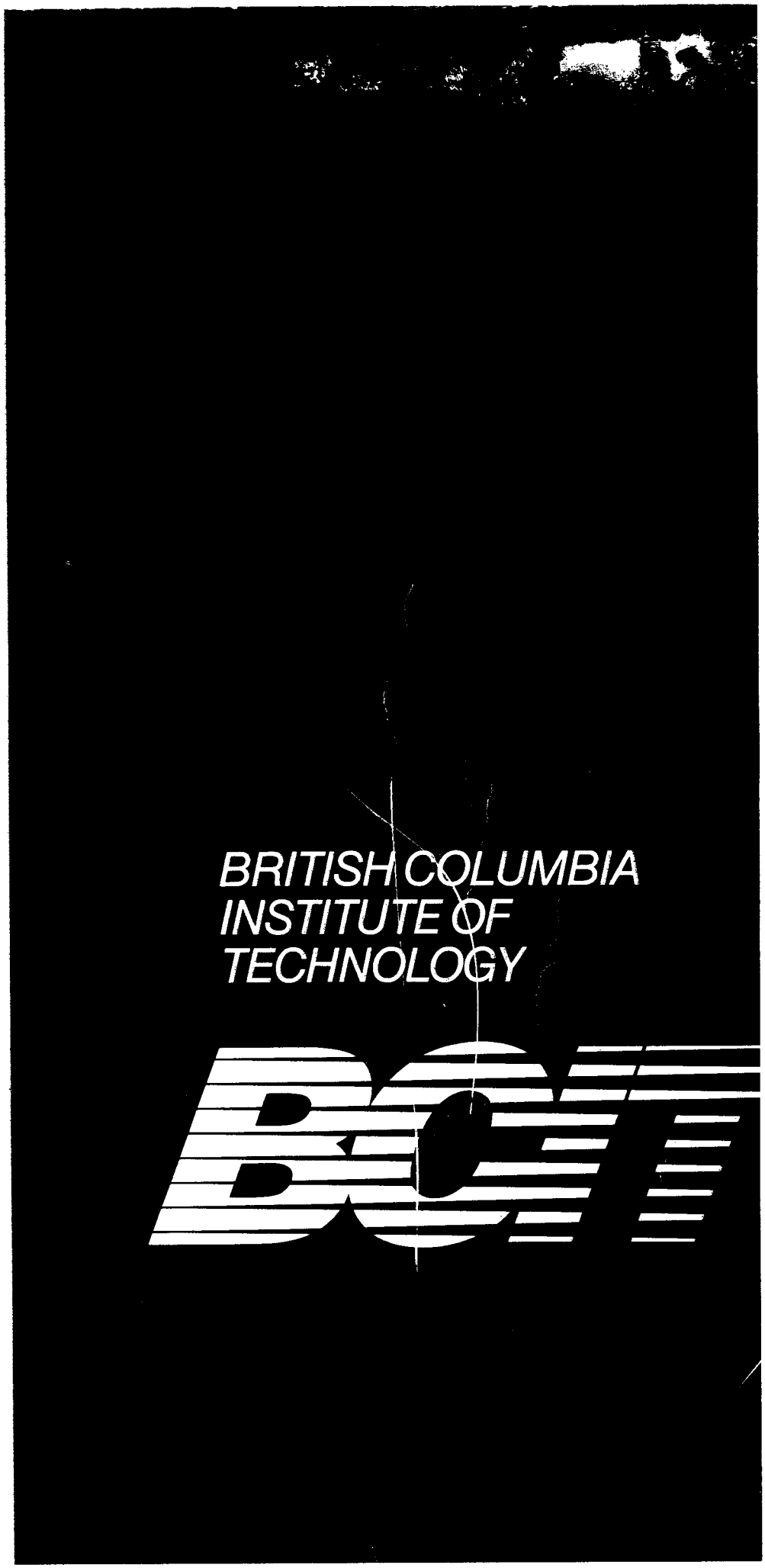


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President's Message

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The British Columbia Institute of Technology is on the threshold of an exciting new future, one which many of you hopefully will wish to share.

On April 1 1986, the well known and respected Pacific Vocational Institute and former British Columbia Institute of Technology were amalgamated as part of a long range plan by the provincial government to strengthen technological development. The new institute — BCIT — has been given a mandate to expand and revitalize its program profile, and to forge partnerships in training for British Columbians.

BCIT now offers a wide range of programs through the Schools of Health Sciences, Management Studies, Academic and Vocational Studies, Construction and Natural Resource Studies and Computing and Electro-Mechanical Studies. Links between these programs and to other institutions will enable us to offer a network of training opportunities to individuals desiring to develop careers that keep pace with the changing technological needs of today's work place.

We are forging partnerships in training with industry for apprenticeship and journeyman training and for co-op education, with universities for research and technological transfer and with colleges for post diploma programs. Over the coming months, we also plan to create an environment at BCIT where applied research can benefit our faculty and students as well as the businesses and industries we serve. With these ambitions, BCIT will become like no other learning institution — a unique experience from start to finish for all those who choose our programs. Opening this calendar may be, for you, the beginning of that unique experience.

Roy V. Murray

ROY V. MURRAY,
P.Eng.,
President

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General Information

Campus Locations

1. Burnaby, Main Campus — Full-time and Part-time Technology and Trades Courses and Programs

   3700 Willingdon Avenue
   Burnaby, B.C.
   V5G 3H2
   434-1610

   Office Hours — From late August to early December and early January to late April:
   0830–2030 Monday–Thursday
   0830–1630 Friday
   0830–1230 Saturday (except holiday weekends)

   Consult our advertising supplements for details of special evening opening hours.

2. Downtown Education Centre — Part-time Studies Technology Courses only

   549 Howe Street
   Vancouver, B.C.
   V3C 2C6
   687-4666

   Office Hours — When school is in session:
   0830–1830 Monday–Thursday
   0830–1630 Friday
   Otherwise 0830–1730 Monday–Friday

3. Surrey — Part-time Studies Technology Courses only

   Princess Margaret Senior Secondary School
   12870 72nd Avenue
   Surrey, B.C.
   V3W 2N1

   NOTE: While the Burnaby main campus and Downtown Education Centre offer year-round registration service for part-time studies courses, the Surrey location has limited registration services. Please see our advertising supplements for registration and course details for this location.

4. Maple Ridge — Trades courses and programs only

   Box 3000 (248th Street)
   Maple Ridge, B.C.
   V2X 8L3
   462-7131

5. Sea Island — Trades Avionics courses and programs only

   Vancouver International Airport (South)
   4440 Stark Street
   Richmond, B.C.
   V7B 1A1

Personal Data

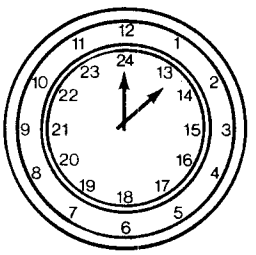
It is the student's responsibility to ensure all personal data on file with the Registrar's Office is accurate.

Refund Deadline

It is the student's responsibility to check the refund deadline dates. This information may be obtained at the information or registration areas in the Registrar's Office.

BCIT uses the 24-hour clock

0001–12:01 AM
0100–1:00
0200–2:00
0300–3:00
0400–4:00
0500–5:00
0600–6:00
0700–7:00
0800–8:00
0900–9:00
1000–10:00
1100–11:00
1200–12:00 noon



1300–1:00 PM
1400–2:00
1500–3:00
1600–4:00
1700–5:00
1800–6:00
1900–7:00
2000–8:00
2100–9:00
2200–10:00
2300–11:00
2400–12:00 midnight

Conduct and Attendance

It is assumed that all students enrolled at the British Columbia Institute of Technology are interested in pursuing an intense program of studies and that they are prepared to conform to all regulations.

1. Students are expected to conduct themselves in exemplary fashion at all times and pay diligent attention to their studies. If the School Dean or the Registrar believes a student's conduct is such that it is detrimental to the interests of the Institute, a recommendation may be made to the President to exclude the student from further attendance. The President has the final power to suspend or expel a student for disciplinary reasons, subject to the student's right to appeal this decision to a committee designated by the Board of Governors. A student who has been expelled or suspended for misconduct will not be admitted to the Institute grounds or buildings.

2. The Institute is not responsible for debts incurred by student organizations.

3. If through carelessness or negligence, a student damages Institute property, the student will be held responsible. If the damage is caused by students whose names are not known, the cost of repairing the damage may be assessed equally among all students enrolled at the Institute.

4. A student will not be permitted to borrow or remove any apparatus or tools except by written authority of the President or his delegate.

5. General supervision over all forms of entertainment given under the auspices of a student organization comes under the jurisdiction of the President.

6. It is the policy of BCIT to rely on the judgement of students to maintain a reasonable standard of dress and appearance. The choice of dress is left to the individual student, subject to the following considerations:

(a) in some field trips and laboratory situations, safety considerations require that special head gear, shoes or other clothing, and other safety equipment must be worn;
(b) where programs involve regular periods of scheduled experience, in industry or hospital for example, the student may be required to wear a uniform or otherwise dress himself/herself in the appropriate manner acceptable to the affiliating agency.

Based on experience to date, BCIT faculty believe that there is a positive relationship between general dress standards and employment of graduates. Faculty are prepared to advise students in the area of acceptable attire.

7. Regular attendance in lectures, seminars and laboratory periods is required of all students. If a student is absent for any cause other than illness for more than 10% of the time prescribed for any subject, he/she may be prohibited from completing the course. In case of illness or other unavoidable cause of absence, the student should communicate immediately with his department head, stating the cause of absence. Special regulations governing attendance in clinical experience areas are prescribed by the School of Health Sciences.

Academic and Administrative Personnel

R.V. Murray, C.D., B.Eng., M.Eng., P.Eng., President
D.J. Svetic, P.Eng., Vice President, Education
D.M. Macpherson, C.A., Vice President, Finance
L.T. McNeely, R.I.A., Vice President, Administration
P.W. Jones, Ph.B., Ph.L., Ph.D., Vice President, Student Services and Educational Support
H. Arthur, B.A.(Hons.), M.A., Dean, School of Academic and Vocational Studies
B. Gillespie, B.Sc., M.Sc., Ph.D., Dean, School of Health Sciences Studies
R. Hyde, B.S.A., M.Sc., P.Ag., Dean, School of Construction and Natural Resource Studies
J. Kyle, B.A., M.B.A., Ph.D., Dean, School of Management Studies
R. Sterne, B.A.Sc., P.Eng., Dean, School of Computing and Electro-Mechanical Studies
R. Bell, Director, Personnel/Employee Relations
D. Hickman, MAIBC, FRAIS, Director, Physical Plant
H. Hyde, B.A., M.A., Coordinator, Student Services
B. Copping, M.D., B.Sc., M.Sc., Director, Medical Services
P. Pick, B.A., M.L.S., Institute Librarian
J. Mitchell, Director, Recreation and Athletic Services
R. Curtis, B.Comm., M.B.A., R.I.A., Director, Learning Resources
G. Lloyd, B.Sc., Director of Development
N. Andrew, C.G.A., Director, Financial Services
W. Hepple, Director, Material Management
V. Karpinsky, B.A.(Hons.), Director, Student Housing
I. Nash, B.A., M.A., Manager, Bookstore
M. Mazziotti, Dipl.T., Registrar

Board of Governors

As of June 1985 the following members have been appointed as members and constitute the Board of Governors:

Chairman:
Malcolm C.J. Wickson, B.Comm., LL.B.
President
Mal-Cam Properties

Vice-Chairman:
Fleming Sondergaard
General Manager
Collins Manufacturing

Rose-Mary L. Basham, B.A., LL.B.
Partner, Mawhinney & Kellough
Barristers and Solicitors

Kenneth Frederick Harding
Secretary-Treasurer
Whillis-Harding Insurance Agencies Ltd.

Thomas Edward Kisling
President
Kisling Consulting Ltd.

James L. McPherson, F.C.A.

Frederick George Randall
Business Manager
International Union of Operating Engineers

Thomas A. Simons, P.Eng.
President
H.A. Simons (International) Ltd.
Consulting Engineers

Edward J. Sirney
Sirney & Son Stone Masonry Contractors Ltd.

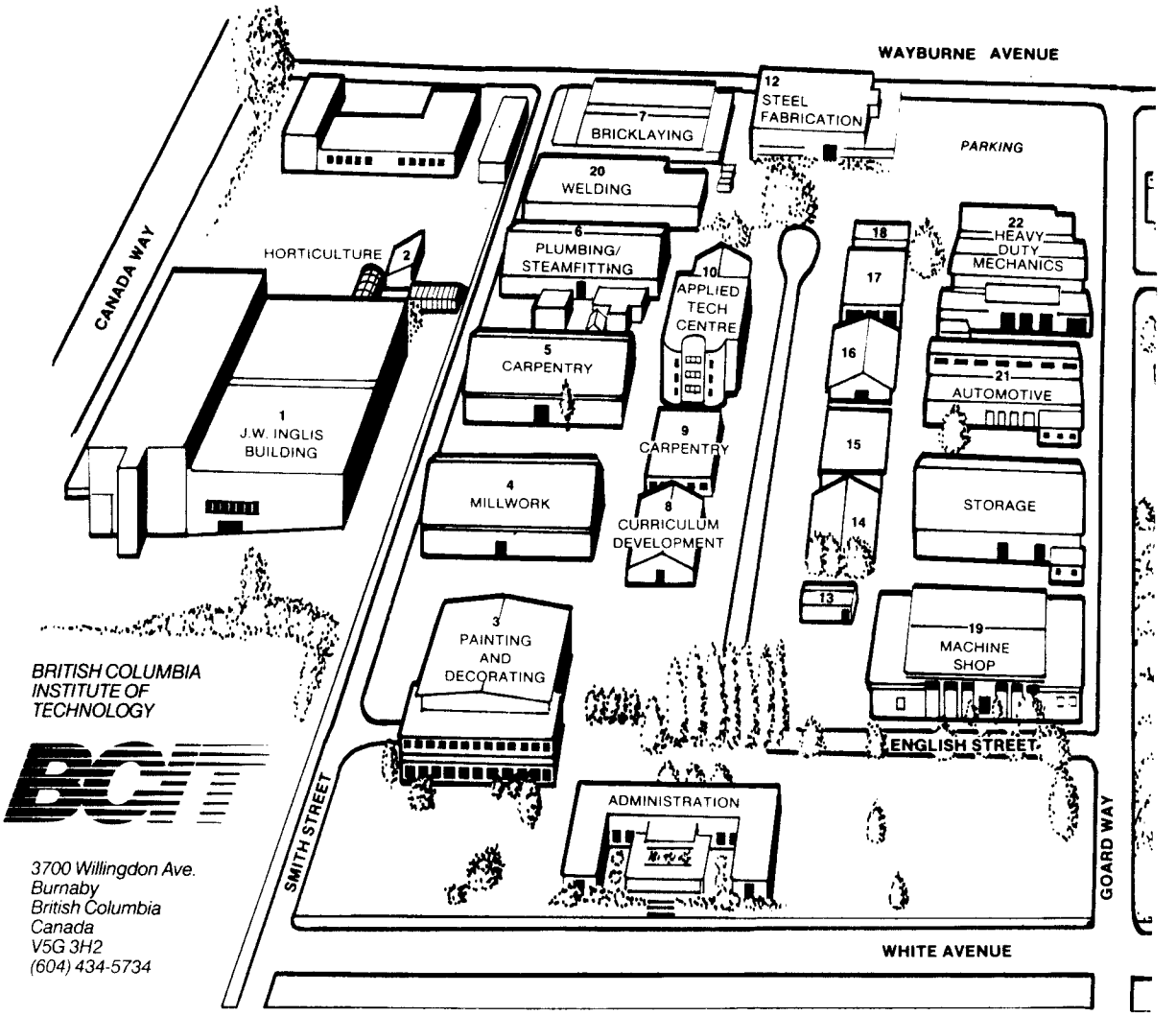
Vinod Sood, B.Sc., C.A.
President and Chief Executive Officer
Finning Tractor & Equipment Company Limited

Carole Taylor, B.A.
CKNW

Edward Arnold Taylor, C.G.A.
Comptroller
Crestbrook Forest Industries Limited

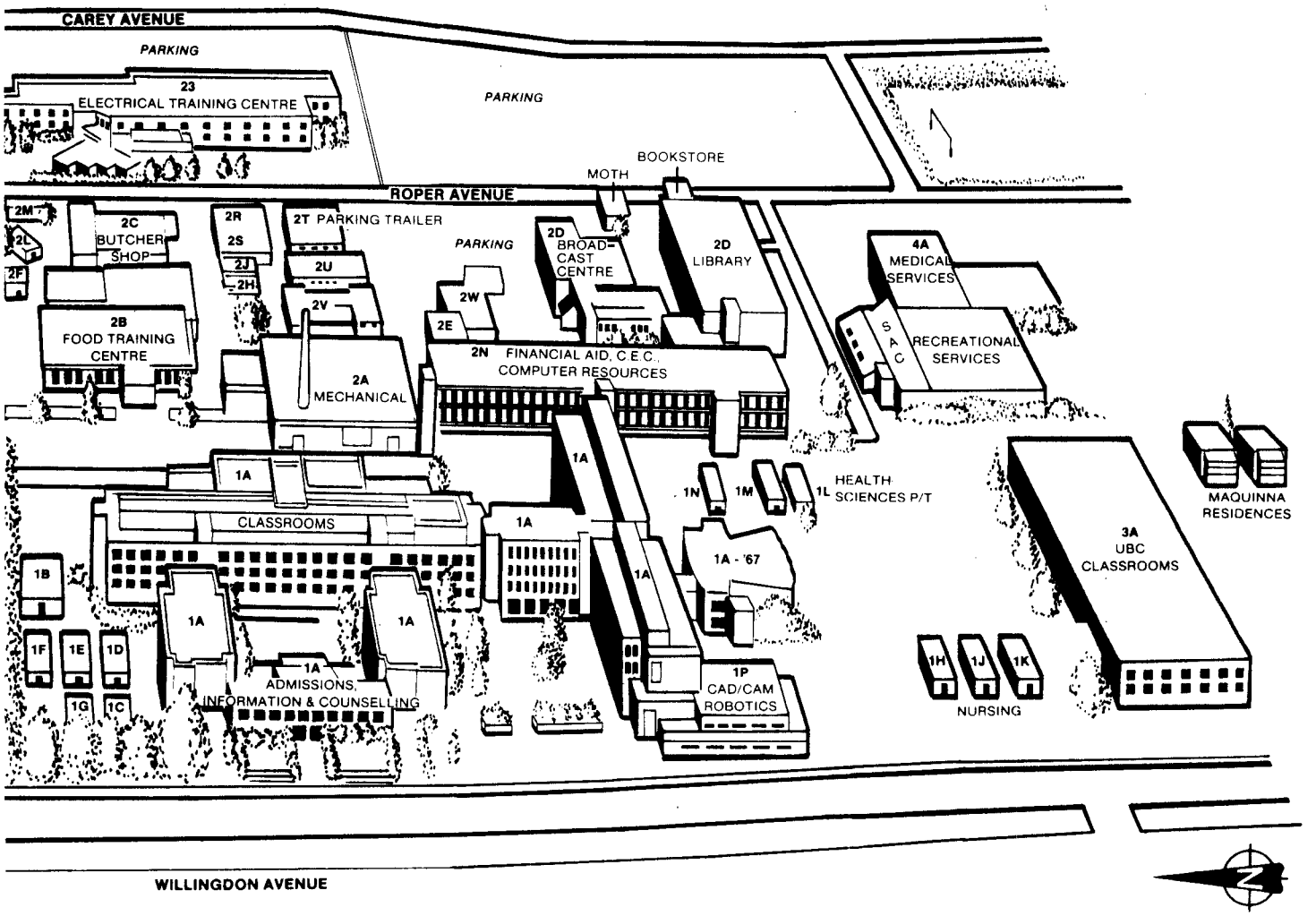
Keith Yorston
Chairman
Q.M. Industries Limited

Secretary to the Board:
Patricia Maertz



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CAMPUS MAP



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Student Services

Counselling

The Counselling Services centre offers a free and confidential career counselling service to all current and prospective BCIT students. Professionally trained counsellors will assist students in selecting a career, making a career change, re-entering the work force, or adjusting a career to fit a chosen lifestyle.

Current and prospective students are invited to drop in to the Career Resource Centre in the counselling office to view slide and tape presentations of various BCIT trades and technologies, or to pick up brochures on each trade and technology. There are reference materials to assist you in your educational and lifestyle planning as well as calendars from other Canadian and U.S. post-secondary institutions and universities. There is also a special section devoted to women's issues.

Counselling Services, in conjunction with Part-time Studies, offers several Career Search Workshops during the school year. These workshops are four sessions (12 hours) long and are designed primarily for prospective students who have been in the work force at least two years. Participants examine their career paths and lifestyles in terms of direction and personal satisfaction. Registration for Career Search Workshops is handled through Part-time Studies. For more information call 432-8204 or 432-8205.

BCIT students may receive assistance in overcoming blocks to successful educational performance to optimize learning efficiency and effectiveness. Supportive counselling to BCIT students during times of stress or change is also available through Counselling Services. It may take the form of direct service to the student or referral to the appropriate campus service or community agency.

The Special Needs Counsellor provides persons with disabilities and special needs with career, educational and personal counselling assistance. The Special Needs Counsellor also coordinates services for these students and facilitates their participation in training.

The Women's Access Consultant assists enrolled and prospective women students to access and participate in nontraditional trades, technician and technology training.

For further information about any of the counselling services at BCIT, contact the Counselling Services centre in room 205, building 2N, or telephone 432-8327. The centre is open Monday to Friday, 0830-1630, September to June and 0800-1600 July and August. (subject to change)

Prospective students should make appointments to attend the group information sessions.

Counselling Staff

Stu Gibbs, B.A., M.S.Ed.
Dr. Norma Hawkes, B.A., M.Ed., D.Ed., Unit Coordinator
Heather Hyde, B.A., M.A., Student Coordinator
Howard Peto, B.S.A., M.Ed.
Special Needs Counsellor
Women's Acess Consultant

Program Advising

PROGRAM ADVISORS are available for information about courses, learning opportunities and career opportunities for both full and part-time studies at all Institute locations. Appropriate referrals may be made in order to best serve students' needs. The Career Resource Centre is available to assist students with program brochures and additional career and occupational information.

Advisors may be seen by appointment or on a drop-in basis, in addition to telephone enquiries.

We are located in the STUDENT SERVICES division, Burnaby and Maple Ridge, where we look forward to hearing from you by telephone, mail, or in person. Students outside the lower mainland may reach us by using the **HOT LINE, 1-800-242-0676.**

Program Advisors

Raelene Rowe, B.A., Coordinator

BURNABY

Ann McNaughton, Program Advisor
Anne Bullinger, Program Advisor
Paul Fortier, B.R.Ed., Program Advisor

MAPLE RIDGE

Pat Awarau, B.A., Program Advisor

PART-TIME STUDIES

Chris Lloyd, Dipl.T., Program Advisor
Marvin Woolley, A.Sc.T., Program Advisor

Financial Aid and Awards

The most important point to remember when considering educational finances is to plan ahead. For this reason you are urged to investigate the financial assistance programs available, and explore other options well before the start of a new school year.

How Much Will It Cost

The first step in determining your total financial picture is to calculate resources and expenses. In addition to tuition fees and book/supply costs, single students not living with their parents can expect to spend approximately $600.00 per month on living expenses. It is important that costs such as rent, food, utilities, transportation, clothing, laundry and entertainment are taken into account. To estimate total resources, you should consider such items as savings, parental contribution and part-time earnings while attending school.

If your estimated expenses exceed your total resources, please consider the following programs and services available at BCIT. (Note: These programs and services are subject to change).

B.C. Student Assistance Program

This government sponsored program is the major source of financial assistance for post-secondary students. The maximum assistance a student is eligible for varies according to program length and whether a student is single, married or has dependents. Based on 1985/86 guidelines, the maximum available for a single student or a married student without children is as follows:

PROGRAM/YEAR LENGTH (WEEKS)	CANADA STUDENT LOAN MAXIMUM	B.C. STUDENT LOAN MAXIMUM	TOTAL LOAN MAXIMUM
12	$1260	$ 750	$2010
18	$1890	$1125	$3015
22	$2310	$1375	$3685
30	$3150	$1875	$5025
36	$3780	$2000	$5780
43	$4515	$2000	$6515
52	$5460	$2000	$7460

The maximums for single parents and married students with children are slightly higher. *Please note:* These figures are maximums — the amount a student actually receives is determined by an assessment of their financial circumstances. Students who require funds at the beginning of the program/year should apply at least 3 months before the start of classes.

Work Study Program

The Work Study Program is a government sponsored program designed to provide on-campus, part-time work for students in financial need. This program is intended for students whose financial needs cannot be fully met by the B.C. Student Assistance Program, or for those who wish to reduce the amount of their student loans. Many of the positions provide career related work experience, and the hours are generally flexible so as not to interfere with classes. Positions are posted at the Canada Employment Centre beginning in the second week of September.

BCIT Bursaries

BCIT bursaries are non-repayable awards ranging from $100 to $1,000. They are made possible through contributions from private companies, organizations and individuals to the BCIT Scholarship and Bursary Fund. A description of available bursaries can be found in the booklet "BCIT Student Awards and Financial Aid", copies of which may be obtained from the Student Services Reception desk.

To be considered for a bursary, students must demonstrate financial need and have satisfactory academic standing. In some cases consideration is also given to the student's services to BCIT and/or the community. Technology students cannot apply for a bursary until they have successfully completed one term at BCIT. An application must be submitted with the normal deadline being the third week in January. Vocational students must also complete an application to be considered for bursaries. The deadline is the 29th of each month.

BCIT Scholarships

Based on first year performance, scholarships are presented to full-time technology students entering second year. Presentations are made at the October Scholarship Ceremonies. These awards are automatic with no application necessary. A complete list of scholarships can be found in the BCIT Awards and Financial Aid booklet.

Emergency Loans

Short-term, interest-free emergency loans are available, in some circumstances, to assist students in meeting essential living and educational expenses. Students are expected to have exhausted all other possible financial resources, including family loans, before being considered for an emergency loan. These loans are normally granted to students who are able to repay them from a specified source within a short time period.

For further information, telephone 432-8327 or visit the Student Services Reception desk on the second floor of the 1A Building (front wing).

Staff

Jennifer Orum, B.Ed., M.A., Coordinator
Cathy Schweers, Advisor
Angie Chan, Senior Financial Aid Assistant
Hanne Logan, Financial Aid Assistant
Mary-Ann Moysiuk, Financial Aid Assistant

Library Services

The BCIT Library system consists of the main library, three branch libraries, and learning centres. The library is one of the province's major centres for technological information, serving curricular needs of the Institute as well as providing general support to business and industry in British Columbia. Library holdings include over 200,000 volumes of books, periodicals, pamphlets, maps, microcomputer software, films, videos and kits. Major strengths are found in the collections of technical reports, standards, and Statistics Canada. The listening and viewing area of the main library houses preview booths, slide tape units, video monitors, microform viewers and microcomputers.

The 2-year programs provide five hours a week for library use and research. Professional staff give instruction in library research skills. The opportunity to become familiar with key information sources in a chosen field assists students not only in completing course assignments but also in facing the challenge of keeping current in a changing work environment. As well as individual and group instruction, there are printed guides to various information sources, facilities and services.

BCIT students use computer terminals in the libraries to access DOBIS, the complete on-line catalog of holdings. This is the first integrated on-line library system in the province to serve an academic community.

A courier service delivers library materials between Maple Ridge, Sea Island, and the Burnaby campuses.

Learning/testing centres are located at the two Burnaby campuses and at Maple Ridge for students in competency-based learning programs.

Quick Facts about the Library Services Division

Library Hours:

September — May (subject to change)

Main Library
Monday–Thursday 0730–2230
Friday 0730–1800
Saturday and Sunday 1000–1800

Maple Ridge and Inglis Libraries
Monday–Friday ..... Check for times
Summer hours vary ..... Check for times

Learning Centre hours: (subject to change)

South Campus, Burnaby
Monday–Friday 0700–1700

North Campus, Burnaby,
Monday–Friday 0800–2000

Maple Ridge
Monday–Friday 0730–1530

Book Replacement Fee

A non-refundable fee is levied for overdue material that is not returned. The fee covers the purchase and processing of a replacement copy and is payable to the BCIT Finance office No statement of marks, diploma or certificate is issued until the student settles all financial obligations for overdue material. Overdue loans result in the blocking of further loan transactions.

Faculty and Staff

Paula C. Pick, B.A., M.L.S., Institute Librarian
Margot Allingham, B.A., M.L.S., Reference Librarian
Sheila Ferry, B.A., B.L.S., Reference Librarian
Frank Knor, Dipl.T., B.Ed., B.L.S., Multi-campus Coordinator
Merilee MacKinnon, B.A., M.L.S., Head Cataloguer/DOBIS Project Leader
Robert A. Roy, B.A., M.A., B.L.S., Public Service Coordinator
Gerry Weeks, B.A., M.L.S., Information Service Coordinator
Nini McPhail, Inglis Library
Lillian Dueckman, Maple Ridge Library
Rae Higuchi, Learning Centres Coordinator

Medical Services

A three-bed Medical Services unit, located in the Student Activity Centre, is staffed by physicians and nurses Monday through Friday, 0830 — 1630, and offers the same services as any doctor's office. A doctor is on call after hours, and Burnaby Hospital is ten minutes from campus. A psychiatrist and physiotherapist are also available. All visits are strictly confidential.

All patients who wish to see a doctor must have valid medical coverage and B.C. students can either have their own coverage or, if under 25, apply to remain on their parents' plans. Out of Province students may use their own Provincial Health Plans. Foreign students studying on student visas must arrange for private medical insurance. Application forms for the Medical Services Plan of B.C. (and information on premium assistance for eligible, low-income students), and application forms for private medical coverage are available in Medical Services. Emergencies are always seen.

Some medication is dispensed free of charge and most immunizations are free. Prescribed allergy shots can be given. There is no dentist on staff, but Medical Services can usually assist with dental referrals.

No appointment is needed to visit Medical Services except in the case of a complete physical examination. Referral to either the physiotherapist or the psychiatrist is through Medical Services or your own physician. The physiotherapist's office is adjacent to the Medical Services facility. For more information on Medical Services please visit us or call 432-8608.

Staff

Barbara E. Copping, B.Sc., M.Sc., M.D., Director-Physician
David Mullard, M.D., B.S., Physician (part-time)
Jacqueline Hurst, B.Sc., M.D., Physician (part-time)
David Fung, M.B., B.Ch., F.R.C.P(C)., Psychiatrist (part-time)
Ralph, Wyatt, B.A., B.S.R., Physiotherapist
James Morrow, R.N., Nurse
Shirley Tempest, R.N., Nurse (part-time)
Millie Linnen, R.N., Nurse (part-time)
Joan Barrett, Secretary
Carol Braden, Medical Office Assistant

First Aid

First aid attendants are on call as follows:

Burnaby North Campus
Monday–Friday (Attendant located in Building #22)
0700–1630 ..... Call local 8872
1630–2200 ..... Call voice pager 680-3168 wait for beep tone then give message
Saturday (Attendant located in Building #20)
0830–1230 ..... Call local 8845

Burnaby South Campus (Attendant located in Building 4A)
Monday–Friday
0830–1630 ..... Call local 8608 or 5609

Note: After 1630 Monday-Friday and Saturday call north campus attendant as above.

When first aid attendants are on duty:

(a) If injury or health problem is life threatening or if patient is otherwise immobile:
(i) Call attendant as above giving precise location of patient,
(ii) Call ambulance at 872-5151 advising them to enter the campus via Willingdon/Goard Way,
(iii) Call security — pager #735-5201 — wait for beep tone — give location of patient and request security to meet ambulance at Willingdon/Goard Way entrance and escort ambulance crew to patient.
(b) If patient is mobile, escort to first aid attendants at above locations.

When first aid attendants are not on duty if injury or health problem is life threatening or if patient otherwise requires medical treatment, call ambulance at 872-5151.

Maple Ridge Campus
Monday–Friday 0730–1530

Sea Island Campus
Monday–Friday 0800–1600

Housing

The BCIT Housing Office can help you find housing and urges you to begin your search as soon as you have been officially accepted.

Students enrolled in long-term programs are eligible to apply for accommodation in the Maquinna Residence, which opened in September 1978. Students enrolled in short-term or long-term programs are eligible for accommodation in Redford House, or may prefer to live in private housing in the community.

Maquinna Residence

Located on campus, a short walk from classes, the Maquinna Residence consists of seven low-rise, split-level houses with a total of 336 beds and common cooking and living facilities. Parking and administrative services are also provided.

Six single study-bedrooms, carpeted and comfortably furnished with bed, desk and bureau, are located on each floor and share individualized washroom facilites. Two floors share a kitchen, dining area and living room. The common kitchen area includes three refrigerators, two stoves, two sinks and adequate cupboard space. Each house has separate laundry and storage facilities.

Each house accommodates 48 people and has a Residence Adviser's apartment. Houses accommodate students on an all-male, all-female or co-educational basis. BCIT does not currently have accommodation for married students, and/or students with dependents.

Redford House

Located in Burnaby, approximately 3 kilometers from the Burnaby Campus, Redford House accommodates students in a high-rise facility, in a combination of single and double rooms. Each room is comfortably furnished and contains a private washroom. Redford House does not provide students with cooking facilities. A dining room in Redford House, cafeteria services on-campus, and restaurants nearby provide meal services.

How to apply for Residence Accommodation

Maquinna Residence. Students from outside the Vancouver Lower Mainland applying for Maquinna Residence accommodation commencing in September are given first priority for residence accommodation. After the Labour Day weekend, geographic origin is not a factor in admissions. First year students receive a residence application form following notification of acceptance from the Admissions Department. The residence application form should be completed and returned to the housing office immediately. Applicants will be informed of their status by early July. Only long-term students are eligible for the Maquinna Residence.

Redford House. Long-term and short-term students are eligible to live in Redford House. Students may apply by letter or telephone. Preregistration is essential to ensure that a room is available.

Off-campus housing

Since residence accommodation is limited, most BCIT students live in off-campus housing. BCIT compiles a list of accommodation offered by residents in surrounding communities, and has established a regular resource of off-campus housing for students. Maps, general information, listings and a telephone service, are available for use in the Housing Office during the week, with some weekend service during late summer. To check weekend hours, please contact the housing office by mail or telephone. The off-campus housing service is available on a year-round basis

Transit

The BCIT campus has frequent bus service everyday, with several routes providing direct access to the campus. Also, the Sky Train rapid transit service is a short bus ride from the campus and Redford House. Monthly transit pass costs vary according to distances travelled and are available from "This'n That" stores on-campus.

For information about bus routes, fares and schedules within the Greater Vancouver transit system, call the Metro Transit Information line at 324-3211. You can also pick up bus schedules for Greater Vancouver in the Maquinna Residence or Redford House.

Food Services on Campus

The Food Training Centre

In the Food Training Centre, Building 2B, food operations are mainly performed by students in training. Service is available from 0700 in the Snack Bar with breakfast served until 1030 and lunch from 1030 to 1330. The cafeteria opens at 0900 serving lunch from 1130 to 1330. On some days of the week, Hospitality Students operate the dining room with full table service, bar service and a variety of ethnic menus. These days are dependent on training, and information is available at local 5239.

The Bakery

Students in the FTC operate a bakery counter at the entrance where pies, cookies, bread and a wide variety of pastries are offered for sale at reasonable prices. When training needs allow, special cake orders are taken; ask the cashier. Hours: 0900 to 1400.

The Butcher Shop

The butcher shop is another popular shopping place on campus. It is located off the loading dock at the rear of the FTC. Here student butchers cut a wide variety of meats and operate a deli counter. Freezer orders may be placed as well. Hours: 0900 to 1400.

The Campus Cafe

The Campus Cafe, Building 2N Breezeway is open **Monday through Thursday from 0700 to 1000** for breakfast cooked to order; lunch is served from 1100 to 1330 and dinner from 1600 to 1930. At both lunch and dinner there's a choice of hamburgers made to order; pasta bar with choice of 4 sauces and 3 pastas; fresh fruit health bar; salad bar and the never-empty soup corner. The deli-bar offers sandwiches made to your order: seven kinds of bread, croissants, pita bread. In fine weather, the patio area has umbrella tables for outdoor eating. In the Campus Cafe there is a large non-smoking area and the surroundings are made pleasant by dozens of hanging plants. On **Friday** there is no evening service and **closing time is 1530.** On **Saturdays** the Campus Cafe opens for breakfast **from 0800 to 1000 and for lunch from 1100 to 1330;** coffee and snacks are available from opening to closing. The Campus Cafe is operated by Campus Food Services, BCIT. Questions may be addressed to the manager, Tony Spotzl, at local 8819.

Night School Service

Mobile coffee service is available in buildings 1A and 2N, Monday through Thursday from 1915 to 2015, for the convenience of those attending night classes.

Redford House

At Redford House cooking students and instructors operate the Culinaire Dining Room. This is an attractively appointed dining room featuring gourmet food, full table service and full bar service with an extensive wine list. Redford House is located at 1850 Rosser Avenue, one block west of Brentwood Mall. Breakfast, lunch and dinner are served Monday through Friday. Please call 298-8260 for reservations and information.

Growlies

The Student Association operates "Growlies" at the SAC serving a variety of salads, sandwiches and hot foods. Vending machines are located at several points around campus. These services are available from September to the end of June. The summer schedule is not confirmed at time of printing.

Catering Service

Campus Food Services offers catering service to meetings, dinners and all campus related functions. Call local 8819 for information.

Parking

All vehicles parking on campus, day or night, must display a valid Institute parking permit. Paid parking is in effect 24 hours, year round. Parking and traffic is administered and controlled by the Safety and Security Department, Building 2T, phone 432-8719. Parking Office hours are 0800-1600 Monday to Friday. Improperly parked vehicles or vehicles not displaying valid permits are subject to impoundment off campus at the owner's risk and expense. License numbers of impounded vehicles are posted at the entrance to the parking office, Building 2T, together with the name and location of the towing company. Persons parking on campus are encouraged to read the Parking and Traffic Regulations available at the parking office. Vehicles should be kept locked at all times. BCIT does not accept liability for theft from, or damage to, vehicles parked on campus.

Parking permits can be purchased at the parking office 0800-1600, Monday-Friday, year round. Sales of parking permits at other times will be announced in the campus media.

Handicapped Parking

Special parking arrangements are available by contacting the parking office.

Parking Violations

To avoid vehicle impoundment, please note the following: ensure that a valid permit is displayed at all times while parked on campus day or night; park only in areas authorized by permits; do not park in fire lanes, blocking fire hydrants, along yellow curbs, on roadways or anywhere not designated for parking or that impedes free traffic flow/pedestrian safety; do not block off another parked vehicle; do not use parking permits fraudulently.

Vehicle Assistance

Vehicle breakdowns or other problems should be referred to security staff who will assist if possible.

Bookstore

The BCIT bookstore is located at the south end of the campus on the ground floor in the south east corner of the Building 2D. It sells required textbooks and educational material for BCIT courses. Textbook lists may be consulted in the bookstore. In addition to textbooks, an extensive selection of school, drafting, engineering and computer supplies as well as paperbacks, bestsellers, magazines and sportswear are available. Personal computers may be purchased at special educational prices by full-time students. Special orders for books may be placed. The bookstore is open from 0800-1600 hours throughout the year, Monday to Friday. Extended hours of operation are offered at the beginning of each term. A schedule of dates and extended hours is posted in the bookstore prior to the commencement of each term.

Textbooks and educational material for courses at the Downtown Education Centre are available at the bookstore outlet at that location. Telephone 687-4678 for hours of operation.

Used Textbooks

The BCIT bookstore schedules used book buy backs each term. Textbooks required for that term are purchased from students for up to 50% of the current new book prices. Buy back dates are posted around the Institute a few weeks prior to the event.

Placement

The Canada Employment Centre is located in room 204 of the 2N building. The office is open between 0830-1630, Monday through Friday, throughout the year.

The Centre provides a job placement service to diploma and certificate program graduates as well as summer and part-time job listings for undergraduates. Alumni may use the centre for up to two years from graduation.

To assist new diploma graduates, the Centre provides an on-campus recruiting program for employers to interview students for career positions prior to graduation.

As well as job placement, the Centre also provides:

- labor market information
- company information
- job search techniques
- assistance with resumes and interview preparation.

For students who require a tutor, a registry of peer tutors is maintained.

Telephone: 432-8333 for more information.

Staff

Bev English, Dipl.T., Branch Manager

Recreation and Athletic Services

BCIT offers a variety of indoor and outdoor recreational facilities designed to appeal to most students. These include four racquetball/handball courts and two squash courts; an excellent gymnasium accommodating eight badminton, two basketball and three volleyball courts, which is also used for many other sports and recreational activities. Our activity room is equipped with a universal gym, free weights, exercise area, table tennis, ballet barre and much more. Four tennis courts, two sports fields, a fitness trail and exercise stations, as well as a 396 metre track offer excellent outdoor recreation. Complete shower facilities, change and locker rooms for both men and women are included.

Hours of Operation

September — May:

Monday–Thursday	0645–2300
Friday	0645–2100
Saturday and Sunday	0900–2100

June — August:
to be announced.

Facility hours are subject to change, check the weekly schedule posted outside the Recreation and Athletic Equipment office.

Facilities and Services — How to Use Them — All students, staff and alumni are encouraged to use the recreation facilities. Lockers, towel and laundry services are available to rent. Most equipment is provided on loan; current BCIT identification is mandatory. There is a nominal rental fee for balls, birds and racquets. There are many structured programs to participate in as well as plenty of recreation time when the gym is available for your own activity. Check the facility schedule for open and programmed time.

Guests — Students and staff may bring one guest into the facility at any time. Guests cannot sign out equipment and are asked to follow the facility regulations.

How Trades or Technologies Can Book the Gym — Gym time is available three to five specified periods each week; BCIT groups can book half the gym. This program is known as challenge bookings and is set up so groups can get together and enjoy a recreation activity of their choice.

How to Book Badminton, Tennis and Table Tennis Facilities — Bookings are made on a first-come, first served basis with no charge for court time. You must check in and book the court at the equipment office. (No pre-booking allowed, 45 minutes court time limit).

How to Book Squash and Racquetball Courts — How often can I book? Seven full days advance booking per person, Monday through Sunday. Initial and last name must be given for all bookings. Student and staff bookings may be made by calling 432-8612 or in person. A current BCIT library card or BCIT picture ID card must be shown when you pay. Alumni may book in person or by telephone. General public may book courts in person or by telephone.

Payment of Court Fees — All fees must be paid prior to court use. Current BCIT ID must be presented in order to get the student rate. Players are required to check in at the Equipment Office prior to using the courts. A 10 minute grace period is provided for players to claim their courts. If left unclaimed, they may be resold to someone else, unless prepaid. Players must vacate their courts at the end of the specified booking period whether the game has ended or not. Failure to observe court courtesy rules will result in loss of playing privileges. Recreation and Athletic Services reserves the right to book court times for private lessons.

Facility Regulations — The Recreation and Athletic Services staff are responsible for the facility. **Smoking is not allowed in any part of the recreation facility.** Alcoholic beverages, including beer and wine, will not be allowed in the recreation facility unless approved by the Institute's chief executive officer and the appropriate permits obtained. Proper attire and accessories, shorts and shirts or sweat suits are highly recommended and clean, non-marking gym shoes (white soles preferred). Safety eye protection is highly recommended while playing squash or racquetball.

Recreation and Athletic Services — Is here to assist you in planning your leisure time. Fitness activities and leagues are scheduled around your academic programs. If you have a special interest that does not appear in this section drop in or call the Recreation and Athletic Services office located in the lobby of the SAC building, telephone 432-8613.

Intramurals — Leagues for volleyball, indoor soccer, soccer, ice hockey, wallyball, flag football, basketball, squash, racquetball, etc. are organized for school breaks, evenings and early mornings. Watch notice boards and *The Link* for costs and team information.

Clubs — We organize activities such as trips or tournaments for weekends or midterm breaks. Some funding is available to assist in transportation and equipment rentals. Activities pursued by existing clubs include skiing, outdoor recreation, scuba, sky-diving, archery and windsurfing.

Non-credit Courses — Beginner courses in kung-fu, squash, racquetball, jazz dance, golf, aerobic fitness, etc., are on-going during the school year and are subsidized by the student activity fee.

One-day Workshops — Are scheduled on weekends. They include self-defence for women, massage, stress management and various sports.

Kilometre Club — The Kilometre Club is sponsored by the Recreation and Athletic Services Department to encourage students, staff and alumni to keep active and participate in cycling, swimming or running. To become a club member, register at the Recreation and Athletic Services Office, Monday to Friday from 1000-1400. Registration Fee: $3.00 per person/per activity. To be entitled to a T-shirt you must: Cycle 600 km in 4 months, or Swim 30 km in 4 months or run 150 km in 4 months or a run/swim/cycle combination. On completion of the appropriate activity, a T-shirt will be awarded in recognition of your dedication to achieving your goal.

Special Events — Throughout the year, we schedule special events for students and staff to promote fitness and social activities (Bunny Shoot, Challenge games, etc.), also recreational, low skill requirement, invitational and competitive tournaments with students and staff from UBC, SFU, Douglas College, etc. BCIT students are entitled to participate in any program. If you have any other interests that might attract students/staff, drop in or call the campus recreation coordinator 432-8613.

Swimming Pool Tickets — The Recreation and Athletic Services Department makes available pool tickets for the following pools:

Canada Games Pool (New Westminister)	10 tickets/$14.00
C.G. Brown Pool (Burnaby)	10 tickets/$10.00
Bonsor Pool (Burnaby)	10 tickets/$ 8.00

Alumni — Your Willingdon Club membership entitles you to participate individually or as a team in intramural leagues and other events. Contact the Recreation and Athletic office for information on leagues and schedules.

Additional Information — A brochure on dates, times and rules for intramural activities is available from the Recreation and Athletic Services and Equipment office in the SAC.

Extramural Athletics — BCIT, in conjunction with funding assistance from the Student Association, will continue to embark on the gradual re-introduction of an extramural athletic program for the 86/87 academic year.

Badminton	Men and Women
Curling	Men and Women
Rugby	Men
Racquetball and Squash	Men and Women
Volleyball	Men and Women
Soccer	Men
Basketball	Men and Women

We encourage any student wishing to try out for teams to watch for Cougar posters and to inquire at the equipment office for practice times and locations.

Recreation and Athletic Services (Program Office) 432-8613. Equipment Office and Attendants (Racquet Court Bookings) 432-8612.

Student Association

The Student Association is the independent "student union" at BCIT with an annual cash flow approaching $3 million. It provides most of the non-academic services and nearly all of the recreation and entertainment on the campus.

All BCIT students, whether full-time or part-time, automatically become members of the SA upon registration. The student activity fee, which is paid as a small addition to BCIT course fees, goes directly to the SA to help pay for the recreational and social activities provided on campus.

Another portion of the fee goes to pay for the SA's new Campus Centre, a multi-million dollar recreational complex organized and financed entirely by the SA. The Campus Centre is the first independently financed student building constructed in western Canada in twenty years. Phase one, containing squash and racquetball courts, is now complete. Fund raising is underway for two more phases.

Student government began in 1966, two years after the Institute opened its doors. In October 1968, the Student Association was registered in Victoria as a Society under the Societies Act. The Student Activity Centre was built in July 1971 and the first TNT was opened. The SA pub, known as "Taps", is fully licenced and first opened its doors in 1976. In 1978 the SA opened its own food service, Growlies. In 1983 a racquetball centre was built, expanding the SAC building. In 1984 a satellite dish and screen with M.T.V. was installed in the pub. The BCIT and PVI student unions amalgamated in 1985.

The SA holds elections each March to choose 8 of a ten member executive: President; VP Administration and Finance; VP Public Relations; VP Student Affairs; Sport Chairperson; Engineering Society Chairperson; Business Society Chairperson; Health Society Chairperson. In addition 2 students from the Vocational Division of BCIT are appointed to serve on the executive. The executive is responsible for the day-to-day management of the Association's affairs and the spending of its budget. The executive meets regularly with the Student Council consisting of representatives from all the technologies on campus.

The Executive and Council, in addition to managing the SA's internal affairs, are charged with representing BCIT's students to all levels of institutional, municipal and provincial governments. In recent years, this work has included lobbying against tuition fee increases, coordination of the Campus Centre and work with the BCIT administration for efficient and useful student services.

Most of the management of the SA's business operations is entrusted to a full-time professional staff of about 30, which is hired by the executive and reports to business manager Phil Henderson. Linda Field is the TNT stores manager, Mark Coombs is food and beverage manager, Don Wright is manager of the Link area, Janice Eden is the office manager, Patti Kluckner is the accountant, Darren Sureges is Media Services Manager, and a student looks after marketing and public relations.

Activities

The SA funds the Intramurals athletics and clubs program, which provides lunch hour and after class recreation for several hundred BCIT students. Extramurals have returned to BCIT this year. For skiers, the SA has access to a 24 bed chalet at Whistler Mountain, which is available year round to students at a reasonable nightly rent.

The publications department provides The Link, BCIT's student newspaper, printing and binding jobs for students and maintains the SA-owned copy machines.

For the past dozen years, the SA has been a major supporter of the Shinerama Cystic Fibrosis fundraising campaign held each September, during which students shine shoes for donations around the Lower Mainland. Students are also organized to help with the Variety Club Telethon each February. Over a quarter of a million dollars have been donated to charities in Vancouver by BCIT students.

Video game addicts find a well equipped games room in the SAC Building. Student travellers can obtain discount charter flights through the SA's Association of Student Councils affiliation.

BCIT's Student Association deserves its reputation as "the best organized student union in western Canada".

There are four *"This and That"* stores on campus; Store #1, on the ground level of the 2N Building, features school supplies, calculators, clothing, photo finishing, special class needs including tapes, floppy discs, technology jackets and drafting supplies; bus passes, newspapers, munchies, gift items and a whole lot more. Store #2, located in the north foyer of the 1A Building, has nearly everything listed above plus coffee, ice cream, and popcorn. Store #3, located in the SAC, specializes in clothing and sporting goods and, for your every day needs; cigarettes, pop, munchies, newspapers and school supplies. #4 store, located in the north campus Inglis Building, features the same items as above.

Also located in the Inglis Building is a resume service and an employment action centre designed to aid the north campus students in their employment search.

Etcetera

The Institute and the Student Association offer many services and amenities which make student life more interesting and enjoyable.

Lost and Found

Refer enquiries to Safety and Security, 432-8878.

Lockers

Lockers at BCIT are available to students on a first-come basis, except in technologies with special requirements such as Forest Resources, Surveying and Building. Students should locate an unreserved locker near their technology and put their lock on it. Lockers are situated throughout the Institute on each floor of most buildings. Lockers must be vacated at the end of each academic year, or no later than May 31. The Institute will not accept responsibility for loss or damage to a student's personal property.

Banking

Banking services on campus are available through the Canadian Imperial Bank of Commerce at the north end of the administration building. The branch is well acquainted with Canada Student Loans, so you may choose to negotiate your loan on campus. Out of town students should bring enough money to buy books, pay fees and pay the first month's rent. This can be in the form of a bank draft, travellers cheques, or inter-branch banking can be arranged before students leave their home towns. For your convenience, there is also an Insta-Teller Machine available.

Office of the Registrar

Registration is possible at the various campus sites including Maple Ridge, Sea Island (Vancouver International Airport), The Downtown Education Centre (Downtown Vancouver), and Surrey. However, Burnaby is our main campus and primary location for processing applications and maintaining permanent student records.

The Office of the Registrar operates under Institute approved policies and procedures. This information is available at all locations.

Alumni Association

Alumni Executive:

President:	Mr. John Leech (Survey '70 and '71)
Vice President:	Mr. Ron Kuebler (Financial Management '79)
Secretary:	Ms. Nicki Magnolo (Travel and Tourism '81)
Treasurer:	Mr. Fred Gaier (Financial Management '83)
Past President:	Mrs. Debbie Mitchel (Medical Laboratory '75)

The BCIT Alumni Association provides a vitial communication link between graduates and the Institute. Graduates receive the Alumni News, published quarterly by the Association. The Association acts as the official record keeper for BCIT grads, helps organize reunions and offers a group insurance plan.

A priority of the Association is to extend their membership to include Trades/Vocational graduates who have completed programs of 6 months duration or more, holders of Continuing Education Certificate Programs as well as two year Diploma of Technology holders. Membership requires registration and is free of charge.

Other priorities for the Alumni Association include development of Alumni Branch offices, involvement in the Alumni Fund Raising Campaign, increasing membership and services in the Willingdon Club and establishing an alumni network.

The Alumni Office is located in Trailer 1B. The direct line phone number is 432-8847.

Alumni Executive Director: Nicki Magnolo (Travel and Tourism '81)

BCIT ALUMNI ASSOCIATION REGISTRATION FORM

NAME: ..... PHONE: Home _____

ADDRESS: ..... Work _____

..... POSTAL CODE: _____

PROGRAM: ..... GRAD MONTH/YEAR: _____

Please return to:

BCIT ALUMNI ASSOCIATION — 3700 Willingdon Avenue, Burnaby, B.C. V5G 3H2

Diploma Programs

Office of the Registrar 10

School of Computing and Electro-Mechanical Studies 24

School of Construction and Natural Resource Studies 45

School of Health Sciences Studies 82

School of Management Studies 114

Office of the Registrar

FULL-TIME TECHNOLOGY ADMISSIONS INFORMATION

Admissions Policy

BCIT's primary purpose is to provide high quality, post-secondary technological education for residents of British Columbia and Canada.

Applicant priority is first given to British Columbia residents who are Canadian citizens and landed immigrants and have lived in British Columbia for the immediate twelve months prior to enrolment; second priority is given to out-of-province Canadian citizens and landed immigrants, third priority is given to out-of-country applicants. BCIT does not accept applications from persons on visitors visas.

All applicants must provide documentary proof that they meet the necessary Institute and technology prerequisites. Applicants lacking specific prerequisite courses or adequate grades will be referred for upgrading.

Prompt and equitable attention will be given to all applications to ensure applicants maximum availability of the more than 50 excellent technological programs leading to National Diplomas. In those programs where the number of applications exceed available seats, BCIT will select those students deemed to have the best opportunity for success.

Entry to some programs is possible several times a year. For this information, check "when to apply".

Policy subject to change.

While all prospective students must be at least 16 years of age, there is no upper age limit.

Academic Requirements for Admission

Graduation from a senior secondary school with satisfactory grades, as prescribed by the British Columbia Ministry of Education. In addition, candidates must meet special technolopgy prerequisites. *See* **Technology Prerequisite**, this section, and individual technology sections.

English Language Proficiency

Since all BCIT students are expected to possess an acceptable level of language skill, applicants whose primary language is not English, may be required to demonstrate their competence in one of the following ways:

1. by scoring a minimum of 145 on the Vancouver Community College English Language Assessment Test;
2. by scoring a minimum of 550 on the TOEFL;
3. by completing Academic English 12 (B.C.) with C + or better. English 12 Minimum Essentials is not acceptable;
4. by successfully completing English 099 at Vancouver Community College; or equivalent, or;
5. by individual assessment by the English Department.

To obtain an information bulletin which outlines world-wide test locations and application procedures, applicants should contact: Test of English as a Foreign Language, Box 889, Princeton, New Jersey, 08540, U.S.A.

For those B.C. applicants whose first language is English, who wish to complete the high school Communications program to meet BCIT's English requirement, the following combinations are acceptable for September 1987 admissions:

1. Communications 11 and 12 with a "B" standing in Communications 12;
2. English 11 and Communications 12 with a "C" standing in Communications 12;
3. Communications 11 and English 12 with a "C" standing in English 12.

Where a technology specifically requires a "C+" standing in English 12, this standing is required in 2 or 3 above.

Mature Student

1. A person not eligible for admission under any other category may apply as a mature student.
2. Admission under this category is at the discretion of the Registrar on the recommendation of individual Technology Department Heads. The Department Head must be satisfied that the applicant has sufficiently clear objectives, and can provide evidence of probable success in the technology of his/her choice. The Department Head may, at his/her discretion, require applicants to have an interview or take appropriate tests. Along with their application, applicants must submit a statement of intent outlining their reasons for applying. Enquiries regarding admissions under this category should be directed to individual Department Heads by the Registrar.
3. All applicants intending to take advantage of this admission procedure are strongly advised to contact the Office of the Registrar at least twelve months prior to the expected date of admission.
4. Mature students must submit all supporting documents with their applications.

Second Year Regional College Transfer

BCIT offers transfer programs for various technologies from recognized regional colleges within British Columbia. Further information may be obtained by directing your inquiry to the Office of the Registrar at BCIT.

Direct Entry

Those persons who have successfully completed one or more years of study at a level equal to, or higher than, that of a BCIT full-time day program may apply for direct entry into second or third term/level of a program, providing a seat is available, course content is similar and, in the opinion of the Registrar, the applicant's academic record justifies advanced standing.

Readmissions

Students may interrupt their studies after the completion of any term/level. However, an application form must be completed and submitted to the Office of the Registrar, to request readmission into the Institute.

Part-time Day Courses

Students may register in courses given in full-time programs subject to the approval of the technology head, space being available, and official proof that prerequisites have been met.

A student making application for part-time day classes must obtain the signature of the technology head and the instructor of each course, using the form "Application for Part-time Day Courses" available at the Office of the Registrar. Fees must be paid upon presentation of the completed form to the cashier. Completed forms should be submitted to Student Records, Office of the Registrar for processing.

Technology Prerequisites

School of Management Studies

Administrative Management Systems — Algebra 11 and English 12 both with a C+.

Broadcast Communications — All applicants must be able to type 25 wpm, and submit a short essay, approximately 500 words, detailing reasons for choosing Broadcasting as a career.

Broadcast Engineering — Graduation with a National Diploma of Technology in electronics, or equivalent work experience.

Business Administration — Graduation from a BCIT diploma program or a two year college program in an engineering or health technology, or equivalent.

Computer Systems — At least 6 grade 11 or 12 academic courses (Arts and Science), including English 12 and Algebra 11. For second year options, we specifically recommend Algebra 12 for Management Systems and Physics 11 and 12, and Algebra 12 for Engineering Systems.

Financial Management — Algebra 11 and English 12 with C+. Candidates who do not meet this requirement are to include with their application, a letter (with references) outlining their career objectives and reasons for selecting Financial Management to enable the departmental selection committee to consider their application.

Hospitality and Tourism Administration — English 12 and Algebra 11 both with a C+ standing.

Marketing Management — Algebra 11 and English 12 both with a C+ standing.

Operations Management — Algebra 11 with a C+ standing. Physics 11 is desirable.

Transportation/Distribution Management and International Major — Algebra 11 with a C+ standing. Physics 11 is desirable.

Note: Please refer to page 10 of the Admissions section, if you wish to be considered under the Mature Student category.

SEE PROGRAM DESCRIPTION PAGES FOR INDIVIDUAL PROGRAM NON-ACADEMIC PREREQUISITES.

School of Computing and Electro-Mechanical Studies

CAD/CAM — Algebra 12, Physics 11, Drafting 11.

Computer Systems — At least 6 grade 11 or 12 academic courses (arts and sciences), including English 12 and Algebra 11. Second year options: we specifically recommend Algebra 12 for Decision Systems and Physics 11 or 12 and Algebra 12 for Engineering Systems.

In the case of mature students, academic transcripts may be supplemented by relevant business experience, successful recent completion of relevant BCIT Part-time Studies courses with 75% or successful recent completion of relevant courses at other post secondary institutions with 75%. Candidates may be asked to write an aptitude test to aid in the selection process.

Electrical/Electronics — Algebra 12, Physics 11 and Chemistry 11 all with C+ standing.

Mechanical — Algebra 12 and Physics 11.

Mechanical Systems — Algebra 12 and Physics 11.

Robotics — Algebra 12 and Physics 11 both with C+ standing.

School of Construction and Natural Resource Studies

Building — English 12, Algebra 12 and Physics 11.

Civil and Structural — Algebra 12 and Physics 11.

Surveying — Algebra 12 and Physics 11.

Natural Resources

Biological Sciences — Algebra 12 and Chemistry 11.

Forest Resource — Algebra 11 with C+ standing; a Science 11 (Biology required for Fish, Wildlife and Recreation; preferred for Forestry); and one of Science 11, or a Science or Mathematics at the Grade 12 level.

Natural Resource Management — Graduation from a BCIT diploma program in an engineering or business technology. Baccalaureate degree in Bio-Science, Engineering, Geography or Geology will also be considered.

Lumber and Plywood — Algebra 12 and one science 11 (Biology, Chemistry or Physics).

Mining — Algebra 12, Physics 11 and Chemistry 11.

Natural Gas and Petroleum — Algebra 12, Physics 11 or Chemistry 11.

Chemical Sciences — Algebra 12 and Physics 11.

Note: Please refer to page 10 of the Admissions section, if you wish to be considered under the Mature Student category.

Important

Where an algebra course requirement is specified in Engineering Technology and Health Sciences, please note that Academic Math 12 completed before 1978 is an acceptable prerequisite.

SEE PROGRAM DESCRIPTION PAGES FOR INDIVIDUAL PROGRAM NON-ACADEMIC PREREQUISITES.

School of Health Sciences Studies

Biomedical Electronics and Electrophysiology — Algebra 12, Physics 11 and Chemistry 11 all with a C+ standing.

Diagnostic Medical Sonography — Completion of a two year allied health program such as Radiography, Nuclear Medicine Technology or General Nursing, or a Bachelor of Science or equivalent in a health-related science.

Environmental Health — Algebra 12, Physics 11 and Chemistry 12.

General Nursing (R.N.) — Under 23 years at time of entry: Senior secondary school graduation with: Chemistry 11, either Chemistry 12 or Biology 12 and English 12 all with a C+ standing; Algebra 11 with C standing. **Over 23 years at time of entry:**

Senior secondary school graduation or equivalent with: Chemistry 11, either Chemistry 12 or Biology 12, all with a C + standing. English 12 with a C + standing is desirable. The St. John Ambulance Standard First-Aid certificate is required by the end of term 1.

Health Information

Health Record Administrator: Algebra 12, Biology 12 and proficiency in typing (approx. 50 wpm).

Health Record Technician: Algebra 12, Biology 12 and proficiency in typing (approx. 50 wpm).

Medical Laboratory — The following First Year University-level courses (or their equivalent in a Community College) are the prerequisites for entry into the Medical Laboratory Technology program:

Biology	UBC 101 or 102
Chemistry	UBC 110 or 120
Physics	UBC 110 or 115
English	UBC 100*
Mathematics	UBC 3 credits at the Math 100 level**

A complete First Year Science Program. 15 credits at UBC (or its equivalent at a Community College) is required for entry into the program. Applicants who do not have the appropriate courses and credits (or their equivalent) will not be considered eligible.

* For admission to the program in August 1986 only, an alternate to the English course will be accepted. The alternate course must be UBC 3 credit course (or equivalent). The English prerequisite is waived for entry in 1986 only. All applicants must be completely competent in both written and oral English. The applicant's fluency in English will be assessed at a personal interview.

** No specific Mathematics courses are recommended. However, a total of 3 UBC credits at the Math 100 level (or its equivalent) are required. Calculus or Statistics courses are acceptable. Applicants should be aware that, in the event that their application to Medical Laboratory is not successful, Calculus courses are required for entry into most second year university science programs.

Medical Radiography — Algebra 12, two science 11s (Physics 11 preferable) and one science 12. C + in the final year of secondary school is required.

Nuclear Medicine Technology — Algebra 12, Chemistry 11 and 12, and one other Science 11 (Physics 11 desirable).

Occupational Health and Safety — Algebra 12, Chemistry 11 and Physics 11.

Prosthetics and Orthotics — Algebra 12 and Physics 11. Course in metalwork and woodwork are recommended. Note that this program offers an entry once every two years only. The next session begins September, 1986.

Note: Please refer to page 10 of the Admissions section, if you wish to be considered under the Mature Student category.

Important

Where an algebra course requirement is specified in Engineering Technology Studies and Health Sciences Studies, please note that Academic Math 12 completed before 1978 is an acceptable prerequisite.

SEE PROGRAM DESCRIPTION PAGES FOR INDIVIDUAL PROGRAM NON-ACADEMIC PREREQUISITES.

Basic Training for Skills Development Upgrading — Level 4

Experience has indicated that those students who have taken the five months upgrading course could not successfully compete with those students who have an academic level of achievement in engineering, health and certain management technologies. The mathematics and sciences which BCIT students are required to assimilate are too difficult for those who have had such limited exposure to these subjects. Students who have taken the upgrading course are still required to have Grade 12 level special technology prerequisites.

General Educational Development Tests

These tests are designed for people who have not completed high school graduation but who, because of experience, have presumably reached a level of general development equivalent to high school graduation. Unfortunately, whatever general development a person may have accomplished, mathematical and science ability and knowledge may not necessarily have been strengthened.

Therefore, success in the General Educational Development Tests is considered to be equivalent to BCIT general prerequisites; that is, graduation from a senior secondary school. Applicants who are successful in these tests are required to achieve satisfactory standings in the special prerequisites specified by the technology they have applied to.

How to Make up Course Deficiencies

Preparatory programs are available through the School of Academic and Vocational Studies for those students who lack specific prerequisites or desire refresher courses. For information, please contact Program Information at 434-1610.

How to Apply

Applications for admission to a program should be submitted as early as possible, as some programs at BCIT have a limited number of seats available. Application forms and additional information may be obtained from the Office of the Registrar, BCIT, 3700 Willingdon Avenue, Burnaby, B.C. V5G 3H2, phone 434-1610. These forms should be completed and returned with the necessary **official** documents attached. See Document Requirements.

When to Apply — Full-Time Programs

Applications for admission into full-time programs are accepted for processing from the dates shown below to 14 days after the commencement of classes.

Term Starting	Processing Date
May 1986 Electrical/Electronics	August 1, 1985
September 1986 All Programs including August Nursing and Medical Laboratory	January 2, 1986
January 1987 Computer Systems Financial Management Marketing Management Electrical/Electronics General Nursing	June 2, 1986

May 1987	August 1, 1986
Electrical	
September 1987	January 2, 1987
All programs including August	
Nursing and Medical Laboratory	

Applicant Status Categories

Candidates making application to BCIT will receive correspondence informing them of their status according to the following guidelines:

Acceptance — The applicant who meets the requirements of the Institute and the program may be fully accepted.

Provisional Acceptance — A decision to accept provisionally is based upon the initial information submitted by the applicant. Full acceptance is dependent on final data submitted and applicability to criteria.

Wait Lists — When all seats in a program are filled, a wait list of qualified applicants is generated. If a space becomes available, an applicant on the wait list will be given the seat. Waitlists are not transferred to following sessions. We encourage applicants to contact Admissions who may suggest other similar programs in which seats are available.

Non-Acceptance — The applicant does not meet the requirements of the Institute and/or the program.

Final acceptance or non-acceptance by BCIT is based on the decision of the Registrar. BCIT reserves the right to accept only those applicants who appear to have the capabilities necessary to succeed in the chosen programs.

Acceptance is non-transferable from term to term.

Document Requirements

The following official documents must accompany the completed application form. **Photocopies are not acceptable.**

1. A senior secondary school transcript showing graduation. Applicants who are presently attending high school must submit a statement of marks of grade 11 subjects, and first semester grade 12 marks from the principal's office. A statement showing courses currently attending is also required. All marks must be substantiated by a final secondary school transcript incorporating school marks and provincial exam marks.

2. If applicable, all official post-secondary school statements of marks indicating credits and grades achieved.

3. Applicants who are not Canadian citizens must submit official government documents indicating Landed Immigrant Status or Student Authorization. Transcripts and all other related academic documents must be translated into English and notarized at the applicant's expense.

4. School of Health Sciences applicants are required to complete a medical questionnaire and return it to the Medical Services Department at BCIT. Some health technologies require students to present evidence of having had a recent chest x-ray as well as having completed an immunization program. You will be notified if this information is required from you. If, due to extenuating circumstances, supporting documentation is not available at the time, students will be required to complete the necessary procedures at Medical Services, at BCIT.

5. Students who have been selected for admission must have medical insurance coverage prior to registration.

   Non-Canadian students who have been selected for admission must apply in person to the Medical Services Department, for an Application for Student Medical and Hospital Plan, prior to attending BCIT. Payment for this medical coverage is to be made at the same time, either by personal cheque or money order, to the vendor of the policy. Proof of coverage will be required.

6. Applicants who voluntarialy withdrew or were withdrawn from another Institute may be requested by the teaching department to provide a written report explaining the reason and/or written authorization to request a report from the previous Institute. These documents can be used to determine acceptance to the desired program.

   Note: Whether or not a person is accepted for admission, academic documents are not returned. Applications and documents are not maintained by the Institute for those applicants who are accepted and are unable to enrol, or for those candidates who have not been accepted. If making re-application to BCIT, a new application must be completed and all supporting documents must be resubmitted.

Course Credit, Course Exemption and Advanced Standing

Course exemption may be granted for courses taken previously at BCIT.

Course credit may be granted for individual subjects taken at BCIT or other recognized post-secondary institutions, when the course is equivalent in content to the course for which credit is sought.

Guidelines

a) First year students may only apply for course credit/exemption after they have been fully accepted and paid their commitment/term fees.

b) Second and third year students, who are direct entrants to BCIT, may apply for course credit/exemption upon receiving full acceptance.

c) Students who are presently enrolled at BCIT may apply for course credit/exemption at any time within the specified schedule.

Course credit/exemption may be applied for each term or on an academic year basis. Applications for the next term will be processed approximately half way through the current term.

Course credit/exemption is granted or denied by the Registrar upon recommendation by the technology department head and/or the teaching department head.

If course credit/exemption is granted and not replaced with an approved course of equal duration, you will not be eligible for BCIT scholarships. However, if you are registered in courses for which the weekly hours total at least 60% of the weekly hours for the full program, you may apply for a B.C. Student Loan or Canada Student Loan. In order to be eligible to receive an HONORS diploma or GRADUATING AWARD, SECOND YEAR students who receive course credit/exemption or advanced standing in one or more subjects must register in a substitute course approved for this purpose by the department head.

Applications for course credit/exemption must be submitted to the Office of the Registrar no later than 14 calendar days after the commencement of classes each term. Late applications will only be accepted if prior written authorization has been received by the Registrar from the technology department head.

Change of Program

After the commencement of classes, a request for program transfer requires the completion of a Program Change form by the student. It is the responsibility of the student to obtain approval and signatures from the appropriate Department Head, Dean and Registrar. Permission must be granted by the Registrar before a change in program can be affected.

Course Credit

A credit is defined as approximately one classroom hour per week over a 12–20 week term. Therefore, a course taught for three hours per week for 12 weeks would normally be assigned three credits.

It is recognized that in assigning credits to courses, other criteria are also considered, such as:

—course content
—learning outcomes
—whether it is a lab (clinical or practicum)

Certificates and Diplomas

Although BCIT has recently changed over from a system of **units** to the **credit** system as defined above, we are still in the process of reviewing our certificates and diploma requirements in terms of number of credits.

Transfer from Full-time Studies to Part-time Studies

A student transferring to part-time studies from a full-time diploma program will generally be granted credit exemption for all courses successfully completed prior to withdrawal from full-time studies. A student who fails one or more subjects in the full-time program is encouraged to consider part-time studies programs before withdrawal from full-time studies.

Examinations, Grading and Marks

Formal examinations are written at the end of each term. Students are required to take the examinations for each course at the time set by the Institute. Students unable to write examinations due to special circumstances should first contact their instructor; then, if necessary, consult the Department Head.

External Examinations — Part-time Studies only

We will attempt to co-operate with any **part-time** student who cannot write an examination because of absence from the city, by allowing the student to write the examination at a set time in another centre under an invigilator acceptable to the Institute.

Return of Examinations

For full-time students, mid-term and Christmas examination papers may be returned to students ten school days after the official institute distribution schedule for the Statement of Marks. Only those examinations designated as "restricted exams" by the Dean shall not be returned.

Part-time students wishing to have their examination papers returned should make arrangements with their course instructor.

Determination of Standing

Final standing is determined on the basis of term progress and examination results. Full-time students subject standings are reviewed by a Divisional Marks Review Committee where final standing is determined. Subject standing is as follows:

1—First class	80% or more
2—Second class	65% to 79%
3—Pass	50% to 64%
4—Failure	less than 50% or unapproved/unofficial withdrawal from subject or program.

When an "F" appears beside a course it indicates one of the following:

1. Failure in the subject
2. Withdrawal after the deadline (refer to section on Withdrawal from Program Courses.)
   A full-time student whose transcript bears such a standing is generally not permitted to proceed to the next term unless granted special permission by letter from the Registrar, after approval by the Divisional Marks Review Committee.

A Aegrotat — A pass standing based on term marks.
CH Challenge Credit — Challenge exam written for the course.
C Course Credit Granted — Recognition of approved equivalent studies and/or experience.
EC Exempt Course — Recognition of previous course completion at BCIT.
PP Provisional Pass — Will be changed to Pass or Fail depending on performance in a subsequent specific course.
P Provisional Pass Fulfilled — Provisional Pass conditions achieved.
AP Adjudicated Pass — Standing based on overall performance in the term.
N Not Complete — Course requirements not completed.
X No examination or grade given for this course.
S Satisfactory — Course requirements fulfilled, no mark assigned.
U Unsatisfactory — Course requirements not fulfilled, no mark assigned.
AU Audit — Attended course, no credit assigned.
W Withdrawal — Approved withdrawal from a course or program.

Withdrawal from Program Courses

A full-time student withdrawing from one or more courses without permission will receive an "F" on his/her transcript. Withdrawal **with** permission from his/her Department Head or Dean and **within** withdrawal deadlines will show a "W" on the transcript. Appeals to the Registrar will be adjudicated by the Registrar and the Dean. It is the student's responsibility to check withdrawal deadlines.

A full-time student withdrawing officially from the whole program, will be allowed to do so until two-thirds of the way through the term and a "W" will show on the transcript. If withdrawing after the deadline, the transcript will show "F" for all courses dropped.

A part-time student cannot withdraw after two-thirds of the term cut-off date without having an "F" on his/her transcript for the courses dropped.

Distribution of Marks

Students will not be provided with marks prior to the issuance of a Statement of Marks by the Registrar's Office. Marks will not be released over the telephone.

Marks, including the result of December examinations, will be mailed to students by the Office of the Registrar. **Note:** A full-time student who has failed a term ending in December (also April and August for Computer Systems, Financial Management, Marketing Management and Electrical) will be advised by telegram prior to the commencement of the next term. A letter indicating the student's status, and the student's Statement of Marks follows the telegram.

Transcripts resulting from final examinations are mailed to graduating students by the Office of the Registrar. All other students will receive a Statement of Marks for the term.

Additional Transcripts

A fee of $4 for the first copy and $1 for each additional copy is charged for transcripts. The fee is due at the time the request is made.

Withholding Statement of Marks

No Statement of Marks, transcript, diploma or certificate will be issued until the student has cleared up all financial and other obligations to the Institute such as tuition fees, library fines, rent. These documents may also be withheld on such other grounds as the Board of Governors may from time to time direct.

Marks Reassessments

It is the policy of the Institute that students shall be dealt with fairly in all decisions affecting their academic standing. A student who is not satisfied with the final mark award is cautioned that the grade has been reviewed carefully and, aside from clerical error, reassessments seldom result in a higher mark.

A student wishing a reassessment of his/her academic standing must first discuss the matter with the instructor responsible for the initial assessment and, if dissatisfied with the result of that discussion, with the Teaching Department Head.

Failing a resolution of the problem, the student may then submit a Request for Reassessment on the Institute form available from the Office of the Registrar. **ALL PARTS OF THE FORM MUST BE COMPLETED AND MUST REACH THE REGISTRAR'S OFFICE WITHIN 7 SCHOOL DAYS AFTER THE START OF CLASSES IN THE NEXT TERM, OR WITHIN 30 CALENDAR DAYS AFTER THE MAILING OF MARKS FROM THE INSTITUTE, WHICHEVER IS LESS.**

There is a fee of $25 for each subject reassessed. If the mark or standing is favorably adjusted, the fee will be refunded.

The Registrar will inform the student by letter of the result of the reassessment.

Marks Appeals

A student who is dissatisfied with the outcome of a reassessment may appeal the decision to the President.

The student must first discuss the problem with the Dean of the appropriate School. The Dean must provide the Registrar with a written statement confirming the outcome of the discussion.

If the student then decides to proceed with the appeal, the student must complete and sign a Request to Appeal form and submit it to the Registrar's Office, along with the $25 fee, WITHIN TWO WEEKS OF THE MAILING OF THE REASSESSMENT RESULT TO THE STUDENT.

An Appeal Committee will be formed to deal with the Appeal according to procedures approved by the Education Council for that purpose.

The President will inform the student by letter, of the result of the appeal.

Note: A student who has been permitted to audit classes during the reassessment may continue to do so during the appeal.

Auditing

A student may audit a course with the permission of the instructor. An audit student is not formally evaluated and does not write examinations. However, the student is expected to take an active part in classroom discussions and laboratory exercises, maintain satisfactory attendance and pay the full course fee.

An auditing student does not receive credit for the course, but will receive a Statement of Marks with "Audit" indicated. A student may change his status in the course from audit to credit, with written permission of the instructor during the course, but will not receive credit by applying after the course is completed.

Attendance

Full-time Studies — (see Conduct and Attendance page v).

Part-time Studies — Students are required to attend at least 50% of the scheduled classes and laboratory sessions. Failure to meet the attendance requirement will result in a grade of "N" — not complete.

Failures and Repetition

A student who fails more than one subject in a term may be permitted to repeat the term only at the discretion of the program Dean and the Registrar (see Readmissions procedure under Admissions). It is the responsibility of the student who has failed one or more subjects, but is permitted to continue with his/her program or studies, to present evidence of successful completion of the failed subject(s) to the Office of the Registrar prior to the end of the next term or before a Diploma of Technology is awarded, whichever condition is specified at the time or subsequent to the failure.

Student Research Reports

Some BCIT students are required to research and write reports, with the guidance of faculty and staff, as part of their course work. Unless otherwise specified by the instructor, these reports are assigned as educational exercises only. The student, not BCIT, is ultimately responsible for the content of such a report.

Diplomas

Diploma of Technology

Graduates of the British Columbia Institute of Technology will be awarded a nationally recognized Diploma of Technology at the convocation exercises. Graduates unable to attend the convocation exercises will have their diplomas sent by registered mail to their current address on file with the Institute.

Honors Diploma

An Honors Diploma is awarded to a graduating student whose average marks for all courses that constitute an approved second year program of studies is 80% or greater.

Students who have been granted course credit exemption or advanced standing for second year courses while in attendance at BCIT, will not be eligible for Honors Diploma status, unless approved courses are added to maintain 100% workload. The Office of the Registrar must be notified by the Department Head of approved substitute courses.

Double Diploma

After receiving a Diploma of Technology in any field of study from BCIT, a graduate may earn a second diploma in another area of study upon the successful completion of one full year or its equivalent. Each program will be developed in consultation with the student's department head, giving special recognition to the student's individual needs. Each program leading to a Double Diploma must be approved by the Technology Department Head and the Registrar. Application forms may be obtained from the Office of the Registrar.

Replacement Diploma

Only one diploma will be issued to each student. Should a student request a copy because of loss a "Request for a Replacement Diploma" form must be completed and returned to the Office of the Registrar. Upon review of the reason for the loss, the Registrar may issue a replacement diploma. There is a $10 charge for issuing a replacement diploma.

Certificates and Certificate of Technology

See Part-time Technology Admissions information.

Graduating Awards

Honor Awards

The following Honor Awards are presented at convocation.

The ***Governor General's Silver Medal*** is presented to the top academic student in a Technology Diploma Program. Graduates from the previous August Nuclear Medicine class are also considered, as are August and December graduates from the Electrical/Electronics Technology and December graduates from Nursing.

The ***Lieutenant Governor's Silver Medals*** are awarded for academic excellence and contribution to both Institute and the community at large. Two are presented each year, one to a Trades program graduate and the second to a graduate of a Certificate Program. (Subject to the approval of the Lieutenant Governor's Office).

The ***Board of Governors' Citizenship Award*** is presented to the graduating student who has a record of active participation in a student activities, a reputation for mature personal relations with both staff and students, and reasonable academic standing.

The ***President's Award*** is presented to the most outstanding academic student in each of the four Schools — Computer and Electro-Mechanical Studies, Construction and Natural Resource Studies, Health Sciences Studies and Management Studies.

Academic Awards

Academic Awards, are presented annually to students who achieve the highest academic standing in their programs of studies. The following awards were presented at the June 1985 Graduating Awards Ceremony.

School of Computing and Electro-Mechanical Studies

CAD/CAM
The CAD/CAM Award

Computer Systems
The Computer Systems Award in Information Systems
The Computer Systems Award in Management Systems
The Computer Systems Award in Microcomputer Systems
The Computer Systems Award in Expert Systems
The Computer Systems Award in Engineering Systems

Electrical/Electronics
The Microtel Pacific Research Award in Telecommunications
The Federal Pioneer Award in Power
The Instrument Society of America Award in Instrumentation
The MacDonald, Dettwiler and Associates Limited Award in Control Electronics

Mechanical
The Canadian Manufacturers' Association Award in Production
The Canadian Society for Mechanical Engineering Award in Design
The Mechanical Contractors Association of B.C. Award in Mechanical Systems

School of Construction and Natural Resource Studies

Biological Sciences
The B.C. Federation of Agriculture R.B. Stocks Award in Agri-Management
The B.C. Nursery Trades Association Award in Landscape Horticulture
The Canadian Agricultural Chemical Association, B.C. Section Award in Food Production
The Fisheries Association of B.C. Award in Food Processing

Building
The Architectural Institute of British Columbia Award in Architecture
The Building Award in Economics
The Building Award in Mechanical Systems

Civil and Structural
The Swan Wooster Engineering Company Limited, Col. W.G. Swan Award

Surveying
The BCLS — George New Compass Award

Lumber and Plywood
The Council of Forest Industries Award

Mining
The Canadian Institute of Mining and Metallurgy, Vancouver Branch Award

Natural Gas and Petroleum
The Westcoast Transmission Company Ltd. Award

Chemical Sciences
The Canadian Institute of Mining and Metallurgy, Vancouver Branch Award in Extractive Metallurgy
The Canadian Pulp and Paper Association, Technical Section, Pacific Coast and Western Branches Award in Pulp and Paper
The Canadian Society for Chemical Technology Award in Organic Chemistry
The Chemical Sciences Award in Pollution Sciences
The Chemical Sciences Award in Physical Metallurgy

School of Health Sciences Studies

Biomedical Electronics
The Biomedical Electronics Graduation Award
The Electrophysiology Graduating Award

Health Information
The Health Record Association of B.C. Award in the Health Record Administrator Program
The Health Record Association of B.C. Award in the Health Record Technician Program

Medical Laboratory
The B.C. Society of Medical Technologists Award

Medical Radiography
The B.C. Radiological Society Award

Nuclear Medicine Technology
The Frosst Radiopharmaceutical Division, Ralph Jamieson Award

Occupational Health and Safety
The Occupational Health and Safety Award

General Nursing
The W.B. Saunders Co. Canada Ltd. Award

Psychiatric Nursing
The Registered Psychiatric Nurses Association of B.C., Richard Strong Memorial Award

School of Management Studies

Administrative Management Systems
The Bank of British Columbia Award in Administrative Systems
The Finning Tractor and Equipment Co. Ltd. Award in Personnel and Industrial Relations
The Business Administration Award

Broadcast Communications
The British Columbia Association of Broadcasters Award

Financial Management
The Canadian Life and Health Insurance Association Award
The Society of Management Accountants of British Columbia Award in Accounting
The Royal Bank Finance Award

Hospitality and Tourism Administration
The British Columbia Hotels' Association Award in Hotel, Motel and Food Service
The Ryan Schlyecher Memorial Award in Travel and Tourism

Marketing Management
The Bank of British Columbia Award in International Business
The Real Estate Council of British Columbia Award in Real Estate
The Vancouver Sun Award in Technical Sales and Marketing
The Canadian Tire Award in Advertising and Sales Promotion

Operations Management
The Vancouver Transportation Club Award in Transportation and Distribution

Achievement Awards

School of Construction and Natural Resource Studies

Biological Sciences
The B.C. Food Technologists Award in Food Processing

Building
The Clay Brick Association Award
The P.B. Ford and Company Award
The Royal Institution of Chartered Surveyors, B.C. Group Award
The Quantity Surveyors Society of B.C. Awards
The Isabel Verner Memorial Book Prize
Construction Specifications Canada, Vancouver Chapter Award

Civil and Structural
The Dillingham Construction Ltd. Award
The Dominion Construction Awards
The Wright Engineers Ltd. Award
The Associated Engineering Services Ltd. Award
The Society of Engineering Technologists of the Province of B.C., Presidents' Award of Excellence

Surveying
The Dillingham Construction Ltd. Award
The Canadian Institute of Surveying Membership Award

Lumber and Plywood
The Ralph S. Plant Ltd. Award

Chemical Sciences
The Canadian Pulp and Paper Association, Technical Section, Pacific Coast and Western Branches Award in Pulp and Paper
BCIT Mathematics Department Book Prize
The Can Test Limited Awards

School of Computing and Electro-Mechanical Studies

Mechanical
The Institution of Mechanical Engineers, Western Canada Branch, Commander S.M. Terry Memorial Award
H.A. Simons (International) Ltd. Award
The Wright Engineers Ltd. Award

School of Health Sciences Studies

Biomedical Electronics
The Graphic Controls Canada Ltd. Award

Medical Laboratory
The Coulter Electronics Canada Awards in Hematology
The Metropolitan Clinical Laboratories Ltd. Award in Biochemistry
The Metropolitan Clinical Laboratories Ltd. Award in Microbiology
The Ortho Diagnostics Award in Immunohematology
The Sherwood Medical Industries Inc., Paraplast Award in Histology
The General Diagnostics Awards for General Proficiency

Nuclear Medicine Technology
The Metropolitan Clinical Laboratories Ltd. Award for Clinical Excellence

General Nursing
The Department Head's Prize for Excellence in Bedside Nursing

Psychiatric Nursing
The Psychiatric Nursing Department Service Award

Prosthetics and Orthotics
The School of Health Sciences Prize

School of Management Studies

Administrative Management Systems
The Westcoast Transmission Company Ltd. Awards
The Administrative Management Systems Students' Award
The London Drugs Ltd. Award

Broadcast Communications
The British Columbia Film Industry Association, Jack Gettles Memorial Award for Creativity in Television
The Broadcast Communications Commercial Production Award of Excellence
The Broadcast Communications Commercial Production Award, Honorable Mention
The Rogers Cable T.V. — Vancouver Award of Excellence in Broadcast Engineering
The Canadian Broadcasting Corporation Award in Television

Financial Management
The Certified General Accountants of B.C. Awards
The Financial Executives Institute, Vancouver Chapter Award
The Society of Management Accountants of B.C. Award
The Institute of Chartered Accountants of B.C. Award
The Vancouver Stock Exchange Award

Hospitality and Tourism Administration
The Columbia Association of Hospitality Accountants Award in Accounting
The Hotel Vancouver Award in Hotel, Motel and Food Service
The Sunsational Vacations Limited Award in Travel and Tourism
The White Spot Ltd. Awards in Hotel, Motel and Food Service

Marketing Management
The Block Bros. Industries Ltd. Award in Real Estate Management

Operations Management
The Canadian Association for Production and Inventory Control, Vancouver Chapter Awards
The Operations Management Award

Fees and Expenses

Full-Time Tuition Fees Policy for Academic Year 1986/87

Tuition expenses are reviewed annually and have been established by the Board of Governors of the British Columbia Institute of Technology and approved by the Ministry of Education for the academic year 1986/87 and are subject to change each academic year.

1. A non-refundable commitment fee of $75.00 is due upon the applicant's acceptance into first level, including Double Diploma programs. This fee is applied toward the tuition fees and is not transferable to part-time courses.
2. An accepted applicant whose commitment fee has not been paid by the due date stated on the letter of acceptance will forfeit the seat which has been reserved.
3. An accepted applicant is required to pay the remainder of first level fees 60 days before the commencement of classes.
4. An applicant accepted less than 60 days before the commencement of classes is required to pay tuition fees upon acceptance.
5. Double Diploma Program students pay according to Two-level Programs.
6. After the commencement of classes, a student whose fees are outstanding will be excluded from classes and have his/her registration cancelled. An additional $50.00 fee will be levied for reinstatement into classes.
7. Part-time day courses are assessed $54.00 per credit to a maximum tuition fee of $680.00 per level.
8. **Second Year Students** — A student returning to begin the second year of a two-year program is required to pay full term fees 30 days before the commencement of classes.

Payment made by cheques and money orders should be made payable to the BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY or BCIT. Payment may also be made by VISA or MASTERCARD. A charge of $15.00 will be levied for costs in handling cheques returned for non-sufficient funds or other reasons. Please include your SOCIAL INSURANCE NUMBER with your payment.

International Students

Fees for international students on student authorizations are based on full cost recovery, and subject to approval by the Provincial Government. Based on the 1985-86 fee structure, the minimum tuition fee rate for international students for 1986-87 will be $6,800 per academic year.

Miscellaneous Fees

The following fees have been approved by the BCIT Board of Governors.

Annual Fees

Tuition fees and all related policies have been reviewed for the 1986/1987 year by the British Columbia Institute of Technology Board of Governors and may be subject to change.

	1st Year	2nd & 3rd Year
General Tuition	$1,360	$1,360
Student Activity (annual)	75	75
Convocation (mandatory)		15
Total	$1,435	$1,450

First Year Students 1986/87

All first year students must pay their fees according to the following schedule:

First Level (term) — due 60 days before commencement of classes

General tuition (includes $75 non refundable commitment fee)	$680
Student activity fee	38
	$718

Second Level (term) — due first week of classes

General tuition	$680
Student Activity	37
	$717

Second and third year students 1986/87

All second and third year students must pay their fees according to the following schedule:

Third Level (term) — due 30 days before commencement of classes

General tuition	$680
Student activity	38
	$718

Fourth Level (term) — due first week of classes

General tuition	$680
Student activity	37
Graduation fee	15
	$732

Summer term only — The student activity fee is $22.00 for all levels.

General Nursing

All students must pay according to the fee schedule previously stated for the School of Health Sciences.

Note: The only exception is Level 5.

Level 5 — due first week of classes.

General Tuition	$680
Student Activity	15
	$695

Two-level Programs 1986/87

Health Record Technician and Double Diploma Programs

Level 1 — due 60 days prior to the commencement of classes

General Tuition (includes $75 non-refundable commitment fee)	$680
Student Activity	38
	$718

Level 2 — due first week of classes

General Tuition	$680
Student Activity	37
Graduation	15
	$732

Electrical/Electronics Technology 1986/87

All students must pay according to the fee schedule previously stated for the School of Engineering Technology.

Note: The only exceptions are: Co-op Program Level 4 and Level 5.

Co-op Program — due first week of classes.

General Tuition	$340
Student Activity	15
	$355

Level 4 — due first week of classes

General Tuition	$680
Student Activity	38
	$718

Level 5 — due first week of classes

General Tuition	$680
Student Activity	37
Graduation Fee (mandatory)	15
	$732

Effective April 1, 1986

NSF Cheques	$15.00
Transcript of Marks	$ 4.00 for first copy and $1.00 for each additional copy
Duplicate of Diploma	$10.00 per copy
Reassessment or Appeal of Exam	$25.00 per subject
Duplicate Tax Receipts	$10.00

Effective 1986/87 Academic Year

Graduation Fee	$15.00
Challenge Exam Fee	$75.00
Reinstatement Fee	$50.00

Withdrawal and Refund Procedure

How to Withdraw

Students who wish to withdraw officially from BCIT must commence the process by first reporting to the Counselling Centre.

Students who are asked to withdraw from a course for reasons of discipline or unsatisfactory progress may forfeit any right to a refund under this section.

Refunds — Subject to Change for 1987/88

Refunds of fees for first level students who withdraw up to 14 days after the commencement of classes:

General Tuition: Complete refund, less $75 commitment fee.

Student Activity: Complete refund.

Refunds of fees for students (other than first level students) who withdraw up to 14 days after the commencement of classes:

General Tuition: Complete refund.

Student Activity: Complete refund.

Refunds of fees for students who withdraw 14 days after the commencement of classes:

General Tuition: No refund.

Student Activity: Appropriate student activity fee refunds will be issued by the Institute up to the last day of withdrawal refund.

After the last day of February, any student activity fee refunds must be claimed in writing from the BCIT Student Association Office and the student's ID card(s) turned in on receipt of the refund. Withdrawal verification will be made by the BCIT Student Association before processing the claim.

Important Dates 1986/87

Schools of Computing and Electro-Mechanical Studies, Construction and Natural Resource Studies, Health Sciences Studies, Management Studies and Academic and Vocational Studies.

See subsequent pages for Electrical Technology, General Nursing, Medical Laboratory and Diagnostic Medical Sonography.

1986

Jul 1 — CANADA DAY
Jul 4 — Term Fee Deadline for Level 1 registering Sep 2
Jul 25 — Last day to withdraw from Level 2 Financial Mgmt, Computer Systems and Marketing Mgmt in order to receive "W" on transcript

Aug 1 — Term Fee Deadline for Level 3 registering Sep 2
Aug 4 — B.C. Day
Aug 8 — Term Fee Deadline for Level 3 Hospitality and Tourism registering Sep 8
Aug 18 -22 — Examinations for Level 2 Financial Mgmt, Computer Systems, and Marketing Mgmt
Aug 25 -29 — Medical Radiography Level 1 Hospital Orientation

Sep 1 — LABOR DAY
Sep 2 — Level 1 and 3 Registration
Sep 3 — Level 1 and 3 classes begin
Sep 8 — Hospitality and Tourism Level 3 Registration and classes begin
Sep 16 — Last day to withdraw in order to receive full refund (less $75 Commitment Fee for Level 1)
Sep 16 — Last day to apply for Course Credit/Exemption
Sep 21 — Last day to withdraw from Level 3 Hospitality and Tourism in order to receive full refund

TBA — SHINERAMA
Oct 13 — THANKSGIVING

Nov 3 — Term Fee Deadline for Level 1 Financial Mgmt, Computer Systems and Marketing Mgmt
Nov 7 — Last day to withdraw in order to receive "W" on transcript
Nov 11 — REMEMBRANCE DAY

Dec 8 -12 — Examinations Levels 1 and 3
Dec 15 -Jan 1 — CHRISTMAS BREAK

1987

Jan 2 — Level 1 Registration for Financial Mgmt, Computer Systems and Marketing Mgmt
Jan 5 — Levels 2 and 4 classes begin
Jan 5 — Level 1 classes begin for Financial Mgmt, Computer Systems and Marketing Mgmt
Jan 9 — Term Fee Deadline for Levels 2 and 4
Jan 19 — Last day to withdraw in order to receive full refund (less $75 Commitment Fee for Level 1)
Jan 19 — Last day to apply for Course Credit/Exemption

TBA — SPRING BREAK
Apr 3 — Last day to withdraw in order to receive "W" on transcript
Apr 17 — GOOD FRIDAY
Apr 20 — EASTER MONDAY

May 18 -22 — Examinations Levels 1, 2 and 4
May 25 — VICTORIA DAY (may be changed by Order-in-Council)

Jun 1 — Level 2 classes begin for Financial Mgmt, Computer Systems and Marketing Mgmt
Jun 5 — Term Fee Deadline for Level 2
TBA — CONVOCATION

Electrical Technology

1986

Jul 1 — CANADA DAY
Jul 4 — Term Fee Deadline for Level 1 registering Sep 2

Aug 1 — Term Fee Deadline for Level 3 registering Sep 2
Aug 4 — B.C. Day

Sep 1 — LABOR DAY
Sep 2 — Registration for all Levels; CO-OP 1 and 2 begins
Sep 3 — Classes begin for all Levels
Sep 5 — Term Fee Deadline for Levels 2, 4, 5 and CO-OP 1 and 2
Sep 16 — Last day to withdraw in order to receive full refund (less $75 Commitment Fee for Level 1)
Sep 16 — Last day to apply for Course Credit/Exemption

TBA — SHINERAMA
Oct 13 — THANKSGIVING

Nov 3 — Term Fee Deadline for Level 1 registering Jan 2/87
Nov 7 — Last day to withdraw in order to receive "W" on transcript
Nov 11 — REMEMBRANCE DAY

Dec 3 — Term Fee Deadline for Level 3 registering Jan 2/87
Dec 8 -12 — Examinations all Levels
Dec 15 -Jan 1 — CHRISTMAS BREAK

1987

Jan 2 — Registration for all Levels; CO-OP 1 and 2 begin
Jan 5 — Classes begin for all Levels
Jan 9 — Term Fee Deadline for Levels 2, 4, 5, and CO-OP 1 and 2
Jan 19 — Last day to withdraw in order to receive full refund (less $75 Commitment Fee for Level 1)
Jan 19 — Last day to apply for Course Credit/Exemption

Mar 4 — Term Fee Deadline for Level 1 registering May 4
Mar 13 — Last day to withdraw in order to receive "W" on transcript

Apr 3 — Term Fee Deadline for Level 3 registering May 4
Apr 13 -16 — Examinations for all Levels
Apr 17 — GOOD FRIDAY
Apr 20 — EASTER MONDAY

May 4 — Registration for all Levels; CO-OP 1 and 2 begins
May 5 — Classes begin for all Levels
May 8 — Term Fee Deadline for Levels 2, 4, 5 and CO-OP 1 and 2

May 15 — Last day to withdraw in order to receive full refund (less $75 Commitment Fee for Level 1)
May 15 — Last day to apply for course credit/exemption
May 25 — VICTORIA DAY (may be changed by Order-in-Council)

TBA — CONVOCATION

Jul 1 — CANADA DAY
Jul 10 — Last day to withdraw in order to receive "W" on transcript

Aug 3 — B.C. DAY
Aug 10 -14 — Examinations for all Levels

General Nursing

1986

Jun 18 — Term Fee Deadline for Level 1 registering Aug 14

Jul 1 — CANADA DAY
Jul 18 — Term Fee Deadline for Level 3 registering Aug 18

Aug 4 — B.C. DAY
Aug 14 and 15 — Term 1 Registration and Orientation

Aug 18 — Terms 3 and 5 Registration; all Term classes begin
Aug 22 — Terms Fee Deadline for Terms 2, 4 and 5

Sep 1 — LABOR DAY
Sep 2 — Last day to withdraw in order to receive a full refund (less $75 Commitment Fee for Term 1)
Sep 2 — Last day to apply for Course Credit/Exemption

TBA — SHINERAMA

Oct 13 — THANKSGIVING
Oct 31 — Last day to withdraw in order to receive "W" on transcript

Nov 3 — Term Fee Deadline for Term 1 registering Jan 2/87
Nov 11 — REMEMBRANCE DAY

Dec 5 — Term Fee Deadline for Term 3 registering Jan 2/87
Dec 8 -12 — Examinations for all Terms

Dec 15 -Jan 1 — CHRISTMAS BREAK

1987

Jan 2 — Term 1 Registration and Orientation
Jan 5 — Term 3 and 5 Registration; all Term classes begin
Jan 9 — Term Fee Deadline for Terms 2, 4 and 5
TBA — CONVOCATION
Jan 19 — Last day to withdraw in order to receive a full refund (less $75 Commitment Fee for Term 1)
Jan 19 — Last day to apply for Course Credit/Exemption

TBA — SPRING BREAK

Mar 21 — Last day to withdraw in order to receive "W" on transcript

Apr 17 — GOOD FRIDAY
Apr 20 — EASTER MONDAY

May 4 -8 — Examinations for all Terms
May 25 — VICTORIA DAY (may be changed by Order-in-Council)

TBA — CONVOCATION

Medical Laboratory Technology

1986

Jun 6 — Term Fee Deadline for Level 1 registering Aug 5

Jul 1 — CANADA DAY

Aug 4 — B.C. DAY
Aug 5 — Level 1 Registration
Aug 6 — Level 1 Classes begin
Aug 19 — Last day to withdraw in order to receive a full refund (less $75 Commitment Fee)
Aug 19 — Last day to apply for Course Credit/Exemption

Sep 1 — LABOR DAY

TBA — SHINERAMA

Oct 13 — THANKSGIVING
Oct 24 — Last day to withdraw in order to receive "W" on transcript

Nov 11 — REMEMBRANCE DAY

Dec 15 -16 — Examinations
Dec 17 -Jan 1 — CHRISTMAS BREAK

1987

Jan 5 — Level 2 Classes begin
Jan 9 — Term Fee Deadline for Level 2
Jan 19 — Last day to withdraw in order to receive a full refund
Jan 19 — Last day to apply for Course Credit/Exemption

TBA — SPRING BREAK

Apr 3 — Last day to withdraw in order to receive "W" on transcript
Apr 17 — GOOD FRIDAY
Apr 20 — EASTER MONDAY

May 25 — VICTORIA DAY (may be changed by Order-in-Council)
May 26 -27 — Examinations

Diagnostic Medical Sonography

1986

Jul 1 — CANADA DAY
Jul 4 — Term Fee Deadline for Level 1 registering Sep 2

Aug 4 — B.C. DAY

Sep 1 — LABOR DAY
Sep 2 — Level 1 Registration
Sep 3 — Level 1 Classes begin
Sep 16 — Last day to withdraw in order to receive full refund (less $75 Commitment Fee)
Sep 16 — Last day to apply for Course Credit/Exemption

TBA — SHINERAMA

Oct 13 — THANKSGIVING

Nov 7 — Last day to withdraw in order to receive "W" on transcript

Nov 11 — REMEMBRANCE DAY

Dec 8 -12 — Examinations

Dec 15 -Jan 2 — CHRISTMAS BREAK

1987

Jan 5 — Level 2 Clinical Phase begins

Jan 9 — Term Fee Deadline for Level 2

Jan 19 — Last day to withdraw in order to receive a full refund

Jan 19 — Last day to apply for Course Credit/Exemption

Apr 17 — GOOD FRIDAY

Apr 20 — EASTER MONDAY

May 25 — VICTORIA DAY (may be changed by Order-in-Council)

Jun 5 — Last day to withdraw in order to receive "W" on transcript

Jul 1 — CANADA DAY

Aug 3 — B.C. DAY

Aug 17 -21 — Examinations

Note: There is no summer break for this program.

School of Computing and Electro-Mechanical Studies

Diploma Programs

CAD/CAM 25

Computer Systems 27
- Information Systems 27
- Management Systems 27
- Microcomputer Systems 27
- Engineering Systems 27
- Expert Systems 27

Electrical/Electronics 31
- Electrical 32
- Telecommunications 32
- Control Electronics 32
- Instrumentation 32
- Microelectronics 32
- Power 33
- Robotics 33

Mechanical 39
- Mechanical Design 39
- Mechanical Production 39
- Mechanical Systems 42

CAD/CAM

It is now a widely recognized fact that Canadian industrial and engineering practices are being radically transformed by the introduction of automation into the workplace. A variety of acronyms — CAD, CADD, CAE, CAM, and CIM — have been coined to denote that this shift is different in kind from the normal evolutionary "fine tuning" of traditional processes. The CAD/CAM program — Computer Aided Design, Computer Assisted Manufacturing — explores the effects of this transition and develops a sophisticated end user of this complex technology.

CAD/CAM has important applications in the production, supervision, distribution and storage of computerized drawings. CAD/CAM design tools are used in the development of machines, tools, buildings, structures and maps. Associated non-graphic information can be stored and retrieved affecting a wide range of corporate data bases. This challenging technology offers exciting opportunities for the experienced technologist.

Job Opportunities

CAD/CAM Technologists will work in disciplines as diverse as surveying, civil and structural, mining and forestry, architectural practices, manufacturing industries and software development. Students have started their own consulting and service companies. Oil companies, municipalities, government agencies and manufacturing companies are actively implementing or examining CAD/CAM. Finally, opportunities exist in technical sales and training.

The Program

Two streams are currently available to students. Graduated engineering technologists and engineers are offered the opportunity of upgrading their current skill set through a direct entry program. This program offers intense one year training in CAD/CAM. Regular students are offered a two year program with a first year emphasizing traditional engineering discipline training.

All students will have completed a curriculum of studies in Math, Technical Communications, Drafting, Computer Science, Programming Languages and applications. The second year emphasis is placed on the use of graphics terminals with projects from the student's field of interest. Many software packages will be sampled. Data Base concepts and applications, systems management, and acquisition studies are addressed.

It is anticipated that this program will be accredited by the Applied Science Technologists and Technicians of BC.

Prerequisite

For first year applicants: Algebra 12, Physics 11 and Drafting 11.

For second year, direct entry applicants: a Diploma of Technology equivalent to BCIT or better, Departmental approval and CDCM 201 (or equivalent).

Applicants should have good communication and engineering skills, ability to reason in a logical manner and good disposition towards team work.

Faculty and Staff

S.C. Todd, M.I. Mech. E., C. Eng., F.I.E.D., P. Eng., Department Head
C. Goodbrand, B.A. (Comp.Sci.), Program Head
D. Cowley, B.Ap.Sc., P.Eng.
G. Johnson, B.A. (Geog.)
J. Read, Dipl.T.
G. Dryer, Dipl.T.

PROGRAM: CAD/CAM

Level 1		Classroom hours per week
CDCM 100	Drafting 1	6.0
CDCM 101	Computer Sciences 1	3.0
CHSC 105	Engineering Materials	4.0
MATH 149	Basic Technical Mathematics for Mechanical	5.0
MECH 104	Statics	4.0
MECH 106	Manufacturing Processes 1	4.0
TCOM 109	Technical Communication	4.0

Level 2		Classroom hours per week
CDCM 200	Drafting 2	4.0
CDCM 201	Cadraft 1	5.0
ELEC 209	Electrical Principles and Applications	4.0
MATH 249	Calculus for Mechanical	4.0
MECH 206	Mechanics of Materials	4.0
MECH 209	Manufacturing Processes 2	4.0
TCOM 210	Technical Communication	4.0

Level 3		Classroom hours per week
CDCM 301	Cadraft 2	9.0
CDCM 302	Computer Science 2	6.0
CDCM 304	Engineering Design	4.0
ELEC 470	Robotics and CNC Languages	6.0
MATH 349	Numerical Methods for Mechanical	4.0
MECH 320	Fluid Power 1	3.0

Level 4		Classroom hours per week
CDCM 303	CAM	4.0
CDCM 400	CAD/CAM Projects	10.0
CDCM 401	CAD/CAM Management	4.0
CDCM 404	Cadesign	3.0
CDCM 406	Computer Systems	4.0
MATH 460	Mathematics for CAD/CAM	4.0

Course Descriptions

CDCM 100 Drafting 1 — Basic techniques of drafting with emphasis on Orthographic, Isometric and Auxilary projections. Links between traditional drafting and computer drafting will be part of this course, with exposure to computer techniques.

CDCM 101 Computer Science 1 — Introduction to Computer Science and programming using BASIC. Emphasis will be on structured problem solving. Applications drawn from the engineering disciplines.

CDCM 200 Drafting 2 — The emphasis is on working drawings, dimensioning and parts lists. Applications will be multidisciplined.

CDCM 201 Cadraft 1 — Rudiments of Computer Aided Drafting. Machines Log-on procedures, 2-D Orthographic drafting, dimensioning, annotations, assemblies and creating user interfaces.

CDCM 301 Cadraft 2 — A continuation of Cadraft 1. Elementary 3D modelling, auxiliary, isometric and perspective projections. Surfaces, surface of projection, surface of revolution.

CDCM 302 Computer Science 2 — Introduction to FORTRAN programming. Emphasis will be on structured problem solving. Applications are drawn from CAD system development: transformations, windowing, scan line conversion, etc.

CDCM 303 CAM — Introduction to Computer Numerical Control (CNC) as an integrated design tool. Creation of Graphic model, tool and machine definition, tool path creation, post processors (APT, COMPAC II), tape interfaces and direct machine linkages.

CDCM 304 Engineering Design — An introductory course in engineering design. The emphasis is on mechanical and structural applications through analysis and conceptual drawings and design.

CDCM 400 CAD/CAM Projects — A collection of projects with applications to the student's field of interest. Extensive independent study and project research are emphasized. Research covers existing software packages, package modification package creation integrating graphics and data base.

CDCM 401 CAD/CAM Management — System management techniques for a modest CAD/CAM shop. Requirements analysis, evaluations and acquisition of CAD/CAM equipment. Disciplined acquisition studies.

CDCM 404 CAD Design — Modelling of complex surfaces. Surfaces of projection, revolution. Bezier surfaces, ruled surfaces, tab surfaces, etc.

CDCM 406 Computer Systems — An introduction to integrated graphics programming environments. Emphasis will be on file systems (sequential, direct, keyed) and data base systems (hierarchical, network, relational). Projects will be drawn from engineering applications.

CHSC 105 Engineering Materials — Comparative properties of all classes of engineering materials including metals, alloys, polymers, concrete, wood and ceramics. Common causes of failure in service including fatigue, weathering, embrittlement and corrosion.

ELEC 209 Electrical Principles and Applications — Power, resistance, capacitance, inductance, circuit theory and load analysis. Concepts of integrated circuits, component identification and application. AC and DC drives, stepping motors, encoders, resolvers and induction scates.

ELEC 470 CNC and Robotic Languages — Introduces the student to current CNC and Robot languages such as APT and VAL. Investigates the integrated manufacturing centre. Prerequisite: CDCM 311 and MECH 130 or CDCM 303.

MATH 149 Basic Technical Mathematics for Mechanical — Introduction to differential and integral calculus of polynomial functions including appropriate support topics from algebra, analytical geometry, plane geometry, solid geometry, trigonometry and the theory of logarithms and exponential functions. There will be a strong emphasis on applications to the physical sciences and mechanical engineering.

MATH 249 Calculus for Mechanical — An introduction to the differential and integral calculus of trigonometric, logarithmic and exponential functions and their application, maxima and mimima, areas and volumes, centroids and moments of inertia, calculation of work, bending beams, functions of several variables and partial derivatives, and elementary first order differential equations.

MATH 349 Numerical Methods for Mechanical — Numerical integration, solution of algebraic and transcendental equations by iterative methods, numerical solution of differential equations and numerical differentiation. Matrix approach to 2-D and 3-D transformations with application to computer graphics. Gauss-Jordan method applied to the solution of systems of linear equations. Linear programming using the simplex method and the transportation problem.

MATH 460 Mathematics for CAD/CAM — Geometric modelling including cubic splines, bezier curves and surface patches. Matrix approach to transformations. Raster algorithms and techniques including curve generation, halftoning and other special effects. Kinematics and simulation. Solid modelling. Overview of finite element method. Selected algorithms from cartography. Interactive computer graphics concerns.

MECH 104 Statics — Vectors, force systems, concurrent and coplanar, nonconcurrent and coplanar. Graphical representation and solutions. Ideas of equilibrium. Mathematical representation of equilibrium. Analysis of frames. Statically determined structures. Redundancies. Beams, principles of moments and centroids. Second moment of area.

MECH 106 Manufacturing Processes 1 — A basic orientation course which provides the student with practice in metal removal, and a study of related theory.

MECH 206 Mechanics of Materials — Stress, strain and deflection. Tension, compression, shear, torsion, deflection and buckling of material under load. Beams, columns, shafts, thin- and thick-walled cylinders, riveted and welded joints.

MECH 209 Manufacturing Processes 2 — Detailed knowledge of basic machine tools, evaluation of design and production features. Organized processing, break even points, equal cost quantities, estimating production costs, machine tool specification, installation and maintenance systems.

MECH 320 Fluid Power 1 — Provides an understanding of pneumatic control systems. Fluid power components, their symbols, function and construction are examined and used in the design, construction and testing of simple and sequential control systems. Sizing calculations for system components are covered.

TCOM 109 Technical Communication — In this course, students learn the basic skills to become effective writers and speakers in the mechanical industry. They learn the layout, content and graphic skills of technical writing, and research and employment application techniques. They write technical memos, letters and descriptions, and give an oral report.

TCOM 210 Technical Communication — In this course, students practice the reporting techniques used in the engineering mechanical industries. They write feasibility reports, proposals, memos, letters, comparison and progress reports and a formal technical report. They also present an oral technical report. Prerequisite: TCOM 109.

Computer Systems

The computer has made it possible to store, retrieve and analyze vast quantities of complex information at high speed and has become invaluable as a managerial tool. Computers are commonplace in business accounting, banking and airline reservations systems, scientific research applications, in compiling insurance actuarial tables and in planning and control of industries. Large mainframe computers, minicomputers and microcomputers are now ubiquitous in the workplace. In order for the computer to do its job, an analyst must define the problem to be solved and a programmer must give the computer a detailed set of instructions to follow in solving the problem. Thus it is the human element which determines the degree of success of any computer application.

Job Opportunities

Many graduates begin their careers as junior programmers and, after some experience, may choose to move into jobs as systems analysts, programmer analysts or operating systems programmers. Others may become technical writers or move into sales or supervisory positions. Still others seek an entrepreneurial role as independent software authors or original equipment manufacturers (OEMs).

The Program

The first year of the program is comprised of basic business courses such as accounting, economics, statistics and an introduction to programming and systems, using mainframe, mini and microcomputers. In the second year, students specialize in one of the following options:

Information Systems — in addition to business systems and programming, students receive additional instruction in MIS and management skills.

Management Systems — students specialize in quantitative approaches to managerial decision making. Some of the topics covered are computer simulation, linear programming, computer graphics and the computer language APL.

Microcomputer Systems — Students specialize in microcomputer technology; digital logic and hardware, microcomputer systems programming, micro-based systems design and micro applications software.

Engineering Systems — this option offers specialized courses in CAD/CAM and computer graphics, as well as traditional training in computer programming and systems analysis.

Expert Systems — this is the branch of Artificial Intelligence which develops automated systems to capture the skills of human experts. These systems are now feasible for a variety of applications on microcomputers as well as larger systems.

Most options are limited in size to about 20 students. Where the number of applications exceeds the option size, students will be selected using a weighted average of selected first year marks.

Prerequisite 1 — First Year Entry

At least 6 grade 11 or 12 academic courses (arts and sciences), including English 12 and Algebra 11. *Second year options:* we specifically recommend Algebra 12 for Decision Systems and Physics 11 or 12 and Algebra 12 for Engineering Systems.

In the case of mature students, academic transcripts may be supplemented by relevant business experience, successful recent completion of relevant BCIT Part-time Studies courses with 75%, or successful recent completion of relevant courses at other post secondary institutions with 75%. Candidates may be asked to write an aptitude test to aid in the selection process.

Prerequisite 2 — Second Year Direct Entry

Qualified applicants are also accepted for direct entry into the second year of the diploma program. Successful applicants usually have a university degree or a diploma of technology from a recognized post secondary institution, or a number of courses from the BCIT Part-Time Studies Program equivalent to the first year course load, or an equivalent combination of post secondary training and work experience. Direct entry students may be required to take additional courses in order to make up deficiencies in their backgrounds. Such courses may be scheduled in consultation with the heads of the respective options.

Additional Information

All applicants should enjoy solving problems, using a logical and systematic approach. Because students spend many hours at computer terminal keyboards, applicants would find that the ability to touch type is useful.

Faculty and Staff

F.J. Martin, B.A. (Hons.), M.Sc., F.L.M.I., C.D.P., Acting Department Head
P. Abel, B.A. (Hons.), C.G.A..
D. Breckner, B.A., M.A.
R. Coolidge, Dipl. T., Co-ordinator, Service Courses
K.E. Holden, R.I.A.
H. Holst, C.D.P., Program Head, Information Systems Option
G.T. Kidd, B.Sc.
R.B. Long, C.G.A., Coordinator, Part-time Studies
V.A. Peppas, Dipl. T., C.D.P.
M. Ramkay, B.Sc.
M. Scriabin, M.B.A., Ph.D., Head, Laboratory for Applied Research in Computer Systems
F. Senior, B.A. (Hons.) C.D.P.
C.P. Simmons, C.G.A.
K. Takagaki, B.A. (Hons.), R.I.A., C.D.P Program Head, Microcomputer Systems Option
M.E. Turner, M.B.A., P.Eng. Ph. D. Program Head, Decision Systems and Expert Systems Options
A.Y.W. Wong, B.A.Sc., M.Eng., P.Eng., Program Head, Engineering Systems Option

TECHNOLOGY: Computer Systems

Level 1 — Classroom hours per week

ADMN 101	Economic Issues	3.0
BCOM 103	Business Communication for Computer Systems	3.0
COMP 150	Application Programmming — ASSEMBLER	5.0
COMP 170	Systems Analysis and Design 1	4.0
COMP 172	Systems and Programming Methodology, PASCAL	4.0
FMGT 101	Accounting 1	4.0
MKTG 102	Introduction to Marketing	3.0
OPMT 113	Applied Math	4.0

Level 2 — Classroom hours per week

ADMN 483	Computers and the Law	3.0
BCOM 203	Business Communication for Computer Systems	2.0
COMP 250	Application Programming — BASIC, COBOL	6.0

COMP 251 Microcomputer Systems and Applications 1					3.0
COMP 270 Systems Analysis and Design 2					5.0
FMGT 201 Accounting 2					4.0
OPMT 133 Statistics in Industry					4.0

Level 3	Info	Dec	Micro	Eng	Exp
ADMN 220 Organizational Behavior	3	—	—	3	—
COMP 280 Introduction to Decision Systems	3	—	3	3	3
COMP 350 Application Programming — COBOL, ASSEMBLER	6	6	6	—	6
COMP 351 Microcomputer Systems and Applications 2	—	—	5	—	—
COMP 352 Software Support Systems 1	3	3	3	3	3
COMP 355 CAD/CAM 1	—	—	—	3	—
COMP 356 Applications Programming — FORTRAN, ASSEMBLER, BASIC	—	—	—	6	—
COMP 357 LISP and Expert Systems	—	—	—	—	5
COMP 370 Technical Aspects of Systems Design	4	4	4	4	4
COMP 381 Decision Systems 1	—	8	—	—	—
COMP 392 Computer Projects 1	5	5	5	5	5
FMGT 102 Introduction to Financial Accounting	—	—	—	3	—
FMGT 305 Cost Accounting	4	4	4	—	4
OPMT 168 Management Engineering 1	3	—	—	—	—
	31	30	30	30	30

Level 4	Info	Dec	Micro	Eng	Exp
ADMN 111 Management Fundamentals	3	3	3	3*	3
COMP 251 Microcomputer Systems and Applications 1	—	—	—	3	—
COMP 450 Applications Programming — PL/1, CICS, 4th Generation Languages	6	6	6	6	6
COMP 451 Microcomputer Systems and Applications 3	—	—	8	—	—
COMP 452 Software Support Systems 2	3	3	3	3	3
COMP 453 Selected MIS topics	4	—	—	—	—
COMP 455 CAD/CAM 2	—	—	—	5	—
COMP 457 PROLOG and Expert Systems	—	—	—	—	8
COMP 470 Advanced Systems Analysis and Design	4	4	4	4	4
COMP 481 Decision Systems 2	—	8	—	—	—
COMP 492 Computer Projects 2	5	5	5	5	5
NGAS 403 Process Dynamics	—	—	—	3	—
OPMT 268 Management Engineering 2	4	—	—	—	—
	29	29	29	29	29

*Engineering Systems students take ADMN 111 if they have previously taken COMP 251.

Course Descriptions

ADMN 101 Economic Issues — Exposes students to the application of various economic principles to the study of particular problems. Topics vary depending upon the instructor and the technology receiving the courses.

ADMN 111 Management Fundamentals — An insight into the basic nature of business problems and the administrative process involved in handling them, with emphasis on the personnel management function. Study and discussion is undertaken of actual business situations illustrating problems frequently met in industry requiring managerial analysis, decision and action.

ADMN 220 Organizational Behavior — The study of factors that either influence or are influenced by people at work. The course will focus on macro factors such as organizational structure, technology and environment; group factors such as conflict and decision making; and micro or individual factors such as attitudes, perception and motivation.

ADMN 483 Computers and the Law — Acquaints students with the legal system of Canada and British Columbia, with an emphasis on understanding how to deal with the kinds of legal problems that one is likely to encounter in the computer field.

BCOM 103 — Business Communication for Computer Systems — Teaches basic communication theory and the principles of effective business writing. Practice is given in writing informational and persuasive memos and letters. Students also make an informative oral presentation and complete a job application unit. Assignments are specific to the computer field.

BCOM 203 Business Communication for Computer Systems — Continues the studies begun in BCOM 103. Students write a variety of informational analytical reports. They make persuasive oral presentations and learn how to interview for information. Assignments are specific to the computer field. Prerequisite: BCOM 103.

COMP 150 Application Programming — ASSEMBLER — An introduction to the principles of programming using IBM ASSEMBLER language. Emphasis is on understanding the mode of operation of a program, practice in the flow-charting, coding, debugging and documenting of simple business applications. Topics include data storage, use of registers, binary arithmetic, loading and searching tables.

COMP 170 Systems Analysis and Design 1 — An introduction to the common business applications — accounts receivable, accounts payable, inventory. The course will focus on the analysis, design and development of a computer system. The course includes commonly used tools (systems flowcharts, decision tables, data gathering techniques, forms design) in the analysis and design states, and a group project to convert a clerical system to a computer system.

COMP 172 Systems and Programming Methodology — PASCAL — This course complements COMP 150 and 170 and is a prelude to all future systems and programming courses. One of the key activities involving computers is the capture, storing, manipulation and retrieval of data to provide information (and thus, knowledge) for more intelligent decision-making. This course introduces various underlying concepts related to data such as representation inside a computer, and how data can be manipulated and accessed. The course also provides standard techniques which can be applied to a variety of commonly encountered programming situations, without regard to the syntax or characteristics of any particular programming language. Lab assignments concentrate on bridging the gap between fuzzy, informal, natural language problem specifications and the precise, formal specifications needed for programming.

COMP 250 Application Programming — BASIC, COBOL — BASIC is used to develop interactive programming and processing techniques. COBOL is introduced to reinforce the structured, modular programming techniques developed in COMP 150 and

151. COBOL programs are written to provide experience in solving practical business problems. Topics include subroutines, table handling, disk file updating and data validations.

COMP 251 Microcomputer Systems and Applications 1 — A study of microprocessors and microcomputer systems. Stresses the wide range of microcomputer applications as well as the differences and similarities to mini/mainframe systems. Topics include: overview of LSI and VLSI technology, microcomputer system architecture, hardware and software characteristics, application considerations. Also includes selected topics in computer fundamentals as related to microcomputers, such as machine concepts, Boolean logic, and Digital design principles. Students complete a project involving microcomputer hardware, software or related topic.

COMP 270 Systems Analysis and Design 2 — A continuation of the material covered in COMP 170, covering areas such as: systems development life cycle, getting a project started, preliminary investigation, systems requirements, fact finding techniques, data flow concepts and diagrams, data dictionaries, cost/benefit analysis, design of input/output and controls, on-line system design considerations, system testing, and implementation, hardware and software selection. Human factors and ethical issues are stressed.

COMP 280 Introduction to Decision Systems — An overview of the use of computers to assist management in short and long run decision making for planning and control. Topics include decision theory, inventory models, simulation, and linear programming, as well as the behavioral aspects of implementation of computer models.

COMP 350 Application Programming — COBOL, ASSEMBLER — Continuation of COMP 250. Completion of ASSEMBLER language programming including the linkage of separately written program sections. Completion of COBOL language. Students write several programs incorporating a variety of programming techniques.

COMP 351 Microcomputer Systems and Applications 2 — Hardware topics include digital logic, MPU and MPU support chip sets, interfacing techniques and current real life microcomputer systems and peripherals. Software topics include several MPU instruction sets, microcomputer operating systems, and common microcomputer programming languages such as PASCAL, C, Advanced BASIC, and various ASSEMBLY languages.

COMP 352 Software Support Systems 1 — This course covers technical topics in hardware and software related to operating systems and other software support systems. Topics include hardware and software architecture, operating systems, resource management (memory processor, I/O device, data, etc.) utility functions, and programming language issues.

COMP 355 CAD/CAM 1 — Lectures, demonstrations, and practical hands-on exercises are used to present topics on: CAD/CAM hardware; CAD/CAM software and algorithms; drawing production and management.

COMP 356 Applications Programming — FORTRAN, ASSEMBLER, BASIC — Continuation of COMP 150/250. Upon successful completion of this course, the student will be able to design and code advanced FORTRAN programs using structured style and top down design; use subprograms and linkage to ASSEMBLER, and use BASIC to do graphic routines.

COMP 357 LISP and Expert Systems — A major goal of this course is to have students become proficient in the language LISP so they can use it as an Expert System development tool in COMP 457. Once the basic syntax and features of the language have been covered, the course will focus strongly on LISP application areas, in particular those suitable for Expert Systems work.

COMP 370 Technical Aspects of Systems Design — Topics include tape and disk storage characteristics with an indepth study of file organization methods, Sequential, Indexed and Direct. In addition, the study of issues in the development of on-line systems with a major on-line systems project.

COMP 381 Management Decision Systems 1 — The development of computer and non-computer models which assist management in decision making in an uncertain environment. Topics include decision theory, inventory models, queuing theory, simulations of discrete and continuous systems, and risk analysis. Behavioral as well as quantitative aspects are emphasized. Feasibility studies, reports and presentations are required throughout. Students develop programs in FORTRAN and PASCAL.

COMP 392 Computer Projects 1 — These courses allow students to work on projects of their choice within guidelines specified by faculty. The projects will be drawn from a variety of sources, wherever possible from industrial situations, and may require extensive contact with the business community, and will cover a large number of diverse applications. Students will ordinarily work in teams and will seek direction from a faculty member assigned as their project supervisor. Some of the projects will continue through both terms, others will end in COMP 392 and new ones start in COMP 492.

COMP 450 Application Programming — PL/I, CICS, 4th Generation Languages — Continuation of COMP 350, including the PL/I language, the chief programmer team approach and on-line programming using CICS. Students will also be briefly introduced to a number of other languages such as RPG, APL, FOCUS, etc. Considerable time will be spent on a large multi-program system which will have been designed in COMP 470.

COMP 451 Microcomputer Systems and Applications 3 — An advanced course in Microcomputer Systems. Topics covered will include Systems Software (assemblers, compilers, operating systems, editors); Applications Software (spreadsheet, data base, communications, word processing, etc.); microcomputer networks; microcomputer management and control. Students will conceive, design and implement a systems software project (e.g. language interpreter, cross assembler, communications package, etc.). The impact of microcomputer technology within organizations and its relation to traditional data processing will also be emphasized.

COMP 452 Software Support Systems 2 — see COMP 352.

COMP 453 Selected MIS Topics — An overview of current topics of interest to the Management Information Systems practitioner. Professional journals and articles are used to explore such themes as: trends and controversies in MIS; ethical issues; career paths and professionalism; and future directions for MIS. Students read, interpret and lead discussions of relevant material.

COMP 455 CAD/CAM 2 — Lectures, demonstrations, and practical hands-on exercises are used to present topics on CAD/CAM hardware, CAD filing systems, work station ergonomics, practical applications of CAD/CAM, acquisition procedures.

COMP 457 PROLOG and Expert Systems — This course stresses Expert Systems project development techniques. Students write programs to practice the concepts taught. The language PROLOG is taught as the course progresses, and students use LISP, PROLOG, or Expert Systems skill packages to do major projects towards the end of the course.

COMP 470 Advanced Systems Analysis and Design — Structured systems analysis; relational data base concepts; design of on-line systems; data communications and networking. Includes analysis, design and specifications of a major project which will be programmed in COMP 470. Also includes a series of special computer related topics of current interest.

COMP 481 Decision Systems 2 — Systems which assist management in planning and control of projects, the allocation of scarce resources and other short and long range planning and operational decisions. As in COMP 381, behavioral as well as quantitative aspects of the systems are examined and feasibility studies, reports and presentations are required. Topics include PERT and CPM scheduling methods, linear programming theory and application with emphasis on problem formulation, sensitivity analysis and implementation of findings; non-linear, integer and dynamic programming; comparison of optimization, simulation and heuristic methods; choosing the appropriate technique. The course uses "package" programs where applicable.

COMP 492 Computer Projects 2 — see COMP 392.

FMGT 101 Accounting 1 — Permits persons with little or no accounting background to become familiar with the techniques of working through the full accounting cycle. It provides theoretical and practical training in basic accounting as preparation for FMGT 201. Topics include accounting as an information system; introduction to accounting theory; income measurement; traditional record-keeping procedures; the accounting cycle; special journals; cash; investments and receivables.

FMGT 102 Introduction to Financial Accounting — Includes a survey of the accounting process and a review of basic accounting theory. Preparation and analysis of financial statements and the reporting of financial information to outsiders is covered in depth. Also covered is accounting for assets, liabilities and owner's equity.

FMGT 201 Accounting 2 — The follow-up to FMGT 101, topics include inventory, long-lived assets, liabilities, forms of business organizations, cash-flow and working capital analysis, manufacturing accounting, management accounting, consolidated statements, analysis of financial statements and price level changes. Prerequisite: FMGT 101.

FMGT 305 Cost Accounting — Direct costing and the contribution approach; cost-volume-profit analysis; cost analysis for managerial planning and decisions; inventory planning, control and valuation; budgeting and profit planning; standard costs; cost and price variance analysis; capital budgeting. Applications on HP 3000 will be studied during late term labs. Prerequisite: FMGT 201 or 215.

MKTG 102 Introduction to Marketing — Includes a detailed study of the basic marketing functions, marketing research, product planning, selection of trade channels, merchandising, advertising, sales promotion and salesmanship. Marketing of consumer goods as well as industrial goods will also be covered.

NGAS 403 Process Dynamics — Introduces a practical and effective 'real time' process control situations. The student is required to produce interim progress reports during the course and a final, formal technical report at the end of the course. Topics include: system dynamics, response time, control strategies, system optimization, system modelling, flow charting, transducer and control valve evaluation.

OPMT 113 Applied Math — First portion of course involves positional numbering systems, binary arithmetic and an introduction to Boolean Algebra as it relates to operation of digital computers. The second phase covers mathematics of finance including simple interest, compound interest, annuities and project evaluation methods both before and after taxes. Typical business and personal applications are illustrated.

OPMT 133 — Statistics in Industry — Fundamentals of descriptive statistics and an introduction to inferential statistics. Inferential Statistics include probability theory; sampling and sampling distributions; estimation; hypothesis testing; linear regression and correlation analysis using a computer package (SPSS).

OPMT 168 Management Engineering 1 — The use of systematic problem solving techniques to apply cost saving measures to a data processing environment. The use of terms of reference to clarify goals for system improvements. Recording and analysis techniques such as work measurement, activity sampling, flow process charting and multiple activity charting in the information processing workplace. The application of critical examination to selected work situations. Quantified evaluation of alternatives to arrive at a best solution. Tactics for implementing and maintaining the change.

OPMT 268 Management Engineering 2 — Project control through the use of arrow and precedence diagrams. Time logic to level resource use. Microprocessor software packages for project control. Financial analysis of an investment proposal to prepare a request for expenditure, risks as a decision parameter, sensitivity analysis, decision trees and Monte Carlo techniques to analyze risks. Forecasting and projections using spreadsheet software. Applications of multi-dimensional corporate modelling. Overview of robotics and the implications for computer students. Students research a topic or a company within the computer industry and make an effective oral presentation.

Electrical/Electronics

Electrical energy, electronic systems, industrial automation and control, and telecommunications form the base of modern high technology. These disciplines and the related systems and equipment are essential to the factory, the industrial process, the office, the small business, the hospital and the home. Modern transportation could not function without electronic systems.

There is a need for persons trained in the principles and applications of electronic systems to take their places in the technical team. The positions held by these persons are found in design, development, production, installation, sales and maintenance. The positions may be in commercial companies, government agencies, or educational institutions. The technologist graduate of the Electronics group is the anchor of this team.

The Electrical/Electronics program is accredited by the Applied Sciences Technologists and Technicians of British Columbia.

The Program

Five options are offered in the Technology; Control Electronics, Instrumentation and Process Control, Power, Telecommunications, Microelectronics and Robotics.

The first three levels of the technology program are common to all five options. Levels 4 and 5, for all five options, are practically oriented, being primarily related to the specific industrial practices.

Throughout the progam, students spend a good portion of their time in laboratories and workshops carrying out practical, applied assignments.

The *Power Option* is concerned primarily with Industrial Electronics, generation, transmission and the distribution, utilization and control of electrical energy. Power electronics requires the study of digital techniques and microprocessors which are now integral components of power and industrial electronics systems. This option is currently planned to be run once a year in the January-April term.

The *Instrumentation and Process Control Option* is concerned with the application of automation and control systems to industrial processes. It is a multidisciplinary program combining analog and digital electronics, computer systems and software development, applied physics (mechanics, fluid mechanics and thermodynamics), and feedback techniques. Emphasis is placed on the application of modern measurement and control strategies to a wide range of manufacturing and processing industries. Offered January-April and September-December.

The *Telecommunications Option* emphasizes the application of electronics in the telecommunications industry, from simple broadcast and mobile transceivers to large density microwave radio systems, as well as electronic navigational, satellite communication systems and the use of new generation computers in the telecommunications industry. Level 4 offered all terms. Level 5 not offered in the April-August term.

The *Control Electronics Option*, which might well be called the Computer Control Option, presents a broad-based electronics program of study designed to provide the student with the background necessary for entry into a wide variety of areas in the electronics career field. Emphasis is on digital electronics, industrial electronics and digital computers, since the techniques involved are common to all modern electronic systems. Level 4 offered all terms. Level 5 not offered in the April-August term.

The *Microelectronics Option* deals with the miniaturization and integration of electronic circuitry and with the application of computer tools, used in the design (CAD) and engineering (CAE) of electronic circuitry. The curriculum will include instruction in hands-on usage of CAD/CAE systems. Students will learn the uses of simulation techniques in the design of digital and analog circuitry. Basic training will be given in the layout of both hybrid and monolithic custom integrated circuits using CAD methods. Design projects, circuit assembly, and circuit testing will be carried out by students to emphasize practical applications wherever possible. Offered January-April and September-December

The Robotics (Automation) Technology program will provide the student with knowledge of the applications of flexible automation equipment, the various mechancial systems used and the electronics incorporated for their control. Gaining "hands on experience" with a variety of industrial robots and machinery in a modern, well equipped lab will be emphasized. Particular attention will be given to applying automation techniques to British Columbia industries. The program includes 5 academic study levels and 3 salaried co-operative work terms during which the student can gain invaluable experience working in associated industries.

Semester System

The Electrical/Electronics Technology operates on the semester system. That is, there are three study periods of 15 weeks each per year. Students are admitted three times each year in January, May and September. The Robotics option is available in September only. All levels (it takes five levels to complete the program) run concurrently except for those which do not run in the summer. See individual option description for frequency of offering.

Co-operative Education is an integral part of the Electrical/Electronics Technology. During this portion of the program, the student is placed in an electronics related work setting in consultation with BCIT and industry, on a paid basis.

Some benefits to students are:

1. The student will receive more training in the classroom and in the workplace, a need expressed by industry due to the accelerating changes occurring in the electronics technologies.
2. There is more flexibility as to program entry and graduation.
3. Should there be a need to repeat a Level, that Level is available in each semester.
4. If a seat is not available in the September semester, the applicant can apply for the January or May semesters.
5. Valuable experience is gained in the electronics industries, making the student instantly employable upon graduation.

Transfer credits of the Electrical/Electronics Technology program, to British Columbia universities are possible on an individual basis.

Prerequisites

Algebra 12, Physics 11 and Chemistry 11, all with a C + standing. Note that Chemistry 11 is not required for applicants to the Robotics option.

Faculty and Staff

J.H. Casimir, B.A.Sc., P.Eng., Department Head
E.H.V. Back, Dipl.T., A.S.T.T.
R.J. Barrett, A.S.T.T.
R. Beketa, Dipl.T.
U.R. Bottcher
L.Boyle, Dipl.T., B.Sc.

R. Chadwick
C. Chociolko, Dipl.T.
T.W. Coghlan, Dipl.T., A.S.T.T.
N. Cousins, B.Sc., M.Sc., P.Eng.
P. Fenske, Dipl.T.
B. Fingarson, Dipl.T.
D. Finlayson, Dipl.T.
J. Gascoyne, Dipl.T.
T.J. Glave, B.Sc. (Eng.), P.Eng.
C.F. Glazier, B.Sc. (Eng.), P.Eng., Program Head
E.G. Hancock, Dipl.T., B.Eng., P.Eng., Program Head
L.C. Hannah, Dipl.T.
G.R. Harland, Dipl.T., A.S.T.T.
J. Hayes, Dipl.T., A.S.T.T.
T. Hurtubise
M. Inch, B.Sc.
K. Jothen, B.A. (Co-op)
K. Kajiwara, Dipl.T., A.S.T.T.
E. Kenward, B.Sc.
M. Lane, Dipl.T.
J. Leibel
D. Lewis, B.A.Sc., (Mech), P.Eng.
J. Lein
J. McLarnon, B.Sc., M.Sc., Ph.D.
W.F. Miklas, Dipl.T., A.S.T.T.
A. Miller
A.R. Murdoch, B.A.Sc., P.Eng.
M.G.R. Phillips, B.Sc., Ph.D.
R. Randall
R. Riches, B.Sc., M.Sc.
I. Ross, B.Sc. (Hons.)
R.T. Russell
J.W. Schoonover, Dipl.T., A.S.T.T.
E.W. Scratchley, B.A.Sc., M.A.Sc., P.Eng., Program Head
J.N. Tompkin, B.Sc. (Eng.), P.Eng., Chief Instructor
E.A. Upward, Dipl.T., A.S.T.T., Program Head
E. Wilmink, B.Rec. (Co-op)

TECHNOLOGY: Electrical

Level 1		Classroom hours per week
ELEC 100	Circuit Analysis 1	6.0
ELEC 101	Shop Practice	5.0
ELEC 102	Programming 1	3.0
MATH 143	Basic Technical Mathematics for Electrical	7.0
PHYS 106	Physics for Electrical Technology	6.0
TCOM 104	Technical Writing	3.0

Level 2		Classroom hours per week
ELEC 200	Circuit Analysis 2	5.0
ELEC 201	Printed Circuit Board Fabrication	4.0
ELEC 202	Digital Logic	3.0
ELEC 203	Electronic Circuits 1	6.0
MATH 243	Calculus for Electrical	7.0
PHYS 206	Physics for Electrical Technology	5.0

Level 3		Classroom hours per week
ELEC 302	Digital Techniques 2	5.0
ELEC 303	Electronic Circuits 2	5.0
ELEC 304	Telecommunications 1	5.0
ELEC 305	Electrical Equipment 1	5.0
ELEC 306	Transducer Applications	5.0
ELEC 307	Pulse Techniques	5.0

CO-OP 1		Classroom hours per week
ELEC 390	Co-op 1	30.0

CO-OP 2		Classroom hours per week
ELEC 490	Co-op 2	30.0

PROGRAM: Telecommunications

Level 4		Classroom hours per week
ELEC 402	Digital Systems	6.0
ELEC 404	Telecommunications 2	6.0
ELEC 406	Data Communications	6.0
ELEC 408	Antennas and Transmission Lines	5.0
MATH 343	Transform Calculus for Electrical	4.0
TCOM 204	Technical Writing	3.0

Level 5		Classroom hours per week
ELEC 415	Computer Systems	6.0
ELEC 416	Communications Networks	5.0
ELEC 417	Telecommunications 3	5.0
ELEC 418	Radio Frequency Circuit Design	6.0
ELEC 419	Microwave Principles	5.0

PROGRAM: Control Electronics

Level 4		Classroom hours per week
ELEC 402	Digital Systems	6.0
ELEC 403	Industrial Electronics	5.0
ELEC 406	Data Communications	6.0
ELEC 407	Feedback	6.0
MATH 343	Transform Calculus for Electrical	4.0
TCOM 204	Technical Writing	3.0

Level 5		Classroom hours per week
ELEC 415	Computer Systems	6.0
ELEC 420	Computer Control Systems	5.0
ELEC 421	CAD Systems	5.0
ELEC 423	Video Graphics	6.0
ELEC 434	PASCAL	5.0
OPMT 149	Business Management for E and E	3.0

PROGRAM: Instrumentation

Level 4		Classroom hours per week
CHSC 341	Unit Operations	4.0
ELEC 402	Digital Systems	6.0
ELEC 411	Electronics for Interfacing and Signal Conditioning	5.0
ELEC 412	Transducers for Measurement and Control	6.0
ELEC 413	Control Devices and Techniques	6.0
TCOM 204	Technical Writing	3.0

Level 5		Classroom hours per week
CHEM 302	Industrial Analyzers	5.0
ELEC 420	Computer Control Systems	5.0
ELEC 424	Industrial Processes and Control Systems	6.0
ELEC 426	Microprocessors in Measurement and Control	6.0
ELEC 427	Transducer Systems	5.0
ELEC 428	Instrumentation Engineering Project	4.0

PROGRAM: Microelectronics

Level 4		Classroom hours per week
ELEC 402	Digital Systems	6.0
ELEC 432	CAD/CAE for Microelectronics	6.0
ELEC 433	Hybrid Microelectronics	6.0
ELEC 434	PASCAL	5.0
MATH 343	Transform Calculus for Electrical	4.0
TCOM 204	Technical Writing	3.0

Level 5		Classroom hours per week
ELEC 406	Data Communications	6.0
ELEC 415	Computer Systems	6.0
ELEC 436	Analog Integrated Circuit Design	5.0
ELEC 437	Principles of VLSI Design	5.0
ELEC 438	Microelectronics Applications	5.0
OPMT 149	Business Management for E and E	3.0

PROGRAM: Power

Level 4 — Classroom hours per week

ELEC 402	Digital Systems	6.0
ELEC 403	Industrial Electronics	5.0
ELEC 406	Data Communications	6.0
ELEC 407	Feedback	6.0
MATH 343	Transform Calculus for Electrical	4.0
TCOM 204	Technical Writing	3.0

Level 5 — Classroom hours per week

ELEC 405	Electrical Equipment 2	5.0
ELEC 414	Power Systems	6.0
ELEC 429	Power Electronics	5.0
ELEC 430	Systems Design	4.0
ELEC 475	Illumination	3.0
ELEC 476	Industrial Systems	4.0
OPMT 149	Business Management for E and E	3.0

PROGRAM: Robotics

Level 1 — Classroom hours per week

ELEC 103	AC/DC Circuits	7.0
MATH 134	Basic Technical Mathematics for Robotics	7.0
MECH 106	Manufacturing Processes 1	4.0
MECH 320	Fluid Power 1	3.0
PHYS 108	Physics for Robotics Technology	6.0
TCOM 104	Technical Writing	3.0

Level 2 — Classroom hours per week

ELEC 102	Programming 1	3.0
ELEC 202	Digital Logic	3.0
ELEC 203	Electronic Circuits 1	6.0
MATH 234	Calculus for Robotics	7.0
MECH 211	Manufacturing Processes	4.0
MECH 420	Fluid Power 2	3.0
PHYS 208	Physics for Robotics Technology	5.0

Level 3 — Classroom hours per week

ELEC 302	Digital Techniques 2	5.0
ELEC 303	Electronic Circuits 2	5.0
ELEC 305	Electrical Equipment 1	5.0
ELEC 315	Robot Fundamentals	6.0
MATH 343	Transform Calculus for Electrical	4.0
TCOM 204	Technical Writing	3.0

Level 4 — Classroom hours per week

ELEC 307	Pulse Techniques	5.0
ELEC 402	Digital Systems	6.0
ELEC 407	Feedback	6.0
ELEC 467	Robot Applications and Gripper Design	5.0
ELEC 468	Robot Servicing and Maintenance	3.0
ELEC 470	CNC and Robotic Language	5.0

Level 5 — Classroom hours per week

ELEC 471	Digital Control using Microcomputers	6.0
ELEC 472	Robot Sensors	5.0
ELEC 473	Integrated Manufacturing Cell Design	5.0
ELEC 474	Drafting and Design Project	8.0
OPMT 149	Business Management for E and E	3.0
OPMT 460	Industrial Engineering	4.0

Course Descriptions

CHEM 302 Chemical Instrumentation — Teaches the student the principles and applications of electronics transducers and circuitry used in the process analysis of liquids and gases. Topics include electro-chemical principles and terminology, selection of transducers, electrolytic conductivity, specific ion probes, specific ion electrodes, flame ionization detectors, chromatographs and spectrophotometers. Lab exercises consist of design, construction and calibration of transducers such as coulometric electrodes and ionization detectors as well as construction of characteristic signal linearization and amplification circuitry.

CHSC 341 Unit Operations — First and second law of thermodynamics; enthalpy, entropy, phase rule, thermodynamic diagrams and tables; properties of steam; fluid flow and measurement in pipes and channels, piping, pipe fittings and valves; flow of heat, conduction, convection, radiation, film and overall transfer co-efficients, heat exchangers; principles and application of equipment for evaporation, distillation, absorption, extraction; humidification and dehumidification; drying; solid-liquid and liquid-liquid extraction.

ELEC 100 Circuit Analysis 1 — This course teaches the principles and methods of analysis related to DC circuits. Topics include work, energy, voltage current, power, resistance, inductance, capacitance, impedance, SI units and terminology. Methods of analysis include loop, superposition, Nodal, Thevenin and Norton. The lab portion of the course provides practice in the use of power supplies, function generators, multimeters and components. The labs are synchronized with the lectures so that theory is studied and confirmed by application.

ELEC 101 Shop Practice — Through the design and manufacture of a specific electronic project, students learn the basic skills required in the field of electronics including basic electronic drafting, preparation of detailed drawings, sheet metal cutting and folding, soldering, selection and mounting of connectors such as phono and BNC, basic printed circuit layout and manufacture. Introduces students to the basic discrete passive components used in electronics and to the techniques of layout and fabrication of electronic equipment. Upon successful completion, the student should have a good understanding of the characteristics of components used in electronic equipment, chassis and metal cabinet design, electronic drafting conventions, preparation of detailed drawings, sheet metal cutting and folding, as well as the tools and measurement techniques used in electronic fabrication.

ELEC 102 Programming 1 — Teaches structured computer programming with the BASIC computer language. Topics include the use of a disk based operating system, input and output commands, decision making, repetative programming structures, subroutines, string manipulations and the use of graphics on the IBM PC.

ELEC 103 AC/DC Circuits — Definition of common electrical variables (potential, current, charge, power, etc.) and electrical circuit parameters (resistance, inductance and capacitance). Introduction to circuit analysis techniques applicable to DC and AC circuits.

ELEC 200 Circuit Analysis 2 — Introduces the behavior of electrical circuits and networks when driven by a single-phase alternating current (AC) source; preparation for courses in electronics and power systems. The course includes the sine wave, average and effective values, power and power factor; resistance, capacitance and inductance as elements in single-phase AC circuits; phasor diagrams, impedance, admittance, voltage, current and power diagrams; analysis of AC circuits with complex algebra; resonance and resonant circuits, high and low pass filters; the application of circuit laws and theorems to single-phase AC circuits, the analysis of two-part networks; coupled circuits. The circuit theory is verified using multimeters, sine wave generators, amplifiers and dual trace oscilloscopes.

ELEC 201 Printed Circuit Board Design — The first 4 weeks of this continuation of Shop Practice, deal with printed circuit board repair and reworking. Topics and work include materials, manufacturing methods, tools used for repair, high reliability soldering,

repair of heat damaged and mechanically damaged boards, boards with plated holes and multi-layer boards. The last 8 weeks cover the design and fabrication of single side printed circuit boards. Topics and work include material and equipment requirements, artwork layout from schematic, board processing (etching, drilling and component mounting).

ELEC 202 Digital Logic — Covers logic gates from the TTL and CMOS families wth study of their specifications and data sheets. Noise and loading considerations are introduced. Schematic symbology and development of logic systems are studied. Sequential logic, flip flops (RS, JK, D Type, Master-slave), simple counters, shift registers and timing diagrams are all covered. Emphasis is on thorough understanding of characteristics like propagation delay, clock synchronization and timing sequences.

ELEC 203 Electronic Circuits 1 — Explains how electronic circuits work, how to analyse them and how to design, modify and combine them to perform complex functions. Topics include interpretation of bipolar and field-effect transistor characteristic curves; voltage and current amplifying circuits; the transistor as a switch; loadline analysis; choice of Q-point; bias circuits; equivalent circuits; frequency response, feedback, oscillation response; oscillator circuits; power amplifiers of various types; heat sink calculations and characteristics and application of switching devices including the unijunction.

ELEC 208 Circuit Analysis AC/DC — Applicants are required to obtain authorization from the department before enrolling in this course. This course enables persons with a strong background or education in the electrical field to cover and/or review those topics necessary to take the more advanced courses in the Electrical Program. Students study the basics of how single phase AC and DC circuits work, and how to analyze and design them for particular situations. This course is not intended for those without previous training in electrical theory or advanced math. Prerequisite: Math higher than ALG 12, PHYS 11 and CHEM 11.

ELEC 209 Electrical Principles and Applications — Power, resistance, capacitance; inductance circuit theory and load analysis. Concepts of integrated circuits, component identification and application. AC and DC drives, stepping motors, encoders, resolvers and induction scates.

ELEC 250 Electrical Systems — Students learn how to plan the electrical system for a specific building, with the electrical designer. How to read and work with common electrical drawings and specifications, understand single and three-phase systems, and power factor correction for minimumal operations costs; recognize and avoid building designs that create costly electrical design problems. Prerequisite: ELEC 150.

ELEC 302 Digital Techniques 2 — This course studies logic gates from the TTL family, their specifications and data sheets. Noise and loading considerations are introduced. Schematic symbology and development of logic systems are studied. Sequential logic, flip flops (RS, JK, D type, Master-slave), simple counters, shift registers and timing diagrams are all covered. Emphasis is placed on thorough understanding of characteristics like propagation delay, clock synchronization and timing sequences. Also included are analog to digital and D/A conversion techniques.

ELEC 303 Electronic Circuits 2 — A continuation of ELEC 203 Electronic Circuits 1. One half of the course deals with circuit applications not previously covered including DC power supplies, voltage and current regulation; small-signal tuned amplifiers, neutralising and the cascade configuration; wide band amplifiers; DC amplifiers; differential amplifiers. The remaining half of the course gives an introduction to linear integrated circuits, particularly the operational amplifier and some of its circuit applications including an introduction to active filters. Prerequisite: ELEC 200, 203, and MATH 243.

ELEC 304 Telecommunications 1 — Introduces students to the principles of telecommunications. Beginning with the history of communications and the nature of speech and waveform composition, discussion develops into the various modulation techniques. These include amplitude modulation and its derivative. Associated demodulation and detection techniques are discussed for each modulation type. Other topics include frequency generation, frequency multipliers, frequency translation filter circuits. Prerequisite: ELEC 203, MATH 243, and ELEC 200 or ELEC 208.

ELEC 305 Electrical Equipment 1 — Begins as a continuation of circuit analysis then moves on to the study of motors, generators, transformers and rectifiers. Topics include a review of phasor diagrams, power factors, three phase power and circuit analysis, single and three phase power distribution systems, DC motors and generators, induction motors, Synchronous motors and generators, stepper motors, motor control circuits, transformers (single and three phase), and three phase rectification. Prerequisite: ELEC 200 or 208 and MATH 243 or 313, PHYS 206.

ELEC 306 Transducer Applications — Introduces the student to the electrical and electronic transducers used to interface systems to the real world. Methods used to measure strain, force, position, temperature and pressure will be discussed, and the circuitry used will be described and evaluated. The application of feedback to control a process variable will also be discussed. Theory will be supported by laboratory exercises applying typical industrial equipment to measure the variables studied. Prerequisite: MATH 243, PHYS 206, ELEC 303.

ELEC 307 Pulse Techniques — Introduces pulse signal circuits such as clippers and clamps, transistor switches, astable and monostable multivibrators, Schmitt triggers, ramp generators, DC to DC converters and phase lock loops. Both discrete transistors (bipolar and FET) and CMOS integrated circuits are used in building all these circuits. Each circuit is analyzed in detail and its practical application is considered. Prerequisite: ELEC 200, 202, 203, MATH 243.

ELEC 315 Robot Fundamentals — Discusses the types of robots and the coordinate systems under which they operate. Investigates accuracy, repeatability in relation to load capability. Investigates various programming options and considers human factors and safety in robot deployment. Prerequisite: ELEC 102, 203.

ELEC 390 Co-op 1

ELEC 402 Digital Systems — A detailed introduction to microcomputer architecture and machine language programming using the Z80. The student is introduced to a text editor, assembler, linker, and debugger under the LP/M operating system. The CP/M system is used as a development tool to investigate the Z80 memory organization, internal structure, and assembly language programming. A small single board Z800 system is used to investigate Z80 timing, control, buffering, interfacing, interrupts and support chips. Prerequisite: ELEC 102, 302, 303 and 307.

ELEC 403 Industrial Electronics — Covers DC power supplies and regulators including a major session on switching regulators. DC-to-AC inverters. Triac and SCR phase control is introduced along with SCR and VMOS FET power control for DC circuits. Relay ladder logic circuits are implemented with programmable controllers. Other topics briefly covered include battery characteristics, battery chargers, and electrical hazards. Prerequisite: ELEC 303, 305 and 307.

ELEC 404 Telecommunications 2 — Continues the development of circuits and telecommunication techniques into transmitters and receivers. Typical AM, FM and SSB transmitters are examined in detail including automatic frequency control, metering and monitoring, input transducers and antenna coupling. Similarly, practical receivers are examined including tuned radio frequency and superheterodyne. Receiver sensitivity, selectivity and fidelity are fully discussed. Other topics include oscillator tracking, beat frequency oscillator, automatic gain and frequency controls, squelch and the audio section. Noise, emphasis, distortion and other transmitter and receiver performance criteria are discussed. The video signal and receiver are also studied. Prerequisite: ELEC 303, 304.

ELEC 405 Electrical Equipment 2 — This course is a continuation of ELEC 305. Commencing with a review and expansion of topics on fuses and circuit breakers, the course moves on to a more detailed study of DC and AC motors and their starting equipment. Students will be introduced to electrical protective devices such as instrument transformers, protective relays and lighting arresters. Prerequisite: ELEC 305.

ELEC 406 Data Communications — Introduces the techniques used to communicate digital data from one point to another. Topics include data transmission media: DC loops; voice frequency channels; transmission methods including FSK, PSK, PCM; and time division multiplexing. Interface standards such as RS232C, RS422 and coding techniques such as NRZ, RZ, NRZ1, Manchester are covered. Transmission line theory brings up band width bit rate limitations, error rates and noise. Other topics include protocols such as bisync, SDLC, HDLC and networking schemes including X.25, and Ethernet. Prerequisite: ELEC 302, 303, 307 and 402. (ELEC 402 may be taken concurrently.)

ELEC 407 Feedback — Emphasizes the theory of feedback and its effect on continuous and discrete time linear systems. Topics include signal-flow graph analytic techniques, the transfer function concept and stability criteria for feedback systems. These topics are applied to the analysis and design of oscillators, wideband amplifiers and modern analog filters. The sampling concept (discrete time system) and the complex z-plane are introduced. Several approaches to the realization of a sampled data system are reviewed. Prerequisite: ELEC 303, 306 and MATH 343. (MATH 343 may be taken concurrently.)

ELEC 408 Antennas and Transmission Lines — Provides practical knowledge of the methods and devices used for the transmission of radio frequency energy. Topics include the characteristic and limitations of open-wire lines, coaxial lines and waveguides; dipole and simulated dipole antennas; loop antennas; antenna arrays and microwave antennas (horns, slotted lines, parabolic).

ELEC 411 Electronics for Interfacing and Signal Conditioning — Deals with the application of analog electronics to process automation and control systems. Topics include: the specification, design and evaluation of amplifiers commonly used in transducer interfacing applications; high accuracy and stability signal conditioning design techniques; analog signal transmission and multiplexing systems with emphasis on the 2-wire current loop. A strong practical approach is ensured by relevant lab exercises and projects. Prerequisite: ELEC 302, 303, 306.

ELEC 412 Transducers for Measurement and Control — Introduces techniques used in the industrial measurement of pressure, flow, level, density and viscosity. Various pressure transducers are discussed including manometers and differential pressure transmitters. Flow measuring elements such as orifice plates, turbine flow meters, magnetic flow meters and ultrasonic flow meters are discussed. Applications of density and viscosity to various processes are examined. Labs consist of the configuration, calibration and testing of various industrial devices. Prerequisite: PHYS 206, ELEC 306, ELEC 411. (ELEC 411 may be taken concurrently.)

ELEC 413 Control Devices and Techniques — Examines the principles and practices used in the design and application of common industrial process control components and systems. Topics include: automatic process control principles using open and closed loop systems. Basic feedback design principles used with electronic, pneumatic and hydraulic devices used as transmitters, signal converters positioners and power amplifiers. Control valve specification and sizing is also included. Lab exercises will consist of analyzing the design and performance of manufacturers control equipment applied to actual steam and liquid processes. PrerequisiteL ELEC 306, 412. (ELEC 412 may be taken concurrently.)

ELEC 414 Power Systems — Commences with an overview of energy sources and then moves on to the circuit analysis of electrical power transmission and distribution systems. Synchronous machine, transient and subtransient reactances and how they affect symmetrical and asymmetrical fault currents will be studied in detail. Topics may include hydro, thermal, nuclear, solar, wind and tidal power, synchronizing and load sharing of generators and systems, transmission and distribution line parameters, the per unit method of circuit calculation, transmission and distribution line voltage regulation and determination of available short circuit currents. Prerequisite: ELEC 305.

ELEC 415 Computer Systems — Introduces software and hardware concepts and strategies that are essential for development of computer systems. Topics include: top-down design; disk controllers and structures; direct memory access; inter CPU communication; stand alone systems; and memory management. Prerequisite: ELEC 402 and 406. (ELEC 406 may be taken concurrently.)

ELEC 416 Communication Networks — Introduces students to the present-day North American telecommunications network. Topics include evolution of telephone systems, transmission and switching; transmission mediums; frequency division multiplexing; time division multiplexing including pulse code modulation; introduction to data communications and fibre optics; switching systems including step-by-step (strowger), cross-bar-common control; electronic space and time division types; associated signalling, power and traffic considerations. Prerequisite: ELEC 404, 406, 402.

ELEC 417 Telecommunications 3 — Introduces students to the modes of propagation of electromagnetic energy and the types of equipment used to establish telecommunication links. Topics include ground, sky and spacewave propagation; microwave paths; environmental factors; site considerations; point-to-point communications and noise performance of communication systems.

ELEC 418 Radio Frequency Circuit Design — Teaches the design of HF VHF electronic circuits and introduces the student to proper layout schemes and fabrication of such circuits. Topics include wide-band transformer design, characteristics of wide-band amplifiers, effects of four feedback forms on amplifier input/output and transfer characteristics; high frequency small signal modelling of bipolar and field effect transistors; design of wide-band power amplifiers, computer modelling and computer aided design; practical suggestions for discrete component layout; introduction to thick film circuitry. Prerequisite: ELEC 404, 408.

ELEC 419 Microwave Principles — An introduction to microwave principles and devices most frequently encountered in communications, radar and other industries using microwave energy.

Topics include sources of microwave, attenuating devices, frequency and power measuring devices, modulators, isolators and amplifiers. Also included is a study of high capacity microwave transceivers and analysis of satellite communication links. Prerequisite: ELEC 404, 408.

ELEC 420 Computer Control Systems — Examines the application of computer systems to the monitoring and control of industrial processes. Topics include real time operating systems, structured programming, and high-level language programming techniques. Data acquisition systems will be examined with attention to the specification of I/O systems, programmed and interrupt-driven I/D techniques, the sampling theorem, and frequency response. In the lab the student will develop routines to perform graphic displays, keyboard handling and command decoding. Data acquisition and 3-mode process control. Prerequisite: ELEC 102, 402 and 407 or 413.

ELEC 421 CAD Systems — Introduces the student to computer programs used in electronics. Electronic design programs for Digital Logic Simulation and for Printed Circuit Layout are covered, with student projects in each. A spreadsheet for costing and accounting is introduced. A computer aided design (CAD) program is used for drafting and schematic drawing. Database management for inventory, staffing and records systems is also covered. This course is mostly lab work with each student learning each program individually. Prerequisite: ELEC 102, 201 and 402.

ELEC 423 Video Graphics — Introduces practical industrial applications of video for acquisition and display of data. The fundamentals of video raster scan and vector displays are reviewed and video cameras are used in image measurement and digital image storage. Image generation on a video monitor is discussed and simple digital circuits are used to generate pictures. The light pen, image storage in RAM, alphanumeric ROM character generators and CRT controllers are all introduced in lectures and in lab projects. Assembly language programming is used with a small Z80 computer to create graphics displays. Prerequisite: ELEC 303, 307 and 402.

ELEC 424 Industrial Processes and Control Systems — This course examines the practical application of automatic control systems to industrial processes. Common industrial processes are introduced and their basic operating characteristics identified. Appropriate control strategies are discussed for a wide variety of processes, including boiler systems, energy management, batch processing, multiple effect evaporators, distillation and PH systems. These processes will be used to demonstrate the application of the most common multi-variable control strategies, including 3 mode feedback, cascade, ratio and feedforward systems. Prerequisite: ELEC 412, 413, 427, CHSC 341. (ELEC 427 may be taken concurrently.)

ELEC 426 Microprocessors in Measurement and Control — Investigates the application of the microprocessor to industrial process control systems. Topics include the design of hardware and software systems to implement basic binary control functions as well as more advanced two position and PID types. This course will also include a discussion of analog controller circuits and a review of the latest commercial products. The lab portion of this course will provide practical experience in microprocessor circuit design, interfacing of analog and digital I/O and software design. Prerequisite: ELEC 402, 411, 420. (ELEC 420 may be taken concurrently.)

ELEC 427 Transducer Systems — Continuation of ELEC 412, industrial measurement techniques for temperature, humidity and dew point are examined. These include psychrometers, hysrometers and vapour equilibrium systems. SAS analysis techniques including chemical absorption, thermal conductivity, paramagnetic, heat of combustion and zirconium oxide analysers are studied. Various advanced process analysers are also included with particular emphasis on industrial applications. Topics include process spectrometry, industrial PH measurement and SAS chromatography. Prerequisite: ELEC 411, 412 and CHEM 11.

ELEC 428 Instrumentation Engineering Project — Examines process control system design and documentation techniques. By detailed analysis of industrial processes and related control systems, the student acquires a working applications knowledge. Current ISA, SAMA and ASME symbologies are used in the preparation of control system documentation such as process and instrument drawings, functional, loop and installation drawings. Topics such as hazardous area classification and related instrument design practices are also examined. Project work involves all aspects of control system design from concept to evaluation. Prerequisite: CHSC 341, ELEC 424, 427. (ELEC 424, 427 may be taken concurrently.)

ELEC 429 Power Electronics — A continuation of ELEC 403 Industrial Electronics this course acquaints the student with numerous industrial and utility applications which use programmable controllers, thyristors and power transistors. Topics include relay control circuits and their implementation with programmable controllers, thyristor DC motor speed controllers, static excitors, and variable frequency induction motor drives. Other topics may include chopper control of DC traction motors and single and three phase inverters. Prerequisite: ELEC 305, 403, 407.

ELEC 430 Systems Design — Consists of design oriented projects in the area of motor control and lighting systems and in conjunction with ELEC 475 and 476 is designed as preparation for employment in consulting offices. From written descriptions of control circuit operation, students design control schematics to implement relay control systems. From the completed relay control schematics, power and control wiring diagrams are prepared to implement these systems. From written descriptions of commercial building lighting and receptacle system requirements, students practice designing and drafting a wiring system acceptable to Canadian Electrical Code regulations. Prerequisite: ELEC 305.

ELEC 432 CAD/CAE for Microelectronics — Offers an introductory treatment of logic simulation techniques, schematic capture and CMOS integrated circuit layout. This laboratory-oriented course trains students in the use of current electronic CAD/CAE systems. In the first third of the course, the principles of logic simulation are covered and computer simulation exercises (IBM PC's) acquaint students with the use of TTL libraries, ROM's, ALU's and PLA's. Next, students learn to use the Mentor Graphics workstations to create schematics and simulate circuits. The final third of the course is an introduction to CMOS mask level design using interactive graphics and a descriptive language. The fundamentals of MOS operation and manufacture are presented. Students develop small full-custom and standard-cell layouts up to the point where the data base could be used to manufacture parts. Prerequisite: ELEC 302, 402. (ELEC 402 may be taken concurrently.)

ELEC 433 Hybrid Microelectronics — An introductory course covering the design, fabrication, and application of hybrid (thick film) microcircuits. The course begins with an overview of the thick film production process, the properties and characteristics of thick film materials, and the resulting thick film design guidelines. Students are introduced to IC-GRAPH, an IBM PC software tool for the interactive layout of microelectronic production process masks. Active RC filters are an application area that can take advantage of the precision resistor capabilities of custom thick film circuits. Students are introduced to procedures for generating the modern filter expressions (Butterworth, Chebyshev, Optimum, Bessel, etc.) and active RC circuis that are capable of synthesizing these filters. Lowpass, highpass, bandpass and

band reject filters are investigated. Signal Flow Graphs are introduced as a circuits analytic tool and the computer software tool ACNAP is employed for predicting proposed design theoretical performance. Students perform a complete thick film active filter design project. Prerequisite: ELEC 303, MATH 343.

ELEC 434 PASCAL — Begins with an overview of microcomputer operating systems, programming languages and compilers and interpreters. The IBM personal computer is used throughout the course for interactive student training. The main part of the course covers PASCAL language programming and emphasizes structured programming techniques. Students will gain reasonable proficiency at writing short PASCAL programs and calling external subroutines or DOS functions. Prerequisite: ELEC 102.

ELEC 436 Analog Integrated Circuit Design — An introduction to the analysis and design of analog integrated circuits. The course starts with a review of basic MOS and BJT transistor operation and single transistor linear circuits. Circuit design techniques specific to IC design are then introduced and the course proceeds to techniques needed for combining stages into a complete operational amplifier. The course includes an introductory treatment of frequency response, compensation, pole splitting, and slewing. Students design complete CMOS and BJT op-amps using both algebraic and computer stimulation techniques and then implement their designs using transistor arrays in the laboratory. Prerequisite: ELEC 303, 433.

ELEC 437 Principles of VLSI Design — A continuation from ELEC 432. More advanced topics in logic design, analysis, and simulation are covered including symbol library creation (Mentor) and behavioral language modelling. MOS chip layout and simulation concepts are further developed with emphasis on the CMOS process. Both full-custom layouts and design with gate arrays (ULAs) are explored. This includes custom PLA techniques and algorithmic design. Design projects are taken to the stage where they could be sent out for manufacture. In addition to layout, students learn to use circuit extraction (MEXTRA) and circuit simulation (SPICE) programs. Analytical treatments are presented in parallel. Both static and dynamic logic structures are discussed and simulated. Laboratory work is done on Mentor Graphics workstations and IBM PCs. Prerequisite: ELEC 302, 402, 432.

ELEC 438 Microelectronic Applications — A continuation of ELEC 433 stressing analog filter design employing custom CMOS monolithic integrated circuits. The course begins with the design of doubly terminated lossless ladder networks. Switched-capacitor equivalent circuits are then introduced and explained, allowing the realization of switched-capacitor equivalent ladder networks. The Z-Transform is introduced to allow a more general approach to discrete time (samples) filter circuit design. Through the aid of Bilinear Transform and Z-Plane mapping procedures, students learn to convert any analog (continuous time) filter expression into its equivalent discrete time low pass, highpass, bandpass, or band reject forms and their ultimate synthesis via a cascade of monolithic switched-capacitor biquad circuits. Students design, assemble, and test a switched-capacitor filter. The course terminates by returning to the thick-film hybrid circuit and investigating its potential in the area of high frequency and very high frequency circuit design. Prerequisite: ELEC 433.

ELEC 467 Robot Applications and Gripper Design — Discusses applications of robots in automated manufacturing centres and the corresponding gripper and fixture design required for these applications. Prerequisite: ELEC 315, MECH 209, MECH 420.

ELEC 468 Robot Servicing and Maintenance — Discusses maintenance strategies and procedures for the various types of kinds of robots (pneumatic, hydraulic and electric). Prerequisite: MECH 420, ELEC 302, 303, 315.

ELEC 470 CNC and Robotic Language — Introduces the student to current CNC and Robot languages such as APT and VAL. Investigates the integrated manufacturing centre. Prerequisite: MECH 209, ELEC 102 or EQUIVALENT.

ELEC 471 Digital Control Using Microcomputers — A continuation of ELEC 407 Feedback 1 where a microcomputer now replaces the analog PID controller. Prerequisite: ELEC 407, 402.

ELEC 472 Robot Sensors — Investigates techniques and applications where robots are enhanced by the capability of vision and touch. Prerequisite: ELEC 467, 402, 406.

ELEC 473 Integrated Manufacturing Cell Design — Investigates the integration of NC machine tools with robots for machine loading/unloading. Discusses the complete integrated manufacturing centre with the addition of CAD/CAM down loading to the CNC/Robot controller. Prerequisite: ELEC 467, 470.

ELEC 474 Drafting and Design Project — A graduation paper researched and presented by the student on some aspect of robot design, programming or application.

ELEC 475 IES Lighting Fundamentals — This is the IES lighting fundamentals course presented by the Illumination Engineering Society and BCIT Part-Time Studies (evening course). Contents include light and color, lighting needs, lighting sources including characteristics and efficiencies of lamps, luminaires, illuminance calculations, how lighting affects people, exterior lighting and lighting economics.

ELEC 476 Industrial Systems — Deals with the design of electrical systems for industrial plants and commercial buildings. Topics include lighting systems, feeder calculations and ratings, motor branch feeders, motor control centres, switchboards, unit substations, demand factors, voltage levels, grounding, ground fault protection and system protection and co-ordination, together with all appropriate sections of the Canadian Electrical Code. Prerequisite: ELEC 305.

ELEC 490 Co-op 2

MATH 134 Basic Technical Mathematics for Robotics — Trigonometric functions, identities, solution of triangles graphing and addition of sinusoidal functions. Complex numbers, rectangular/polar transformations, phasor representation of sinusoidal waveforms. Common and natural logarithms, logarithmic/semilogarithmic graphs, decibels, exponential growth and decay. Systems of linear equations, determinants, application to electrical networks.

MATH 143 Basic Technical Mathematics for Electrical — Common and natural logarithms, logarithmic/semilogarithmic graphs, decibels, exponential growth and decay. Systems of linear equations, determinants, application to electrical networks. Trigonometric functions, identities, solution of triangles, graphing and addition of sinusoidal functions. Complex numbers, rectangular/polar transformations, phasor representation of sinusoidal waveforms.

MATH 234 Calculus for Robotics — The derivative, differentiation rules, applied maxima/minima and implicit differentiation with applications to electrical technology. Antidifferentiation, the indefinite integral and the definite integral including area, mean value and RMS value. Differentiation and integration of trigonometric, logarithmic and exponential functions.

MATH 243 Calculus for Electrical — The derivative, differentiation rules, applied maxima/minima, and implicit differentiation with applications to electrical technology. Antidifferentiation, the indefinite integral and the definite integral including area, mean value and RMS value. Differentiation and integration of trigonometric, logarithmic and exponential functions.

MATH 343 Transform Calculus for Electrical

MECH 106 Manufacturing Processes 1 — A basic orientation course which provides the student with practice in metal removal, and a study of related theory.

MECH 211 Manufacturing Processes — Evaluation of machine tool operations, organized processing, break even points and equal cost quantities, productivity and cost estimating. Machine tool specifications, installation and maintenance, testing and evaluation production welding processes and techniques.

MECH 320 Fluid Power 1 — Provides an understanding of pneumatic control systems. Fluid power components, their symbols, function and construction are examined and used in the design, construction and testing of simple and sequential control systems. Sizing calculations for system components are covered.

MECH 420 Fluid Power 2 — Provides an understanding of hydraulic control systems and an introduction to fluidic control systems and control logic. Fluid power components, their symbols, function and construction are examined and used in the design, construction and testing of a variety of hydraulic control systems. Sizing calculations for system components are also covered. Prerequisite: MECH 320.

OPMT 460 Industrial Engineering — Covers problem-solving and decision making approaches to a project installation. Topics include: PERT networks, CPM barcharts, work measuring techniques in planning and project installations, method study techniques, acceptable management principles in labor supervision.

PHYS 106 PHYSICS for Electrical Technology — A general level course about physical quantities, their properties, relationships, how they affect each other and their connecting principles. Motion, force, mechanical energy and power are studied concerning translational and rotational motion. Then follows basic electricity, atomic physics and the band theory of solids and its application to semiconductor devices. The lab program emphasizes measurements, data analysis and experimental techniques while confirming and expanding the lecture concepts.

PHYS 108 Physics for Robotics Technology — This general physics course emphasizes topics of special relevance to robotics. Part 1 introduces measurement and data analysis. Part 2 covers basic mechanics, including static equilibrium, work, energy, power, torque and rotational motion. Part 3 covers mobility. Part 4 covers semiconductor physics including the theory, construction and operation of semiconductor devices.

PHYS 206 Physics for Electrical Technology — Topics include sound, light and optics, basic electricity and magnetism, basic semi-conductor theory, atomic and nuclear phenomena. Mathematical treatment requires algebra and trigonometry and possibly some calculus.

PHYS 208 Applied Physics for Robotics Technology — This general physics course emphasizes topics of special relevance to robotics. Part 1 covers magnetics and electromagnetics with applications in robotic pickup systems and stepping motors. Part 2 covers hydraulics and fluid flow. Part 3 covers thermal energy and thermodynamics. Part 4 covers advanced mechanics, with special emphasis on mechanical properties of matter, 3-D force systems, stress and vibrations. Parts 4 and 5 cover waves, sound and optics with related applications. Part 6 introduces radiation and radiation hazards related to robotics. Prerequisite: PHYS 106.

TCOM 104 Technical Writing — This course emphasizes clear, correct, concise technical writing in the electrical/electronics field. Students learn how to organize technical information, illustrate documents, define and describe technical objects and processes, write routine letters, memos and instructions, and summarize technical articles. Students also write a resume and application letter for Co-op.

TCOM 204 Technical Writing — In this course students prepare a professional job search package, practise interviewing skills, and write informal reports. They also learn techniques and formats for writing documentation. Students also do technical briefings. Prerequisite: TCOM 104.

Mechanical

Design and Production Options

The mechanical technologist may be involved in the design, construction and installation of machines and mechanical devices, or in the production side of manufacturing. It is a field of tremendous scope in that specialists must be able to analyze problems, propose efficient technical solutions, implement these solutions and evaluate the results.

Job Opportunities

Graduates can choose from a diversity of work situations. Consulting engineering offices employ mechanical technologists as design draftsmen for machinery, steelwork, piping, power plants and installation. Others may choose to take up positions in plant engineering offices, production departments or estimating departments. Additional opportunities exist in testing, inspection, installation, service and technical sales. Supervisory posts may be assumed after appropriate job experience.

The Program

In the first three terms, all students in the technology have the same curriculum which includes math, physics and specialized studies in mechanical engineering, production and materials. Lecture material is given practical application in problem solving and design sessions, and in lab and shop assignments. Field trips to industrial settings are an important adjunct to the classroom and lab and are also useful in helping students decide on an area of speciality. In the final term of their second year, students stream into one of two options: Design or Production.

The Mechanical Technology reserves the right to limit the number of students in any of its options.

This program is accredited by the Applied Science Technologists and Technicians of BC.

Prerequisite

Algebra 12 and Physics 11 are course requirements for this program. Applicants should have a solid academic background and good communications skills, be able to apply ideas in practical situations and be able to work effectively with people in a team situation.

Faculty and Staff

S.C. Todd, M.I.Mech.E., C.Eng., F.I.E.D., P.Eng., Department Head
E.B. Barry, B.Sc.
R.O. Darling, B.Sc., P.Eng.
P. Dollan, H.N.C.
D.C. Gerlitz, B.Sc., M.S., P.Eng. Program Head, Design and Production
R.G. Graham, B.Sc., M.A.S.H.R.A.E., P.Eng., Program Head, Systems
G. Henderson, Dipl.T., A.S.T.T.
B.E. Horlacher, Dipl.T.
G.D. Johnson, M.I.Mech.E., C.Eng., M.I.Prod.E. P.Eng., Program Head, Part-time Studies
K. Johnson, A.S.T.M.E.
E.H. Labounty, M.A.S.H.R.A.E.
V.M. Strijack, B.Sc., P.Eng., Assistant Department Head
J.P. Sullivan, B.Sc., P.Eng., M.A.S.H.R.A.E.

TECHNOLOGY: Mechanical

Level 1		Classroom hours per week
CDCM 101	Computer Science 1	3.0
CHSC 105	Engineering Materials	4.0
MATH 149	Basic Technical Mathematics for Mechanical	5.0
MECH 100	Mechanical Drafting 1	3.0
MECH 104	Statics	4.0
MECH 105	Engineering Economics	3.0
MECH 106	Manufacturing Processes 1	4.0
TCOM 109	Technical Communication — Mechanical	4.0

Level 2		Classroom hours per week
CHSC 205	Engineering Materials	4.0
MATH 249	Calculus	4.0
MECH 200	Mechanical Drafting 2	3.0
MECH 205	Dynamics and Thermal Processes	4.0
MECH 206	Mechanics of Materials	4.0
MECH 209	Manufacturing Processes 2	4.0
PHYS 216	Physics for Mechanical Technology	4.0
TCOM 210	Technical Communication	4.0

PROGRAM: Mechanical Design

Level 3		Classroom hours per week
ELEC 257	Electrical Equipment	4.0
MATH 349	Numerical Methods for Mechanical	4.0
MECH 300	Mechanical Drafting 3	2.0
MECH 301	Machine Design 1	5.0
MECH 302	Thermal Engineering 1	5.0
MECH 303	Fluid Mechanics	3.0
MECH 304	Manufacturing Processes 3	4.0
MECH 320	Fluid Power 1	3.0

Level 4		Classroom hours per week
CDCM 410	CADRAFT (Mechanical)	4.0
ELEC 255	Instrumentation for Mechanical	4.0
MATH 494	Computer Graphics for Mechanical	3.0
MECH 401	Machine Design 2	5.0
MECH 402	Theory of Mechanisms	4.0
MECH 404	Thermal Engineering 2	4.0
MECH 406	Fluid Systems	3.0
MECH 420	Fluid Power 2	3.0

PROGRAM: Mechanical Production

Level 3		Classroom hours per week
ELEC 257	Electrical Equipment 1	4.0
MATH 349	Numerical Methods for Mechanical	4.0
MECH 300	Mechanical Drafting 3	2.0
MECH 301	Machine Design 1	5.0
MECH 302	Thermal Engineering 1	5.0
MECH 303	Fluid Mechanics	3.0
MECH 304	Manufacturing Processes 3	4.0
MECH 320	Fluid Power 1	3.0

Level 4		Classroom hours per week
ELEC 470	CNC and Robotic Languages	4.0
MATH 449	Statistics and Quality Control for Mechanical	4.0
MECH 406	Fluid Systems	3.0
MECH 411	Production Engineering Management	4.0
MECH 413	Tool Design	3.0
MECH 414	Metrology and CNC	6.0
MECH 420	Fluid Power 2	3.0
OPMT 182	Industrial Engineering (Mechanical)	4.0

Course Descriptions

CDCM 101 Computer Science 1 — Introduction to Computer Science and programming using BASIC. Emphasis will be on structured problem solving. Applications drawn from the engineering disciplines.

CDCM 410 CAD Drafting 1 — Rudiments of computer aided drafting. Machine log-on procedures, simple 2-D drawings, orthographic projections, dimensioning, annotations.

CHSC 105 Engineering Materials — Comparative properties of all classes of engineering materials including metals, alloys, polymers, concrete, wood and ceramics. Common causes of failure in service including fatigue, weathering, embrittlement and corrosion.

CHSC 205 Engineering Materials — Continuation of CHSC 105.

ELEC 255 Instrumentation for Mechanical — Topics include basic devices used for measuring pressure, temperature, level, density and flow. Instrument static and dynamic performance. Instrument application to industrial processes. Design of pneumatic and hydraulic measurement and control equipment using high-gain amplifiers and negative feedback. Basic principles of automatic control, process, dynamic behavior and controllability. On/off, proportional, integral and derivative control. Control strategy. Ratio, cascade, multivariable and feedforward systems. Introduction to computer control.

ELEC 257 Electrical Equipment — An introduction to industrial electrical equipment. Topics include AC and DC motors and their application to electro-mechanical drive systems; protecting and controlling related equipment; sources of energy; transformation into primary and secondary voltage levels, distribution of power throughout the plant; switching; voltage control and power factor correction.

ELEC 470 CNC and Robotic Languages — Introduces the student to current CNC and Robot languages such as APT and VAL. Investigates the integrated manufacturing centre. Prerequisite: CDCM 311 and MECH 130 or CDCM 303.

MATH 149 Basic Technical Mathematics for Mechanical — Introduction to differential and integral calculus of polynomial functions including appropriate support topics from algebra, analytical geometry, plane geometry, solid geometry, trigonometry and the theory of logarithms and exponential functions. There will be a strong emphasis on applications to the physical sciences and mechanical engineering.

MATH 249 Calculus for Mechanical — An introduction to the differential and integral calculus of trigonometric, logarithmic and exponential functions and their application, maxima and minima, areas and volumes, centroids and moments of inertia, calculation of work, bending beams, functions of several variables and partial derivatives, and elementary first order differential equations.

MATH 349 Numerical Methods for Mechanical — Numerical integration, solution of algebraic and transcendental equations by iterative methods, numerical solution of differential equations and numerical differentiation. Matrix approach to 2-D and 3-D transformations with application to computer graphics. Gauss-Jordan method applied to the solution of systems of linear equations. Linear programming using the simplex method and the transportation problem.

MATH 449 Statistics and Quality Control for Mechanical — Organization and graphical presentation of data, frequency distributions and measures of central tendency, variation and other measures. Probability theory and laws. Random variables, discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Method of least squares, regression and correlation. Control chart concepts and application, acceptance sampling. Chi-squared tests. Non-parametric statistics

MATH 494 Computer Graphics for Mechanical — Introduces students to interactive BASIC, and concepts of programming in two and three dimensions. Students experience "hands-on" practice with computer graphics systems.

MECH 100 Mechanical Drafting 1 — Techniques of producing and reading mechanical drawings using standard format and the development of basic skills in applying these techniques. Use of instruments, line work, lettering, geometric construction isometrics, with emphasis placed on orthograhic projection, auxiliary views, sections, dimensions and working drawings.

MECH 104 Statics — Vectors, force systems, concurrent and coplanar, nonconcurrent and coplanar. Graphical representation and solutions. Ideas of equilibrium. Mathematical representation of equilibrium. Analysis of frames. Statically determined structures. Redundancies. Beams, principles of moments and centroids. Second moment of area.

MECH 105 Engineering Economics — Emphasizes the importance of making sound economic decisions when faced with alternative methods of solving technical problems. The course material provides the basic skills and concepts required to analyze comparative costs and to understand the time value of money (interest), inflation, depreciation, running costs, salvage value and tax considerations.

MECH 106 Manufacturing Processes 1 — A basic orientation course which provides the student with practice in metal removal, and a study of related theory.

MECH 200 Mechanical Drafting 2 — Advanced techniques including limits and fits, isometric and orthographic single line piping diagrams, descriptive geometry, intersections, development, gears, threads and fasteners, weld symbols and working drawings and projects.

MECH 205 Dynamics and Thermal Processing — Kinematics: basic equation of motion, motion diagrams, trajectories. Kinetics: Newton's Laws, inertia, rectilinear and rotational kinetics, systems of bodies. Work, energy power, efficiency. Introduction to heat and fluid processes; steam tables, first law of thermodynamics. Basic steam power and refrigeration cycles.

MECH 206 Mechanics of Materials — Stress, strain and deflection. Tension, compression, shear, torsion, deflection and buckling of material under load. Beams, columns, shafts, thin- and thick-walled cylinders, riveted and welded joints.

MECH 209 Manufacturing Processes 2 — Detailed knowledge of basic machine tools, evaluation of design and production features. Organized processing, break even points, equal cost quantities, estimating production costs, machine tool specification, installation and maintenance systems.

MECH 300 Mechanical Drafting 3 — Advance practices in geometric tolerances, cams, structural steel conveyors are studied.

MECH 301 Machine Design 1 — The theory in prerequisite courses is covered plus combined stresses with emphasis on solution by Mohr's circle; theories of failure; stress concentration; fatigue phenomena; welded connections; bolted and rivited connections; spur; helical and worm gear drives; speed reducers; belt and roller chain drives; flexible couplings; shafts; antifriction and journal bearing; brakes and clutches; power screws; helical and leaf springs; an introduction to mechanical vibrations with emphasis on the critical speeds of rotating assemblies. Continued in MECH 401.

MECH 302 Thermal Engineering 1 — First and second law of thermodynamics. Steady and non-flow energy equations, specific heats of gases, vapor tables, gas and vapor processes. Carnot, Rankine and basic IC engine cycles. Air compressors. Heat transfer.

MECH 303 Fluid Mechanics — Basic principles of fluid properties, energy losses, Reynold's number, Moody diagram, flow measuring devices, dynamics of flow lift and drag. Fluid statics.

MECH 304 Manufacturing Processes 3 — In this course the student makes a detailed study of processes such as casting hot and cold forming, extruding, forging, stamping, pressing and material joining, including machines and materials. Quantities/costs will be investigated. Manufacturing processes recently introduced will be discussed in oral presentations by the student. Visits to local industries will be arranged.

MECH 320 Fluid Power 1 — Provides an understanding of pneumatic control systems. Fluid power components, their symbols, function and construction are examined and used in the design, construction and testing of simple and sequential control systems. Sizing calculations for system components are covered.

MECH 401 Machine Design 2 — Basic principles derived in MECH 301 are applied to various deign elements. Topics include springs, roller bearings, power screws, spur and helical gearing, level and worm gearing, couplings, brakes, clutches.

MECH 402 Theory of Mechanisms — Designed to provide a study of motion in machines. Topics include velocity and acceleration diagrams and cams.

MECH 404 Thermal Engineering 2 — Mixtures of gases and vapors, Gibbs-Dalton Law, psychrometry, air conditioning, combustion processes and nozzle flow; analysis of steam and gas turbines and jet propulsion. Practical lab investigations by students.

MECH 406 Fluid Systems — Dimensionless parameters. Pump characteristics, operation and maintenance. Cavitation. Air movement and supply, fan performance and characteristics, duct sizing and networks.

MECH 411 Production Engineering Management — Presents aspects of manmagement and the industrial engineering functions of a manufacturing plant. It is intended for technologists, engineers, designers, draftpersons and technical sales people who wish to have a clearer understanding of the range of problems and decisions involved in a manufacturing organization. Topics include management and plant organization, plant location and layout, production control, maintenance management, production planning, job design and time standards.

MECH 413 Tool Design — The course includes introduction to design of special purpose tooling, process planning, design considerations of various types of jigs, fixtures, gauges, metal-cutting dies, feed mechanisms, presses, scrap strip-layout, standard parts. Assignments will have to be worked on away from classroom.

MECH 414 Metrology and CNC — Includes measurement of surface texture and flatness, optical and electrical comparators, metrology of screw threads, precision measuring instruments, fundamentals of inspection, mass production gauging, computer numerical control programming and program verification on a 3-axis CNC mill. Prerequisite: MECH 230.

MECH 420 Fluid Power 2 — Provides an understanding of hydraulic control systems and an introduction to fluidic control systems and control logic. Fluid power components, their symbols, function and construction are examined and used in the design, construction and testing of a variety of hydraulic control systems. Sizing calculations for system components are also covered. Prerequisite: MECH 320.

OPMT 182 Operations Management — Students will be introduced to problem situations at the management level of a production organization. Each topic is introduced by lecture and continued by lab work involving practice in various solution techniques. Students are expected to produce management reports for each assignment. The topics covered are: business forecasting at the product level; inventory control including EOQ, ELS and an introduction to MRP; project control using CPM and PERT; quantitative methods including linear programming and waiting line techniques; and an introduction to business accounting and finance, including production cost accounting. All students are required to work with packaged computer programs.

PHYS 216 Physics for Mechanical Technology — A general level course covering the elements of wave motion, sound, light and basic electricity and magnetism.

TCOM 109 Technical Communication for Mechanical — In this course students learn the basic skills to become effective writers and speakers in the mechanical industry. They learn the layout, content and graphic skills of technical writing, and research and employment application techniques. They write technical memos, letters and descriptions, and give an oral report.

TCOM 210 Technical Communication for Mechanical — In this course, students practice the reporting techniques used in the engineering mechanical industries. They write feasibility reports, proposals, memos, letters, comparison and progress reports and a formal technical report. They also present an oral technical report. Prerequisite: TCOM 109.

Mechanical Systems

The graduate of this program will be able to pursue a career in a field of Mechanical Systems for residential, commercial, institutional and industrial buildings. Graduates will be prepared for the design and installation of water supply, drainage, fire protection, refrigeration, heating, ventilating and air conditioning.

Job Opportunities

Mechanical engineers, working in liaison with architects, structural engineers and electrical engineers, oversee design work on systems for most large buildings. As support staff, trained mechanical systems technologists who can function with minimum of supervision as designers, specification writers, field inspectors, and drafting personnel are required. Mechanical contractors bid competitively for mechanical systems work, and require trained systems technologists as estimators and project management assistants.

Systems in newly completed and existing buildings have been receiving more attention in recent years. Services in this area include system management programs to optimize energy efficiency; testing and balancing of new systems; and physical changes to existing systems to realize greater fuel economy.

The Program

Course material encompasses water supply, drainage, fire protection, refrigeration, heating, ventilating and air conditioning, backed by support courses which include fluid engineering, thermodynamics, engineering economy and computer science. In recent years, the pursuit of greater energy efficiency and safety in buildings has placed new demands on the systems base from which the graduate can effectively participate in achieving these objectives.

It is anticipated that this program will be accredited by the Applied Science Technologists and Technicians of British Columbia.

Prerequisite

Algebra 12 and Physics 11 are course requirements for this program. Applicants should have a solid academic background and good communications skills, be able to apply ideas to practical situations and be able to work effectively with people in a team situation. Supervisory posts may be assumed after appropriate job experience.

Faculty and Staff

S.C. Todd, M.I.Mech.E., C.Eng., F.I.E.D., P.Eng., Department Head
E.B. Barry, B.Sc.
R.O. Darling, B.Sc., P.Eng.
P. Dollan, H.N.C.
O.C. Edwards, B.A.Sc., M.A.Sc., P.Eng.
D.C. Gerlitz, B.Sc., M.S., P.Eng. Program Head, Design and Production
R.G. Graham, B.Sc., M.A.S.H.R.A.E., P.Eng., Program Head, Systems
G. Henderson, Dipl.T., A.S.T.T.
B.E. Horlacher, Dipl.T.
G.D. Johnson, M.I.Mech.E., C.Eng., M.I.Prod.E.P.Eng., Program Head, Part-time Studies
K. Johnson, A.S.T.N.E.
E.H. Labounty, M.A.S.H.R.A.E.
V.M. Strijack, B.Sc., P.Eng., Assistant Department Head
J.P. Sullivan, B.Sc., P.Eng., M.A.S.H.R.A.E.

PROGRAM: Mechanical Systems

Level 1		Classroom hours per week ➧
CDCM 101	Computer Science 1	3.0
CHSC 105	Engineering Materials	4.0
MATH 149	Basic Technical Mathematics	5.0
MECH 104	Statics	4.0
MECH 105	Engineering Economics	3.0
MSYS 100	Systems Drafting 1	3.0
MSYS 101	Plumbing	4.0
TCOM 109	Technical Communication	4.0

Level 2		Classroom hours per week ➧
CHSC 205	Engineering Materials	4.0
ELEC 150	Illumination (term 2B)	3.0
MATH 249	Calculus for Mechanical	4.0
MECH 205	Dynamics and Thermal Processes	4.0
MECH 206	Mechanics of Materials	4.0
MSYS 200	Systems Drafting 2	3.0
MSYS 202	Heating and Ventilating 1 (term 2A)	4.0
PHYS 216	Physics for Mechanical	4.0
TCOM 210	Technical Communication	4.0

Level 3		Classroom hours per week ➧
BLDG 112	Building Construction 1	3.0
ELEC 255	Instrumentation for Mechanical	5.0
ELEC 257	Electrical Equipment	4.0
MATH 349	Numerical Methods for Mechanical	4.0
MECH 302	Thermal Engineering 1	5.0
MECH 303	Fluid Mechanics	3.0
MECH 320	Fluid Power 1	3.0
MSYS 301	Heating and Ventilating 2	3.0

Level 4		Classroom hours per week ➧
MECH 404	Thermal Engineering 2	4.0
MECH 406	Fluid Systems	3.0
MECH 410	Mechanical Estimating (term 4B)	4.0
MSYS 400	Air Conditioning Systems	6.0
MSYS 403	System Noise Control (term 4A)	4.0
MSYS 404	Mechanical Equipment	4.0
MSYS 405	Maintenance (term 4B)	4.0
MSYS 406	Fire Protection (term 4A)	4.0
OPMT 460	Industrial Engineering	4.0

Course Descriptions

BLDG 112 Building Construction 1 — Principles of building construction in terms of the assembly of materials. Examination of typical systems of wood and masonry construction. Study of architectural detailing and the origins and purposes of building and zoning by-laws. Application of the above components to the preparation of working drawings.

CDCM 101 Computer Science 1 — Introduction to Computer Science and programming using BASIC. Emphasis will be on structured problem solving. Applications drawn from the engineering disciplines.

CHSC 105 Engineering Materials — Comparative properties of all classes of engineering materials including metals, alloys, polymers, concrete, wood and ceramics. Common causes of failure in service including fatigue, weathering, embrittlement and corrosion.

CHSC 205 Engineering Materials — Continuation of CHSC 105.

ELEC 150 Illumination — Deals with the types and characteristics of lighting sources; quantity and quality of light; lighting units, terminology and calculations.

ELEC 255 Instrumentation for Mechanical — Topics include basic devices used for measuring pressure, temperature, level, density and flow. Instrument static and dynamic performance. Instrument application to industrial processes. Design of pneumatic and hydraulic measurement and control equipment using high-gain amplifiers and negative feedback. Basic principles of automatic control, process, dynamic behavior and controllability. On/off, proportional, integral and derivation control. Control strategy. Ratio, cascade, multivariable and feedforward systems introduction to computer control.

ELEC 257 Electrical Equipment — An introduction to industrial electrical equipment. Topics include AC and DC motors and their applications to electro-mechanical drive systems; protecting and controlling motors; industrial electrical power systems and related equipment; sources of energy; transformation into primary and secondary voltage levels, distribution of power throughout the plant; switching; voltage control and power factor correction.

MATH 149 Basic Technical Mathematics for Mechanical — Introduction to differential and integral calculus of polynomial functions including appropriate support topics from algebra, analytical geometry, plane geometry, solid geometry, trigonometry and the theory of logarithms and exponential functions. There will be a strong emphasis on applications to the physical sciences and mechanical engineering.

MATH 249 Calculus for Mechanical — An introduction to the differential and integral calculus of trigonometric, logarithmic and exponential functions and their application, maxima and minima, areas and volumes, centroids and moments of inertia, calculation of work, bending beams, functions of several variables and partial derivatives, and elementary first order differential equations.

MATH 349 Numerical Methods for Mechanical — Numerical integration, solution of algebraic and transcendental equations by iterative methods, numerical solution of differential equations and numerical differentiation. Matrix approach to 2-D and 3-D transformations with application to computer graphics. Gauss-Jordan method applied to the solution of systems of linear equations. Linear programming using the simplex method and the transportation problem.

MECH 104 Statics — Vectors, force systems, concurrent and coplanar, nonconcurrent and coplanar. Graphical representation and solutions. Ideas of equilibrium. Mathematical representation of equilibrium. Analysis of frames. Statically determined structures. Redundancies. Beams, principles of moments and centroids. Second moment of area.

MECH 105 Engineering Economics — Emphasizes the importance of making sound economic decisions when faced with alternative methods of solving technical problems. The course material provides the basic skills and concepts required to analyze comparative costs and to understand the time value of money (interest), inflation, depreciation, running costs, salvage value and tax considerations.

MECH 205 Dynamics and Thermal Processing — Kinematics: basic equation of motion, motion diagrams, trajectories. Kinetics: Newton's Laws, inertia, rectilinear and rotational kinetics, systems of bodies. Work, energy power, efficiency. Introduction to heat and fluid processes; steam tables, first law of thermodynamics. Basic steam power and refrigeration cycles.

MECH 206 Mechanics of Materials — Stress, strain and deflection. Tension compression, shear, torsion, deflection and buckling of material under load. Beams, columns, shafts, thin- and thick-walled cylinders, riveted and welded joints.

MECH 302 Thermal Engineering 1 — First and second law of thermodynamics. Steady and non-flow energy equations, specific heats of gases, vapor tables, gas and vapor processes. Carnot, Rankine and basic IC engine cycles. Air compressors. Heat transfer.

MECH 303 Fluid Mechanics — Bsic principles of fluid properties, energy losses, Reynold's number, Moody diagram, flow measuring devices, dynamics of flow lift and drag. Fluid statics.

MECH 320 Fluid Power 1 — Provides an understanding of pneumatic control systems. Fluid power components, their symbols, function and construction are examined and used in the design, construction and testing of simple and sequential control systems. Sizing calculations for system components are covered.

MECH 404 Thermal Engineering 2 — Mixtures of gases and vapors, Gibbs-Dalton Law, psychrometry, air conditioning, combustion processes and nozzle flow; analysis of steam and gas turbines and jet propulsion. Practical lab investigations by students.

MECH 406 Fluid Systems — Dimensionless parameters. Pump characteristics, operation and maintenance. Cavitation. Air movement and supply, fan performance and characteristics, duct sizing nd networks.

MECH 410 Mechanical Estimating — Basic theories and principles of estimating construction costs and direction for organizing facts from bidding documents. Measurement and pricing using "price master" and "labor calculator", for ventilation, domestic hot water heating and sanitary drainage systems.

MSYS 100 Systems Drafting 1 — Basic techniques for development of drawing skills and reading simple drawings related to building mechanical services, use of scales and instruments producing lettering and linework, geometric constructions, dimensioning, orthographic projection, descriptive geometry, and pictorial drawings in the form of drawing assignments.

MSYS 101 Plumbing — Topics include codes, basic engineering principles and graphic presentations related to plumbing systems design, load calculations, piping methods, sizing of system components for storm and sanitary drainage and water distribution. Some drafting skill will be required.

MSYS 200 Systems Drafting 2 — Further topics in mechanical drafting practices and projects on systems in buildings and plants.

MSYS 202 Heating and Ventilating 1 — Covers the principles involved with heat loss in buildings and practises of heating and ventilating encompassing a study of system components and design procedures. These will then be applied to the preparation of heat loss calculations and working drawings for a heating/ventilating system.

MSYS 301 Heating and Ventilating 2 — Principles and practices of heating and ventilating for residential, commercial and institutional buildings. Instructional material encompasses fuel oil, gas and solar heat energy sources; fuel handling heating boilers; solar collectors; building heat loss evaluation; building ventilation, load evaluation; space air distribution; ducted air distributions; warm air heating.

MSYS 400 Air Conditioning Systems — Part 3 of a three-part course on heating, ventilating and air conditioning. Properties of air extending use of psychrometric chart to air conditioning comfort criteria and examination of air conditioning processes; refrigeration for air conditioning, encompassing evaporator, compressor, condensor and expansion valve performance characteristics and selection; air conditoning systems, encompassing representative unitary, constant volume and variable volume systems.

MSYS 403 System Noise Control — Lab assignments are arranged to solve fundamental problems of sound propagation; use mechanical equipment sound performance data to select equipment to satisfy acceptable noise levels; and to recognize and arrive at solutions to potential mechanical system noise problems in the design stage.

MSYS 404 Mechanical Equipment — A study of drive configurations, prime movers, fans, pumps, heat exchangers, pressure vessels from an application, specifications, maintenance and safety point of view.

MSYS 405 Maintenance — The elements of this course are basic systems, preventative maintenance and budget costs, maintenance planning, estimating, scheduling, measurement and inventory.

MSYS 406 Fire Protection — Includes mechanical fire protection systems; regulations and codes of practice; building hazard classification; stand pipe and sprinkler systems; systems components and design to NFPA 13.

OPMT 460 Industrial Engineering — Covers problem-solving and decision making approaches to a project installation. Topics include: PERT networks, CPM barcharts, work measuring techniques in planning and project installations, method study techniques, acceptable management principles in labor supervision.

PHYS 216 Physics for Mechanical — A general level course covering the elements of wave motion, sound, light and basic electricity and magnetism.

TCOM 109 Technical Communication — In this course students learn the basic skills to become effective writers and speakers in the mechanical industry. They learn the layout, content and graphic skills of technical writing, and research and employment application techniques. They write technical memos, letters and descriptions, and give an oral report.

TCOM 210 Technical Communication — In this course, students practice the reporting techniques used in the engineering mechanical industries. They write feasibility reports, proposals, memos, letters, comparison and progress reports and a formal technical report. They also present an oral technical report. Prerequisite: TCOM 109.

School of Construction and Natural Resource Studies

Diploma Programs

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Building

Spiralling advances in technology have increased the public's expectation of their communities and the buildings constructed within them. Structures are expected to be designed and constructed to rigorous standards of workmanship and safety while at the same time incorporating all the features which contribute to speed of erection, financial efficiency and user satisfaction. The construction industry is one of the major employment fields in Canada, turning over a large proportion of the total dollar volume of business in the country. These two factors, high public expectation of the industry and the dynamic nature of the industry, present both a challenge and an opportunity — attractive criteria for any career.

Job Opportunities

Since graduates have the advantage of understanding buildings from several perspectives — the architectural and structural elements; the mechanical, plumbing, drainage and electrical systems; the cost implications and the contractual and managerial processes — they will be able to fill technological positions which lie between the professional architect, engineer and contractor on the one hand, and the skilled tradesman on the other.

With experience, graduates of Building Technology become senior drafting personnel, job captains, specification writers, estimators or contracts managers, building inspectors, officials in property management departments, appraisers and assessors, partners in construction organizations and technical representatives for building supplies and equipment manufacturers. Many graduates will become estimators with general and sub-trade contractors, preparing bids and checking job costs and progress some. Instruction is also given in appraisal and assessment, leading to employment with public and private agencies. The growing field of Building Technology presents opportunities in consulting offices, assisting in design, specification writing and construction inspecting; with contractors doing estimating, shop drawings and supervision; with suppliers explaining the capabilities and application of equipment and systems.

The Program

The Building Technology program is designed to give both men and women a sound preparation for rewarding careers in many facets of the construction industry.

First year courses are common to all students and in addition to English, math and physics, include various basic technological subjects. Lecture instruction, drafting room practice and field trips are part of the program, and students are often able to further their education through summer jobs with architects, engineers, contractors or by doing inspection work for public and private agencies.

In their second year, students (subject to their demonstrated ability and departmental approval) will be placed in one of two specialized majors: Architectural and Economics. Information on these two electives is available from the Program Head.

The *Architectural* Major is intended for those students who plan to work in architectural design and drafting offices. Subjects such as design, drafting, rendering techniques and graphics are studied to enhance expertise in this area.

The *Economics* Major is intended for those students who plan to work in construction and project management offices. It is concerned with costing and the evaluation of property and construction, either in the drawing stage or already constructed.

Post-graduation

The Architectural Institute of British Columbia offers graduates credit for some of the examinations in their syllabus of studies for articled students. The Canadian Institute of Quantity Surveyors will accept graduates as Probationer Members, and give credit in a similar manner. The Building Technology program is fully accredited by the Applied Science Technologists and Technicians of B.C. Information on these professional development possibilities is available from the Program Head.

Prerequisite

English 12, Algebra 12 plus Physics 11, all with C+ are course requirements for this program.

Faculty and Staff

R.I. McNeil, B.Surv., B.C.L.S., D.L.S., Dipl. Adult. Ed., P.Eng., *Department Head*
F.A.A. Alfeld, Dipl.Eng.
G. Berkenpas, Senior Instructor
R. Guerin
D.C. Hale, Dipl.T.
G.M. Hardie, M.Ed., F.R.I.C.S., Program Head
H.E. Kuckein, M.A.I.B.C., M.R.A.I.C., Senior Instructor
J. Lancaster, B.Comm., M.C.I.Q.S.
A. Maharajh, Dipl.T., A.Sc.T.T., M.C.I.Q.S.
J.A. McInnes, P.Eng.,
M. Stepler, Dipl.T., A.Sc.T.T., Dipl.T. Adult Ed. (on leave)
D.D. Workman
M. Kuzych, B.Arch., M.R.A.I.C., M.A.I.B.C.
T. Thonig, Dipl.T.

TECHNOLOGY: Building

Level 1		Classroom hours per week ➧
BLDG 101	Drafting	4.0
BLDG 102	Building Construction 1	5.0
BLDG 103	Materials and Methods	4.0
BLDG 104	Construction Site Processes	3.0
BLDG 108	Introduction to Computers	2.0
CIVL 135	Building Structures 1	3.0
MATH 140	Basic Technical Mathematics	5.0
MSYS 101	Plumbing	3.0
TCOM 101	Technical Communication	4.0

Level 2	(Term 2A 10 weeks)	Classroom hours per week ➧
BLDG 105	Construction Contracts 1	2.0
BLDG 201	Planning	4.0
BLDG 202	Building Construction 2	6.0
CIVL 236	Building Structures 2	3.0
MATH 240	Calculus and Analytic Geometry	5.0
MSYS 202	Heating and Ventilating 1	4.0
OPMT 185	Project Management	2.0
PHYS 219	Physics	4.0

Level 2	(Term 2B 10 weeks)	Classroom hours per week ➧
BLDG 201	Planning	4.0
BLDG 202	Building Construction 2	6.0
BLDG 206	Construction Estimating 1	4.0
CIVL 236	Building Structures 2	3.0
ELEC 150	Illumination	3.0
MATH 240	Calculus 1 and 2 with Analytical Geometry	5.0
PHYS 219	Physics	4.0
TCOM 201	Technical Communication	3.0

PROGRAM: Architectural Major

Level 3		Classroom hours per week
BLDG 302	Building Construction 3 for Architectural Major 1	4.0
BLDG 306	Construction Estimating 2	4.0
BLDG 309	Architectural Major 1	6.0
CIVL 337	Building Structures 3	3.0
ELEC 250	Electrical Systems	4.0
OPMT 260	Management Engineering 1	2.0
PHYS 319	Physics	4.0

Level 4	(Term 2A 10 weeks)	Classroom hours per week
BLDG 305	Construction Specifications	2.0
BLDG 402	Construction 4 for Architectural Major 2	6.0
BLDG 406	Construction Estimating 3	4.0
BLDG 409	Architectural Major 2	6.0
BLDG 413	Codes and Regulations	2.0
BLDG 419	Building Acoustics	3.0
CIVL 438	Building Structures 4	3.0
OPMT 360	Management Engineering 2	2.0
TCOM 301	Advanced Technical Communication	2.0

Level 4	(Term 2B 10 weeks)	Classroom hours per week
BLDG 205	Construction Contracts 2	2.0
BLDG 305	Construction Specifications	2.0
BLDG 402	Construction 4 for Architectural Major 2	6.0
BLDG 406	Construction Estimating 3	4.0
BLDG 409	Architectural Major 2	6.0
CIVL 438	Building Structures 4	3.0
MECH 412	Space Conditioning	3.0
SURV 120	Introduction to Survey	3.0

PROGRAM: Economics Major

Level 3		Classroom hours per week
BLDG 306	Construction Estimating 2	4.0
BLDG 312	Construction 3 for Economics 1	6.0
BLDG 316	Economics Major 1	6.0
CIVL 337	Building Structures 3	3.0
ELEC 250	Electrical Systems	4.0
OPMT 260	Management Engineering 1	2.0
PHYS 319	Physics	4.0

Level 4	(Term 2A 10 weeks)	Classroom hours per week
BLDG 305	Construction Specifications	2.0
BLDG 406	Construction Estimating 3	4.0
BLDG 412	Construction 4 for Economics 2	6.0
BLDG 416	Economics Major 2	6.0
CIVL 438	Building Structures 4	3.0
MATH 440	Mathematical Methods and Computing for Building	4.0
OPMT 360	Management Engineering 2	2.0
TCOM 301	Advanced Technical Communication	2.0

Level 4	(Term 2B 10 weeks)	Classroom hours per week
ADMN 311	Industrial Management	4.0
BLDG 205	Construction Contracts 2	2.0
BLDG 305	Construction Specifications	2.0
BLDG 406	Construction Estimating 3	4.0
BLDG 412	Construction 4 for Economics 2	6.0
BLDG 413	Codes and Regulations	2.0
BLDG 416	Economics Major 2	6.0
MECH 412	Space Conditioning	3.0
SURV 120	Introduction to Survey	3.0

Course Descriptions

ADMN 311 Industrial Management — Designed to give students an understanding of business management and an opportunity to apply principles and techniques through analysis of business case-problems.

BLDG 101 Drafting — Elementary drafting techniques; lettering and symbols; orthographic, isometric and axonometric projections; perspective; shades and shadows. Drawing board practice of foregoing components.

BLDG 102 Building Construction 1 — Principles of building construction in terms of the assembly of materials. Examination of typical systems of wood and masonry construction. Study of architectural detailing and the origins and purposes of building and zoning by-laws. Application of the above components to the preparation of working drawings.

BLDG 103 Materials and Methods — Physical and chemical properties of common construction materials. Standards and gradings for materials. Construction methods and building procedures. Field studies and examination of sample products. Filing and retrieval of technical literature.

BLDG 104 Construction Site Processes — Job site management. Planning, implementation and control of site construction processes. Supervision of construction activities. Contractual relationships and documentation. Application of field studies to actual practice layouts.

BLDG 105 Construction Contracts 1 — Fundamentals of contracts. Parties to construction contracts. Basic types of construction contracts. Relationship between information and risk. Standard forms of construction contracts used in Canada and elsewhere. Appropriate documentation and related issues.

BLDG 108 Introduction to Computers — Computers as machines. Computers as management devices. Hardware and software defined. Aspects of programming, operating, and networking. Demonstrations of practical applications in building technology. Hands-on practice and research assignments related to the topic.

BLDG 201 Planning — Fundamentals of functional building design. Planning and organization of residential spaces. Design of simple utilitarian objects. Elementary architectural design problems and presentation techniques. Prerequisite: BLDG 101.

BLDG 202 Building Construction 2 — Continuation of BLDG 102. Prerequisite: BLDG 102.

BLDG 205 Construction Contracts 2 — Continuation of BLDG 105. Detailed examination of contents of current standard forms of Canadian construction contracts. Contractual procedures involving payments and adjustments. Application of principles to actual cases. Study of recent litigation involving construction contracts. Responsibilities for design and advice. Prerequisite: BLDG 105.

BLDG 206 Construction Estimating 1 — Introduction to general theories of measurement and pricing of construction work. Specific study of particular methods of measurement. Application to elementary examples of work. Introduction to bidding procedures and documentation. Sources of cost data. Introduction to computer applications for estimating. Prerequisite: BLDG 103.

BLDG 302 Building Construction 3 for Architectural Major 1 — Continuation of BLDG 202. Examination of typical systems of construction in heavy timber, steel and concrete. Site fabrication and assembly; prefabrication. Selection and location of materials in buildings. Extensive preparation of working drawings. Field trips to building sites and fabrication plants. Prerequisite: BLDG 202.

BLDG 305 Construction Specifications — Fundamentals of language as a means of communication. Style in specifications. Organization and presentation of information in construction contract documentation. Filing and retrieval of construction information using Masterformat. Preparation and reproduction procedures for production of project manuals. Use of word-processing equipment for specifications. Practical applications. Prerequisite: BLDG 103.

BLDG 306 Construction Estimating 2 — Continuation of BLDG 206. More detailed study and application of measurement and pricing of work of specific trades with emphasis on concrete work. Examination of CIQS Methods of Measurement of Construction Work. Prerequisite: BLDG 206.

BLDG 309 Architectural Major 1 — Short history of contemporary architecture and building. Conceptualization and planning. Theory, aesthetics and structure as integral parts of design.

BLDG 312 Construction 3 for Economics 1 — Same as BLDG 302, but with less emphasis on drawing board skills and more emphasis on construction implementation procedures. Prerequisite: BLDG 202.

BLDG 316 Economics Major 1 — Principles of land development, use and title. Appraisal and assessment of property values for purchase, sale, taxation and other purposes. Techniques of analysis and synthesis of construction project costs. Sources of cost information and data.

BLDG 402 Construction 4 for Architectural Major 2 — Continuation of BLDG 302, for Architectural Major. Prerequisite: BLDG 302.

BLDG 406 Construction Estimating 3 — Continuation of BLDG 306. Measurement and unit pricing of specific construction trades. Preparation of estimate summaries and bids or proposals to owners or clients. Construction cost accounting. Documentation used in estimating and cost accounting processes. Bid strategies, bid depositories, bid procedures in general. Prerequisite: BLDG 302.

BLDG 409 Architectural Major 2 — Continuation of BLDG 309. Graphics and freehand drawing of architectural subject matter. Advanced perspective drawing in a variety of media. Architectural model making. Extensive seminar discussions, guest lecturers and field trips. Prerequisite: BLDG 309.

BLDG 412 Construction 4 for Economics 2 — Continuation of BLDG 312, for Economics Major. Prerequisite: BLDG 312.

BLDG 413 Codes and Regulations — Building Law in Canada. A general survey of codes and regulations affecting design and construction, including zoning and professional practice. Specific study of the National Building Code, with particular reference to use and occupancy, and the control of fire hazards. Prerequisite: BLDG 302 or BLDG 312.

BLDG 416 Economics Major 2 — Continuation of BLDG 316. Financial management; contract management. Cost accounting and budget control methods. Bid strategies and procedures. Development of feasibility studies. Presentation of reports on construction economic affairs and jobsite controls. Techniques of costing, pricing and analysis of economic data. Prerequisite: BLDG 316.

BLDG 419 Building Acoustics — Theory and principles of sound, including properties, propagation, sources and measurement techniques. Noise criteria and control of noise in buildings. Selection of materials having appropriate acoustical and aesthetic qualities for buildings. Calculations encountered in acoustical considerations. Prerequisite: BLDG 302 and 309.

CIVL 135 Building Structures 1 — Basic theory of statics including the calculation of loads acting on structures, and the calculation of support reactions and internal axial and shear forces and bending moments due to the applied loads. Students will be expected to analyse simple trusses and plot shear and bending moment diagrams for beams. This course lays the groundwork for subsequent courses in strength of materials and elementary structural design, and is presented in lectures followed by tutorial problem solving sessions.

CIVL 236 Building Structures 2 — The link between statics and design, this course concentrates initially on various types of stress, including shear, bending and buckling stresses. Investigation of properties of sections, shear forces, bending moments, deflections, loads, methods of framing and site visits, allow for analysis of existing buildings and use of the timber design manual. Prerequisite: CIVL 135.

CIVL 337 Building Structures 3 — The emphasis in this course is placed on elementary structural design concepts for timber, steel and reinforced concrete structures. Students are familiarized with design aids such as handbooks, manuals, catalogues and tables used in the construction industry. Architectural students study primarily timber structures, including concrete formwork design. All other students study a more condensed course including timber, steel and concrete. Concepts such as lateral stability and resistance to wind and earthquake forces are included. Prerequisite: CIVL 236.

CIVL 438 Building Structures 4 — Architectural students study elementary reinforced concrete design including an appreciation of its variations, such as prestressed concrete and reinforced masonry, followed by an introduction to soils engineering including compaction, foundation systems and retaining walls. All other students take a shorter course including bolted and welded connections of steel members, a condensed version of the soils engineering mentioned above, and an introduction to concrete formwork design. Prerequisite: CIVL 337.

ELEC 150 Illumination — Deals with the types and characteristics of lighting sources; quantity and quality of light; lighting units, terminology and calculations.

ELEC 250 Electrical Systems — Students learn how to plan the electrical system for a specific building, with the electrical designer. How to read and work with common electrical drawings and specifications, understand single and three-phase systems, and power factor correction for minimumal operations costs; recognize and avoid building designs that create costly electrical design problems. Prerequisite: ELEC 150.

MATH 140 Basic Technical Mathematics — Quadratic equation and systems of linear equations. Radian measure. Trigonometric functions, solution of triangles, and vectors. Irregular areas and volumes. Exponential/logarithmic theory and transformations, common and natural logarithms, and logarithmic/semilogarithmic graphs. Variation, straight line equation, and curve fitting. Linear programming.

MATH 240 Calculus 1 and 2 with Analytic Geometry — Conic sections and polar/rectangular transformations. Limits, the derivative, differentiation rules for algebraic, trigonometric, logarithmic and exponential functions, curve sketching, implicit differentiation, higher order derivatives, applied maxima/minima, related rates and differentials. Antidifferentiation, the indefinite integral and the definite integral including area, volume, centroid and moment of inertia.

MATH 440 Mathematical Methods and Computing — BASIC arithmetic and functions, input/output statements, relational operators, branching statements, strings and arrays. Linear programming using the simplex method and the transportation problem. Cost estimating computer case study.

MECH 412 Space Conditioning — The student will study and analyze factors influencing indoor comfort, including building solar orientation, evaluation of cooling loads, properties of air, air-conditioning processes, and gain an overview of air conditioning methods.

MSYS 101 Plumbing — Topics include codes, basic engineering principles and graphic presentations related to plumbing systems design, load calculations, piping methods, sizing of system components for storm and sanitary drainage and water distribution. Some drafting skill will be required.

MSYS 202 Heating and Ventilating 1 — Covers the principles involved with heat loss in buildings and practises of heating and ventilating encompassing a study of system components and design procedures. These will then be applied to the preparation of heat loss calculations and working drawings for a heating/ventilating system.

OPMT 185 Project Management — An introduction to the fundamentals of Critical Path Method (CPM) as it applies to project planning, scheduling and control, and project management. The course includes arrow, precedence and time logic diagrams; resource allocation, time cost analysis and the role of the computer.

OPMT 260 Management Engineering 1 — Applies the systematic problem-solving and decision-making approach to construction industry problems. The course includes computerized facilities planning; work study, using recognized method study techniques to examine and improve the way in which a job is accomplished; recognized work measurement techniques for estimating, planning and cost control and engineering economics.

OPMT 360 Management Engineering 2 — Techniques of work innovation and management problem-solving. Goal setting, agreement creation, work measurement and documentation. Uses computer software for project management with emphasis on the manager's perspective.

PHYS 219 Physics — A general physics course designed to meet the specific needs of the Building Technology. There is a lab component. Topics include: mechanics — statics, kinematics, dynamics, work and energy, basic machines; electricity and magnetism — electrostatics, basic circuits, electromagnetic effects; electric motors; matter — solids, liquids and gases, hydrostatics, fluid flow; heat and thermodynamics — change of state, heat transfer, heat engines, energy sources; wave and simple harmonic motion — mechanical and acoustical vibrations.

PHYS 319 Physics — A general physics course designed to meet the specific needs of the Building Technology. There is a lab component. Topics include: mechanics — statics, kinematics, dynamics, work and energy, basic machines; electricity and magnetism — electrostatics, basic circuits, electromagnetic effects; electric motors; matter — solids, liquids and gases, hydrostatics, fluid flow; heat and thermodynamics — change of state, heat transfer, heat engines, energy sources; wave and simple harmonic motion — mechanical and acoustical vibrations.

SURV 120 Introduction to Survey — An introduction to engineering survey; linear distance; the theory and use of theodolite; direction, bearing and angles; use of traverses in site engineering; elevations, use and theory of the level, how to use the plane table.

TCOM 101 Technical Communication — In this course students learn the basic techniques and applications of written and spoken communication. Assignments are related as closely as possible to the practical careers of Building Technology students, including direct and persuasive requests, informational memos, job application letters and resumes.

TCOM 201 Technical Communication — In this applied communication course students learn the theory and practice writing different types of short reports based on industry-related case studies. They learn report formats and write occurrence, trip progress, investigation and recommendation reports. Prerequisite: TCOM 101.

TCOM 301 Advanced Technical Communication — In this course, students concentrate on two problems of particular relevance to second-year students — obtaining employment and writing presentations. They update their job search packages and write proposals, follow-up letters, progress reports, a formal technical report and give an oral technical briefing. Prerequisite: TCOM 101, TCOM 201.

Civil and Structural

Civil and Structural technologists are involved in the design and construction of highways, bridges, airports, railways, municipal works, power developments, dams, canals, docks and harbors. The field has enormous creative potential and offers the technologist involvement in all phases of a project, from design stage to finished job.

Job Opportunities

Graduates find employment as inspectors, construction supervisors, testing lab technicians, design detailers and investigation and construction technologists in government and in private industry. A number of graduates have founded their own consulting or construction businesses. Others are placed in engineering, contracting, surveying or architectural firms as project managers or supervisors, or to work in design or analysis. These jobs usually entail an equal amount of time spent outdoors as indoors. Fieldwork usually takes place from spring to fall.

The Program

The diverse and stimulating program includes field trips to assist students in developing their creativity, ingenuity and critical abilities, as well as major projects in which the student develops, in consultation with professionals, appropriate methods of approach and solution. In the second year, students may choose their options to provide a degree of specialization in varying ares of the civil or structural technology. These include Geotechnical, Highways Traffic, Water Resources, Construction and Structures.

The program has been accredited at the technologist level by the Applied Science Technologists and Technicians of B.C. and, upon completion of the BCIT diploma program, graduates are eligible for membership in the Society.

Prerequisite

Algebra 12 and Physics 11 are course requirements for this program. Applicants should be skilled in the use of the English language, have good mathematical ability and be interested in the physical sciences. Drawing or sketching ability is useful.

Exemption from the academic requirements may be made in the case of mature applicants with applicable practical experience.

Transfer

Graduates of the Civil and Structural Program with a sufficiently high standing are granted full credit for their work at BCIT by the University of Lakehead Civil Engineering Department. After taking summer school they are then eligible to enter fourth year engineering directly and graduate with an accredited degree in two years. Students with a high academic standing also obtain good transfer credits to other Canadian Universities such as the University of Waterloo.

Faculty and Staff

R.I. McNeil, B.Surv., B.C.L.S., Dipl. Adult Ed., P.Eng., Department Head
T. Abbuhl, Dipl.T., A.Sc.T.
A.R. Barren, B.Sc., Ph.D., P.Eng., Program Head
R.B. Brown, Dipl.T., A.Sc.T.
R. Butler, M.I.C.E., M.I. Struct E., C.Eng., P.Eng.
P. Cunnington, B.Sc., P.Eng.
D. Graham, B.A.Sc., M.A.Sc., P.Eng.
M.J. Heinekey, B.Tech., Dipl.T., Dipl. Adult Ed., A.Sc.T.
G.Q. Lake, B.A.Sc., P.Eng.,
J. McLean, B.Ed., A.Sc.T.
C.A. Payne, B.A.Sc., M.A.Sc., P.Eng.
E. Reid, M.I.C.E., C.Eng., P.Eng.
B. Samson, B.A.Sc., M.A.Sc.
R.C. Starr, B.Eng., M.A.Sc., P.Eng. Chief Instructor
C.E. Wade, B.Sc., M.I.T.E., P.Eng., on leave

TECHNOLOGY: Civil and Structural

Level 1		Classroom hours per week
CIVL 101	Statics	6.0
CIVL 103	Hydrology	3.0
CIVL 109	Construction Materials 1	3.0
MATH 142	Basic Technical Math	5.0
MECH 101	Drafting Fundamentals	2.0
PHYS 107	Physics	5.0
SURV 130	Survey	3.0
TCOM 103	Technical Communication	3.0

Level 2	(Term 2A 10 weeks)	Classroom hours per week
CIVL 202	Strength of Materials	6.0
CIVL 207	Hydraulics 1	3.0
CIVL 211	Civil Computer Applications 1	3.0
MATH 242	Calculus 1 and 2	5.0
MECH 202	Drafting	2.0
PHYS 207	Physics	5.0
SURV 230	Survey	3.0
TCOM 203	Technical Communication	3.0

Level 2	(Term 2B 10 weeks)	Classroom hours per week
CIVL 203	Elementary Structural Design	6.0
CIVL 207	Hydraulics 1	3.0
CIVL 211	Civil Computer Applications	3.0
MATH 242	Calculus 1 and 2	5.0
MECH 202	Drafting	2.0
PHYS 207	Physics	5.0
SURV 230	Survey	3.0
TCOM 203	Technical Communication	3.0

PROGRAM: Geotechnical and Highways/Traffic

Level 3		Classroom hours per week
CIVL 304	Structural Design General	6.0
CIVL 308	Hydraulics 2	3.0
CIVL 313	Subdivision Planning and Street Design	6.0
CIVL 325	Soil Mechanics 1	6.0
MATH 342	Matrix Methods	4.0
SURV 330	Survey for Civil and Structural	3.0
TCOM 302	Advanced Technical Communication	2.0

Level 4	(Term 2A 10 weeks)	Classroom hours per week
CIVL 412	Municipal Services	6.0
CIVL 426	Soil Mechanics 2	6.0
CIVL 432	Construction Estimating	3.0
MATH 442	Statistics for Civil and Structural	4.0
OPMT 180	Construction Management 1	3.0
PHOT 127	Photo Interpretation	3.0
SURV 430	Survey for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	2.0

Level 4	(Term 2B 10 weeks)	Classroom hours per week
CIVL 410	Construction Materials 2	3.0
CIVL 417	Highway Design	6.0
CIVL 427	Soil Mechanics 3	6.0
CIVL 436	Construction Planning	3.0
MATH 442	Statistics for Civil and Structural	4.0
PHOT 127	Photo Interpretation	3.0
SURV 430	Survey for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	2.0

PROGRAM: Water Resources

Level 3		Classroom hours per week
CIVL 304	Structural Design General	6.0
CIVL 308	Hydraulics 2	3.0
CIVL 313	Subdivision Planning and Street Design	6.0
CIVL 325	Soil Mechanics 1	6.0
MATH 342	Matrix Methods	3.0
SURV 330	Survey for Civil and Structural	3.0
TCOM 302	Advanced Technical Communication	2.0

Level 4	(Term 4A 10 weeks)	Classroom hours per week
CIVL 412	Municipal Services	6.0
CIVL 416	Water Resources	3.0
CIVL 426	Soil Mechanics 2	6.0
CIVL 432	Construction Estimating	3.0
MATH 442	Statistics	4.0
OPMT 180	Construction Management 1	3.0
SURV 430	Survey for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	2.0

Level 4	(Term 4B 10 weeks)	Classroom hours per week
CIVL 410	Construction Materials 2	3.0
CIVL 416	Water Resources	3.0
CIVL 417	Highway Design	6.0
CIVL 436	Construction Planning	3.0
MATH 442	Statistics for Civil and Structural	4.0
OPMT 280	Construction Management 2	3.0
PHOT 127	Photo Interpretation	3.0
SURV 430	Survey for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	2.0

PROGRAM: Construction

Level 3		Classroom hours per week
CIVL 304	Structural Design General	6.0
CIVL 308	Hydraulics 2	3.0
CIVL 313	Subdivision Planning and Street Design	6.0
CIVL 417	Highway Design	6.0
MATH 342	Matrix Methods	3.0
SURV 330	Survey for Civil and Structural	3.0
TCOM 302	Advanced Technical Communication	2.0

Level 4	(Term 4A 10 weeks)	Classroom hours per week
CIVL 325	Soil Mechanics 1	6.0
CIVL 412	Municipal Services	6.0
CIVL 423	Structures 2	6.0
MATH 442	Statistics for Civil and Structural	4.0
OPMT 180	Construction Management 1	3.0
SURV 430	Survey for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	2.0

Level 4	(Term 4B 10 weeks)	Classroom hours per week
CIVL 410	Construction Materials 2	3.0
CIVL 426	Soil Mechanics 2	6.0
CIVL 432	Construction Estimating	3.0
CIVL 433	Construction Detailing	3.0
CIVL 436	Construction Planning	3.0
MATH 442	Statistics for Civil and Structural	4.0
OPMT 280	Construction Management 2	3.0
SURV 430	Survey for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	2.0

PROGRAM: Structures

Level 3		Classroom hours per week
CIVL 308	Hydraulics 2	3.0
CIVL 313	Subdivision Planning and Street Design	6.0
CIVL 322	Structures 1	6.0
CIVL 417	Highway Design	6.0
MATH 342	Matrix Methods	3.0
SURV 330	Survey	3.0
TCOM 302	Advanced Technical Communication	2.0

Level 4	(Term 4A 10 weeks)	Classroom hours per week
CIVL 325	Soil Mechanics 1	6.0
CIVL 423	Structures 2	6.0
CIVL 432	Construction Estimating	3.0
CIVL 434	Structural Detailing	3.0
MATH 442	Statistics for Civil and Structural	4.0
OPMT 180	Construction Management 1	3.0
SURV 430	Survey for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	2.0

Level 4	(Term 4B 10 weeks)	Classroom hours per week
CIVL 410	Construction Materials 2	3.0
CIVL 424	Structures 3	6.0
CIVL 426	Soil Mechanics 2	6.0
CIVL 436	Construction Planning	3.0
MATH 442	Statistics for Civil and Structural	4.0
OPMT 280	Construction Management 2	3.0
SURV 430	Survey for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	2.0

Course Descriptions

CIVL 101 Statics — Vectors, force systems, graphical analysis, resultants, components, moments, equilibrium laws, force polygons, funicular polygons, frames and trusses, stress diagrams, Bowes' notation, flexible tension members, load shear and bending moment curves. Closely supervised problem sessions are used to provide the student with practice in common analytical and graphical solutions to problems of static load on statically determinate structures.

CIVL 103 Hydrology — This introductory course presents the basic concepts and techniques of small watershed analysis and the type of work involved in the design, supervision and construction of drainage facilities. The course will present the fundamentals of practical hydrology including: the hydrologic cycle; precipitation types and measurement; snowmelt, runoff and streamflow; basic frequency analysis and open channel flow. Lectures, assigned problems, and two design projects will be used to demonstrate the principles involved.

CIVL 109 Construction Materials 1 — Introduces the fundamentals of construction materials — concrete, asphalt, and aggregates. Students learn to perform basic tests on these materials in accordance with established standards and recommended industry laboratory procedures. In addition, students learn to sample, inspect and test these materials under civil project conditions.

CIVL 202 Strength of Materials — Simple stresses; stress, strain, elasticity; compound bars and columns; temperature stress; elastic limit, limit of proportionality; yield; ultimate; factor of safety; load factor; ductility; resilience; fatigue; shock. Properties of sections; bending moments; shear forces; theory of flexure; slopes and deflection of beams; restrained and continuous beams. Strut theories; eccentric loading, lateral loading. Testing techniques; machines; extensometers; strain gauges; brittle lacquers; photo elasticity; evaluation of results. Prerequisite: CIVL 101.

CIVL 203 Elementary Structural Design — Having previously studied forces and material properties, students learn to apply these to the analysis of real structures. They also study the effects of wind, snow and earthquake loads as determined by national

standards. Design and analysis of steel and timber beams, columns and trusses and their connections are used as examples. Prerequisite: CIVL 202.

CIVL 207 Hydraulics 1 — Through problem sessions and lectures, the student learns to determine the hydrostatic forces exerted by water on a variety of structures, gates, tanks and dams. As part of a project, the student analyzes a complex tank full of water to determine the forces and centres of pressure. Special problems of hydrostatic pressures produced in accelerated or rotated fluids are given. Further problem sessions lead to the understanding of energy transfers and losses in pipe systems and the significance of friction losses in waterworks systems. In this part of the course, the student analyzes a simple pump-driven circulation system and graphs all energy gradients in profile along the system. Evaluation is by individual interview, problems and quizzes.

CIVL 211 Civil Computer Applications — BASIC language commands, statements, line numbers variables, string variables, expressions, input/output logic including algebra employing arrays, built in functions, subroutines, random access and sequential access files, screen graphics. Projects using BASIC; FORTRAN compared to BASIC; mainframe file editing/printing using CMS/VM spreadsheets; word processing data bases. Highway terminology — horizontal/vertical curves. Introduction to Canadian standards.

CIVL 304 Structural Design General — Designed for students taking Civil options. Through analysis and design projects, students are introduced to reinforced concrete as a structural material. The effects of continuity with structures are discussed in lectures and connection details for all structural components in basic building materials are developed. Prerequisite: CIVL 203.

CIVL 308 Hydraulics 2 — Lectures and assignments on open and closed channel flow including distribution of flow pipe networks, water-hammer, and stresses in pipes. Hydraulic element chart and specific energy in open channel and culvert flow. Prerequisite: CIVL 207.

CIVL 313 Subdivision Planning and Street Design — Through this introduction to the physical layout of urbanization, the student learns to systematically subdivide a piece of land in accordance with recommended standards using imagination and creativity. Design a major street to recommended standards including geometrics, elevation tables, catch basin locations and rotation of crown; and to design a minor street complete with intersection, curb returns and appropriate drainage. The topic is viewed from the range of planner, engineer, developer, consumer and resident, and the knowledge could be used working for a developer, municipal planner or engineer, or a consulting engineer or contractor. This course offers the opportunity to make decisions and to actually design a civil works project. Briefs are produced and there is exposure to designing an office environment as well. Prerequisite: CIVL 206.

CIVL 322 Structures 1 — Heavy emphasis is placed on statically indeterminate structures in this, the first of three second year structures courses. In addition to determining the design criteria for continuous beams and frames by the use of moment distribution, reinforced concrete designs for one way slabs, continuous beams and columns, as well as retaining walls, are investigated. The designs are "drafted" and "reinforced" with site visits. Prerequisite: CIVL 203.

CIVL 325 Soil Mechanics 1 — Through lectures and laboratory work the principles of basic soil mechanics and soil testing are covered. Topics include mass/volume relationships, soil classification, compaction, geology, subsurface investigation, permeability and pressured diagrams, effective stress, consolidation, shear strength.

CIVL 410 Construction Materials 2 — Introduction to the design of Portland cement and asphaltic concrete as materials. Students learn to design concrete to specified strength and perform Marshall design on asphalt. The course also includes an introduction to cement chemistry and manufacturing, non-destructive testing and statistical analysis of concrete; the analysis and interpretation of Marshall designs of asphalt. Inspection techniques for construction material in general and specific emphasis on inspection procedures, reporting and safety for civil engineering will be covered in this course. As per CIVL 417 with additional topics relevant to highway structures such as bridge abutments, multiplate culverts, etc. Prerequisite: CIVL 109.

CIVL 412 Municipal Services — Students plan a residential subdivision for a piece of accessible raw land and design an arterial street bordering the subdivision and specific minor streets and intersections within the subdivision. The instructor acts as supervisor and consultant to students. Lectures on the basics of neighborhood planning and on design standards and methods are given as needed. The plan includes the waterworks distribution system, sanitary sewers and storm sewers and their design with full plans and profile drawings for each service. Through preparatory lectures and discussions, the student is introduced to municipal road standards, crown and drainage, street geometry, street appurtenances, paving methods, domestic fire and industrial water demands, water distribution design methods, distribution reservoirs and pressure control, pumping, sewer flows and sewer design, sewage pumping stations and loads on buried conduits. Field trips are made to municipal operations. Prerequisite: CIVL 207, CIVL 206.

CIVL 416 Water Resources — Lectures and problem sessions present the analysis of surface runoff by the rational formula and unit hydrograph, mass curves for water supply storage, flood routing and detention storage. The use of the computer in predicting water resources and quality (mathematics modelling) is covered. Prerequisite: CIVL 207 or CIVL 105.

CIVL 417 Highway Design — Students will complete the preliminary design of a section of rural highway in B.C. Working in groups, students will establish curve radii, spiral lengths, curve data, stations, curve superelevation, superelevation development, centre line profile, vertical curve lengths, typical section details, drainage details, culvert sizes. Using an earthwork computer program students will optimize earthworks by manipulating input files on vertical alignment, typical section and superelevation and by analysis of resulting mass haul. Preliminary working drawings will also be prepared. Prerequisite: CIVL 206, CIVL 207, CIVL 211.

CIVL 423 Structures 2 — Through analysis and design projects, students continue to achieve appreciation and understanding of structures. Emphasis is placed on computer aided structural analysis and design, and on formwork design. Students will acquire the ability to present calculations, sketches and drawings in a clear, concise, professional manner, and to solve problems within a specified time limit. A field trip to inspect a structure under construction is included. Prerequisite: CIVL 322.

CIVL 424 Structures 3 — An existing bridge is chosen in consultation with the instructor, and the student designs, aligns and details an alternative crossing to the original. The student learns about layout, moving loads, influence lines, continuous girders.

trusses, arches, deflections of spans, bridge deck floor systems, sway bracing, deck slabs, joint details, piers and abutments and piling. Prerequisite: CIVL 423.

CIVL 426 Soil Mechanics 2 — This course applies the knowledge learnt in CIVL 325 to a variety of geotechnical, foundation and drainage design problems. Projects include seepage studies and stability analysis of soil slopes, earth pressures and retaining structures, foundation design. Prerequisite: CIVL 325.

CIVL 427 Soil Mechanics 3 — Lectures, laboratory and project work and guest lectures cover the following topics: geotechnical aspects of tailings dam design, construction and maintenance; triaxial soil testing; maintenance and operation of laboratory/field electronic equipment; reinforced earth; elementary rock mechanics. Prerequisite: CIVL 426.

CIVL 432 Construction Estimating — The student is involved in construction estimate preparation both as an individual and as a member of a team. Lectures illustrate the procedures for taking off quantities, establishing productivity forecasts and unit costs, and accounting and job control methods.

CIVL 433 Construction Detailing — Introduction to the practical aspects of taking-off, fabrication, and the placing and inspecting of reinforcing steel in concrete structures. Field trips to fabricating plants and construction sites augment classroom instruction.

CIVL 434 Structural Detailing — Students are required to design and detail connections, and draw solutions to detailing problems taken from structures used in other related courses, i.e. timber, steel and reinforced concrete. Includes bill of materials and reinforcing bar lists.

CIVL 436 Construction Planning — Introduction to the time-value of money and the application of sound economic principles to comparison of construction alternatives and acquisition and maintenance of equipment. A major construction project is analyzed by the student emphasizing critical path planning and the optimum use of resources. Planning for construction projects involving repetitive operations is demonstrated by worked examples. Construction industry guests lecture on current projects and the responsibility of the technologist.

MATH 142 Basic Technical Mathematics for Civil and Structural — Quadratic equation and systems of linear equations. Radian measure. Trigonometric functions, solution of triangles, and vectors. Irregular areas and volumes. Exponential/logarithmic theory and transformations, common and natural logarithms, and logarithmic/semilogarithmic graphs. Variation, straight line equation, and curve fitting. Linear programming.

MATH 242 Calculus 1 and 2 for Civil and Structural — Conic sections and polar/rectangular transformations. Limits, the derivative, differentiation rules for algebraic, trigonometric, logarithmic and exponential functions; curve sketching, implicit differentiation, higher order derivatives, applied maxima/minima, related rates and differentials. Antidifferentiation, the indefinite integral and the definite integral including area, volume, centroid and moment of inertia.

MATH 342 Matrix Methods for Civil and Structural — Matrix theory and operations, types of matrices, determinants, matrix inversion, elementary matrix transformations and solution of systems of linear equations. Linear programming using the Simplex method. Network analysis.

MATH 442 Statistics for Civil and Structural — Organization and graphical presentation of data, frequency distributions and measures of central tendency, variation and other measures. Probability theory and laws. Random variables, discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Method of least squares and regression and correlation. Time series analysis. Control chart concepts and application, acceptance sampling.

MECH 101 Drafting Fundamentals — An introductory course for persons with little or no experience in graphics. (Students are required to purchase drafting equipment and supplies on the first night of class) Students learn to produce and read simple drawings. Topics include scales, geometric constructions, basic orthographics detail interpretation, line visibility, dimensioning, auxiliary views, true shape, inclined and skew surfaces, sections, pictorials, working drawings and freehand sketches.

MECH 202 Drafting (Civil and Structural) — Intersections, developments, descriptive geometry, contours, sections, profiles, cut and fill problems. All treated generally on a project basis with civil and structural design procedures.

OPMT 180 Construction Management 1 — An introduction to the fundamentals of the Critical Path Method (CPM) as it applies to project planning, scheduling, control and management. This course includes arrow diagrams, precedence diagrams, resource allocation, time-cost analysis, PERT, bid determination, project management and the role of the computer. The course is designed to meet the needs of the civil engineering student.

OPMT 280 Construction Management 2 — The study of problem-solving in industry, with particular emphasis on heavy construction and manufacturing problems. The course includes method study, process charting, activity sampling, work measurement, motion economy and productivity. Special emphasis is placed on the human problems associated with change. The course is particularly slanted towards civil engineering.

PHOT 127 Photo Interpretation — Civil and Structural — Covers the fundamentals of aerial photo interpretation, basic photo interpretation equipment, geologic and soil mapping, air photo interpretation for terrain evaluation, engineering applications of aerial photo interpretation including site evaluation and route location. The fundamentals of photogrammetry and the applications of photogrammetric equipment to highway engineering are also covered.

PHYS 107 Physics for Civil and Structural — This is a general level physics course emphasizing the application of physical principles to the Civil and Structural Technology. A section on the application of geophysical exploration techniques used in the technology is included. Topics covered include statics, kinematics, dynamics, energy and power, angular motion, thermal properties of matter, fluid mechanics, wave motion and waves in elastic media, basic electricity and magnetism, instrumentation, optics and atomic and nuclear phenomena. The lab program stresses measurements, data analysis and experimental techniques.

PHYS 207 Physics for Civil and Structural — see PHYS 107.

SURV 130 Surveying — Civil and Structural — Fundamental concepts of surveying; measurement of distances, use of compasses, theodolites, plane tables, levels and chains, site surveys. Calculations relating to traverses, triangulations, areas and volumes; obtaining, recording and plotting topographic detail. Care, maintenance and adjustment of equipment.

SURV 230 Surveying — Civil and Structural — see SURV 130.

SURV 330 Surveying — Civil and Structural — see SURV 130.

SURV 430 Surveying — Civil and Structural — see SURV 130.

TCOM 103 Technical Communication for Civil and Structural — In this course students practice basic writing and word processing skills, and write inquiry, complaint and adjustment letters. They also write several short, technical memos and give an oral report. Assignments and materials are taken from the civil and structural field.

TCOM 203 Technical Communication for Civil and Structural — Students will write job application letters and resumes and learn about job interviews. They write short progress, incident, trip reports and inspection reports common to the Civil and Structural field. They also practice oral reporting. Prerequisite: TCOM 103.

TCOM 302 Advanced Technical Communication for Civil and Structural — Students analyze and write problem-solving, analytical and recommendation reports typical of the civil engineering field. They also learn small group communication theory, write management letters, organize staff and site meetings and participate in role-plays. Prerequisite: TCOM 103, TCOM 203.

TCOM 401 Advanced Technical Communication for Civil and Structural — In this course, students continue practising advanced communication skills such as using word processing to write specifications, how to handle complaints on the telephone, persuasive presentations and technical proposals. The focus of the course is on selling engineering ideas. Prerequisite: TCOM 103, TCOM 203, TCOM 302.

Surveying

The skills of the survey technologist are in demand in a large number of businesses and industries. Surveying and photogrammetry are essential to many phases of industrial and business development including construction, natural resource exploration and development, and mapping. Surveying techniques have become more sophisticated through the use of electronic devices and computers so that shape, size and location of objects or land masses can be determined with precision and speed.

Job Opportunities

Surveying firms, consulting engineers, the oil and gas industry, government mapping, highway, planning and engineering departments and utility companies provide some of the job possibilities for surveying graduates. Employment may be found throughout Canada and around the world. This program is accredited by the Applied Science Technologists and Technicians of B.C.

The Program

BCIT offers both two year and specialized one year programs. In conjunction with Continuing Education, the Survey department presents a training program to the Technician level. The major surveying program is the two year course of studies leading to a National Diploma in Surveying. Students in this program acquire a solid background in math, physics, cartography, photogrammetry, plane and geodetic surveying and computers. The practical skills of note keeping, drafting, field operations and calculations are also covered. Prospective students should have a genuine interest in mathematics, computers, earth sciences and should enjoy a vigorous outdoor lifestyle. Students desiring a less academic program may take advantage of the more field-oriented Junior Technician level program. Students who select this program will normally complete Term One of the General Survey program and then transfer into a specialized course of studies in applied survey techniques.

Students whose interests are centred in the areas of photography, computers and cartography, should consider the Photogrammetric Operators program. This program is a two term course of studies specializing in production photogrammetry. Employment in surveying during the summer break is considered desirable.

Post-graduation

Following completion of the two year diploma program, students are eligible for membership in the Applied Science Technologists and Technicians of BC. Graduates are granted some course credits at the University of Calgary in the Survey Engineering Department and at the University of New Brunswick and examinations set by the Western Canadian Board of Examiners for Land Surveyors' Association or Corporation of the four Western Canadian provinces.

Prerequisite

Algebra 12 and Physics 11 are course requirements for this program. Applicants should have a good understanding of math and physics to the university level. Good health is also important because of the physical demands of survey work. Photogrammetry Option students must have good stereo vision.

Faculty and Staff

R.I. McNeil, B.Surv., B.C.L.S., D.L.S., Dipl. Adult Ed., P.Eng., Department Head
K.Bracewell, Dipl.T.
R. Bremner, Dipl.T.
J.S. Caldwell
D.C. Deans, B.A., Program Head
K. Errington, B.C.L.S., Cert.Min.Surv., Senior Instructor
K.Frankich, Dipl.Ing., M.A.Sc., Ph.D.
K. Gysler, B.Eng., M.Eng., D.L.S., P.Eng. Chief Instructor
D. Jarvos, Dipl.T.
G. Kehoe, B.A.Sc., B.C.L.S.
D.S. Martens, Dipl.T., B.C.L.S.
R.G. Miller, Dipl.T., B.A.
W.A. Tupper, Dipl.Ing.
N. Wong, Dipl.Ing., A.R.I.C.S.

TECHNOLOGY: Surveying

PROGRAM: Surveying

Level 1 — Classroom hours per week

MATH 151	Basic Technical Mathematics	7.0
MECH 101	Drafting Fundamentals	3.0
PHYS 123	Physics	5.0
SURV 161	Plane Survey Computations 1	3.0
SURV 164	Field Survey 1	8.0
SURV 172	Computer Applications 1	2.0
TCOM 111	Technical Communication	3.0

Level 2 — Classroom hours per week

MATH 251	Calculus	7.0
MECH 203	Drafting	2.0
PHOT 267	Photogrammetry 2	3.0
PHYS 223	Physics	3.0
SURV 261	Plane Survey Computations 2	3.0
SURV 264	Field Survey 2	8.0
SURV 265	Survey Drafting	1.0
SURV 272	Computer Applications 2	2.0
TCOM 212	Technical Communication	3.0

Level 3 — Classroom hours per week

MATH 351	Matrix Methods	4.0
PHOT 367	Photogrammetry 3	2.0
SURV 361	Plane Survey Computations 3	2.0
SURV 362	Geodetic Surveying 1	3.0
SURV 363	Adjustments of Surveying Measurements	3.0
SURV 364	Field Survey 3	7.0
SURV 365	Drafting and Survey CAD	2.0
SURV 367	Earth Sciences	3.0
SURV 368	Descriptions and Survey Law	2.0
SURV 372	Computer Applications 3	2.0

Level 4 — Classroom hours per week

MATH 451	Statistics	4.0
PHOT 467	Photogrammetry 4	3.0
SURV 461	Plane Survey Computations 4	2.0
SURV 462	Geodetic Surveying 2	4.0
SURV 463	Mathematical Cartography	3.0
SURV 464	Field Survey 4	6.0
SURV 465	Survey CAD 2	3.0
SURV 468	Cadastral Surveying	2.0
SURV 469	Planning and Land Utilization	2.0
SURV 474	Field Surveying for Photogrammetry Option	2.0

PROGRAM: Technician's Program

Classroom hours per week

MECH 203	Drafting	2.0
PHOT 267	Photogrammetry 2	3.0
SURV 260	Computational Methods for the Field Technician	5.0

SURV 265	Survey Drafting	1.0
SURV 268	Field Survey Techniques	13.0
SURV 272	Computer Applications 2	2.0
TCOM 121	Technical Communication	3.0

PROGRAM: Photogrammetry

Level 3 Classroom hours per week

MATH 351	Matrix Methods	4.0
PHOT 365	Cartography — Photogrammetry	2.0
PHOT 377	Photogrammetry	11.0
SURV 361	Plane Survey Computations 3	3.0
SURV 362	Geodetic Surveying 1	3.0
SURV 363	Adjustments of Survey Measurements	3.0
SURV 372	Computer Applications 3	2.0
SURV 374	Field Surveying	3.0

Level 4 Classroom hours per week

MATH 451	Statistics	4.0
PHOT 465	Cartography — Photogrammetry	3.0
PHOT 477	Photogrammetry	10.0
SURV 461	Plane Survey Computations 4	2.0
SURV 462	Geodetic Surveying 2	4.0
SURV 463	Mathematical Cartography	3.0
SURV 469	Planning and Land Utilization	2.0
SURV 474	Field Surveying	3.0

Course Descriptions

MATH 151 Basic Technical Mathematics — Quadratic equation and systems of linear equations. Trigonometric functions of any angle, solution of triangles, graphs of trigonometric functions, identities, and trigonometric equations. Celestial mechanics and angular measures. Definitions and theorems from solid geometry, solutions of spherical triangles and problems in navigation. The straight line, conic sections and transformation of coordinates.

MATH 251 Calculus — Limits, the derivative, differentiation rules for algebraic, trigonometric, inverse trigonometric, logarithmic and exponential functions; curve sketching, related rates, differentials and radius of curvature. Partial differentiation, Taylor and Maclaurin series and Puissant's theorem. Least squares theory. Antidifferentiation, the indefinite integral and the definite integral including area, volume and ARC length. Integration by parts, partial fractions and substitution techniques.

MATH 351 Matrix Methods — Matrix theory and its application in surveying focussing on the elements of matrix operations used in least squares adjustments. Included are vectors and coordinate transformations, matrix calculus, eigenvalues and eigenvectors. quadratic forms and ellipses.

MATH 451 Statistics — Organization and graphical presentation of data, frequency distributions and measures of central tendency, variation and other measures. Probability theory and laws. Random variables, discrete and continuous theoretical distributions. Sampling, estimation, propagation of error, preanalysis, regression and correlation, and the use of variance/covariance matrix.

MECH 101 Drafting Fundamentals — An introductory course for persons with little or no experience in graphics. (Students are required to purchase drafting equipment and supplies on the first night of class) Students learn to produce and read simple drawings. Topics include scales, geometric constructions, basic orthographics detail interpretation, line visibility, dimensioning, auxiliary views, true shape, inclined and skew surfaces, sections, pictorials, working drawings and freehand skteches.

MECH 203 Drafting — Techniques in ink; intersections and developments; contours; profiles; rights-of-way; survey problems and projects.

PHOT 267 Photogrammetry 2 — Introduction to aerial photographs and other remote sensing acquired data; use of map and air photo; geometry of the air photo (scale, displacement and parallax); optics for photogrammetry (refraction, reflection, prisms and lenses); stereoscopy and stereoscopes; radial line triangulation and planimetric map compilation; aerial cameras.

PHOT 365 Cartography — Photogrammetry — Drafting principles as applied to photogrammetric compilation and cartography; inking and scribing techniques; surround detail, lettering and scales; production procedures.

PHOT 367 Photogrammetry 3 — The compilation of a flight plan and detailed specifications for a photogrammetric project; photographic measurements and refinements using a comparator and other instruments; the elements of exterior orientation expressing the space position and angular orientation of a tilted photograph; use of direct optical projection sterioplotters; sterioplotters with mechanical or optical mechanical projection systems and automated stereo plotting instruments; application of on- and off-line projection systems and automatic contouring during orthophotoproduction; the location of points by intersection from two or more terrestrial photographs.

PHOT 377 Photogrammetry — The geometry and physical nature of the photograph; optics for photogrammetry; principles of photography; dark room procedures; aerial cameras; stereoscopy; the spatial model; comparator measurements of photocoordinates; planning aerial photography; plotting instruments; classification and operation of stereoplotters; aerial triangulation; photogrammetric control extension, coordinate tranformation; use of electronic computers; photo-interpretation; terrestrial and oblique photogrammetry; map compilation; cartography; remote sensing; photogrammetric refinement; general specifications.

PHOT 465 Cartography — Photogrammetry — Drafting principles as applied to photogrammetric compilation and cartography; inking and scribing techniques; surround detail, lettering and scales; production procedures.

PHOT 467 Photogrammetry 4 — Review of geometric projections, inner, relative and absolute orientation. Three dimensional similarity transformation, projective transformation, collinearity transformation, projective transformation, collinearity and coplanarity equations. Restitution instruments — analog and analytical types. Accuracy of photogrammetric measurement. Aerial triangulation. Photogrammetric products — topographic maps. Orthophoto maps and digital elevation models (DEM).

PHOT 477 Photogrammetry — Coordinate transformations; colinearity and coplanarity equations; accuracy of coordinate determination; aerial triangulation — preparation, measuring and adjustment; applications of photogrammetry to survey and mapping projects; introduction to digital mapping.

PHYS 123 Physics — General topics covered include light and optical instruments, kinematics, statics, dynamics, angular motion, energy, work properties of matter, temperature, thermal properties of matter, wave motion, basic electricity and magnetism and electronic distance measuring. The lab program stresses measurement, data analysis, experimental investigation of physical laws and technical report writing. Mathematical treatment requires only algebra and trigonometry. Applications of the general topics are relevant to the Surveying Technology.

PHYS 223 Physics — see PHYS 123.

SURV 161 Plane Survey Computations 1 — Mathematical basics; geometry and theorems pertaining to circles; plane trigonometry; angles and bearings; definitions and conversions of angles to bearings and vice versa; coordinate systems; polar and rectangular; inversing; computations of traverses; traverse adjustment by compass and transit rules; locations of gross linear and angular gross errors; area computations by coordinate and DMD methods; UTM traverse computations; missing parts; see SURV 261.

SURV 172 Computer Applications 1 — This course is designed to familiarize the student with the operation of the hand held computer from two perspectives: first, as a calculator to do random computations; second, as a programming tool to solve routine survey problems. Material covered: modes of operation, operator hierarchy, numeric functions, numeric and string variables, array variables, basic statements and commands, program structure, elementary programming and program editing.

SURV 260 Computational Methods for the Field Technician — Review of important geometry theorems and their application to survey. Computations of simple circular curves, and symmetric vertical curves. The solution of problems related to the subdivision of land. The reduction of field acquired measurements.

SURV 261 Plane Survey Computations 2 — Missing parts: different techniques of computations problems on subdivision of land; prismodal and trapezoidal rules of area computations; geometry and elements of circular and compound curves; various methods of curve layout; vertical curve; calculations of areas of cross-sections and earthworks volumes; slope staking; control surveys: intersection and resection; inaccessible base.

SURV 264 Field Survey 2 — An extension of SURV 164 Field Survey 1. Students use techniques developed in large field project where further instrumentation in the form of tacheometers, electronic distance measuring equipment is used.

SURV 265 Survey Drafting — Completion of this course will give students the ability to apply drafting fundamentals to the solution of survey problems. Students will acquire skills in: plotting cadastral survey data; drafting plans, profiles and cross-sections; developing simple earth-work diagrams.

SURV 268 Field Survey Techniques — This is an intensified field oriented course. Successful completion will give students the ability to carry-out routine survey tasks. These will include extensive practice in the use of surveyor's levels, theodolites and various types of EDMs.

SURV 272 Computer Applications 2 — A continuation of SURV 172. Topics include BASIC programming for strings, for-next loops, subroutines, data files, introduction to MS-DOS, introduction to word processing, serial communication for hand held computers.

SURV 361 Plane Survey Computations 3 — Geometric spaces in surveying, surveying measurements, propagation of errors, computers and numerical approaches in surveying; computations of control surveys; triangulation, trilateration, traversing, reduction of eccentric measurements, intersection, resection, inaccessible base; transformation of coordinates, partitioning of land, horizontal and vertical curves; integrated surveying; deformations; three dimensional surveying systems.

SURV 362 Geodetic Surveying 1 — Properties of the ellipse and the ellipsoid of revolution; calculation of radii of curvature; spherical excess; Legendre's theorem, method of addends. Field tests; triangle closures, side equations, sine consistency checks; reduction to sea level. Convergence of meridians, computation of geodetic position, foreward and inverse. Trigonometric levelling; reciprocal, non-reciprocal, refraction, intervisibility problems.

SURV 363 Adjustments of Survey Measurements — Definitions and classification of errors, measures of precision; propagation law of standard errors; weights and propagation of weights; principle of least squares (in matrix notation); adjustment by variation of parameters; conditional observations; combined adjustments; adjustments of triangulation, trilateration nets, and traversing.

SURV 364 Field Survey 3 — This course introduces the student to the instruments and methods used in carrying out plane and geodetic surveys. The projects are aimed at engineering, hydrographic, mining, legal and precise surveys. The student is introduced to the reduction and presentation of the field data, with the application of computers in some areas.

SURV 365 Drafting and Survey CAD — Topics covered include sequential files, string manipulation, microcomputer graphics, role of CAD in surveying, BASIC and FORTRAN programming for plotters and digitizers, data collector transfers, reduction of field data, coordinate goemetry programs, creation of plot files. Surveyor general requirements for survey plans, inking.

SURV 367 Earth Sciences — A study of the forest flora of British Columbia; the characteristics of native trees, their identifying features and common uses. Elementary geology, including the study of rocks and minerals, geologic structures, general location and uses of common ores. Soil classification and location.

SURV 368 Descriptions and Survey Law — This course covers basic Survey Law, land tenure and land registration systems. Land survey systems are examined and the format of descriptions for deeds is outlined--the use of metes and bounds descriptions, together with adjoiners, aliquot parts, centre line descriptions are developed.

SURV 372 Computer Applications 3 — Students will study the FORTRAN language and achieve a moderate proficiency in writing programs for survey computations and graphics. Topics include features of the IBM mainframe, CMS terminal operating systems, XEDIT (Editing Utility), use of the WATIV compiler, fundamentals of the FORTRAN language, FORTRAN 77 compiler, CALCOMP calls, file handling and transfers, IBM PC, FORTRAN compilers.

SURV 374 Field Surveying — Control surveys by triangulation, trilateration and traversing; indirect optical distance measurement; electro-magnetic distance measurements; the gyro-theodolite; trigonometrical and barometric levelling.

SURV 461 Plane Survey Computations 4 — see SURV 361.

SURV 462 Geodetic Surveying 2 — Gravitational and centrifugal force; gravity, gravity measurements and reductions, anomalies, separation of the geoid; precise levelling, orthometric and dynamic heights. Close satellite theory, spherical and rectangular coordinate systems, Doppler positioning by satellite, electronics in surveying, propagation of electromagnetic waves, refraction. B.C. system of integrated surveys, computations in the UTM system, zone to zone transformations.

SURV 463 Mathematical Cartography — Concepts and properties of maps; classifications of maps; theory of distortions; conformality; equivalency; Tissot's indicatrix, conical projections; cylindrical projections; perspective projections; polyconic projection of British Columbia; UTM projection; stereographic projection of New Brunswick.

SURV 464 Field Survey 4 — see SURV 364.

SURV 465 Survey CAD 2 — Topics covered include: data structures, programming for digitizers and plotters, introduction to computer graphics, and algorithms for computer cartography.

SURV 468 Cadastral Surveying — Deals with surveys which do not have to account for curvature of the earth. Analysis of methods and instrumental errors, use of specialized equipment. Application of survey methods to engineering surveys, mining surveys, hydrographic surveys, legal surveys and higher order surveys.

SURV 469 Planning and Land Utilization — The planning process as it applies to regional and community planning; the role of various planning authorities and their powers; legislation effecting planning; zoning and its implication for land use and land development; land use studies; the subdivision of land and elementary economics related to land development.

SURV 474 Field Surveying — see SURV 374.

TCOM 111 Technical Communication — In this course, students learn the style and organization of clear technical writing. They write letters and memos, process descriptions and instructions, and design graphics relevant to surveying. They also give an oral report.

TCOM 121 Technical Communication — Under development.

TCOM 212 Technical Communication — In this course, students learn the fundamentals of job seeking, meeting and reporting. They participate in meetings and give an oral technical report. They write resumes, job application letters, technical briefs and proposals and occurrence, trip progress, evaluation and recommendation reports. Prerequisite: TCOM 111.

Natural Resource Studies

Biological Sciences

The Biological Sciences Technology, offers a variety of secure and worthwhile career possibilities encompassing indoor and outdoor work in large or small-scale settings. Food processing offers stable employment, even during unsettled economic conditions, since this industry is tied to population growth. Those with a concern for their environmental surroundings, may gravitate towards landscape horticulture. Others may be interested in mastering the complexities of farm management.

The Program

The first term of the Biological Sciences Program provides students with a general background before they proceed to one of two options: Food Processing or Landscape Horticulture. All programs and options in the Biological Sciences Technology are accredited by the Applied Science Technologists and Technicians of B.C.

Note: The second year of Food Production and Management in Agriculture programs will be offered in 1986/87 but not offered in subsequent years.

Job Opportunities

Graduates in the *Food Processing Option* find employment in the food manufacturing industry, where they may perform chemical, physical and bacteriological tests on food materials during processing and on packaged goods, or they may supervise manufacturing processes within the plant. Other opportunities are found in government laboratories and inspection services.

Landscape Horticulture Option graduates are employed with landscape contractors, greenhouses, nurseries, parks and recreation systems, landscape architects and planners.

Prerequisite

Algebra 12 and Chemistry 11 are course requirements for the Biological Sciences Program (Food Processing, Landscape Horticulture).

Faculty and Staff

J.T. Neilson, B.A.Sc., P.Eng., Acting Department Head
S.B.J. Andersen, B.A., Chief Instructor
R.S. Berry, B.S.A., P.Ag.
K.G. Cummings
J.T. Gillingham, B.S.A., M.Sc., Ph.D.
R.N.E. Hargreaves, Dipl.T., A.S.E.T.
R.N. Hitchman, B.S.A., P.Ag.
W. Hooge, B.S.A., P.Ag., Chief Instructor
V.J. Martens, B.S.A., M.Sc., P.Ag., Chief Instructor
J.H. Muir, B.S.A., P.Ag.
S.M. Murray, B.Sc. (Agr.), P.Ag.
B.E. Rothe
J.K. Soutter, H.D.F.T.

TECHNOLOGY: Biological Sciences

PROGRAM: Food Production

Level 3		Classroom hours per week
BISC 300	Agricultural Field Studies	-
BISC 304	Introductory Food Analysis	5.0
BISC 305	Mechanics of Machines	4.0
BISC 307	Applied Genetics	4.0
BISC 308	Plant Technology	6.0
BISC 309	Animal Technology	4.0
CHEM 311	Instrumental Analytical Methods	5.0
TCOM 303	Advanced Technical Communication	2.0

Level 4		Classroom hours per week
BISC 407	Agricultural Analysis	5.0
BISC 408	Experimental Techniques	4.0
BISC 409	Agricultural Mechanics	5.0
BISC 410	Plant Protection	6.0
BISC 411	Soil Technology	5.0
MATH 444	Introduction to Computing	2.0
MKTG 419	Agricultural Product Marketing	3.0

PROGRAM: Landscape Horticulture

Level 1		Classroom hours per week
BISC 102	Introductory Microbiology	6.0
BISC 103	Biology	5.0
CHEM 103	Applied Chemical Principles 1	6.0
MATH 144	Basic Technical Math	5.0
PHYS 102	Physics for Biological Sciences	5.0
TCOM 105	Technical Communication	3.0

Level 2		Classroom hours per week
ADMN 110	Management	3.0
BISC 205	Introductory Botany and Soils	6.0
BISC 206	Horticulture 1	5.0
BLDG 117	Landscape Drafting	3.0
CHEM 217	Applied Chemical Principles	3.0
PHYS 202	Physics	5.0
SURV 125	Introduction to Survey	3.0
TCOM 205	Technical Communication	3.0

Level 3		Classroom hours per week
BISC 306	Horticulture 2	6.0
BISC 310	Landscape Mechanics	5.0
BISC 311	Nursery Crop Production	6.0
BISC 312	Landscape Techniques	5.0
BISC 313	Advanced Plant Identification	3.0
BLDG 217	Landscape Drafting	3.0
TCOM 303	Advanced Technical Communication	2.0

Level 4		Classroom hours per week
BISC 410	Plant Protection	6.0
BISC 411	Soil Technology	5.0
BISC 412	Landscape Techniques	6.0
BISC 413	Landscape Field Practices	6.0
BISC 414	Supervisory Practices	4.0
BISC 417	Silviculture and Forest Nurseries	4.0
CIVL 442	Land Engineering	3.0

PROGRAM: Food Processing

Level 1		Classroom hours per week
BISC 102	Introductory Microbiology	6.0
BISC 103	Biology	5.0
CHEM 103	Applied Chemical Principles 1	6.0
MATH 144	Basic Technical Math	5.0
PHYS 102	Physics	5.0
TCOM 105	Technical Communication	3.0

Level 2		Classroom hours per week
BISC 201	Food Processing	6.0
BISC 202	Microbiology for Food Processing	5.0
CHEM 203	Applied Chemical Principles 2	6.0
MATH 244	Statistics 1 and 2	5.0
PHYS 202	Physics	5.0
TCOM 205	Technical Communication	3.0

Level 3		Classroom hours per week
BISC 301	Food Processing	5.0
BISC 302	Nutrition for Food Processing	2.0
BISC 303	Quality Control	4.0
BISC 304	Introductory Food Analysis	5.0
BISC 305	Mechanics of Machines	5.0
OPMT 163	Management Engineering 1	3.0
TCOM 303	Advanced Technical Communication	2.0

Level 4		Classroom hours per week
ADMN 110	Management	2.0
BISC 401	Food Processing	5.0
BISC 402	Process Analysis	5.0
BISC 403	Quality Control	2.0
BISC 404	Food Analysis	5.0
BISC 405	Enzymatic Analysis	2.0
BISC 406	Sanitation	4.0
ELEC 253	Instrumentation for Biological Sciences	3.0
MATH 444	Introduction to Computing	2.0

PROGRAM: Agri-Management

Level 3		Classroom hours per week
BISC 300	Agricultural Field Studies	1.0
BISC 305	Mechanics of Machines	4.0
BISC 307	Applied Genetics	4.0
BISC 308	Plant Technology	6.0
BISC 309	Animal Technology	4.0
BISC 314	Agri-Business Law and Taxes	3.0
BISC 315	Agri-Business Organization and Management	5.0
BISC 316	Agri-Business Finance and Appraisal	3.0
BISC 317	Summer Technical Report	1.0

Level 4		Classroom hours per week
ADMN 340	Personnel Administration	3.0
BISC 409	Agricultural Mechanics	5.0
BISC 410	Plant Protection	6.0
BISC 411	Soil Technology	5.0
BISC 415	Agri-Business Organization and Management	5.0
BISC 416	Crop and Livestock Management	4.0
OPMT 163	Management Engineering 1	2.0

Course Descriptions

ADMN 110 Management — Management is intended to give students an appreciation of the application of management principles and business techniques. Students are given an opportunity to develop their skills in using lecture material by analyzing typical business problems and proposing and discussing feasible problem solutions. Subjects covered include planning, organizing, leadership, control and financial management.

ADMN 340 Personnel Administration — An introduction to the fundamentals of personnel management including organization of the personnel function, salary administration, fringe benefits, training, management development and performance appraisal, constructive discipline, grievances and morale.

BISC 102 Introductory Microbiology — Designed to train students in the basic microbiological procedures employed in a laboratory: use and care of the microscope, staining methods, aseptic techniques, methods of identifying micro-organisms.

BISC 103 Biology — A study of the principles underlying living phenomena including the organizational attributes of living matter. Evolutionary development is traced from one-celled organisms to higher plants and animals. The economic importance of various classes of plants and animals is included.

BISC 201 Food Processing — An introduction to the principles and processes of canning, freezing, dehydrating and fermentation of foods. The use of salt, sugar and additives to preserve food. The importance of packaging of foods. Experimental portions of food will be preserved by various methods during lab periods. Prerequisite: BISC 102, CHEM 103.

BISC 202 Microbiology for Food Processing — The application of microbiology to food manufacturing. The isolation of micro-organisms significant to food processing for the purposes of differentiation and classification. Maintaining high bacteriological standards in processed foods. Shelf-life studies, spoilage control, food fermentations. Assessing microbiological test results and report writing to management. Prerequisite: BISC 102.

BISC 205 Introductory Botany and Soils — Plant morphology and physiology, with particular reference to ornamental and horticultural plants, soil types and introduction to soil testing. Culture and management of ornamental and recreational turf grass. Prerequisite: BISC 103.

BISC 206 Horticulture 1 — The principles of environmental control and plant response. Basic greenhouse and plant propagation techniques. Principles of plant taxonomy and nomenclature. Recognition and use of woody species found in the landscape. Prerequisite: BISC 103.

BISC 300 Agricultural Field Studies — A study of agricultural operations unique to the southern interior of B.C. A written report is required.

BISC 301 Food Processing — The study of food manufacturing processes in the fish, meat, fruit and vegetable, cereal, dairy, beverage and confectionery industries. Principles and techniques of proper handling and preservation of products in these industries will be emphasized. The use of ingredients such as sweeteners, flavorings, coloring and preservatives will be discussed. Prerequisite: BISC 201.

BISC 302 Nutrition for Food Processing — A study of the nutrients found in food, their importance, metabolic function and dietary requirements. The selection of diets to meet varied nutritional needs. The relationship of nutrition and health. Nutritional labelling. The effect of processing on the nutritional quality of foods. Prerequisite: CHEM 103, CHEM 203.

BISC 303 Quality Control — An assessment of food quality. Responsibilities and organization of a quality control department in the food industry. Statistical procedures for sampling. Federal and provincial government regulations. An introduction to tristimulus colorimetry and measurement of color in foods. Prerequisite: MATH 244.

BISC 304 Introductory Food Analysis — An introduction to the theoretical and practical aspects of sampling and sample preparation. The proximate analysis of foods and livestock rations. An

introduction to carbohydrate and protein chemistry with selected analyses, using the best equipment available. Prerequisite: CHEM 103, CHEM 203.

BISC 305 Mechanics of Machines — Basic mechanical principles of food processing and agricultural equipment including mechanical power transmission, electrical power, fluid systems and heat transfer. Materials of construction and equipment lubrication. The application of microcomputers to food processing and agriculture systems. Prerequisite: PHYS 102, PHYS 202.

BISC 306 Horticulture 2 — The diverse methods of plant propagation are covered including seed collection, extraction and stratification. Seed bed preparation and growing media. Asexual propagation of selected species by cuttings, grafting and budding. Micropropagation and tissue culture. Hydroponic culture systems. Prerequisite: BISC 205, BISC 206.

BISC 307 Applied Genetics — Principles of genetics, including heredity and environment; Mendel's law of segregation, expression and interaction of genes and multiple factor inheritance; applied plant breeding and animal breeding.

BISC 308 Plant Technology — Plant environment and control. Plant processes and their manipulation in commercial crop plants. Application of various plant culture techniques in crop production, with reference to representative cereals, forages, vegetables, small fruits and tree fruits grown in British Columbia.

BISC 309 Animal Technology — A general familiarization with the livestock and poultry industries as they relate to food production. Animal physiology. Role of basic nutrients in metabolism. Nutritive requirements of livestock during growth, reproduction and lactation. Feed ration formulation. Feed additives.

BISC 310 Landscape Mechanics — A study of basic engineering principles as applied to landscape construction and maintenance equipment, irrigation and drainage systems, nursery and greenhouse systems. The application of microcomputers to landscape and greenhouse systems. Prerequisite: PHYS 102, PHYS 202.

BISC 311 Nursery Crop Production — Field and container culture of nursery plants. Nursery stock specifications. Site selection and layout. Growing structures and equipment. Prerequisite: BISC 103, BISC 206.

BISC 312 Landscape Techniques — History and principles of landscape design. Inventory of client requirements. Site analysis. Preparation of working drawings, bidding and contract documents.

BISC 313 Advanced Plant Identification — A continuation of the plant identification studies begun in Horticulture 1, with particular reference to the species and cultivar level. The use of plants in the landscape. Students must present a plant collection as part of the course requirement. Prerequisite: BISC 103, BISC 206.

BISC 314 Agri-Business Law and Taxes — Major aspects of law and taxation as they affect agricultural producers and supply and support businesses. Property and income taxes, estate planning, laws of contract. Federal and provincial laws affecting agriculture in areas such as labor and expropriation. How to obtain and analyze information in the fields of law and taxation.

BISC 315 Agri-Business Organization and Management — Business organization methods used by farm and agricultural businesses. Management applications in agriculture: goal setting, planning, resource acquisition, staffing coordinating, controlling, monitoring the operation. Use will be made of available farm business management programs. Computer applications in agriculture. Applying knowledge in many areas to learn effective decision making.

BISC 316 Agri-Business Finance and Appraisal — Capital and credit in farm business administration including sources of agricultural funds, analysis and appraisal of commercial farms, analysis of financial statements, discussion of financial controls on the farm and in related business, and the use of capital budgeting.

BISC 317 Summer Technical Report — Students prepare and present a technical report on a phase of agricultural management experienced during the 12-week practicum. Financial and decision making aspects are emphasized.

BISC 401 Food Processing — see BISC 301. Prerequisite: BISC 301.

BISC 402 Process Analysis — An analysis of the unit operations and equipment encountered in food processing. Operations involving raw and processed material are covered, as are plant systems including materials handling, waste management, plant layout and design, packaging equipment. Prerequisite: BISC 201, BISC 301. BISC 305.

BISC 403 Quality Control — The sensory evaluation of food; facility design, selection of taste panels; statistical analysis of data; laboratory measurement of consistency and texture of foods; recording and reporting with control charts; and evolutionary operations. Prerequisite: BISC 303.

BISC 404 Food Analysis — An introduction to the chemistry of fats and oils. Practical laboratory analysis of lipids, vitamins and minerals using the latest equipment available. Prerequisite: BISC 304, CHEM 311.

BISC 405 Enzymatic Analysis — An introduction to the use of enzymes to perform determination of a variety of food constituents with great sensitivity and specificity. This is a relatively new and promising analytical tool. A high quality, ultra-violet spectrophotometer is used in this course. Prerequisite: BISC 304, CHEM 311.

BISC 406 Sanitation — Microbial aspects of industrial sanitation. Properties of good detergents and sanitizers. Government regulation. The use and storage of toxic materials. Approved water supply. Industrial practicums. Prerequisite: BISC 102, BISC 202.

BISC 407 Agricultural Analysis — An introduction to the chemistry of fats and oils, with selected analyses of lipids. A practical training in soil analysis, plant analysis and fertilizer analysis using the latest equipment available.

BISC 408 Experimental Technology — Design and layout of experiments using typical biological subjects. The application of the scientific method and statistical methods. Recording and presentation of experimental data. Techniques in plant histology and microscopy.

BISC 409 Agricultural Mechanics — An analysis of the unit operations and equipment encountered in agriculture. Various systems including irrigation, drainage, field operations, crop protection, harvesting and animal systems will be discussed. Equipment components and selection of equipment will be analyzed.

BISC 410 Plant Protection — The morphology and identification of weeds, diseases and insects. Life histories of representative species. Strategy of control by cultural, biological and chemical means. Currently recommended pesticides are reviewed.

Pesticide safety, pest and pesticide legislation. Students are examined under the provisions of the "Pesticides Control Act" for pesticide applicator and pesticide dispenser certificates. Prerequisite: BISC 103 and CHEM 103 or CHEM 203 or CHEM 217.

BISC 411 Soil Technology — The origin, formation and classification of soils; use of survey reports, map interpretation. Components of soils, soil colloids, cation exchange, reactions, soil acidity, phosphorus, nitrogen, the crop as an indicator of fertility, soil organic matters, fertilizers. Soil-sampling procedures, extraction methods used in soil analysis. Prerequisite: BISC 204 or 205.

BISC 412 Landscape Techniques — see BISC 312. Prerequisite: BISC 312.

BISC 413 Landscape Field Practices — Arboricultural techniques and practices. Pruning, transplanting, tree values, maintenance schedules. Prerequisite: BISC 206, BISC 306, BISC 312, BISC 313.

BISC 414 Supervisory Practices — This course provides an understanding of effective supervisory practices and of organizational behavior. knowledge of labor laws, legal and tax information and government regulations is gained as well as management of resources for improved performance.

BISC 415 Agri-Business Organization and Management — see BISC 315.

BISC 416 Crop and Livestock Management — The principles involved in management of crops and livestock. Optimizing production through application of knowledge and analysis of alternatives. Livestock disease prevention, recognition and treatment. Knowledge of good production standards will be acquired.

BISC 417 Silviculture and Forest Nurseries — An introduction to silviculture as practised in B.C., with emphasis on artificial regeneration of disturbed sites using planting stock. A review of stock types used in the regeneration process, their characteristics and methods of production and an analysis of the field conditions under which each might be used. Prerequisite: BISC 103, BISC 206, BISC 306, BISC 311.

BLDG 117 Landscape Drafting — Fundamentals of drafting. Development of drafting skills using projects based on landscape structural details, such as concrete slabs, steps, retaining walls and planters, as well as wood benches, fences and walls.

BLDG 217 Landscape Drafting — Continuation of BLDG 117. Further development of drafting skills, using projects based on masonry, post and beam, and concrete deck construction.

CHEM 103 Applied Chemical Principles 1 — An introductory course of basic inorganic chemistry, topics include: chemical bonding, stoichiometry, formula writing, solution preparation, oxidation and reduction, acid-base theory, titration calculations and buffer solutions. Laboratory exercises consist of qualitative and quantitative analysis. Good laboratory techniques are emphasized.

CHEM 203 Applied Chemical Principles 2 — A continuation of CHEM 103. Topics include theory of gravimetric and volumetric analysis, simple physical chemistry and organic chemistry. Selected organic topics such as carbohydrates, fats and oils which are applicable to the bio-science technology are discussed in detail. Laboratory exercises consist of quantitative and qualitative analysis and organic separations. Prerequisite: CHEM 103.

CHEM 217 Applied Chemical Principles — A continuation of CHEM 103 with emphasis on application to landscape horticulture. Topics discussed include soil chemical structures, ion-exchange, PH, solubility and redox effects, soil amenders, fertilizers and pesticides. Basic organic chemistry is introduced. Prerequisite: CHEM 103.

CHEM 311 Instrumental Analytical Methods — Deals with instrumentation used for chemical analysis. The theory, construction, application and operation of instrumentation is discussed. Instrumentation for the following is covered: potientiometry, polarography, refractometry, polarimetry, visible, ultra-violet, infra-red spectrophotometry, emission and absorption, flame photometry, gas and liquid chromatography. Laboratory exercises involve use of these instruments. Prerequisite: CHEM 203.

CIVL 442 Land Engineering — An introduction to the behavior of earth and land surfaces and engineering materials under various natural conditions. Included are foundation loads, settlements and bank stability of various soil types and the occurrence and flow of water under and above ground. By means of a project, the student learns to assess runoff flows through hydrological methods, designs a retaining dam for a recreational site complete with inlet and outlet flood-control structures, and estimates quantities for construction purposes.

ELEC 253 Instrumentation for Bio Sciences — An orientation course for the food processing option covering the principles and practices of instrumentation, measurement of pressure, level, temperature and flow and an introduction to negative feedback and automatic control systems.

MATH 144 Basic Technical Mathematics — Exponential/logarithmic theory and transformations, common and natural logarithms, logarithmic/semilogarithmic graphs. Variation, straight line equation, curve fitting. Delta-process, the derivative, differentiation rules, curve sketching, applied maxima/minima, the differential, anti-derivatives, indefinite integral, definite integral with area under a curve. Introduction to computing using BASIC.

MATH 244 Statistics 1 and 2 — Organization and graphical presentation of data, frequency distributions and measures of central tendency, variation and other measures. Probability theory and laws. Random variables, discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Method of least squares, regression and correlation including related estimation and hypothesis tests.

MATH 444 Introduction to Computing — BASIC formatted output, arrays, subroutines, plot routines and files. Spreadsheets and case study.

MKTG 419 Agricultural Product Marketing — An overview of marketing functions as used in all levels of food production and distribution.

OPMT 163 Management Engineering 1 — The techniques of management problem-solving and work simplification, with particular application to engineering and industrial organization. Includes method study, some measurement technique, layout, planning and scheduling. The course emphasizes practical applications to the field of biological sciences.

PHYS 102 Physics — An introductory level course covering a wide range of physical principles, with emphasis on areas of popular interest and special relevance to the biological sciences technology. Topics covered in first term include kinematics, dynamics, friction, statics, energy, power, circular motion, momentum, elasticity and fluid mechanics. Topics covered in second term include temperature, heat, calorimetry, kinetic theory, heat transfer, basic electricity and magnetism, colorimetry, optics relativity and radiation. Measurements, data analysis, experimental techniques and report writing are stressed.

PHYS 202 Physics — see PHYS 102.

SURV 125 Introduction to Survey — Introduction to the theory of engineering survey, practical application of linear measurements, introduction to and theory of the theodolite, bearings and traverse computations, introduction to and theory of levelling, computation of areas and volume.

TCOM 105 Technical Communication — In this course, students learn the fundamentals of oral and written communication demanded by industry; how to organize technical information and plan and present oral reports. They write instructions, process descriptions and several types of technical letters and memos.

TCOM 205 Technical Communication — In this course, students apply the skills learned in the first term to write resumes, job application letters and occurrence, incident, inspection, field trip, progress, recommendation, comparison, feasibility, performance appraisal and evaluation reports. Prerequisite: TCOM 105.

TCOM 303 Advanced Technical Communication — In this course, students practice typical kinds of engineering communication such as persuasive and technical letters, incident and trip reports, proposals and executive summaries. They update resumes and job application letters and learn how to participate in meetings. Prerequisite: TCOM 105, 205.

Forest Resource

British Columbia's greatest renewable natural resource is its forest land. The benefits that derive from the intelligently planned use of this forest land are many, varied and extremely valuable to the people of this province. The wise use of the land and related resources is essential for the continued survival of many industries, as well as for the perpetuation of the resources themselves. The Forest Resource Technology has been established in an endeavor to meet the above needs and offers training in two options: *Forestry* and *Fish, Wildlife and Recreation.*

Job Opportunities

Graduates in the Forestry Option find employment in a variety of industrial and government positions.

The job opportunities for graduates in Fish, Wildlife and Recreation are principally in government agencies and, because of the limited number of jobs, the number of students is restricted.

The Program

Forestry covers forest engineering, logging systems and production, fire control, forest management, forest measurements, silviculture, photo interpretation and mapping, botany and soils, forest utilization and ecology.

Fish, Wildlife and Recreation covers the management of fish, wildlife and wildland recreation and includes habitat ecology, environmental inventory techniques and law enforcement with respect to the above-mentioned resources.

Prerequisite

* The following are minimum requirements: Algebra 11 (C + average); a Science 11 (for F.W.R. option must be Biology 11); any one of another science 11, or a science or mathematics 12. Work experience in natural resources strengthens an application for either of the options. * Out of province and mature student applications will be reviewed by the Department Head.

Expenses

In addition to tuition fees, books, supplies and equipment, students will incur expenses for field trips and a first-aid course. These expenses may be as much as $300 for first year and $400 for second year.

Faculty and Staff

W.R. Cannon, B.A. Acting Department Head
N.E. Alexander, M.P.M.
M.R. Angelo, B.S.F., M.F.
D. Campbell, Dipl.T.
F. Cassetta, B.Sc.F., R.P.F.
C.W. Chestnut, B.A., Ph.D.
T.D. Chisholm, B.Ed.
E.C. Crossin, B.S.F., R.P.F.
C.J. Diebold, C.A.M., A.S.T.T.
D. Guthrie, B.Sc., M.Sc., Ph.D.
D.C. Holmes, B.A.Sc., M.F., R.P.F., P.Eng., Chief Instructor
E.W. Howard, B.S.F., M.F., Cert. Inst.
A.G. Jakoy, B.S.F., M.F., R.P.F., Chief Instructor
R. Kley, Dipl.T.
H. Lenko, B.S.F., R.P.F.
H. Lynum, B.A.Sc., R.P.F.
D.H. MacLaurin, B.S.F.
R.W. Reisen, Dipl.T. E.T.I., A.S.T.T.
N. Shaw, Dipl.T., A.S.T.T.
J. Simpson, B.Sc.F., M.Sc.
B. Sivak, B.S.F., M.F., Ph.D., R.P.F.
P. Willms, Dipl.T.
P. Yanciw, B.A.Sc.

TECHNOLOGY: Forest Resource

PROGRAM: Forestry

Level 1		Classroom hours per week
FSTR 101	Forest Measurements 1	5.0
FSTR 103	Plant Identification	5.0
FSTR 104	Photo Interpretation and Mapping 1	4.0
FSTR 105	Fire Management 1	3.0
FSTR 108	Natural Resource Uses	4.0
MATH 145	Basic Technical Mathematics for Forest Resources	6.0
TCOM 106	Technical Communication	3.0

Level 2		Classroom hours per week
FSTR 201	Forest Measurements 2	8.0
FSTR 202	Forest Soils Introduction	4.0
FSTR 203	Ecology	5.0
FSTR 204	Photo Interpretation and Mapping 2	4.0
FSTR 206	Microcomputer Applications	3.0
MATH 245	Mathematics for Forest Resources	4.0
TCOM 206	Technical Communication	3.0

Level 3		Classroom hours per week
FSTR 301	Forest Measurements 3	6.0
FSTR 302	Timber Harvesting	5.0
FSTR 303	Roads and Transportation 1	6.0
FSTR 304	Forest Pestology	4.0
FSTR 305	Silviculture 1	4.0
FSTR 306	Forest Administration	4.0
FSTR 311	Summer Technical Report	1.0
TCOM 304	Advanced Technical Communication	2.0

Level 4		Classroom hours per week
FSTR 401	Forest Measurements 4	4.0
FSTR 402	Log Production and Cost Control	4.0
FSTR 403	Roads and Transportation 2	5.0
FSTR 404	Forest Pestology	4.0
FSTR 405	Silviculture 2	5.0
FSTR 406	Forest Management 2	4.0
FSTR 413	Independent Studies	3.0
FSTR 415	Fire Management 2	1.0
TCOM 402	Advanced Technical Communication	2.0

PROGRAM: Fish, Wildlife and Recreation

Level 1		Classroom hours per week
BISC 104	Zoology	5.0
FSTR 101	Forest Measurements 1	5.0
FSTR 103	Plant Identification	5.0
FSTR 104	Photo Interpretation and Mapping 1	4.0
FSTR 108	Natural Resource Uses	4.0
MATH 154	Basic Technical Mathematics for FWR	4.0
TCOM 209	Technical Communication	4.0

Level 2		Classroom hours per week
FSTR 202	Forest Soils Introduction	4.0
FSTR 203	Ecology	5.0
FSTR 204	Photo Interpretation and Mapping 2	4.0
FSTR 206	Microcomputer Applications	3.0
FSTR 207	Introduction to Fish, Wildlife and Recreation	4.0
MATH 254	Statistics for FWR	6.0
TCOM 308	Advanced Technical Communication	4.0

Level 3		Classroom hours per week
FSTR 306	Forest Administration	4.0
FSTR 307	Recreational Land Management	7.0
FSTR 308	Wildlife Management	7.0
FSTR 309	Fish Management 1	6.0
FSTR 310	Projects	6.0
FSTR 311	Summer Technical Report	1.0
TCOM 304	Advanced Technical Communication	2.0

Level 4		Classroom hours per week
FSTR 407	Recreational Land Management	7.0
FSTR 408	Wildlife Management	7.0
FSTR 409	Fish Management 2	7.0
FSTR 410	Projects	5.0
FSTR 412	Law Enforcement	2.0
FSTR 413	Independent Studies	3.0
TCOM 406	Public Information Techniques	3.0

Course Descriptions

BISC 104 Zoology — General classification of the animal kingdom. Basic vertebrate zoology. The development of the vertebrate from embryo to adult. The study of the vertebrate body, including the skeletal, muscular, digestive, circulatory, urogenital and endocrine systems.

FSTR 101 Forest Measurement 1 — Fundamental concepts of forest engineering — measurement of distances, direction and elevation. Traverse calculations, obtaining, recording and plotting topographic detail. Care, maintenance and adjustment of equipment. This course is designed to familiarize the student with forest surveying methods used in logging layout and forest measurement.

FSTR 103 Plant Identification — The structure, physiology, taxonomy and uses of plants, with emphasis on those having important biological and economic significance in the biotic zones of B.C. Introduction to reproduction of plants with particular emphasis on conifers. Recognition and evaluation of common plants in forest, range land and alpine habitats of British Columbia and their uses in land management practices.

FSTR 104 Photo Interpretation and Mapping 1 — Practical use and application of aerial photography in natural resources. Classification, reconnaissance, planning and inventory using aerial photos. Practice in the use of stereometers. Construction of forest maps and plans. Transfer of detail from aerial photos using Map-O-Graph, Kail plotters and pantographs. Drafting and map reproduction techniques.

FSTR 105 Fire Management 1 — Historical review of fire behavior simulated to show the effects of topography, fuel and weather conditions. Pre-suppression, including fire-danger ratings, detection, reporting and general preorganization of industrial and government agencies. "Forest Act", Part XI. Fire suppression techniques through fire simulation and prescribed burning training in initial action and problem-solving.

FSTR 108 Natural Resource Uses — An introduction to the natural resources of British Columbia and their management needs, the agencies and organizations for resource management. The meaning of professionalism and the role of the technologist in the use of our natural resource. A review of the forest industry in British Columbia and its importance.

FSTR 201 Forest Measurement 2 — Methods of measuring standing and felled timber. Direct measurement of tree diameters, heights and ages. Characteristics and uses of standard volume tables. Construction of local volume tables. Types of sampling and design. Application of aerial sampling and point sampling with elementary statistical analysis. Compilation methods for sample data. Report writing. Prerequisite: FSTR 101.

FSTR 202 Forest Soils Introduction — Introduces students to soil formation, soil as foundation and soil as a medium for plant growth. Covers the properties of soils, texture, structure and water retention. Introduces students to the soils and landscapes of British Columbia Those students studying for credit must be prepared to take a one day field trip during the term and a weekend field trip at the end of the term. Students must be prepared to provide their own transportation (car pools).

FSTR 203 Ecology — Provides students with background information on and an understanding of the important uses of forest land. The course covers those resources associated with forest land and the problems of administration, management, multiple use and utilization. The principal resources considered are forests, fish, wildlife, range land, water, recreation and minerals. The course also covers ecology, from two main viewpoints: ecological principles first and the practical application of these principles to renewable resource management second. Examples are drawn from current environmental issues. Prerequisite: FSTR 103.

FSTR 204 Photo Interpretation and Mapping 2 — see FSTR 104. Prerequisite: FSTR 104.

FSTR 206 Microcomputer Applications — Introduction to computers and their applications to various forestry, fish, wildlife and recreation requirements.

FSTR 207 Introduction to Fish, Wildlife and Recreation — Basic identification of various fish and wildlife and their importance and interaction with other natural resources.

FSTR 250 Ecology — Introduces students to the basic concepts and terminology of ecology. Develops an appreciation for the components of ecosystems including man and his activities; outlines the energy flow in and introduces management aspects of numerous eco-systems. Students learn to identify numerous eco-systems of terrestrial and aquatic environments, describe energy fixation transfer in them and recognize approaches to proper management. The material is presented in the form of lectures and tutorials. Approximately four field trips are held on Saturdays and Sundays in lieu of classroom sessions.

FSTR 251 Forest Measurement 2 — Familiarizes the student with advanced methods of forest timber volume measurement and calculation, and sampling and report compilation. Subjects include measurement of standing and felled timber, tree diameter, height and age; use of volume tables; construction of local volume tables; sampling types and design; aerial sampling, point sampling with elementary statistical analysis; compilation methods for sample data and report writing. Prerequisite: FSTR 151.

FSTR 301 Forest Measurement 3 — see FSTR 251. Prerequisite: FSTR 201.

FSTR 302 Timber Harvesting — Description and analysis of timber harvesting systems presently used on the British Columbia coast and in the interior. Techniques in the theory and application of logging layout. Environmental considerations in timber harvesting. Multiple land-use concepts. Woods safety.

FSTR 303 Roads and Transportation 1 — Truck road location, construction, maintenance and costing. Preparation of plans and profiles. Measurement of earth and rock work. Optimum road standards, culvert and simple logspan bridge design, construction and maintenance. Hauling costs. Log dumps, land sorting areas and booming grounds. Water transportation of logs.

FSTR 304 Forest Pestology — An integrated study of forest insect and disease problems. Basic life histories. The interactions of damage agencies in the forest. Improved cruise techniques related to insect and disease damage. Use of subject literature. Cooperation with authoritative government agencies. Prevention and control of damage. Measuring and reporting of insect and disease damage. Recognition of the currently important insects and diseases.

FSTR 305 Silviculture 1 — Foundations of forest management: site, stocking, spacing, forest yield, forest growth and regulation. Introduction to silviculture: forest regeneration, seed and stock procurement, principles of seed production and cone collection.

FSTR 306 Forest Administration — Many of the functions once performed by government agencies and industry in the natural resource field are now being contracted out. This course is designed for people interested in embarking on a career in service contracting to the natural resource industry. Upon successful completion of this course, the student will have a basic knowledge of small business planning, be able to read and understand financial statements, understand simple double-entry accounting principles, be able to project a business plan for entrepreneurial activities and develop estimates for contract work.

FSTR 307 Recreational Land Management — An introductory course in recreational land management. Development and recreational use of areas designed as natural parks. Survey of outdoor recreation, history and organization of agencies providing recreational activities in parks. Park development, planning and design. Practical exercises in site analysis, planning and design for specific uses. Park and natural history interpretation. Park operation and administration. Assessment and development of wildlife recreational areas both in and out of established parks. Recognition of recreational sites by aerial photo interpretation of land forms. Private and public programs in forest recreation. Land tenures and land acquisition for recreation. Wildland landscaping. Summer and winter sports area developments. Water-oriented activities, wild-land access problems and trail design. Mountaineering, search and rescue.

FSTR 308 Wildlife Management — The principles and practice of wildlife management, with particular reference to problems and procedures in British Columbia wildlife environments. Dynamics of wildlife populations. Methods of study. Harvesting. Regulations. Natural and artificial regulation of animal numbers. Diseases and parasites. The economics of wildlife, particularly in forest habitats. Extensive field study to support and extend lecture and lab material.

FSTR 309 Fish Management 1 — The biology of British Columbia fish, including anatomy, taxonomy, physiology, behavior and ecology. Management aspects of fisheries, including population dynamics, habitat evaluation and improvement, harvesting, pollution and fishery regulations. Labs deal with methodology as it applies to the above and much of the training in this regard will be done in the field. Emphasis throughout is on the British Columbia situation.

FSTR 310 Projects — Field application of cruising techniques and data compilation by computer. Cruise report preparation including recommendations for environmental considerations. Preparation of forest maps. Familiarization with British Columbia cruising systems. Inventory as opposed to operational cruising. Logging waste assessment. British Columbia log scale application to coastal and interior operations. British Columbia boardfoot rule. Weight-scaling.

FSTR 311 Summer Technical Report — A detailed report on a phase of resource management from first-hand experience or from approved library research.

FSTR 401 Forest Measurement 4 — Field application of cruising techniques and data compilation by computer. Cruise report preparation including recommendations for environmental considerations. Preparation of forest maps. Familiarization with British Columbia cruising systems. Inventory as opposed to operational cruising. Logging-waste assessment. British Columbia log scale applications to coastal and interior operations. British Columbia boardfoot rule. Weight-scaling. Prerequisite: FSTR 301.

FSTR 402 Log Production and Cost Control — Log production planning and scheduling. Production and cost control. Cost analysis. Contracts and contract logging. Woods organization. Industry and government relationships in logging particularly as related to development and management of the related resources. Logging research reports studied. Prerequisite: FSTR 302.

FSTR 403 Roads and Transportation 2 — see FSTR 303. Prerequisite: FSTR 303.

FSTR 404 Forest Pestology — see FSTR 304. Prerequisite: FSTR 304.

FSTR 405 Silviculture 2 — Site examination, analysis and prescriptions; site preparation, planning methods, evaluating artificial regeneration, methods application, contract, planting, costing and inspection; brush control methods and application; spacing methods and evaluation; conifer release, application; fertilization, methods and application. Prerequisite: FSTR 305.

FSTR 406 Forest Management 2 — Principles of integrated resource management; planning and administration; relationship of timber production to other forest land uses; structure and organization of a forest business and enterprise; sustained yield management planning and operations; determination of cut; stumpage appraisal.

FSTR 407 Recreational Land Management — see FSTR 307. Prerequisite: FSTR 307.

FSTR 408 Wildlife Management — see FSTR 308. Prerequisite: FSTR 308.

FSTR 409 Fish Management 2 — see FSTR 309. Prerequisite: FSTR 309.

FSTR 410 Projects — Special study seminars or projects designed to introduce students to current problems and solutions in resource management. Partial or complete involvement with potential employers will be encouraged. Prerequisite: FSTR 310.

FSTR 412 Law Enforcement — Deals with the many aspects involved in the interpretation and enforcement of legislative acts relating to the management of Canada's wildland resource. Among these are the "Fisheries Act", "Parks Act" and the "Wildlife Act".

FSTR 413 Independent Studies — A block of about 90% of class time is provided for a student to choose, research and prepare a written report on a topic related to natural resources. The topic must be approved by the staff. The topic might be pursued individually or in a group.

FSTR 415 Fire Management 2 — see FSTR 105. Prerequisite: FSTR 105.

MATH 145 Basic Technical Mathematics for Forest Resources — Systems of measurement, mensuration, and trapezoidal and Simpson's rules. Angular systems, radian measure applications, trigonometric ratios and Sine/Cosine laws. Ratio, proportion and variation. Polynomials, formulae, functions and their graphs. Graphical linear programming. Vectors and applications. Introduction to descriptive statistics with histograms and ogives.

MATH 154 Basic Technical Mathematics for Fish, Wildlife and Recreation — Systems of measurement, mensuration, trapezoidal and Simpson's rules. Angular systems, radian measure applications, trigonometric ratios and Sine/Cosine laws. Ratio, proportion and variation. Polynomials, formulae, functions and their graphs. Graphical linear programming. Vectors and applications. Introduction to descriptive statistics with histograms and ogives.

MATH 245 Mathematics 2 for Forest Resources — Further descriptive statistics. Probability theory and laws. Random variables, discrete and continuous theoretical distributions. Estimation, hypothesis testing, count data analysis and stratified sampling analysis. Regression and correlation including related estimation.

MATH 254 Statistics Fish, Wildlife and Recreation — Organization and presentation of data, frequency distributions and measures of central tendency; variation, skewness and kurtosis. Probability theory and laws. Random variables, discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Analysis of variance. Method of least squares, regression and correlation, and curve fitting. Some non-parametric statistics.

TCOM 106 Technical Communication — In this course students practice writing skills applicable to the forest resource industry. Instruction, claim, request and adjustment letters and process and mechanism descriptions are covered. They also practice technical library search techniques and oral briefings.

TCOM 206 Technical Communication — Students write incident, progress, comparison and formal, technical reports. They also write a proposal, resume and job application letter. They practice formal meeting, interview and research techniques and are exposed to word processing. Prerequisite: TCOM 106.

TCOM 209 Technical Communication — Introduces students to technical and scientific communication skills required for a career in FWR. They study the principles of effective technical communication, business and technical formats, correspondence, short reports and research techniques for fish, wildlife and parks management topics.

TCOM 304 Advanced Technical Communication — In this course, students review writing skills and apply them to the Summer Technical Report, a major report marked both by the instructor and employers who are Institute graduates. Students also practice revision and editing skills, write several memos and give a major oral technical report. Prerequisite: TCOM 106, TCOM 206.

TCOM 308 Advanced Technical Communication — Students refine job finding skills and update their resumes and application letters. They practice specialized formats and write lengthy technical and scientific reports typical of fisheries, wildlife and parks management. Prerequisite: TCOM 209.

TCOM 402 Advanced Technical Communication — Students update their resumes and job application letters. They also write a procedure, progress report, trip report, journal and several types of advanced business letters typical of the forest industry. They practice illustrating, analytical and organizational skills and write a major report about logging equipment done in conjunction with the logging course. They receive up-to-date information about word processing.

TCOM 406 Public Information Techniques for Fish Wildlife and Recreation — In this course, students study specialized principles and techniques for communication with the public through interpretive and educational programs and the media. They write promotional data, news releases and journal articles. They practice public speaking, preparing graphic displays, interview techniques and interpretive program design. Prerequisite: TCOM 209, TCOM 308, TCOM 405.

Natural Resource Management

3rd Year Program

Forest Resource Technology

This post diploma program is designed to meet the needs of resource technologists who wish to broaden their knowledge of the major natural resources of British Columbia.

The Program

This nine-month program (two terms) examines the natural resources of British Columbia and the needs, constraints and methods to manage these resources in the best interests of the province. Included will be fish, wildlife, recreation, rangeland, hydrology (water), agriculture, mining, tourism and their interdependencies (natures).

When course credits are given, electives will be chosen in consultation with Department Head.

Prerequisite

Graduation from a BCIT diploma program or a two-year college program in an engineering or business technology. Baccalaureate degree in bio science, engineering, geography or geology will also be considered.

Faculty and Staff

W.R. Cannon, B.A., Acting Department Head
M.R. Angelo, B.S.F., M.F.
F. Cassetta, B.Sc.F., R.P.F.
C.W. Chestnut, B.A., Ph.D.
E.C. Crossin, B.S.F., R.P.F.
D. Guthrie, B.Sc., M.Sc., Ph.D.
A.G. Jakoy, B.S.F., M.F., R.P.F.
J. Simpson, B.Sc.F., M.Sc.
B. Sivak, B.S.F., M.F., Ph.D., R.P.F.

PROGRAM: Natural Resource

Level 5		Classroom hours per week
FSTR 501	Fish Resource	2.0
FSTR 502	Rangeland Management	4.0
FSTR 503	Hydrology and Geomorphology	1.0
FSTR 504	Forest Land Management 3	6.0
FSTR 505	Interdependent Resources	4.0
FSTR 506	Projects Special Topics and Current Issues	6.0
FSTR 507	Wildlife Resource	2.0
FSTR 508	Recreation Resource	2.0

Level 6		Classroom hours per week
FSTR 601	Natural Resource Planning	6.0
FSTR 602	Environmental Impact Assessment	6.0
FSTR 603	Environmental Law and Public Relations	3.0
FSTR 604	Natural Resource Economics	5.0
FSTR 606	Projects	5.0
FSTR 613	Independent Studies	3.0
TCOM 607	Public Information Techniques	2.0

Course Descriptions

FSTR 501 Fish Resource — The identification, habitat and life cycles of British Columbia's fish and wildlife. The principles and practice of recreational land management, and the importance of interaction with all other resources.

FSTR 502 Rangeland Management — Includes identification of common range plants, know ledge of range distribution, types of range, productivity intensity and variety of uses, assessment of productivity and stocking, range reclamation, season of use, impact on the forest resource and non-grazing use of range land. In addition range enhancement techniques, including prescribed burning, will be examined.

FSTR 503 Hydrology and Geomorphology — Hydrology-source of water, climate and topography; water flow in channels, seasonal fluctuation, concept of erosion. Geomorphology — study of physical and chemical forces acting upon the earth's surface. Development of landscapes in time.

FSTR 504 Forest Land Management 3 — The first part will include silviculture, pest management harvesting, and forest policy and management concepts and will be specifically designed for non-forestry graduates. The other half of the course will be devoted to timber supply area (TSA) management, and an advanced silviculture project designed for all students.

FSTR 505 Interdependent Resources — A conceptual overview of other non-forested resources such as agriculture, mining, water, tourism, etc.

FSTR 506 Projects, Special Topics and Current Issues — Will include discussions and use of guest lectures relating to current resource topics/issues. A project will also be selected by a student from any of these topics or one of his own choosing in the resource field.

FSTR 507 Wildlife Resource — The identification, habitat and life cycles of British Columbia's wildlife and the roles they play in the environment.

FSTR 508 Recreation Resource — The principles and practice of recreational land management. Tourism as related to outdoor recreation.

FSTR 601 Natural Resource Planning — The emphasis is on integrated resource use. Guest lecturers with expertise in resource planning may be included as part of the instructional team. The course will emphasize integrated resource planning analysis with priority setting assessments. An integrated resource project involving several weeks with considerable field input will be an integral part of this course.

FSTR 602 Environmental Impact Assessment — Assessment of environmental impact and inventory techniques.

FSTR 603 Environmental Law and Public Relations — Environmental law will include review of various provincial and federal resource Acts. Public relations will include dealing with the public, media and other resource users.

FSTR 604 Natural Resource Economics — Includes economic concepts as applied to various natural resources, and relationships to consider in cost/benefit analysis.

FSTR 606 Projects — see FSTR 506. Prerequisite: FSTR 506.

FSTR 613 Independent Studies — A block of about 90% of class time is provided for a student to choose, research and prepare a written report on a topic related to natural resources. The topic must be approved by the staff. The topic might be pursued individually or in a group.

TCOM 607 Public Information Techniques — In this course, students learn specialized techniques for communicating with the public through interpretive and educational programs and the media. They write promotional data, news releases and journal articles. They practice public speaking, preparing graphic displays, interview techniques and media programs.

Lumber and Plywood

British Columbia's leading industry is rapidly adopting advanced technology for the production of lumber and plywood. New plants use computerization with automated processes to convert raw material into end products which are in demand on local and world markets.

Job Opportunities

Young men and women with management skills are needed in B.C.'s largest industry to fill positions in supervisory, technical, marketing and sales jobs. Graduates from this technology are found in key jobs throughout B.C.'s wood products industries. Most are employed where management skills are needed as supervisors, foremen, mill managers, sales people and sales managers, traders and quality control technicians or supervisors. Graduates are also employed in many other areas where their management-oriented training is valued.

The Program

First-year students in the Lumber and Plywood Program study basic sciences and introductory courses including wood science, log utilization, and lumber tallying and grading. In the second year there is increased emphasis on manufacturing techniques, process control and economics. Second-year courses also emphasize management skills in such applications as computers, mill supervision, sales and distribution, and business communications. Classroom instruction is heavily augmented by field trips to coastal and interior operations.

Prerequisite

Algebra 12 and one Science 11, Biology, Chemistry or Physics are course requirements for this program. Applicants are sought who possess initiative, a sense of responsibility, and an interest in leadership and teamwork within industry. Industrial experience lends strength to an application.

Faculty and Staff

J.T. Neilson, B.A.Sc., P.Eng., Acting Department Head
E.G. Worthy, Dipl.T., A.S.T.T., Program Head
D.G. Mickey, Dipl.T.

TECHNOLOGY: Lumber and Plywood

PROGRAM: Lumber and Plywood

Level 1		Classroom hours per week ➧
LUPL 101	Wood Science 1	7.0
LUPL 102	Lumber Grading 1	2.0
LUPL 103	Lumber Tallying*	2.0
LUPL 104	Log Utilization	5.0
MATH 146	Basic Technical Mathematics	5.0
MECH 101	Drafting Fundamentals	2.0
PHYS 118	Physics	5.0
TCOM 107	Technical Communication	3.0

Level 2		Classroom hours per week ➧
CHSC 208	Engineering Materials	3.0
LUPL 108	Lumber Grading 2*	8.0
LUPL 201	Wood Science 2	4.0
MATH 246	Statistics and Quality Control	5.0
MECH 204	Drafting	2.0
PHYS 218	Physics	5.0
TCOM 207	Technical Communication	3.0

Level 3		Classroom hours per week ➧
COMP 121	Computer Applications	3.0
ELEC 257	Electrical Equipment	4.0
LUPL 105	Lumber Manufacture	10.0
LUPL 106	Plywood Manufacture	6.0
LUPL 107	Mill Management 1	2.0
LUPL 202	Summer Technical Report	1.0
OPMT 164	Management Engineering 1	3.0
TCOM 305	Advanced Technical Communication	2.0

Level 4		Classroom hours per week ➧
COMP 283	Linear Programming	3.0
LUPL 109	Mill Management 2	11.0
LUPL 203	Mill Audit and Quality Control	4.0
MECH 416	Mechanical Equipment	3.0
MKTG 420	Wood Products Sales and Distribution	4.0
OPMT 264	Management Engineering 2	4.0
TCOM 403	Advanced Technical Communication	2.0

* The attainment of a recognized industrial certificate with a minimum mark of 70% is required as a condition of graduation.

Course Descriptions

CHSC 208 Engineering Materials — A comparison of materials important to forest products industries including wood and wood products, concrete, metals, alloys, polymers and ceramics. Common causes of failure in service including corrosion, wear, fatigue and embrittlement. Lab sessions emphasize physical and non-destructive testing.

COMP 121 Computer Applications — Computer applications in engineering technologies; how a computer works, recognizing problems suitable for computer solution, flow-charting and communicating with computer personnel. Emphasis is on the use of computers to solve problems related to the technology. Where available, "package" programs are demonstrated and used by students. FORTRAN or BASIC programming language is taught.

COMP 283 Linear Programming — Graphical method; algebraic method; simplex method; analysis of simplex results; LKP problem formulation; use of computer to solve problems; analysis of computer solution; use of reduced costs and shadow prices; sensitivity analysis; practical applications and limitations of LP; implementation of results.

ELEC 257 Electrical Equipment — An introduction to industrial electrical equipment. Topics include AC and DC motors and their application to electro-mechanical drive systems; protecting and controlling motors; industrial electrical power systems and related equipment; sources of energy; transformation into primary and secondary voltage levels, distribution of power throughout the plant; switching; voltage control and power factor correction.

LUPL 101 Wood Science 1 — An introduction to the manufacture of forest products. Topics include elementary botany, identification of British Columbia commercial tree species, macro and micro wood technology and wood defects as they relate to lumber quality. The processing and handling of wood in preparation for lumber manufacturing — debarking, chipping, screening, conveyance and storage.

LUPL 102 Lumber Grading 1 — Given in term 1 in preparation for Lumber Grading 2, the course covers information fundamental to the grading of western softwood lumber including tree growth and wood structure, species identification, classification of products and the recognition of characteristics found naturally, and caused in manufacture.

LUPL 103 Lumber Tallying* — A full course on lumber tallying and shipping, including understanding Foot Board Measure; converting order data to specified lengths, pieces, bundles and packages; calculating wood moisture content and shrinkage; metric conversion and lumber pricing. Final examinations for certification are by the Council of Forest Industries (COFI) during which the student must achieve 70%. A COFI Certificate in Tallying is required to obtain the BCIT Diploma of Technology. Students must also obtain 50% marks during the term of the course given at BCIT.

LUPL 104 Log Utilization — Introduces the basic log-scaling procedures used in coastal mills and also includes different log-sorting methods and recovery calculations used in saw-mill and plywood industries. Considerable time is spent practicing scaling techniques on selected log booms.

LUPL 105 Lumber Manufacture — Methods and equipment used in the manufacture of lumber in the B.C. Coast and Interior are examined. Processes discussed include log preparation, initial and secondary breakdown, kiln drying and planing. Saw feeds, speeds and filing practices are also examined. Field trips augment material given in lectures.

LUPL 106 Plywood Manufacture — Methods and equipment used in the manufacture of plywood in the B.C. Coast and Interior are examined. Processes discussed include peeling, driving, lay-up and finishing. Some time is spent discussing other types of panel boards and related coatings and overlays. Field trips augment material given in lectures.

LUPL 107 Mill Management 1 — This course is designed to supplement material covered in courses on lumber and plywood manufacture. Topics include cost analysis, principles of supervision, accident prevention, fire prevention, industrial relations, maintenance organization, maintenance trades, mobile equipment, materials handling and pollution abatement. A large portion of time is spent on specific assignments in various manufacturing plants.

LUPL 108 Lumber Grading 2* — Students attend industry lumber grading classes sponsored by the Council of Forest Industries (COFI) and receive further instruction at BCIT. Final examinations for certification are given by COFI, at which time the student must achieve a 70% pass mark as a requisite to obtaining the BCIT Diploma of Technology. Students must also obtain the required 50% term marks for the in-school portion of the course.

LUPL 109 Mill Management 2 — see LUPL 107.

LUPL 201 Wood Science 2 — Topics covered include wood and chip units and conversion factors, mechanical and rheological properties, micro- and ultra-structure, wood protection and preservation. The lab section of the course is largely made up of a research project, with emphasis on reporting of methods and results. Prerequisite: LUPL 101.

LUPL 202 Summer Technical Report — Students make a detailed report on one phase of the technical operation of a forest products plant, from first-hand experience or from approved research sources.

LUPL 203 Mill Audit and Quality Control — Lectures and labs complement material given in Lumber and Plywood Manufacture courses and provide the student with the capability to set up and manage a quality control program in a sawmill and plywood plant. Besides being able to identify and correct problems related to quality, the student will be able to sample, analyze and report on size accuracy, fibre usage, product dryness and adherence to standards. Prerequisite: LUPL 105, LUPL 106.

MATH 146 Basic Technical Mathematics for Lumber and Plywood — Graphical linear programming. Exponential/logarithmic theory and transformations, common and natural logarithms and logarithmic/semilogarithmic graphs. Radian measure. Trigonometric functions of any angle, vectors and solution of triangles, graphs of trigonometric functions, identities, compound and double angle formulas, trigonometric equations and inverse functions.

MATH 246 Statistics and Quality Control for Lumber and Plywood — Organization and graphical presentation of data, frequency distributions, measures of central tendency, variation and other measures. Probability theory and laws. Random variables, discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Method of least squares, regression and correlation. Analysis of variance. Control charts concepts and application, and acceptance sampling. Non-parametric statistics.

MECH 101 Drafting Fundamentals — An introductory course for persons with little or no experience in graphics. (Students are required to purchase drafting equipment and supplies on the first night of class) Students learn to produce and read simple drawings. Topics include scales, geometric constructions, basic orthographics detail interpretation, line visibility, dimensioning, auxiliary views, true shape, inclined and skew surfaces, sections, pictorials, working drawings and freehand skteches.

MECH 204 Drafting (Lumber and Plywood) — Covers topics on intersections, developments, descriptive geometry, isometrics and piping, drawings and mechanical equipment detail, and layout projects associated with lumber production.

MECH 416 Mechanical Equipment (Lumber) — A study of mechanical equipment relating to the transmission, application and control of power, with particular reference to the wood processing industry. Topics include line shafting, flexible couplings V-belt and roller chain drives, gearing, variable speed drives, hydraulic and pneumatic systems, centrifugal pump applications and lubrication and bearings.

MKTG 420 Wood Products Sales and Distribution — Examines the major domestic and export markets for lumber and plywood, including ongoing changes in all types of distribution and transportation systems used by the forest products industry. The sales process, from telephone solicitation to complete documentation of FOB and CIF orders, is covered in detail.

OPMT 164 Management Engineering 1 — Lumber and Plywood — An organized approach to problem-solving, with emphasis on the forest products industry. Method study techniques such as problem selection, process charting, multiple activity charting, activity sampling, motion economy and critical examination and development of alternatives are covered. The course also includes an introduction to work measurement. The importance of establishing good human relations with employees is stressed throughout.

OPMT 264 Management Engineering 2 — Lumber and Plywood — The techniques required to solve plant layout and materials handling problems are covered and the student applies these techniques to a comprehensive in-house project. As a term project, the student selects for study a job in an industrial plant in

the forest products industry. The student applies the techniques learned in OPMT 164 and the first part of this course to the solution of a plant project and submits a written report on the findings, including conclusions and recommendations.

PHYS 118 Physics for Lumber and Plywood — An introductory course covering statics, dynamics, momentum, force, friction, energy, power, angular momentum, simple machines, properties of solids, fluids, fluid mechanics, thermal properties of matter, thermal energy, basic electricity and magnetism, optics and atomic and nuclear phenomena.

PHYS 218 Physics for Lumber and Plywood — see PHYS 118.

TCOM 107 Technical Communication for Lumber and Plywood — Prepares students for writing technical material relevant to the lumber and plywood industry. Students study and practice the principles of clear, concise and precise writing and apply those principles to instructions, field trip reports, process descriptions, memos and descriptions of hardware. In addition, students practice oral communication skills.

TCOM 207 Technical Communication for Lumber and Plywood — Further prepares students for writing for the lumber and plywood industry. Students write letters, job application letters, resumes, proposals, progress reports and a technical report done jointly with an engineering course. Students also learn interview techniques. Prerequisite: TCOM 107.

TCOM 305 Advanced Technical Communication for Lumber and Plywood — Students review and practice technical reporting. They write several memos and a Summer Technical Report which is marked jointly by the instructor and people employed in the lumber and plywood industry. They practice illustrating, revising and editing skills, and present an oral technical report. Prerequisite: TCOM 107, TCOM 207.

TCOM 403 Advanced Technical Communication for Lumber and Plywood — Students write technically advanced material typical of the forest products industry. They update their resumes and job application letters and write technical definitions and descriptions, procedures, instructions, trip reports and technical letters. They write one long report based on observations in a mill, in conjunction with an engineering course. Prerequisite: TCOM 107, TCOM 207, TCOM 305.

Mining

Technologists have an important role to play in the exploration, development, and extraction of mineral resources. Up-to-date technology such as computer applications are vital to B.C. and Canadian mining due to narrow profit margins. Coal, industrial mineral and precious metal sectors have expanded to major roles. The technology is many-faceted, and the opportunities are similarly wide-ranging.

Job Opportunites

Graduates enter a wide field of mining and related occupations, from exploration to production, from field to office: geology, geophysics, geochemistry, surveying, sampling, assaying, mine planning, production supervision, services (eg. water control, road construction), rock mechanics, diamond drilling, blasting, equipment sales and computer applications. After an initial training period, one can expect varied, creative, and often independent work with considerable responsibility. Quick advancement to supervisory positions is possible to graduates with initiative, ability and leadership.

Mining communities tend to have well-supported entertainment, sport, and outdoor recreation facilities. These and other benefits often permit the young family to start budgets on a more positive note.

The Program

Courses reflect the wide range of applications and include the following: geology and mining topics in all terms, mineral processing and assaying, several civil engineering courses, surveying, physics, math and communications courses particularly adapted to mining problems. Projects and assignments emphasize industry applications and a hands-on approach and are increasingly computer-oriented. Field schools and guest lecturers are important aspects of the curriculum.

BCIT Mining students enjoy an unusually high level of student financial assistance.

There are good transfer arrangements with several universities and approximately 25% of our students ultimately continue to engineering degrees.

The program is accredited by the Applied Technologists and Technicians of British Columbia.

Prerequisite

Algebra 12, Physics 11 and Chemistry 11 are course requirements for this program.

Faculty and Staff

J.T. Neilson, B.A.S., P.Eng., Acting Department Head
D.J. Hardie, H.N.C.
G.S. Headley, B.A.Sc., M.Eng.

TECHNOLOGY: Mining

PROGRAM: Mining

Level 1		Classroom hours per week
CHEM 101	Applied Chemical Principles 1	6.0
MATH 150	Basic Technical Mathematics for Mining	5.0
MECH 101	Drafting Fundamentals	2.0
MINE 101	Geology 1	3.0
MINE 102	Mining	2.0
PHYS 101	Physics	6.0
SURV 140	Surveying	3.0
SURV 142	Hand Held Computer Techniques	1.0
TCOM 110	Technical Communication for Mining	3.0

Level 2		Classroom hours per week
CHEM 201	Applied Chemical Principles 2	6.0
MATH 250	Calculus 1 and 2 for Mining	5.0
MECH 201	Drafting	2.0
MINE 201	Geology 1	4.0
MINE 202	Mining	2.0
PHYS 201	Physics for Mining	3.0
PHYS 204	Introductory Geophysics	3.0
SURV 240	Surveying	3.0
TCOM 211	Technical Communication for Mining	3.0

Level 3		Classroom hours per week
CHSC 305	Assaying	4.0
CHSC 314	Mineral Processing	3.5
CIVL 339	Statics and Strength of Materials	3.0
MATH 350	FORTRAN and Network Scheduling for Mining	5.0
MINE 301	Structural Geology	3.5
MINE 302	Mining	4.0
PHYS 304	Mining Geophysics	1.5
SURV 340	Surveying	3.0
TCOM 306	Advanced Technical Communication for Mining	2.0

Level 4		Classroom hours per week
CHSC 405	Assaying	4.0
CHSC 414	Mineral Processing	3.5
CIVL 440	Statics and Strength of Materials	3.0
CIVL 441	Hydraulics	3.0
MATH 450	Statistics for Mining	5.0
MINE 401	Geology — Mineral Deposits	3.5
MINE 402	Mining	4.0
SURV 440	Surveying	3.0
TCOM 404	Advanced Technical Communication for Mining	2.0

Course Descriptions

CHEM 101 Applied Chemical Principles 1 — Provides the necessary background for chemical calculations and analysis. Included are stoichiometry, atomic structure, bonding, solution preparation and acid-base and oxidation-reduction reactions and titrations. Simple chemical equilibrium leads to a good working knowledge of pH, buffer solutions, solubility product, selective precipitation and industrial processes involving equilibria. Lab work consists of simple qualitative and quantitative analysis and good lab technique is taught.

CHEM 201 Applied Chemical Principles 2 — A continuation of CHEM 101 giving detailed coverage of gravimetric and volumetric analysis and qualitative analysis of cations and anions. Electrochemistry includes cells, electroplating and corrosion. Simple physical chemistry provides theory of solids, liquids and gases leading to fractional distillation and colligative properties. The Periodic Table is used to correlate many properties of elements and compounds. Names and properties of some organic compounds are covered and lab work covers qualitative and quantitative analysis and physio-chemical separations.

CHSC 305 Assaying — Analytical chemistry applied to the ore minerals, with special attention to fire assaying for gold and silver. Gravimetric, volumetric and instrumental methods are developed for the more common metals.

CHSC 314 Mineral Processing — Deals specifically with mineral processing as appplied to the B.C. mining industry. Covers the essential operations of applied mineral processing ie: grinding, screening, gravity separation, cyclone classification, flotation, sedimentation, thickening, filtration. Emphasis on numerical solution of operating and design type problems. Course includes laboratory work.

CHSC 405 Assaying — A continuation of CHSC 305.

CHSC 414 Mineral Processing — A continuation of CHSC 314. Prerequisite: CHSC 314.

CIVL 339 Statics and Strength of Materials — The definitions, representations and uses of forces and moments are presented, leading to the equations of equilibrium. Following topics include: free bodies, trusses, stresses and shear and bending moment diagrams.

CIVL 440 Statics and Strength of Materials — Simple stresses; stress, strain elasticity; compound bars and columns; temperature stress; elastic limit; limit of proportionality; yield; ultimate; factor of safety; load factor; ductility; resilience; fatigue; shock. Properties of sections; bending moments; shear forces; theory of flexure; deflection of beams; eccentric loading; lateral loading; compound stress and strain; Poisson's ratio; principal stress and strains; Mohr's circle; testing techniques; machines; extensometers; strain gauges; photo elasticity. Special sessions on rock mechanics. Prerequisite: CIVL 339.

CIVL 441 Hydraulics — Properties of fluids, hydrostatics, pressure and centre of pressures; fluid flow, continuity equation, velocity head, Venturi meters. Pipe friction and flow. Flow conditions. Open channel flow in flumes and streams. Flow measurement. Lab demonstrations. Pumps. Prerequisite: CIVL 339.

MATH 150 Basic Technical Mathematics for Mining — Graphical linear programming. Exponential/logarithmic theory and transformations, common and natural logarithms and logarithmic/semilogarithmic graphs. Radian measure. Trigonometric functions of any angle, vectors and solution of triangles, graphs of trigonometric functions, identities, compound and double angle formulas, trigonometric equations and inverse functions.

MATH 250 Calculus 1 and 2 for Mining — Limits, the derivative, differentiation rules for algebraic, trigonometric, inverse trigonometric, logarithmic and exponential functions; curve sketching, implicit differentiation, higher order derivatives, applied maxima/minima, related rates and differentials. Antidifferentiation, the indefinite integral and the definite integral including area, volume, centroid and other applications. Tables of integrals, integration by parts, partial fractions and substitution techniques.

MATH 350 FORTRAN and Network Scheduling for Mining — FORTRAN arithmetic and variables, input/output and formatting, branching, arrays, functions and subroutines. Critical path networking principles, events, activities and slack. Network replanning and adjustment, and crashing a project. Scheduling under limited resources and resource leveling.

MATH 450 Statistics for Mining — Linear programming using the simplex method. Organization and graphical presentation of data, frequency distributions and measures of central tendency, variation and other measures. Probability theory and laws. Random variables, discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Method of least squares, regression and correlation. Geostatistical estimation.

MECH 101 Drafting Fundamentals — An introductory course for persons with little or no experience in graphics. (Students are required to purchase drafting equipment and supplies on the first night of class) Students learn to produce and read simple drawings. Topics include scales, geometric constructions, basic orthographics detail interpretation, line visibility, dimensioning, auxiliary views, true shape, inclined and skew surfaces, sections, pictorials, working drawings and freehand skteches.

MECH 201 Drafting (Mining) — Involves techniques in ink, contours, intersection and developments, dip, strike and outcrop, sections, profiles, descriptive geometry and other graphical mining problems.

MECH 301 Machine Design 1 — The theory in prerequisite courses is covered plus combined stresses with emphasis on solution by Mohr's circle; theories of failure; stress concentration; fatigue phenomena; welded connections; bolted and rivited connections; spur; helical and worm gear drives; speed reducers; belt and roller chain drives; flexible couplings; shafts; antifriction and journal bearing; brakes and clutches; power screws; helical and leaf springs; an introduction to mechanical vibrations with emphasis on the critical speeds of rotating assemblies. Continued in MECH 401.

MINE 101 Geology 1 — Definition, basic concepts, earth's crust, geologic time; atomic structure of minerals, crystal forms and symmetry systems; properties of common minerals, sedimentary rock types, clastic and chemical sedimentaries; igneous rock types, classification; deformation of earth's crust, folds, faults; metamorphic rocks; weathering, erosion and glaciation; economic geology, mineral fuels, non-metallics, ore deposits and their controls; geological history, pre-Cambrian, Paleozoic, Mesozoic, Tertiary, Pleistocene; geologic maps.

MINE 102 Mining — The objective: an introduction to the general sphere of mining and, more particularly, mining exploration. 10 hrs. on identifying the factors important to mine profitability; 20 hrs. giving a unified picture of modern prospecting techniques: geochemistry in some detail, geology, geophysics, geostatistics, sampling and diamond drilling. Maps, photos, reports and references; economics, planning and management.

MINE 201 Geology — Definition, basic concepts, earth's crust, geologic time; atomic structure of minerals, crystal forms and symmetry systems; properties of common minerals, sedimentary rock types, clastic and chemical sedimentaries; igneous rock types, classification; deformation of earth's crust, folds, faults; metaphorphic rocks; weathering, erosion and glaciation; economic geology, mineral fuels, non-metallics, ore deposits and their controls; geological history, pre-Cambrian, Paleozoic, Mesozoic, Tertiary, Pleistocene; geologic maps. A continuation of MINE 101.

MINE 202 Mining — A full description of mining methods; brief subjective descriptions of rock mechanics, fragmentation and mine services which receive detailed treatment elsewhere. Unit operations of drilling, blasting, loading and hauling are discussed in the context of organization, equipment, labor and supplies. Prerequisite: MINE 102.

MINE 301 Structural Geology — Brief review of mechanical principles of rock deformation and of the primary structures of sedimentary, igneous and metamorphic rocks. The origin, nature and classifaction of joints, folds and faults, with emphasis on their relation to mineral resources. Lab work includes examinations of specimens, methods of recording structural data, mapping and solution of structural problems, with emphasis on economic aspects. Prerequisite: MINE 203.

MINE 302 Mining — Two objectives: rock mechanics and mine services. Rock mass classification and field observations, data storage and retrieval (stereonet), stress field description and modes of failure, ground water effects, ground control methods (pit slope stability design, pillars, subsidence and underground support systems) and ground movement monitoring. Electrical power, compressed air, water control ventilation, underground development, materials handling systems not otherwise covered, reclamation and pollution control, safety, management. Guest lecturers used extensively. Prerequisite: MINE 204.

MINE 401 Geology — Mineral Deposits — The terminology, classification, manner of occurrence, distribution and economics of mineral resources, with emphasis on typical Canadian occurrences. Ways of recognizing, discovering and developing mineral deposits. Lab work illustrates and develops techniques in megascopic study and identification of hand specimens; valuation of mineral deposits, computer data storage and retrieval. Field trips are correlated with all classroom work in geology. Prerequisite: MINE 203.

MINE 402 Mining — Two objectives: mine planning and fragmentation. Economics: cost estimating both capital and operating, accounting and records, taxation, marketing (smelter and coal contracts and specifications), balance sheets, financial statements, cash flows and present values, equipment selection. Sampling, cutoffs, waste/ore ratios, geostatistics and mine modelling, largely computerized. Fragmentation subjects include drilling systems, explosive properties and products, safety, field application design. Field labs include high speed photography of students' full scale tests. Prerequisite: MINE 206.

PHYS 101 Physics for Mining, Natural Gas and Petroleum — A general level course covering mechanics, dynamics and the properties of solids and fluids. The associated laboratory covers the principles of measurement and the experimental method of acquiring knowledge.

PHYS 201 Physics for Mining, Natural Gas and Petroleum — A general level course covering thermal properties of matter, waves, electricity, magnetism, electromagnetism and atomic and nuclear physics.

PHYS 204 Introductory Geophysics — Utilizing concepts covered in PHYS 201, the course is an introduction to the uses of geophysics in the search for ore deposits. The course consists of lectures, case study exercises and some field exercises covering the gravity, magnetic, resistivity, self-potential and seismic method of analyzing the physical properties of the earth.

PHYS 304 Mining Geophysics — Consists of field work and some lectures on geophysical methods of mineral exploration. Emphasis is on the operation of geophysical instruments, the method of conducting geophysical surveys and the presentation and interpretation of data.

SURV 140 Surveying — Substance of course on ground points, sighting devices; measurement of distances and angles with a variety of instruments, tapes, etc., under a variety of conditions; compass; accuracy and precision; planetable; errors and mistakes; direction; stadia, profiling; topography; line production offsets; interlining and intersection; random lines and physical feature ties; computations — traverses, coordinate systems; triangulation; areas and volumes; special engineering survey problems and curves.

SURV 142 Hand Held Computer Techniques — An introductory course in the use of the microcomputer to solve various mathematical and surveying problems. Emphasis will be on the application of the small computer system to the solution of mining related problems. Topics include computer programming in BASIC and in small computer systems communications.

SURV 240 Surveying — see SURV 140.

SURV 340 Surveying — Application of survey methods to underground and surface mines. Underground surveying in shaft sinking, development control (level and inclined) and production areas. Elementary astronomy, establishing azimuth by solar and pole star observations. Mine quantities in development areas, pickup of tunnels, cross sectioning, stopes (including tonnage calculations). Construction of mine plans and sections. Field projects include tunnel surveys and open-pit triangulation, tri-lateration and bench pickup. Mining Acts applied to surveying.

SURV 440 Surveying — This is a continuation of SURV 340. The content is the same.

TCOM 110 Technical Communication for Mining — Students receive practice in entry-level writing skills for the mining industry. They write letters of inquiry, request, complaint and adjustment, and short technical memos. They also give an oral technical report.

TCOM 211 Technical Communication for Mining — The major portion of the course provides instruction and practice in writing many different kinds of short, informal, industry-related reports. Students learn how to write resumes and job application letters. They also participate in job interviews, meetings and oral technical briefings. Prerequisite: TCOM 110.

TCOM 306 Advanced Technical Communication for Mining — This course builds on the practice and principles presented in first year. It introduces students to more difficult kinds of letters, memos and short reports. It includes instruction and practice in handling criticism and grievance procedures, participating in meetings, retrieving technical mining-related data, and briefing small groups. As far as possible, assignments are integrated with students' other courses. Prerequisite: TCOM 110, TCOM 211.

TCOM 404 Advanced Technical Communication for Mining — Students complete and update the job search component begun in first year. They then work on more specialized technical reports — site descriptions, geological reports and analytical reports on specific mining methods and equipment. They give a final technical briefing on their mining methods report. As far as possible, assignments are integrated with students' other courses. Prerequisite: TCOM 110, TCOM 211, TCOM 306.

Natural Gas and Petroleum

Because of its size and diversity, the petroleum industry is unique, both in its extremely wide range of occupational opportunities, and in the many challenges it offers employees for learning and growing.

Job Opportunities

The petroleum industry can be considered under four general areas: Exploration and Production, Transmission and Distribution, Manufacturing (refining), and Marketing. There are a variety of positions to be filled by Natural Gas and Petroleum Technology graduates in each of these areas. Past graduates are successfully employed in all these areas, both in Canada and throughout the world. Positions available include:

Exploration and Production: geologic studies, reservoir studies, well testing and servicing.

Transmission and Distribution: operation and maintenance of pipelines, utility studies and corrosion control.

Manufacturing: process operations, laboratory and product quality control, effluent control.

Marketing: product application for all of the petroleum products produced for commercial and industrial equipment.

The Program

The curriculum is designed to cover all major aspects of the petroleum industry, thereby enabling the graduate to successfully enter any area of the industry. The first year covers petroleum geology, reservoir studies and the production and field handling of oil and gas. Emphasis is also given to the basic sciences — chemistry, physics and mathematics — necessary for the scientific and engineering principles involved in studies throughout the course.

The second year covers pipeline transmission, oil refining and products utilization and gas distribution. Alternate fuels are also examined. Computer applications in all areas of studies will be emphasised. Classroom and laboratory instruction will be supplemented by field trips to local installations.

This program is accredited by the Applied Science Technologists and Technicians of B.C.

Prerequisite

Algebra 12, Physics 11 or Chemistry 11 are course requirements for this program. Students should have a keen interest in the operation of large-scale equipment, be prepared to work outdoors and, with training, must be capable of assuming responsibility for the satisfactory and safe operation of highly complex plant equipment.

Faculty and Staff

J.T. Neilson, B.A.Sc., P.Eng., Acting Department Head
D.A. Campbell, B.A., (Hons.), M.Ed.
R.G. Kinney, Dipl.T., A.S.T.T.B.C.

TECHNOLOGY: Natural Gas and Petroleum

Level 1		Classroom hours per week ➧
CHEM 101	Applied Chemical Principles 1	6.0
CHSC 106	Engineering Materials	3.5
MATH 147	Basic Technical Mathematics	5.0
NGAS 102	Petroleum Geology	4.0
NGAS 103	Properties of Reservoir Fluids	3.0
PHYS 101	Physics	6.0
TCOM 108	Technical Communication	3.0

Level 2		Classroom hours per week ➧
CHEM 201	Applied Chemical Principles 2	6.0
COMP 122	Computer Applications	2.0
MATH 247	Calculus 1 and 2	5.0
NGAS 201	Field Production of Gas and Oil	3.0
NGAS 202	Field Handling of Gas and Oil and Gas Processing	2.0
PHYS 201	Physics	3.0
PHYS 204	Introductory Geophysics	3.0
SURV 128	Introduction to Surveying	3.0
TCOM 208	Technical Communication	3.0

Level 3		Classroom hours per week ➧
CHEM 310	Physical Chemistry	5.0
CHSC 341	Unit Operations	6.0
CHSC 351	Pollution Control	3.0
MATH 347	Differential Equations	5.0
NGAS 306	Oil Refining	4.0
NGAS 307	Oil and Gas Pipeline Transmission	6.0
NGAS 308	Fuels	2.0

Level 4		Classroom hours per week ➧
CHEM 415	Petroleum Chemistry	5.0
CHSC 441	Unit Operations	6.0
MATH 447	Statistics and Numerical Methods	5.0
NGAS 401	Gas Distribution and Utilization	4.0
NGAS 402	Petroleum Products: Testing and Utilization	5.0
NGAS 403	Process Dynamics	3.0
NGAS 404	Computer Simulation and Control	2.0

Course Descriptions

CHEM 101 Applied Chemical Principles 1 — Provides the necessary background for chemical calculations and analysis. Included are stoichiometry, atomic structure, bonding, solution preparation and acid-base and oxidation-reduction reactions and titrations. Simple chemical equilibrium leads to a good working knowledge of pH, buffer solutions, solubility product, selective precipitation and industrial processes involving equilibria. Lab work consists of simple qualitative and quantitative analysis and good lab technique is taught.

CHEM 201 Applied Chemical Principles 2 — A continuation of CHEM 101 giving detailed coverage of gravimetric and volumetric analysis and qualitative analysis of cations and anions. Electrochemistry includes cells, electroplating and corrosion. Simple physical chemistry provides theory of solids, liquids and gases leading to fractional distillation and colligative properties. The Periodic Table is used to correlate many properties of elements and compounds. Names and properties of some organic compounds are covered and lab work covers qualitative and quantitative analysis and physio-chemical separations.

CHEM 310 Physical Chemistry — Presents the kinetic theory of gases, the first and second laws of thermodynamics, phase equilibria, chemical kinetics and catalysis. Lab work consolidates lecture material and gives experience in practical physio-chemical measurements.

CHEM 415 Petroleum Chemistry — Presents a survey of the properties and common reactions of the classes of organic compounds which are found in petroleum or are of importance in the petrochemical industry. The chemistry of refining processes, instrumental lab analysis and synthesis of some petrochemicals are presented.

CHSC 106 Engineering Materials — A comparison of materials — concrete, metals, alloys, polymers and ceramics. Common causes of failure in service including corrosion, wear, fatigue and embrittlement. Lab sessions emphasize physical testing and non-destructive testing.

CHSC 341 Unit Operations — First and second law of thermodynamics; enthalpy, entropy, phase rule, thermodynamic diagrams and tables; properties of steam; fluid flow and measurement in pipes and channels, piping, pipe fittings and valves; flow of heat, conduction, convection, radiation, film and overall transfer co-efficients, heat exchangers; principles and application of equipment for evaporation, distillation, absorption, extraction; humidification and dehumidification; drying; solid-liquid and liquid-liquid extraction.

CHSC 351 Pollution Control — Fundamentals of waste treatment and management systems. Basic sampling and testing techniques.

CHSC 441 Unit Operations — see CHSC 341.

COMP 122 Computer Applications — Introduction to the components of a computer. Introduction to "BASIC" on a microcomputer. Relationship of data to input/output. Introduction to "FORTRAN" and "WATFIV" on the IBM mainframe computer. The problems solved via programming are in the natural gas & petroleum field.

MATH 147 Basic Technical Mathematics for Gas and Petroleum — Graphical linear programming. Exponential/logarithmic theory and transformations, common and natural logarithms and logarithmic/semilogarithmic graphs. Radian measure. Trigonometric functions of any angle, vectors and solution of triangles, graphs of trigonometric functions, identities, compound and double angle formulas, trigonometric equations and inverse functions.

MATH 247 Calculus 1 and 2 for Natural Gas and Petroleum — Limits, the derivative, differentiation rules for algebraic, trigonometric, inverse trigonometric, logarithmic and exponential functions; curve sketching, implicit differentiation, higher order derivatives, applied maxima/minima, related rates and differentials. Antidifferentiation, the indefinite integral, and the definite integral including area, volume, centroid and other applications. Tables of integrals, integration by parts, partial fractions and substitution techniques.

MATH 347 Differential Equations for Natural Gas and Petroleum — Methods of integration including integration by parts, trigonometric substitution and partial fractions. Partial differentiation with applications. Elementary differential equations and separation of variables. First order (integrating factor and numerical solution) and second order differential equations with applications.

MATH 447 Statistics and Numerical Methods for Natural Gas and Petroleum — Organization and graphical presentation of data, frequency distributions and measures of central tendency, variation and other measures. Probability theory and laws. Random variables, discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Method of least squares, regression and correlation. Linear programming using the simplex method and the transportation problem. Solution of algebraic and transcendental equations by iterative methods.

NGAS 102 Petroleum Geology — Covers topics in petroleum geology and rotary drilling. Petroleum geology topics include: historical geology, composition of the earth's crust, origin of petroleum, petroleum migration, geology of reservoirs, structural and stratigraphic traps, sedimentary formations, carbonate formations, basic reservoir production calculations, construction of isochore and isopach subsurface maps. Rotary drilling topics include: drilling rigs, the drill string, drilling, drilling fluids, well control, down-hole equipment, an introduction to well testing and servicing.

NGAS 103 Properties of Reservoir Fluids — Introduces the student to the chemical composition and physical properties of natural gas and crude oil, and the phase behavior these fluids exhibit during production from a reservoir. Some elementary applications of reservoir flow characteristics are considered.

NGAS 201 Field Production of Gas and Oil — Covers basic down-hole hydraulics and an introduction to reservoir analysis and production. Topics include drilling fluids, hydraulics, core analysis, reservoir fluid flow, PVT analysis, reserves determination, production techniques and enhanced recovery techniques. A project related to reserves determination will be assigned during the term. Prerequisite: NGAS 102.

NGAS 202 Field Handling of Oil and Gas Processing — Covers the handling of crude oil and natural gas from the well head to the transmission pipeline. Field handling to include: fluid stabilization, gas separation, hydrate control, emulsion treating, well effluent recombination calculations. Gas processing covers sweetening, sulfur recovery, dehydration, natural gas liquids recovery. A technical report with oral presentation is required.

NGAS 306 Oil Refining — Petroleum refining is a very complex operation due mainly to the multitude of products that are made This course covers the refining processes involved in the production of these products. Processes considered include: atmospheric and vacuum distillation; thermal, catalytic and hydro cracking; catalytic reforming; alkylation; polymerization; hydrotreating; chemical treating; lubricating oil refining; process and effluent water treating; air quality control. A term paper with oral presentation is required.

NGAS 307 Oil and Gas Pipeline Transmission — An introduction to natural gas transmission. Topics covered include: natural gas quality, large volume natural gas measurement, pipeline flow and design calculations, pipeline construction, design and operating codes, corrosion control, pipeline control and compressor stations.

NGAS 308 Fuels — Examines alternate uses of conventional fossil fuels. Utilization, availability and production techniques of gaseous, liquid and solid fuels are discussed. Alternate fuel sources and alternate fuel applications are then examined. Topics include: natural gas, manufactured (coal) gas, LNG, LPG, gasolines, diesel fuel, fuel oils and types of coal. Alternate fuel topics include: simulated fuels, supplemental fuels and synthetic fuels. The use of compressed natural gas, propane and or gasoline/alcohol as a motor fuel will also be examined.

NGAS 401 Gas Distribution and Utilization — An introduction to the distribution and utilization of natural gas. Topics covered include: gas measurement, pressure regulation, design and construction of distribution systems, corrosion control, leak surveys, maintenance, gas contract control, peak shaving, burner design, customer relations, system design and operational codes.

NGAS 402 Petroleum Products: Testing and Utilization — Many different products are produced in an oil refinery. Each product has its own individual requirements depending on the use to which it is to be put. The lecture part of the course examines the desired properties and specifications of these products and the equipment in which the products are used. Laboratory periods cover the testing of various products obtained from a typical crude oil. Supplementing these studies are field trips to local refineries. A major term paper is required. Prerequisite: NGAS 306.

NGAS 403 Process Dynamics — Introduces a practical and effective computer based approach for studying and evaluating 'real time' process control situations. The student is required to produce interim progress reports during the course and a final, formal technical report at the end of the course. Topics include: system dynamics, response time, control strategies, system optimization, system modelling, flow charting, transducer and control valve evaluation.

NGAS 404 Computer Simulation and Control — A course in basic computer simulation and control techniques. Emphasis will be on practical input-output applications utilizing an inexpensive 8 BIT microprocessor. Topics include: concept of computer control, input-output software and hardware, interfacing, analog-digital conversions and practical applications.

PHYS 101 Physics for Mining, Natural Gas and Petroleum — A general level course covering mechanics, dynamics and the properties of solids and fluids. The associated laboratory covers the principles of measurement and the experimental method of acquiring knowledge.

PHYS 201 Physics for Mining, Natural Gas and Petroleum — A general level course covering thermal properties of matter, waves, electricity, magnetism, electromagnetism and atomic and nuclear physics.

PHYS 204 Introductory Geophysics — Utilizing concepts covered in PHYS 201, the course is an introduction to the uses of geophysics in the search for ore deposits. The course consists of lectures, case study exercises and some field exercises covering the gravity, magnetic, resistivity, self-potential and seismic method of analyzing the physical properties of the earth.

SURV 128 Introduction to Surveying Natural Gas and Petroleum — The theory of engineering survey. Practical application of linear measurements. Introduction to and theory of the theodolite. Bearings and traverse computations. Introduction to and theory of levelling. Computation of areas and volume.

TCOM 108 Technical Communication for Natural Gas and Petroleum — In this course, students learn the fundamentals of clear technical writing and the principles of style and organization. They write documents relevant to the natural gas and petroleum industry, including technical descriptions and letters and memos of request, adjustment and collection.

TCOM 208 Technical Communication for Natural Gas and Petroleum — Students learn the fundamentals of job seeking, meetings and reporting. They write resumes, job application letters, technical briefs and proposals, and evaluation, recommendation, trip progress and occurrence reports. They practice chairing meetings and presenting oral reports.

Chemical Sciences

Chemical principles and processes form the base of modern industrial society. Whether in the research laboratory or industrial chemical plant, the chemical analyst and chemical process technologist are in great demand. Their skills find challenges on many fronts, including solving environmental pollution problems. Because chemical principles are so universally used, graduates of the Chemical Sciences program find employment in almost every major industrial and research activity in B.C.

Job Opportunities

Graduates are employed as chemists and analysts in research facilities and commercial and industrial labs; engineering assistants in consulting firms; production supervisor trainees in production plants; analysts in environmental and chemical laboratories; assayers or mineral processing technicians in extractive metallurgy plants; process technologists in pulp mills and as corrosion specialists and non-destructive testing specialists.

The Program

The Chemical Sciences Program offers the student grounding in general science and technology courses in the first year of studies, with the opportunity for further specialization in second year.

The first year curriculum emphasizes applied chemistry, general laboratory procedures and testing, and introduces the student to a wide range of industrial chemical processes.

In the second year, Analytical Chemistry, Unit Operations and Unit projects are compulsory throughout, while most other courses are chosen on an elective basis, depending on which technology the student wishes to specialize in. The following programs are offered: *Industrial Chemistry, Laboratory Chemistry, Environmental Science and Pollution Control, Pulp and Paper, Extractive Metallurgy, Physical Metallurgy.*

Prerequisite

Chemistry 11 and Algebra 12 are course requirements for this program.

Faculty and Staff

J.T. Neilson, P.Eng., Acting Department Head
S. Berghold
J. Berry, B.Sc., Ph.D., Program Head
W.J. Bogyo, B.C.L.Ass., Senior Instructor
J.T. Denely, B.Sc., P.Eng., (Alta.)
R. Drouin, Dipl.T.
W.R. Irvine, B.A., M.Sc., P.Eng., Senior Instructor
D.J. McLeod, A.R.M.T.C., A.I.M.
T. Malakoff, Dipl.T.
G.A. Smook, B.S., P.Eng.
T. Voksepp, B.A.Sc., P.Eng.

PROGRAM: Chemical Sciences

Level 1		Classroom hours per week ▼
CHEM 101	Applied Chemical Principles 1	6.0
CHSC 103	Engineering Materials	3.5
CHSC 119	Environmental Science	4.5
MATH 141	Basic Technical Mathematics	5.0
MECH 103	Drafting Fundamentals	4.0
PHYS 114	Physics	6.0
TCOM 102	Technical Communication	3.0

Level 2		Classroom hours per week ▼
CHEM 201	Applied Chemical Principles 2	6.0
CHEM 204	Chemical Laboratory Techniques	3.0
CHSC 202	Laboratory Workshop	1.5
CHSC 203	Engineering Materials	3.5
CHSC 246	Industrial Chemical Processes	3.5
MATH 241	Statistics 1 and Calculus 1	5.0
PHYS 214	Physics	5.0
TCOM 202	Technical Communication	3.0

Level 3 Common		Classroom hours per week ▼
CHEM 310	Physical Chemistry	5.0
CHEM 314	Analytical Chemistry 1	6.0
CHSC 320	Unit Project	2.0
CHSC 341	Unit Operations	6.0
MATH 341	Numerical Methods with BASIC	5.0

Electives		Classroom hours per week ▼
CHEM 309	Organic Chemistry	6.0
CHSC 304	Physical Metallurgy	6.0
CHSC 307	Extractive Metallurgy	6.0
CHSC 311	Pollution Science and Organic Chemistry	6.0
CHSC 346	Pulp and Paper	6.0

Level 4 Common		Classroom hours per week ▼
CHEM 414	Analytical Chemistry 2	6.0
CHSC 420	Unit Project	3.0
CHSC 441	Unit Operations	6.0

Elective 1		Classroom hours per week ▼
CHEM 409	Organic Chemistry for Chemical Science 2	6.0
CHSC 404	Physical Metallurgy	6.0
CHSC 407	Extractive Metallurgy	6.0
CHSC 411	Pollution Science and Microbiology	6.0
CHSC 446	Pulp and Paper	6.0

Elective 2		Classroom hours per week ▼
CHSC 408	Ore Analysis	3.0
CHSC 412	Waste Management	3.0

Elective 3		Classroom hours per week ▼
CHSC 413	Environmental Analytical Methods	3.0
NGAS 403	Process Dynamics	3.0

Elective 4		Classroom hours per week ▼
CHEM 416	Analytical Instrumentation 1	2.0
ELEC 468	Process Measurements	2.0

Elective 5		Classroom hours per week ▼
CHSC 438	Coal Chemistry	2.0
CHSC 448	Industrial Chemistry	2.0
MATH 441	Calculus 2 and Differential Equations	2.0

Course Descriptions

CHEM 101 Applied Chemical Principles 1 — Provides the necessary background for chemical calculations and analysis. Included are stoichiometry, atomic structure, bonding, solution preparation and acid-base and oxidation-reduction reactions and titrations. Simple chemical equilibrium leads to a good working knowledge of pH, buffer solutions, solubility product, selective precipitation and industrial processes involving equilibria. Lab work consists of simple qualitative and quantitative analysis and good lab technique is taught.

CHEM 201 Applied Chemical Principles 2 — A continuation of CHEM 101 giving detailed coverage of gravimetric and volumetric analysis and qualitative analysis of cations and anions. Electrochemistry includes cells, electroplating and corrosion. Simple physical chemistry provides theory of solids, liquids and gases leading to fractional distillation and colligative properties. The

Periodic Table is used to correlate many properties of elements and compounds. Names and properties of some organic compounds are covered and lab work covers qualitative and quantitative analysis and physio-chemical separations.

CHEM 204 Chemical Laboratory Techniques — This course teaches basic techniques in sampling, weighing, moisture determination, ashing, extractions, filtration gravimetric methods and volumetric methods. Instrumental analysis and separation methods will be described, demonstrated and, whenever possible, practised.

CHEM 309 Organic Chemistry — Organic compounds are classified according to functional groups. Naming using IUPAC, common names and trade names of many industrial chemicals. Factors affecting boiling point and solubility, theory of extraction. Preparation and reactions of alkanes, alkenes, aromatics, alcohol. Petroleum refining, addition polymerisation, synthetic rubber. Theory of infrared spectroscopy, interpretation of spectra.

CHEM 310 Physical Chemistry — Presents the kinetic theory of gases, the first and second laws of thermodynamics, phase equilibria, chemical kinetics and catalysis. Lab work consolidates lecture material and gives experience in practical physio-chemical measurements.

CHEM 314 Analytical Chemistry 1 — The course covers the theory and practice of conventional methods of inorganic analysis and includes methods of sample decomposition, sampling, treatment of analytical data, precipitation and complex formation titration, solvent extraction and ion exchange methods, and fire assaying. Laboratory exercises include the ore analysis for iron, chromium, tin, copper, arsenic, zinc, sulphur and silica, as well as fire assaying for gold and silver.

CHEM 409 Organic Chemistry for Chemical Science 2 — A general course covering properties, preparations and reactions of all major classes of organic compounds--aliphatic and aromatic hydrocarbons, halides, alcohols, ethers, carboxylic acids and their derivatives, aldehydes, ketones, amines, amino acids, carbohydrates, heterocyclics, dyes and polymers. Lab work emphasizes organic techniques, qualitative chemical analysis and instrumental methods, infra-red, ultraviolet and gas chromatography.

CHEM 414 Analytical Chemistry 2 — Introduces the basic principles of analytical instruments and their application to a variety of analyses. Major topics include analytical absorption methods (visible, ultraviolet, infrared and atomic absorption), emission methods (flame, spectrographic, ICP), x-ray flourescence and diffraction methods, chromatographic methods (gas and HPLC), electrochemical methods (PH, specific ion, polarography) and trace analysis (electrothermal atomization, hydride generation, etc.).

CHEM 416 Analytical Instrumentation 1 — Covers the construction of electrodes and the use of operational amplifiers in the following analytical methods: constant current coulometric titration, amperometric, potentiometric and polarographic methods. Phototransducers and photometric circuits.

CHSC 103 Engineering Materials — Physical testing of materials including metals, plastics, wood and wood products, concrete, ceramics and soils. Non-destructive testing. Microscopy, photomicrography and photography.

CHSC 119 Environmental Science — An introductory course in environmental chemistry and pollution control. The course examines the major air and water pollutants, including measurement techniques and engineering control methods. Laboratory sessions cover sampling methods now used by industry in B.C.

CHSC 202 Laboratory Workshop — Instruction in basic workshop techniques including glass blowing, soldering, brazing and gas welding. Use of hand and bench tools.

CHSC 203 Engineering Materials — Continuation of CHSC 103.

CHSC 246 Industrial Chemical Processes — A description of the chemical processes involved in major industrial chemical plants in B.C. Emphasis is placed on chemical operations associated with the pulp and paper industry including chemical pulping, water treatment. Lab sessions involve the testing and control procedures utilized in industrial applications.

CHSC 304 Physical Metallurgy — Solidification of metals, casting methods and defects, metal-forming operations, phase diagrams, alloying of metals, heat-treatment. Lab sessions emphasize physical testing of materials, metallography and non-destructive testing. Prerequisite: CHSC 156.

CHSC 307 Extractive Metallurgy — Is concerned with the unit operations of coal and nonferrous metals recovery and upgrading, and with the unit processes of nonferrous and previous metal recovery from ores and concentrates. Mineral processing covers the basic operations of comminution, particle size analysis, classification, screening, flotation, gravity separation. Extractive metallurgy covers the fundamental principles and processes of hydrometallurgy, pyrometallurgy and electrometallurgy. Solutions to design and operating problems are emphasized.

CHSC 311 Pollution Science and Organic Chemistry — An introduction to organic chemistry, with applications to industrial pollution problems.

CHSC 320 Unit Project — Projects relating to the student's chosen specialty are assigned each term. Regular progress reports and a final term report are required. Industrial and laboratory training is emphasized.

CHSC 341 Unit Operations — First and second law of thermodynamics; enthalpy, entropy, phase rule, thermodynamic diagrams and tables; properties of steam; fluid flow and measurement in pipes and channels, piping, pipe fittings and valves; flow of heat, conduction, convection, radiation, film and overall transfer co-efficients, heat exchangers; principles and application of equipment for evaporation, distillation, absorption, extraction; humidification and dehumidification; drying; solid-liquid and liquid-liquid extraction.

CHSC 346 Pulp and Paper — Pulp and paper technology is concerned with mechanical and kraft pulping, chemical and heat recovery, bleaching, papermaking, newsprint manufacture, process control and product testing. The lab portion of this course is designed to equip students with basic testing skills and provide "hands-on" experience with typical mill unit operations. Projects are undertaken in term 4 to involve students in planning and carrying out practical project work.

CHSC 404 Physical Metallurgy — A continuation of CHSC 304. Prerequisite: CHSC 304.

CHSC 408 Ore Analysis — A survey of analytical methods to determine the elemental constituents of ores, concentrates, alloys and metal products. Laboratory work includes principles and practice of gravimetric, volumetric, complexometric and spectrophotometric methods of analysis.

CHSC 411 Pollution Science and Microbiology — Discusses air pollution meteorology, air pollution chemistry, air sampling methods, classical and instrumental techniques for measuring atmospheric and indoor contaminants (e.g. hydrogen sulfide, mercaptan, sulfur oxides, carbon monoxide, ozone, nitrogen oxides, various organic contaminants and lead, mercury, cadmium

and zinc in air, etc.), particulate counting and sizing, stack sampling and some of the principles and techniques used in water pollution microbiology. Laboratory sessions include standard methods used by industrial and government laboratories.

CHSC 412 Waste Management — Physical, biological and chemical methods used in treating municipal and industrial waste waters. The major industrial techniques for control of air pollutants are also discussed.

CHSC 413 Environmental Analytical Methods — Surveys suitable methods of examining many types of water, waste water and materials related to control of water quality. Typical industrial pollution problems related to local industry are discussed during lab periods and special attention is given to proper sampling techniques. A selection is made from the following analysis of field samples; cyanide, pesticides, arsenic, mercury, nitrogen (ammonia, nitrate, organic), oxygen (D.O., B.O.D., C.O.D.), surfactants, phosphates, sulphates, chlorides, proteins, carbohydrates, lignins, phenols and heavy metals.

CHSC 420 Unit Project — see CHSC 320.

CHSC 438 Coal Chemistry — An introduction to coal chemistry with emphasis on coal preparation and coal testing techniques.

CHSC 441 Unit Operations — see CHSC 341.

CHSC 446 Pulp and Paper — see CHSC 346.

CHSC 448 Industrial Chemistry — A survey course covering the major chemical process industries. Lecture material is selected from the following topics; chlorine and caustic production, aluminum production, petroleum refining, metal refining, plastics, phenol and resins, coal hydrogenation, nuclear energy and other sources of energy.

ELEC 468 Process Measurements — An orientation course with emphasis on lab exposure to industrial equipment. Standard methods of applying commercial instruments to measure pressure, level flow and temperature variables are included. The course ends with an introduction to the principles of regulators and controllers.

MATH 141 Basic Technical Mathematics for Chemical Sciences — Graphical linear programming. Exponential/logarithmic theory and transformations, common and natural logarithms and logarithmic/semilogarithmic graphs. Radian measure. Trigonometric functions of any angle, vectors and solution of triangles, graphs of trigonometric functions, identities, compound and double angle formulas, trigonometric equations, and inverse functions.

MATH 241 Statistics 1 and Calculus 1 for Chemical Science — Organization and graphical presentation of data, frequency distributions, measures of central tendency and variation, probability theory, random variables, theoretical distributions, sampling and estimation. Delta-process, the derivative, differentiation rules, implicit differentiation, related rates and applied maxima/minima. The indefinite and definite integrals with applications. Trapezoidal and Simpson's rules for numerical integration. Related rate problems with functions of several variables.

MATH 341 Numerical Method with BASIC for Chemical Sciences — BASIC arithmetic and functions, input/output statements, relational operations, branching statements, formatted output, strings, arrays, and files. Gauss-Jordan method applied to the solution of systems of linear equations, solution of algebraic and transcendental equations by iterative methods, linear programming using the simplex method.

MATH 441 Calculus 2 and Differential Equations for Chemical Sciences — Differentiation and integration of logarithmic and exponential functions with applications. Tables of integrals. Differential equations including variables separable and linear first order with applications. Computer application of Euler's, Heun's and Runge-Kutta's methods for solving differential equations.

MECH 103 Drafting Fundamentals

NGAS 403 Process Dynamics — Introduces a practical and effective computer based approach for studying and evaluating 'real time' process control situations. The student is required to produce interim progress reports during the course and a final, formal technical report at the end of the course. Topics include: system dynamics, response time, control strategies, system optimization, system modelling, flow charting, transducer and control valve evaluation.

PHYS 114 Physics for Chemical Sciences — An introductory level course covering kinematics, dynamics, function, statics, angular motion, energy, momentum, simple machines, properties of matter, fluid mechanics, temperature and heat, thermal properties of matter, basic electricity and magnetism, wave motion and sound, electromagnetic waves, optics, atomic and nuclear phenomena. The lab program stresses measurement, data analysis, experimental technique and report writing. Mathematical treatment requires algebra and trigonometry.

PHYS 214 Physics for Chemical Sciences — see PHYS 114.

TCOM 102 Technical Communication for Chemical Sciences — Introduces students to the techniques and tools used in communicating technical information to people in industry. Students will practice basic skills, learn to analyze information and design an information package — letter, memo proposal or report — for industrial audiences.

TCOM 202 Technical Communication for Chemical Sciences — Students will write a resume and job application letter, and prepare for job interviews. They will do library research, write several short reports, give an oral report, and practice effective meeting strategies and telephone techniques. Prerequisite: TCOM 102.

School of Health Sciences Studies

Diploma Programs

Basic Health Sciences 83

Environmental Health Sciences 84
- Public Health Inspector Training 84
- Occupational Health and Safety 87

Biomedical Electronics 90
- Electrophysiology 93

Health Engineering Services 95
- Health Information Technology 95
- Health Record Administrator 95
- Health Record Technician 96
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Radiological Technical Services 104
- Medical Radiography 104
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Basic Health Sciences

Department of Basic Health Sciences

This department provides courses in human anatomy and physiology, immunology, microbiology, pathophysiology, sociology, organizational psychology, and human development for students enrolled in the School of Health Sciences. These courses are designated by the prefix BHSC and are listed and described in the following health technology entries. Each course is oriented towards a particular technology so that, although the material studied may be introductory in nature, the student quickly becomes aware of applications. In many cases these courses are the foundation upon which specific technology subjects are built. The department's responsibility, therefore, is to teach those concepts of biological and behavioral sciences which provide the student and graduate with the knowledge and comprehension to meet the present and the future challenges of the modern health worker.

Faculty and Staff

D. W. Martin, B.Sc (Hons), M.S.R., Department Head
B. M. Alder, B.S.N., R.N., M.A.
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J. H. Emes, B.Sc (Hons.), M.Sc., Ph.D.
A. G. Handford, B.A.
G. R. Marshall, B.Sc (Kines.), M.Sc. (Kines.)
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E. Shkurhan, B.Sc., M.Sc., Chief Instructor

Environmental Health

Department of Environmental Health Services

Public Health Inspector Training

The public health inspector is a vital member of the community health delivery system. His or her role includes improving the environment through the use of education, consultation, inspection and monitoring techniques and, if necessary, by the enforcement of health legislation. This role is applied in the areas of food hygiene, insect and rodent control, communicable disease investigation, public accommodation, community care facilities, public recreational facilities, water supply and waste disposal systems, occupational health and safety and environmental pollution — air, water, soil and noise. The graduate provides leadership and technical expertise in the development of long-range planning to protect and improve community health. To meet these demands the candidate must be a mature, practical person and possess excellent communicative skills, as well as considerable tact and discretion in working with people at all levels within the community.

Job Opportunities

Employment possibilities for public health inspectors include municipal, provincial and national health agencies, environmental and pollution control agencies and private businesses and industries such as food processing, catering and fisheries. Occasional openings occur in the teaching field. Employment opportunities exist in the industrial health and hygiene area for students who also possess an undergraduate degree.

The Program

The cross-disciplinary curriculum includes general studies in health, engineering, math and the physical and social sciences, in order to give students a thorough understanding of the many health hazards in the environment and to equip them to measure, evaluate and recommend controls for these hazards. Instructional modes include lectures, labs and field experience.

Prerequisite

Algebra 12, Physics 11 and Chemistry 12 are course requirements for this program. Applicants must be in good health. The nature of the work precludes individuals who are severely handicapped. Applicants should be able to show evidence of maturity, have a positive outlook and be interested in serving the community. Acceptance is dependent on a preselection interview.

Post-graduation

After completing the requirements of the two-year program leading to a Diploma of Technology, graduates must complete six months of field training in a recognized health unit under the direction of a medical health officer and a public health inspector. Successful candidates may then sit a national examination to qualify for a Certificate in Public Health Inspection (Canada) granted by the Board of Certification of the Canadian Institute of Public Health Inspectors.

Faculty and Staff

John M. Pelton, B.A., C.P.H.I. (C), Department Head
E.J. Borsky, Dipl.T.
A.A. Guite, B.Sc., M.P.M., C.P.H.I. (C)
C.L. Young, C.E.T, C.P.H.I. (C)

PROGRAM: Environmental Health

Level 1		Classroom hours per week
BHSC 123	Public Health and Pollution Control Microbiology	3.0
CHEM 108	Chemistry for Environmental Health 1	6.0
ENVH 124	Pest Control	2.0
ENVH 141	Food Hygiene 1	4.0
ENVH 142	Public Health Inspection 1	4.0
ENVH 143	Environmental Health and Engineering 1	4.0
HCOM 106	Communication for Environmental and Occupational Health	3.0
MATH 182	Basic Technical Mathematics for Environmental Health	4.0

Level 2		Classroom hours per week
BHSC 204	Basic Anatomy and Physiology	3.0
BHSC 223	Public Health and Pollution Control Microbiology	4.5
CHEM 208	Chemistry for Environmental Health 2	9.0
ENVH 275	Drinking Water and Waste Disposal	7.0
ENVH 266	Epidemiology and Bio Statistics	6.0
ENVH 231	Food Hygiene 2	3.0
ENVH 232	Public Health Inspection 2	3.0
HCOM 205	Communication for Environmental and Occupational Health	4.5
PHYS 212	Environmental Physics	5.0

Level 3		Classroom hours per week
CHEM 313	Instrumental Analytical Methods for Environmental Health	4.0
ENVH 379	Technical Research Methods 1	7.0
ENVH 358	Environmental Health Relations	5.0
ENVH 350	Environmental Noise	5.0
ENVH 357	Public Health Administration 1	3.0
ENVH 331	Food Hygiene 3	3.0
ENVH 332	Public Health Inspection 3	3.0

Level 4		Classroom hours per week
BHSC 424	Communicable Disease Control	6.0
CHEM 418	Industrial Chemical Processes	3.0
CHSC 413	Environmental Analytical Methods	4.0
ENVH 459	Technical Research Methods 2	5.0
ENVH 437	Public Health Administration 2	3.0
ENVH 456	Public Health Law	5.0
ENVH 453	Environmental Health and Engineering 2	5.0
ENVH 470	Industrial Hygiene and Toxicology	7.0
ENVH 471	Food Hygiene 4	7.0

Course Descriptions

BHSC 123 Public Health and Pollution Control Microbiology — An introduction to those areas of microbiology which the public health inspector will use in his or her daily work. The areas include the structure and physiological characteristics of bacteria, viruses and fungi and their significance to food, water, sewage and waste disposal.

BHSC 204 Basic Anatomy and Physiology — Designed to provide a basic knowledge of human anatomy and physiology. Emphasis is placed on the physiology of human body systems and how environmental factors affect these systems.

BHSC 223 Public Health and Polution Control Microbiology — see BHSC 123. Prerequisite: BHSC 123.

BHSC 424 Communicable Disease Control — Provides the student with a sound knowledge of the natural history, spread and control of communicable diseases. Emphasis is placed on modes of transmission and control of diseases of provincial and national importance.

CHEM 108 Chemistry for Environmental Health 1 — A general chemistry course for environmental health. Topics include chemical symbols, formula acid base reactions, calculation based on formulae and chemical equations. Theory of volumetric analysis molarity, normality calculations based on concentration of solutions. Acid base equilibria solution, PH and POH, buffers and hydrolysis.

CHEM 208 Chemistry for Environmental Health 2 — An introduction to organic biochemistry, and a selection of topics of interest to Environmental Health. Organic covers functional group analysis, naming by IUPAC, common name and trade names of many commercial chemicals, oil refining, photochemical smog; pesticides. Biochemistry covers lipids, carbohydrates and proteins. Other topics include alkalinity, hardness, water softening, surfactants, heavy metal poisoning, chemical toxicity, biological oxygen demand, chemical oxygen demand and swimming pool chemistry. Prerequisite: CHEM 108.

CHEM 313 Instrumental Analytical Methods for Environmental Health — Principles and laboratory procedures of the more common instrumental methods of chemical analysis: spectroscopic methods including visible, ultraviolet and infra-red spectroscopy. Atomic absorption spectroscopy, flame photometry, potentiometry, polarography and chromatography. Prerequisite: CHEM 208.

CHEM 418 Industrial Chemical Processes — Designed to give the student an overview of the chemical processes used in industry, the chemicals used, chemical reactions, products manufactured, waste products, pollutants produced and the hazards to personnel. Students will make field trips to selected industries. Prerequisite: CHEM 108.

CHSC 413 Environmental Analytical Methods — Surveys suitable methods of examining many types of water, waste water and materials related to control of water quality. Typical industrial pollution problems related to local industry are discussed during the lab periods and special attention is given to proper sampling techniques. A selection is made from the following analysis of field samples; cyanide, pesticides, arsenic, mercury, nitrogen (ammonia, nitrate, organic), oxygen (D.O., B.O.D., C.O.D.), surfactants, phosphates, sulphates, chlorides, proteins, carbohydrates, lignin, phenols and heavy metals. Two field trips are included.

ENVH 124 Pest Control — With primary emphasis on insects and rodents, this course will examine the identification and life cycles and habits of pests in order to understand the various measures for their control.

ENVH 141 Food Hygiene 1 — The food hygiene courses will examine the public health concerns associated with the food industry. Specific attention will be directed to legislative control and enforcement, inspection techniques, causes and investigation of food-borne illnesses, microbiological concerns and educational programs, as all of these are applied to the food industry in production, processing, handling, storage, service display, construction and materials.

ENVH 142 Public Health Inspection 1 — Provides the student with a knowledge of duties and responsibilities in government organizations. A detailed review of related environmental and health legislation will be covered, as well as the division of control and authority at the federal, provincial and local levels. Control techniques and methodology used by government organizations is stressed.

ENVH 143 Environmental Health and Engineering 1 — Covers a number of topics relevant to the field of environmental health including solid waste collection and disposal, emergency measures, camp and recreational sanitation, housing, community planning and swimming pools.

ENVH 231 Food Hygiene 2 — See ENVH 141.

ENVH 232 Public Health Inspection — See ENVH 142.

ENVH 266 Epidemiology and Bio Statistics — This course enables the student to apply epidemiologic principles to assess the distribution and causes of disease in the population and to use biostatistical methods to critically evaluate data and study conclusions.

ENVH 275 Drinking Water and Waste Disposal — An introductory course which examines the means, methods, design and construction of facilities required to provide adequate potable water and sewage disposal. Associated health hazards, protective measures and how to solve problems encountered in individual systems will be considered. Further topics will include the characteristics of, and disposal methods for, agricultural wastes.

ENVH 331 Food Hygiene 3 — See ENVH 141.

ENVH 332 Public Health Inspection 3 — See ENVH 142.

ENVH 337 Public Health Administration 1 — This is a survey course which examines the principles of organization behavior, organization and design. The theoretical aspects of public health administration will be examined, showing the administrative philosophies from the classical school of administration to present-day philosophy. These administrative concepts will be dealt with as they apply to the functioning of government agencies and health departments. Particular reference will be made to Canadian government organization.

ENVH 350 Environmental Noise — Covers noise topics relevant to the field of environmental health with emphasis on occupational and community noise assessment and control. The lab course will emphasize audiometry, noise measurement and analysis, and calibration techniques utilizing state-of-the-art instrumentation. Prerequisite: MATH 182 or PHYS 212.

ENVH 358 Environmental Health Relations — Examines the interrelationships and interactions between various government departments, agencies and corporations. Additionally, the forces which underly the social behavior of groups, large organizations and communities will be examined. Interpersonal relations will be exemplified through the practical application of public health education and the interaction of personnel in the environmental health field. Principles of public relations will also be examined with emphasis on problems peculiar to public health.

ENVH 379 Technical Research Methods 1 — Provides for the development of the research methods and communication skills necessary to design technical research reports. Special emphasis will be placed on predicting trends in the field of public health. This course is designed to encourage the student to be self-assertive and creative. Prerequisite: ENVH 266.

ENVH 437 Public Health Administration 2 — See ENVH 337.

ENVH 453 Environmental Health and Engineering 2 — See ENVH 143.

ENVH 456 Public Health Law — An examination of the legal system which serves our society, followed by a detailed look at certain areas of substantive law which the public health official is likely to come in contact with in carrying out his or her duties. Special attention will be given to that body of legislation designed

for the protection and promotion of individual and community health. Court procedure and evidence giving are examined in depth.

ENVH 459 Technical Research Methods 2 — See ENVH 379. Prerequisite: ENVH 202.

ENVH 470 Industrial Hygiene and Toxicology — A survey course in occupational health. Given lectures, laboratory exercises and field situations, the student will be able to recognize common occupational health hazards, demonstrate how to use appropriate environmental sampling equipment and recommend control measures which may alleviate potential health hazards.

ENVH 471 Food Hygiene 4 — See ENVH 141.

HCOM 106 Communication for Environmental and Occupational Health — This applied course introduces students to the communication needs of professionals working in the environmental and occupational health and safety fields. It includes organizing information, writing public relations letters, procedures and literature reviews. Students also deliver a short oral training session on an environmental or occupational health and safety topic.

HCOM 205 Communication for Environmental and Occupational Health — Builds on skills taught in HCOM 106 and adds incident, inspection and investigation reports, proposals and a professional job application package. Meetings and interviewing skills are also covered. Students will propose, design and sell a training module for an environmental health or occupational health and safety topic.

MATH 182 Basic Technical Mathematics for Environmental Health — Systems of measurement and mensuration. Linear and quadratic equations and systems of linear equations. Functions and their graphs including power functions. Exponential/logarithmic theory, common and natural logarithms, logarithmic/semilogarithmic graphs and exponential growth and decay.

PHYS 212 Environmental Physics — An introduction to the physical principles, properties and relationships of physical quantities and how they affect each other. Motion, force, energy, power, properties of matter, thermal energy, electricity, wave motion, sound light and radiation as they apply to environmental topics. The lab program emphasizes measurements, data analysis and experimental techniques while confirming and expanding the lecture concepts.

Occupational Health and Safety

Department of Environmental Health Services

One of the primary purposes of this program is to graduate individuals who are able to provide the knowledge and leadership necessary to develop programs in industry that will assist in conserving life, health and property. They will consult with company and labour officials on ways to improve productivity by implementing loss control programs. Graduates will also identify health and safety hazards in the work environment and advise corrective action. The occupational health and safety officer will assume a major role in the development and conduct of safety-training programs for workers. Accidents will be investigated to identify their root causes, and methods found to eliminate recurrences.

To achieve these career objectives the applicant is expected to be a mature, objective person who possesses the ability to communicate decisions and goals in a tactful and professional manner.

Job Opportunities

Career openings are found in industries and regulatory agencies where the health and safety of the workers is of concern.

The Program

The science-oriented program includes combined studies in the health, engineering and business fields. This ideal combination prepares the student to understand the potential safety and health hazards of the work environment, as well as the human relations involved in seeking beneficial solution or methods of improving the workplace environment.

Prerequisite

Algebra 12, Chemistry 11 and Physics 11. Candidates will be interviewed.

Faculty and Staff

John M. Pelton, B.A., C.P.H.I. (C), Department Head
Lars G. Larsson, C.R.S.P., Program Head
Cynthia Harnadek, B.Sc., Dipl.T

PROGRAM: Occupational Health and Safety

Level 1		Credit
CHEM 115	General Chemistry for Occupational Health and Safety	6.0
HCOM 106	Communication	3.0
MATH 188	Basic Technical Mathematics 1	4.0
OH&S 141	Principles of Accident Prevention 1	7.0
OH&S 152	Policies in Industrial Health and Safety	5.0
PHYS 114	Physics	5.0

Level 2		Credit
ADMN 114	Management 1	1.5
ADMN 224	Organizational Behavior Fundamentals	1.5
BHSC 207	Anatomy and Physiology	3.0
CHEM 215	General Chemistry for Occupational Health and Safety	7.5
CHSC 288	Engineering Concepts	6.0
HCOM 205	Communication 2	4.5
MATH 288	Statistics	6.5
OH&S 271	Principles of Accident Prevention 2	7.0
PHYS 214	Physics	7.5

Level 3		Credit
ADMN 345	Human Resource Management	2.0
BLDG 121	Drafting and Blueprint Reading	3.0
CHEM 315	Organic Chemistry for Occupational Health and Safety	6.0
CHSC 388	Engineering Concepts	4.0
OH&S 343	Industrial Hygiene 1 — Noise and Vibration	4.0
OH&S 364	Fire Protection	6.0
OPMT 181	Ergonomics	5.0

Level 4		Credit
ADMN 333	Industrial Relations	1.5
ADMN 361	*Microcomputer Software Systems*	1.5
CHEM 418	Industrial Chemical Processes	4.5
HCOM 302	Advanced Communication	3.0
MECH 206	Mechanics of Materials	6.5
OH&S 446	Occupational Diseases	4.0
OH&S 447	Security Systems	4.0
OH&S 465	Electrical Power and Machinery	6.0
OH&S 478	Loss Control and Auditing	7.0
OH&S 473	Industrial Hygiene 2 — Toxicology	7.0

Course Descriptions

ADMN 114 Management 1 — Designed to give the student a basic understanding of management and accounting. It covers planning, directing, organizing, budgeting, and accounting.

ADMN 224 Organizational Behavior Fundamentals — Studies behaviour and attitudes in an organizational setting. Topics include the organization's effect on personal perceptions, feelings and actions, and their effect on the organization, as well as the individual's effect on the achievement of the organization's purposes. Concepts such as leadership, communications, power, authority, change and conflict are examined.

ADMN 333 Industrial Relations — An introductory analysis of the fundamental issues and facts of labor-management relations. Special emphasis is given to collective agreement content and interpretation, bargaining and basic labor economics.

ADMN 345 Human Resource Management — An introduction to the fundamentals of personnel management including human resource planning; recruiting and selection techniques; job analysis, descriptions and evaluation; compensation administration; performance appraisal systems; training; employee safety and health. Current employment legislation is also reviewed.

ADMN 361 Microcomputer Software Systems — Gives students a basic understanding of the microcomputer and available software. It provides hands-on experience in using various software packages such as word processing and spread sheets as well as the application of software to the field of Occupational Health and Safety.

BHSC 207 Basic Anatomy and Physiology — A study of basic human anatomy and physiology and homeostatic principles. Emphasis is placed on the ways in which the body adapts to external changes, and the problems which attend extreme changes in various work environments.

BLDG 121 Drafting and Blueprint Reading — Incorporation and interpretation of applicable safety regulations in construction drawings, with respect to plant design, lighting, heating, ventilating, air conditioning, fire control, machine details and guards.

CHEM 115 General Chemistry for Occupational Health and Safety — For lecture portion, see CHEM 103. A separate laboratory section is given, specifically for occupational health and safety.

CHEM 215 General Chemistry for Occupational Health and Safety — A continuation of general chemistry topics, using examples drawn from material relevant to the technology: electrochemistry and hazards in extraction, refining and plating industries; acids, bases and corrosive substances; complex ion formation and metal ion toxicity; dust, vapors, liquids and pulmonary hazards; thermochemistry and flammability; chemical kinetics and explosions; radionuclides. Laboratory exercises will reinforce the basic principles in most of these topics. Prerequisite: CHEM 115.

CHEM 315 Organic Chemistry for Occupational Health and Safety — Surveys the various classes of organic compounds likely to be encountered in the workplace. Naming, structure, chemical and physical properties, hazards and handling precautions are emphasized. Practical work provides experience with organic compounds and processes. Prerequisite: CHEM 215.

CHEM 418 Industrial Chemical Processes — Designed to give the student an overview of the chemical processes used in industry, the chemicals used, chemical reactions, products manufactured, waste products, pollutants produced and the hazards to personnel. Students will make field trips to selected industries. Prerequisite: CHEM 108.

CHSC 288 Engineering Concepts — Covers test procedures for mechanical properties; non-destructive testing and failure analysis; the basic concepts of engineering materials including metals, alloys, plastics, woods, ceramics and concrete.

CHSC 388 Engineering Concepts — See CHSC 288.

HCOM 106 Communication for Environmental and Occupational Health — This applied course introduces students to the communication needs of professionals working in the environmental and occupational health and safety fields. It includes organizing information, writing public relations letters, procedures and literature reviews. Students also deliver a short oral training session on an environmental or occupational health and safety topic.

HCOM 205 Communication for Environmental and Occupational Health — Builds on skills taught in HCOM 106 and adds incident, inspection and investigation reports, proposals and a professional job application package. Meetings and interviewing skills are also covered. Students will propose, design and sell a training module for an environmental health or occupational health and safety topic.

HCOM 302 Advanced Communication for Occupational Health — This advanced project course is designed to complement the industry audit done in second year. Students will analyse and write safety policies and procedures, design a safety audit questionnaire, write a recommendation report (based on audit) and propose a safety program outline. They will also present their reports and a segment of their safety program orally. Students will work with industry representatives, handle correspondence, conduct interviews in industry and word process their reports.

MATH 188 Basic Technical Mathematics 1 — Systems of measurement and mensuration. Linear and quadratic equations and systems of linear equations. Functions and their graphs including power functions. Exponential/logarithmic theory, common and natural logarithms, logarithmic/semilogarithmic graphs and exponential growth and decay.

MATH 288 Statistics — Organization and graphical presentation of data, frequency distributions, measures of central tendency and variation. Probability theory and laws. Discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Method of least squares, regression and correlation. Chi-square test.

MECH 206 Mechanics of Materials — Stress, strain and deflection. Tension, compression, shear, torsion, deflection and buckling of material under load. Beams, columns, shafts, thin- and thick-walled cylinders, riveted and welded joints.

OH&S 141 Principles of Accident Prevention 1 — Covers the history of the safety movement, a management approach to accident prevention, the root causes and real costs of accidents, accident investigation, inspections, job safety analysis, maintaining interest in safety, special problem solutions, motivation, the problem employee, and off-the-job safety.

OH&S 152 Policies in Industrial Health and Safety — Deals with legislation relevant to the safety field, claims management and safety policies. The concept of workers' compensation and the structure of the Workers' Compensation Board will also be studied.

OH&S 271 Principles of Accident Prevention 2 — Covers accident prevention for industrial operations. The engineering and technology involved in the various operations is examined. Topics include industrial buildings and plant layouts; construction and maintenance; manual handling and material storage; hoisting apparatus and conveyors, ropes, chains and slings; powered industrial trucks; elevators; principles of guarding; woodworking and metal working machinery; cold forming of metals; hot working of metals; welding and cutting; heating and ventilation.

OH&S 343 Industrial Hygiene 1 — Noise and Vibration — Reviews relevant topics in acoustics, audiometry, noise dosimetry and noise control within buildings. The student will be introduced to basic methods of sound measurement and the assessment of hearing loss. At the end of this course, the student will be able to estimate noise in the work environment and recommend simple sound control measures associated with the use of enclosures, damping and absorbent materials. Prerequisite: Year 1 of the Occupational Health and Safety program, or permission of the instructor, MATH 188 or PHYS 114.

OH&S 364 Fire Protection — Deals with the concept of Fire Prevention. Topics include: the handling and storage of flammable and combustible liquids, chemical hazards, dust explosions, bleve, electrical hazards, construction features, chemistry of fire, fire detection, portable extinguishers, automatic sprinkler systems and inspection procedures.

OH&S 446 Occupational Diseases — Provides the student with an overview of occupational diseases in terms of their causes and prevalence, methods of spread and their prevention. There is discussion of the responsibility of the worker and various professionals as well as the worker in the management of occupational diseases of the lungs which are commonly experienced by workers in B.C.There is discussion on a wide range of problems from contaminated water, food supplies, to scabies and causes of silicosis and "white fingers" disease.

OH&S 447 Security Systems — Gives the student a basic understanding of the security field. It covers threat analysis, physical and electronic barriers, alarm systems, and a look at the latest types of surveillance systems.

OH&S 465 Electrical Power and Machinery — An introductory course in electrical power and machinery with emphasis on safety aspects. Topics include electrical technology, insulators, conductors, magnetism, capacitors, transformers, Canadian Electrical Code, motors, generators, high voltage, hazardous locations, overload, electrical injuries, grounding, lock-out procedures and limits of approach. Prerequisite: MATH 283.

OH&S 473 Industrial Hygiene 2 — Toxicology — This basic course allows the student to indentify, monitor, evaluate and recommend control measures for common chemical and physical

hazards in the work place. The first part of the course reviews the concepts of toxicity and hazard as they apply to the development of permissible levels. The toxicity of common gases, vapours, dusts and fumes is reviewed. The second part of the course discusses the hazards associated with excessive exposure to ionizing and non-ionizing radiation, temperature and pressure extremes.

OH&S 478 Loss Control and Auditing — Covers emergency planning, insurance aspects, computers in safety, auditing, design of a complete safety program, office safety and a study of the loss control aspects of typical B.C. industries. Prerequisite: OH&S 101, OH&S 201 or OH&S 102.

OPMT 181 Ergonomics — Ergonomics concentrates on human factors in the scientific study of people at work, especially regarding worker safety, health, efficiency and comfort. The course explores recent trends in the ergonomics field in relation to the physical working environment, adaptation of tools and workplace to the worker, equipment design, impact on productivity and viewpoints of both workers and management.

PHYS 114 Physics for Chemical Sciences — An introductory level course covering kinematics, dynamics, friction, statics, angular motion, energy, momentum, simple harmonic motion, wave motion and sound, electromagnetic waves, physical optics, basic electricity and magnetism, temperature and heat, thermal properties of matter fluid mechanics, atomic and nuclear phenomena. The lab program stresses measurement, data analysis, experimental technique and report writing. Mathematical treatment requires algebra and trigonometry.

PHYS 214 Physics — See PHYS 114.

Biomedical Electronics

Job Opportunities

Biomedical electronics technologists may be employed in hospitals, clinics, research labs or industry. The technologists basic capability is to maintain and repair electronic equipment used in medicine and biology. Occasionally this equipment will be used by the technologist to obtain biomedical data to aid physicians in their diagnosis and treatment of disease. Such equipment may include patient monitors, electroencephalographs, defibrillators, electrosurgical units, telemetry devices, analytical, chemical and biochemical instruments, x-ray machines and ultrasound diagnostic and therapeutic units. Some of the servicing may involve mechanical/electro-mechanical devices such as respirators, pumps and opto/electronic instruments. In addition to servicing equipment, the biomedical electronics technologist may also be responsible for the following equipment procedures: inventory control; preventative maintenance programs; specification, evaluation and purchasing; instruction in operation and handling; safety inspection. As well as the servicing of equipment, job opportunities for biomedical electronics technologists do exist in other areas. A limited number are employed to design and modify equipment for special purpose tasks in research and/or product development. In addition, an increasing number of technologists are employed in the sales departments of various medical equipment supply companies.

The Program

The Biomedical Electronics Program provides education and training in the following subject areas: technical communications; algebra; calculus; statistics; basic chemistry, organic chemistry, bio chemistry and analytical chemistry; human anatomy and physiology; biophysics; electricity and electronics; biomedical electronics; digital techniques and microprocessor applications. This exposure allows the graduate to work in close association with biomedical engineers, physicians and others who use, maintain, design and supply scientific and medical equipment. During the second year, each student spends four weeks in clinical training, under supervision, in a local hospital, research agency or equipment supply firm.

Throughout the program, emphasis is placed on practically-oriented instruction. "Hands-on" laboratory experience is provided and students are trained in engineering problem solving methodology to allow them to upgrade and maintain their knowledge.

A professional attitude is encouraged throughout the program. Memberships in the Applied Science Technologists and Technicians of British Columbia (ASTTBC) and the Canadian Medical and Biological Engineering Society (CMBES) are recommended.

The Biomedical Electronics program is nationally accredited by ASTTBC. Graduates are eligible for registration as Applied Science Technologists (A.Sc.T.) after two years of relevant work experience following graduation.

Prerequisite

Algebra 12, Physics 11, Chemistry 11 all with a C+ standing are the course requirements and/or a selection/counselling interview with members of the department. Applicants who have special backgrounds and/or experience will also be considered on an individual basis.

Faculty and Staff

George Eisler, M.A.Sc., P.Eng., M.B.A., Department Head
M.J. Barrett, Dipl.T., C.E.T., A. Sc.T.
P.K. Chiu, B.Eng., M.Sc., Ph.D., P.Eng.
N. Fong, B.Sc., B.A.Sc., P.Eng., C.C.E., Program Head
M. Young, B.A., Dipl.T., R.E.T.
D. Moreau, B.Sc., Dipl.T.

PROGRAM: Biomedical Electronics

Level 1		Credit
BMET 100	Electronics Principles and Practice 1	9.0
CHEM 107	Chemistry for Biodmedical Electronics	6.0
ELEC 152	Measurement for Biomedical Electronics	4.0
HCOM 104	Technical Writing for Biodmedical Electronics	3.0
MATH 178	Basic Technical Mathematics for Biodmedical Electronics	8.0

Level 2		Credit
BHSC 202	Human Anatomy and Physiology	9.0
BMET 200	Electronics Principles and Practice 2	10.0
CHEM 207	Introduction to Organic Biochemistry	9.0
GNNU 182	Introduction to Patient Care	1.0
HCOM 203	Technical Writing for Biodmedical Electronics	3.0
MATH 278	Calculus for Biomedical Electronics	12.0

Level 3		Credit
BMET 300	Electronics Principles and Practice 3	6.0
BMET 301	Biomedical Electronics 1	7.0
BMET 310	Digital Electronics 1	7.0
ELEC 252	Measurement for Biomedical Electronics	4.0
MATH 378	Statistics for Biodmedical Electronics	2.0
PHYS 324	Biophysics	3.0

Level 4		Credit
BMET 401	Biomedical Electronics 2	7.0
BMET 402	Biomedical Electronics Project	4.5
BMET 403	Medical Imaging	5.0
BMET 410	Digital Systems and Microprocessors	7.0
BMET 420	Practical Experience in Biomedical Electronics	5.0
CHEM 411	Instrumental Analysis for Biodmedical Electronics	6.0
ELEC 259	Video Fundamentals	3.0
HCOM 301	Advanced Communication for Biodmedical Electronics	1.5

Most courses taken within the program require successful completion of certain prerequisites. For further information contact the Registrar's Office.

Course Descriptions

BHSC 202 Human Anatomy and Physiology — The basic structure and function of the human body is discussed using the systems approach. The cell's role as the unit of structure and function is emphasized. Emphasis is also placed on the regulation of body functions and the role of control systems in homeostasis. Examples of the uses of biomedical instrumentation in diagnosis and treatment are given.

BMET 100 Electronics Principles and Practice 1 — Provides students with basic knowledge of electrical quantities, their units and relationships. The course includes DC circuit analysis techniques for R, RC, RL and RLC circuits; AC circuit analysis for R, RC, RL circuits. Examples of applications to biomedical electronics are included. Lab exercises are coordinated with course content.

BMET 200 Electronics Principles and Practice 2 — Analyzes the properties of passive RLC circuits and introduces basic active devices and integrated circuits. Topics include RLC resonant circuits, bipolar transistor and FET fundamentals, discrete amplifier circuits (single and multistage), amplifier stability, Miller effect, power amplifiers, oscillators, power supplies, regulators, IC regulators, differential amplifiers. Prerequisite: BMET 100.

BMET 300 Electronics Principles and Practice 3 — Covers topics such as integrated circuit components and the uses of various other semiconductor components, e.g. Op Amp, FET, SCR, opto-electronics components, timers, etc. Lab exercises are coordinated with course content. Prerequisite: BMET 200, BMET 202.

BMET 301 Biomedical Electronics 1 — Introduces students to basic properties of biomedical signals: collecting (transducers), processing, displaying and recording. The design, construction and operation of physiological diagnostic/monitoring equipment will be presented through both block and schematic diagrams. Electrical safety, as it relates to biomedical equipment and patient care environments, will be emphasized throughout the course. Equipment control and work environment considerations are included. Lab exercises are coordinated with course content. Prerequisite: BMET 200, BMET 202, BHSC 202.

BMET 310 Digital Electronics 1 — A study of basic digital techniques. Topics include switch and relay control; numbering systems; Boolean algebra; logic synthesis; codes and coding; solid state logic (TTL, CMOS, etc.); noise and loading; encoders, decoders, relay drivers and delay devices; counters, shift registers and arithmetic systems; A/D and D/A conversion, multiplexing. Prerequisite: BMET 200, BMET 202, HCOM 203.

BMET 384 Electronic Circuits — The student is introduced to basic and modern electronic principles and utilizes these principles in the operation, building and laboratory testing of control systems. Students become familiar with the basic theory and operation of DC and AC circuits, techniques for measuring electrical quantities, and the basics of modern electronics used in control systems including analog and digital control systems. To supplement and implement the theory, strong emphasis is placed on "hands-on" training. Prerequisite: MATH 284.

BMET 401 Biomedical Electronics 2 — Various electronic equipment used in the biomedical environment is presented through block diagrams. Selected equipment is covered in more detail with schematic diagrams (e.g. electrosurgical, telemetry and cardiac resuscitation equipment.) Electrical safety considerations of all equipment studied will be presented. Lab Exercises, coordinated with course content, emphasize calibration and repair techniques. Prerequisite: BMET 300, BMET 301, BMET 310.

BMET 402 Biomedical Electronics Project — Students will build a device such as an ECG simulator using the latest technology and design techniques. Students will gain experience regarding the actual implementation of a project such as planning, designing, material acquisition, prototyping, Printed Circuit designing, construction, testing, calibration, commissioning and evaluation. A technical report for the project is also required. Prerequisite: BMET 300, BMET 301, BMET 310.

BMET 403 Medical Imaging — Introduces the concepts involved in imaging systems used in medicine. Equipment examined includes that in X-ray, nuclear medicine, and ultrasound. Prerequisite: BMET 300, BMET 301, BHSC 202.

BMET 410 Digital Systems and Microprocessors — An introduction to microprocessor hardware and software. Topics to be covered: digital arithmetic, memories and mass storage devices, microprocessor architectures, memory and I/O decoding, I/O techniques, interrupts, DMA, LSI/VSLI peripheral chips, data communications, memory management and virtual memory, instruction sets, software development methods, subroutines, data types, operating systems, editors, assemblers, linking loaders, and introduction to a high level language as a microprocessor development tool. Prerequisite: BMET 300, BMET 310.

BMET 420 Practical Experience in Biomedical Electronics — During this period of training, students gain practical experience in biomedical electronics and related fields while working under supervision at a number of hospitals, research agencies and private companies throughout the province. The work experience portion of this course is four weeks in duration. Prerequisite: BMET 300, BMET 301, BMET 403, BMET 410.

BMET 488 Electrical Power and Machinery — An introductory course in electrical power and machinery with emphasis on safety aspects. Topics include electrical technology, insulators, conductors, magnetism, capacitors, transformers, Canadian electrical code, motors, generators, high voltage, hazardous locations, overload, electrical injuries, grounding, transformers, lock-out procedures and limits of approach. Prerequisite: MATH 283.

CHEM 107 Chemistry for Biomedical Electronics — Covers basic general chemistry. The course includes stoichiometry, nomenclature, concentrations of solutions (molarity, molality, equivalent weight, PPM, percent), acid-base chemistry (strong and weak electrolytes, buffers, hydrolysis of salts) and electrochemistry (oxidation, reduction, voltaic cells, nernst equation). The laboratory part of the course which runs parallel with the lectures consists of quantitative analysis, both gravimetric and volumetric.

CHEM 207 Introduction to Organic Biochemistry for Biomedical Electronics — This course gives an introduction to organic and biochemistry. The naming, properties and main reactions of the major classes of organic compounds are discussed. The biochemistry includes both the chemistry and metabolism of fats, proteins and carbohydrates. Lab work includes techniques and synthesis in organic chemistry and biochemical techniques frequently encountered in the clinical lab, e.g.: spectrophotometry, chromatography, electrophoresis. Prerequisite: CHEM 107.

CHEM 411 Instrumental Analysis for Biomedical Electronics — Introduces basic theoretical concepts, instrument components and operation and general application of the following methods: potentiometric absorption, flame absorption and emission, fluorescence, gas and liquid chromatography and automated analysis. Prerequisite: CHEM 207.

ELEC 152 Measurement for Biomedical Electronics — Safety in electrical measurement techniques is emphasized throughout this course. Topics: error % and prediction, standards and calibration, device testing, analog and pulse signals, electrical noise, earthing, understanding service manuals. Equipment used: analog and digital meters, function and signal generators, bridges, frequency counters, curve tracers, oscilloscopes and attachments.

ELEC 252 Measurement for Biomedical Electronics — An orientation course covering basic devices for measuring pressure, temperature, density and flow. A study of the principles of analysis instruments, using potentiometric, amperometric and polarographic techniques; ultraviolet, visible and infrared spectroscopy; flame photometry; paper and column chromatography; electrophoresis and refractometric methods. Concept of regulation and feedback control.

ELEC 259 Video Fundamentals — An introductory course covering the basic principles of video display. Topics include raster scan, industrial composite video signals, character generation, video projects.

GNNU 182 Introduction to Patient Care — Introduces students to the hospital environment and the basic safety concepts of patient care. It includes observation and communication skills, body mechanics, fire safety and medical and surgical asepsis.

HCOM 104 Technical Writing for Biomedical Electronics — Emphasizes clear, correct, health-oriented technical writing for biomedical electronics technologists. Students will learn how to organize and sequence technical information, illustrate documents, describe and define technical material, write direct letters and memos, write a professional resume and application letter, and summarize reports and articles.

HCOM 203 Technical Writing for Biomedical Electronics — A continuation of HCOM 104. This term students will write and present orally hospital-oriented and industry-oriented memo reports, and write and present a longer, formal technical report. This term focuses on professional communication. Students will learn how to use the Wang word processing system to write reports and use medical terminology correctly.

HCOM 301 Advanced Communication for Biomedical Electronics — Designed to help biomedical electronics students complete the writing portion of technology assignments and projects successfully. Because the course content is, in part, determined by technology assignments, it will vary. The instructor and students work as editor and writers in the writing and revising of technology assignments. In addition, students will update resumes to graduate level requirements, as a separate part of the course.

MATH 178 Basic Technical Mathematics Biomedical Electronics — Systems of linear equations, determinants, matrices, types of systems and application to electrical networks. Polynomial curve fitting, loop analysis, and T to Y transformations. Common and natural logarithms, logarithmic/semilogarithmic graphs, decibels, and exponential growth and decay. Trigonometric functions, solution of triangles and graphing and addition of sinusoidal functions. Complex numbers, rectangular/polar transformations, phasor representation of sinusoidal waveforms and AC circuits.

MATH 278 Calculus for Biomedical Electronics — Limits, the derivative, differentiation rules, applied maxima/minima, curve sketching, and differentials with applications to electrical technology. Antidifferentiation, the indefinite integral and the definite integral including area, mean value and RMS value. Differentiation and integration of trigonometric, logarithmic and exponential functions. Fourier series. First and second order differential equations applied to electrical circuits. Basic arithmetic and functions, input/output, branching, strings, arrays and files. Arithmetic in other bases, logic gates and corresponding Boolean algebra, truth tables, Karnaugh maps, logic circuit design and binary addition/subtraction.

MATH 378 Statistics for Biomedical Electronics — Provides students with basic knowledge of statistics. Topics include random sampling, measurement and rounding, frequency distributions, measures of central tendency, measures of dispersion, normal distribution, ranks and percentiles. Estimation, central limit theorem, standard errors, confidence intervals, hypothesis testing, null and alternate hypothesis, large sample hypothesis testing, t-distribution, small sample hypothesis testing and nonparametric testing will also be covered. Computer packages will be discussed.

PHYS 324 Biophysics — This is a general level course in basic physics with emphasis on applications to biological systems. The topics covered are mechanics, heat, sound and light, with related applications. Various biological systems are studied with reference to the physical principles involved in both their development and function.

Electrophysiology Technology

Modern hospitals and health care clinics require the services of trained technologists to operate sophisticated electroneurophysiological testing equipment and other related biomedical equipment. In order to understand the operation of this equipment, the graduate will have studied mathematical, physical science and engineering subjects. Course work in the basic health sciences will inform the student about human physiology and the biological signals to be measured. In addition, course work in the social sciences will prepare the student for interpersonal relationships with the clinical environment. Extensive clinical experience is built into the program to ensure that the student develops necessary practical skills in the work environment.

Job Opportunities

Graduates of the Electrophysiology Program will find employment in hospitals or private clinics in the following fields: electroencephalography (electrical activity of the brain), electromyography (electrical activity of the neuro-muscular system), cardiology (electrical and mechanical activity of the heart), and evoked potentials (activities generated by stimulation of the sensory systems) which include electronystagmography, visual evoked response and brainstem auditory evoked response. Graduates will principally find employment in the Neurophysiology Departments of hospitals. In addition to performing a wide variety of tests on patients, the graduate will be expected to evaluate the results in order to assess the performance of the test equipment. Where necessary, tests will be repeated if an equipment/patient interface problem is identified. In addition to an ongoing evaluation of performance, the graduate will perform quality control procedures on equipment and simple calibration/maintenance functions.

The Program

The program is a combination of lab and lecture instruction at BCIT and clinical experience in the Neurophysiology Departments of local hospitals.

In both spring and fall terms, special courses in Electrophysiology and Neuroanatomy and Neurophysiology will train students in the basics of biological signal measurement and clinical apparatus. In the spring term (20 weeks) different areas of clinical experience will be covered: electroencephalography; electromyography; audiology; opthamology (and other evoked potentials); cardiology; and other clinical areas that might include diagnostic vascular labs.

Upon successful completion of the two year program, the student will receive a National Diploma of Technology in Electrophysiology. After a period of work experience in a clinical sitation, students will become eligible to write the National Certification Examinations of the appropriate certifying body of their chosen fields of interest.

Prerequisite

Algebra 12, Physics 11 and Chemistry 11 all with a C + standing are the course requirements for this program. Individuals wishing to enter this field should be interested in the welfare of people, and should have an aptitude for physics, electrical and mechanical apparatus. Applicants who have special background and/or experience will also be considered on an individual basis. Most courses taken within the program require successful completion of certain prerequisites. For further information contact the Registrar's office.

PROGRAM: Electrophysiology

Level 1		Credit
CHEM 107	Chemistry for Biomedical Electronics	6.0
ELEC 152	Measurement for Biomedical ELectronics	4.0
ENPY 150	Applied Instrumentation	6.0
ENPY 151	Introduction to Clinical Practice	3.0
HCOM 104	Technical Writing for Biomedical Electronics	3.0
MATH 178	Basic Technical Mathematics for Biomedical ELectronics	8.0

Level 2		Credit
BHSC 202	Human Anatomy and Physiology	9.0
CHEM 207	Introduction to Organic and Biochemistry	9.0
ENPY 250	Electrophysiology Devices and Techniques	10.5
GNNU 182	Patient Care	1.0
HCOM 203	Technical Writing for Biomedical Electronics	3.0
MATH 278	Calculus for Biomedical Electronics	12.0

Level 3		Credit
BHSC 312	Neuroanatomy and Physiology	6.0
BHSC 339	Human Behavior	3.0
ENPY 301	Biomedical Electronics 1	7.0
ENPY 350	Electrophysiology	9.0
MATH 378	Statistics for Biomedical ELectronics	2.0
PHYS 324	Biophysics	3.0

Level 4		Credit
ENPY 450	Clinical Experience in Electrophysiology	45.0

Most courses taken within the program require successful completion of certain prerequisites. For further information contact the Registrar's Office.

Course Descriptions

BHSC 202 Human Anatomy and Physiology — The basic structure and function of the human body is discussed using the systems approach. The cell's role as the unit of structure and function is emphasized. Emphasis is also placed on the regulation of body functions and the role of control systems in homeostasis. Examples of the uses of biomedical instrumentation in diagnosis and treatment are given.

BHSC 312 Neuroanatomy and Physiology — Provides a basic understanding of anatomy, physiology and pathophysiology of immediate relevance to the current practices of electrophysiology. Emphasis is placed on the structure and function of the nervous system and selected pathophysiological states.

BHSC 339 Human Behavior — Basic considerations of behavioral science relevant to the Electrophysiology Technologists' concerns will be explored. Theory and research findings dealing with stress and illness behavior will be presented. Professional and ethical considerations and ways of dealing with common hospital events will be explored. Emphasis will be on human relations skills in dealing with patients and staff.

CHEM 107 Chemistry for Biomedical Electronics — Covers basic general chemistry. The course includes stoichiometry, nomenclature, concentrations of solutions (molarity, molality, equivalent weight, PPM, percent), acid-base chemistry (strong and weak electrolytes, buffers, hydrolysis of salts) and electrochemistry (oxidation, reduction, voltaic cells, nernst equation). The laboratory part of the course which runs parallel with the lectures consists of quantitative analysis, both gravimetric and volumetric.

CHEM 207 Introduction to Organic and Biochemistry — This course gives an introduction to organic and biochemistry. The naming, properties and main reactions of the major classes of organic compounds are discussed. The biochemistry includes both the chemistry and metabolism of fats, proteins and carbohydrates. Lab work includes techniques and synthesis in organic chemistry and biochemical techniques frequently encountered in the clinical lab, e.g.: spectrophotometry, chromatography, electrophoresis. Prerequisite: CHEM 107.

ELEC 152 Measurement for Biomedical Electronics — Safety in electrical measurement techniques is emphasized throughout this course. Topics: error % and prediction, standards and calibration, device testing, analog and pulse signals, electrical noise, earthing, understanding service manuals. Equipment used: analog and digital meters, function and signal generators, bridges, frequency counters, curve tracers, oscilloscopes and attachments.

ENPY 150 Applied Instrumentation — Provides the basic electrical/electronic knowledge and skills needed by technologist-practitioners of Prosthetics/Orthotics and EEG/Electrophysiology. Emphasis will be on dealing with problems encountered in the clinical environment.

ENPY 151 Introduction to Clinical Practice — Will orient students to future hospital employment by posing a graded series of typical technical and clinical problems, and encouraging the solution to those problems through co-operation with second-year electrophysiology students in a class project.

ENPY 250 Electrophysiology Devices and Techniques — Introduces the student to devices and techniques used in clinical EEG and ECG laboratory practice. Correct placement and applications of electrodes for these two techniques is taught so that the student is qualified to act as an assistant technologist for summer employment. A comprehensive overview of the field is presented so that students can begin to select their areas of specialization.

ENPY 301 Biomedical Electronics 1 — Introduces students to basic properties of biomedical signals, various types of transducers used in the biomedical environment and requirements and problems encountered in the processing and display of biomedical signals. Lab exercises are coordinated with course content.

ENPY 350 Electrophysiology — The following areas will be covered: theory and operation of EEG equipment and its use, telemetry and EEG; theory and operation of equipment related to ECG, echocardiograms, phonocardiograms and stress testing; monitoring and evaluation of implanted pacemaker performance; theory and operation of non-invasive techniques to assess patients for blood vessel disease; theory and operation of EMG equipment and its use; theory and operation of equipment related to ERG, EOG, VER, and CVA (color vision assessment); theory and operation of ENG related to equipment; related important clinical tests for the above equipment; ultrasonics. Prerequisite: BHSC 202, BMET 200, GNNU 182.

ENPY 450 Clinical Experience in Electrophysiology — An appropriate amount of time is spent in each of the following clinical areas: EEG; EMG; cardiovascular laboratory; audiology; opthalmology. Program will be tailored to the specific student. Clinical work may be out-of-town. Prerequisite: ENPY 350, ENPY 300, ENPY 301, ENPY 310.

GNNU 182 Patient Care — Introduces students to the hospital environment and the basic safety concepts of patient care. It includes observation and communication skills, body mechanics, fire safety and medical and surgical asepsis.

HCOM 104 Technical Writing for Biomedical Electronics — Emphasizes clear, correct, health-oriented technical writing for biomedical electronics technologists. Students will learn how to organize and sequence technical information, illustrate documents, describe and define technical material, write direct letters and memos, write a professional resume and application letter, and summarize reports and articles.

HCOM 203 Technical Writing for Biomedical Electronics — A continuation of HCOM 104. This term students will write and present orally hospital-oriented and industry-oriented memo reports, and write and present a longer, formal technical report. This term focuses on professional communication. Students will learn how to use the Wang word processing system to write reports and use medical terminology correctly.

MATH 178 Basic Technical Mathematics Biomedical Electronics — Systems of linear equations, determinants, matrices, types of systems and application to electrical networks. Polynomial curve fitting, loop analysis, and T to Y transformations. Common and natural logarithms, logarithmic/semilogarithmic graphs, decibels, and exponential growth and decay. Trigonometric functions, solution of triangles and graphing and addition of sinusoidal functions. Complex numbers, rectangular/polar transformations, phasor representation of sinusoidal waveforms and AC circuits.

MATH 278 Calculus for Biomedical Electronics — Limits, the derivative, differentiation rules, applied maxima/minima, curve sketching, and differentials with applications to electrical technology. Antidifferentiation, the indefinite integral and the definite integral including area, mean value and RMS value. Differentiation and integration of trigonometric, logarithmic and exponential functions. Fourier series. First and second order differential equations applied to electrical circuits. Basic arithmetic and functions, input/output, branching, strings, arrays and files. Arithmetic in other bases, logic gates and corresponding Boolean algebra, truth tables, Karnaugh maps, logic circuit design and binary addition/subtraction.

MATH 378 Statistics for Biomedical Electronics — Provides students with basic knowledge of statistics. Topics include random sampling, measurement and rounding, frequency distributions, measures of central tendency, measures of dispersion, normal distribution, ranks and percentiles. Estimation, central limit theorem, standard errors, confidence intervals, hypothesis testing, null and alternate hypothesis, large sample hypothesis testing, t-distribution, small sample hypothesis testing and non-parametric testing will also be covered. Computer packages will be discussed.

PHYS 324 Biophysics — This is a general level course in basic physics with emphasis on applications to biological systems. The topics covered are mechanics, heat, sound and light, with related applications. Various biological systems are studied with reference to the physical principles involved in both their development and function.

Health Information Technology

Department of Health Engineering Services

Health Information Technology offers interested students the advantage of two program options — a one year health record technician option and a two year health record administrator option. The two options have essentially an equivalent first year curriculum and are designed to meet the requirements of prospective employers. Both options are open to female and male candidates. Applicants are advised to discuss the nature of the work with health record administrators or technicians currently working in the field.

Health record professionals make a valuable contribution to the health care system. They provide a very special service to the administrative and treatment teams in a health facility, a service that provides the information necessary to manage the facility to its best advantage while giving patients the best possible care. The major source of health information is the health or medical record which summarizes the information about the patient's care.

Health records are maintained in all health care facilities, and provide a permanent, confidential report of each patient's encounter with the health care delivery system. The health record is a complete, timely, accurate document of medical and allied health professional observations concerning health, illness or injury and is an important tool in evaluating the quality of care. As the necessity for accurate documentation in health care grows, computerization is becoming an increasingly important consideration in the recording and utilizing of health information, including the linking of records.

The Health Information Technology program is fully accredited by the Canadian College of Health Record Administrators (CCHRA). Successful completion of the national examination qualifies the graduate to work anywhere in Canada.

Health Record Administrator Option

This is a *two year* program designed to train students for management and administration in the health record department of hospitals and health agencies. Each graduate receives a Diploma of Technology from BCIT and is eligible for recognition by the Canadian College of Health Record Administrators at the Certificant Level (CCHRA[C]).

Health record departments of hospitals and health agencies require the specialized services of health record administrators to develop, manage and utilize health information systems.

Job Opportunities

The health record administrator may be employed in the hospital health record department, as the director of the department or in a staff position. In addition to traditional employment in hospitals, other facilities such as community health centres, government agencies and industry may also employ health record personnel to develop, implement and maintain health information systems.

Health record administration is an expanding field. With initiative, today's health record administrator may enter any area in which knowledge of health record standards and systems is necessary. As the use of computers grows, health record administrators may expect the design, analysis and use of computerized information systems to become an increasingly important part of their work.

The Program

In collaboration with the Health Record Association of British Columbia and health care agencies, BCIT has designed the Health Record Administrator option to provide two years of instruction in the form of lectures, lab exercises and practical experience. In the first year, students concentrate on the basic health sciences and acquire a fundamental knowledge of health record science. Two weeks of introductory practical experience in hospital health record departments will be provided during term 2. In the second year, health record administration, management, labor relations, organizational theory and computer applications will be stressed. During the last term of the program, a ten week practicum in health record departments of local hospitals and various health agencies will take place. Students incur the costs of travel and living expenses during practicum sessions.

Students are expected to become members of the HRABC while attending the program. To be recognized by the CCRHA, graduates will successfully write the national examination thus becoming Certificant members of the CCHRA.

Graduates will possess the skills required to meet current and future demands for Health Record Professionals trained in information and resource management applicable to the health care industry.

Prerequisite

Algebra 12, Biology 12, and proficiency in typing (approximately 50 wpm) are course requirements for this program. Maturity, responsibility and an interest in health care and information management are essential. The work involved demands attention to detail and accuracy; of utmost importance are leadership, initiative and effective interpersonal skills.

Applicants are required to have a successful personal interview with HIT faculty following a visit to an acute care general hospital health record department.

Faculty and Staff

George Eisler, P.Eng., M.A.Sc., M.B.A., Department Head
Elaine Gibson, CCRHA(C)
Laurie Montgomery, BHRS, CCHRA(C)
Betty Nelson, CCHRA(C), Program Head

PROGRAM: Health Record Administrator

Level 1		Credit
BHSC 103	Human Anatomy and Physiology	4.0
BHSC 122	Microbiology	3.0
HCOM 105	Communication for Health Information Technologists	4.0
HITA 100	Health Record Science	6.0
HITA 101	Medical Terminology	4.0
HITA 102	Health Record Laboratory	2.0
MATH 180	Basic Mathematics and Statistics for Health Information	4.0
MLAB 107	Introduction to Clinical Laboratory	3.0

Level 2		Credit
BHSC 203	Human Anatomy and Physiology	4.5
COMP 111	Data Processing Introduction	4.0
HCOM 204	Communication for Health Information Technologists	4.5
HITA 103	Health Record Laboratory	1.0
HITA 200	Health Record Science	4.5
HITA 201	Concepts of Disease Processes	7.5
HITA 202	Health Record Practicum	4.0
HITA 210	Health Information Processing	10.0
MATH 280	Statistics 2 for Health Information	6.0

Level 3		Credit
BHSC 337	Organizational Psychology	4.0
COMP 211	Computer Applications 1	3.0
HITA 300	Health Record Administration	7.5
HITA 303	Health Record Technological Developments	3.0
HITA 310	Health Information Processing	8.5
OPMT 169	Management Engineering 1	4.0

Level 4*		Credit
BHSC 437	Organizational Psychology	3.0
COMP 311	Computer Applications 2	3.0
HITA 400	Health Record Administration	5.5
HITA 410	Health Information Processing	7.5
HITA 420	Health Information Practicum	20.0
HITA 430	Health Labor Relations	3.0
OPMT 269	Management Engineering 2	3.0

* Courses run from January to spring break in March to be followed by 35 hours/week, 10 week practicum from mid-March to end of May.

Health Record Technician Option

The health record technician is a highly-skilled member of the health care team. Through the Health Information Technology, BCIT has designed a one-year program of study for individuals interested in pursuing this career option.

This program is designed to train students in the technical aspects of health record science. Each graduate receives a Certificate of Technology from BCIT and is eligible for recognition by the Canadian College of Health Record Administrators at the Associate level (CCHRA[A]).

Job Opportunities

The program is designed to prepare graduates for small hospitals where they may assume major responsibilities in the health record department, and for larger hospitals where they work under the supervision of a health record administrator. Other hospital departments and health facilities (such as the Cancer Control Agency of B.C. or Greater Vancouver Mental Health Services) provide additional employment opportunities.

In a small health care facility, the health record technician may be fully responsible for the operation of the health record department; i.e. the initiation, development, operation and maintenance of health information systems. In a larger institution, the health record technician may specialize in one particular area of work. This includes technically evaluating health records according to established standards; compiling various health and administrative statistics;.coding and abstracting data from health records according to recognized classification and data collection systems; maintaining and using a variety of indices, storage and data retrieval systems.

The Program

Lectures, lab exercises and practical experience are combined in the training of health record technicians. Basic health sciences and the fundamentals of health record science are taught in depth. Two weeks of introductory practical experience in hospital health record departments will be provided during term 2. Also during term 2, the student will be introduced to health information processing, data processing, department management and supervision. The program concludes with a more advanced five week practicum during which technical experience is provided by hospital health record departments. Students incur costs of travel and living expenses for practicum sessions.

Students are expected to become members of the HRABC while attending BCIT. To be recognized by the CCHRA, graduates will successfully complete the national examination, thus becoming Associate members of the CCHRA.

Graduates who wish to become health record administrators may do so in a number of ways, such as completing certain specified BCIT continuing education courses or, with suitable prerequisites, returning to BCIT for the second year of the Health Record Administrator Option.

Applicants are required to have a successful personal interview with HIT Faculty, following a visit to an acute care general hospital health record department.

Prerequisite

Graduation from the Selected or Combined Studies Program plus Algebra 12, Biology 12 and proficiency in typing (approximately 50 wpm). Maturity, responsibility and an interest in health care and information handling are essential for a successful career in the health information field. The work involved demands attention to detail, accuracy and reliability.

Applicants are required to have a successful personal interview with HIT faculty, following a visit to an acute care general hospital health record department.

PROGRAM: Health Record Technician

Level 1		Credit
BHSC 103	Human Anatomy and Physiology	4.0
BHSC 122	Microbiology	3.0
HCOM 105	Communication for Health Information	4.0
HITA 100	Health Record Science	6.0
HITA 101	Medical Terminology	4.0
HITT 104	Health Record Laboratory	2.0
MATH 180	Basic Mathematics and Statistics for Health Information	4.0
MLAB 107	Introduction to Clinical Laboratory	3.0

Level 2		Credit
BHSC 203	Human Anatomy and Physiology	4.5
COMP 111	Data Processing Introduction	4.0
HCOM 204	Communication for Health Information Technologists	4.5
HITA 200	Health Record Science	4.5
HITA 201	Concepts of Disease Processes	7.5
HITA 210	Health Information Processing	10.0
HITT 204	Health Record Laboratory	6.0
HITT 205	Health Record Practicum	4.0
HITT 305	Health Record Practicum	10.0

Course Descriptions

BHSC 103 Human Anatomy and Physiology — Provides students with an understanding of normal body structure and function. The course relates this knowledge to various aspects of the work performed by health record technicians and administrators such as coding and abstracting, data collection for evaluation of patient care, and specification of documentation requirements in the health record.

BHSC 122 Microbiology — Deals with the basic characteristics of various types of micro organisms that cause disease in humans. The concepts of communicability and host resistance are included and related to nosocomial infections.

BHSC 203 Human Anatomy and Physiology — See BHSC 103. Prerequisite: BHSC 103.

BHSC 337 Organizational Psychology — Prepares students to work in health records departments in health care institutions at the department head level. Organizational behavior theory and research findings will be presented and applied to situations encountered in health care organizations. Role playing and other involvement exercises will be used to apply the theory. Students will be encouraged to present their work-related experiences to discuss the course content.

BHSC 437 Organizational Psychology — See BHSC 337. Prerequisite: BHSC 337.

COMP 111 Data Processing Introduction — Lectures and practical exercises are used to present topics such as: computer operations; input, output and storage devices; input and reporting methods; report design; data accuracy and error correcting; file processing; systems design concepts; flowcharting; and programming using the BASIC language.

COMP 211 Computer Applications 1 — Covers computer applications in engineering and medical technologies; how a computer works, recognizing problems suitable for computer solution, flowcharting and communicating with computer personnel. Emphasis is on the use of computers to solve problems related to the technology concerned. Where available, 'package' programs will be demonstrated and used by students. FORTRAN or BASIC programming language is taught depending on the technology.

COMP 311 Computer Applications 2 — The objectives and components of health information systems are examined from various perspectives: types of systems, reasons for computerizing health information and the role of the health record administrator in the needs assessment, analysis, design and management of health information systems. The evaluation and selection of hardware and software are also discussed.

HCOM 105 Communication for Health Information Technologists — Introduces health information students to professional communication. The course emphasizes clear, concise and correct health-oriented writing. Students will learn how to select, organize and sequence information, how to write instructions and procedures, how to write direct memos and letters, and how to present information orally. They will also learn how to use the Wang word processing system to plan, write and revise documents.

HCOM 204 Communication for Health Information Technologists — A continuation of HCOM 105. This term, students will learn how to write persuasively, prepare an effective resume and application letter, write effective information and analytical reports, conduct effective meetings, plan and implement an effective inservice education program and how to access and report on information in the professional literature.

HITA 100 Health Record Science — This course provides students with knowledge and practice in the fundamental principles and procedures of health record science. After an orientation to the program and the profession, areas studied in the first term include a detailed examination of all aspects of the health record from formation to completion including numbering and filing systems; microfilming, record retention; hospital accreditation; interdisciplinary relations and intrahospital organization, confidentiality and release of health information. The second term incorporates a more detailed analysis of the profession, legal aspects of health records, the Canadian health care delivery system, and an introduction to management and supervision of a health record department.

HITA 101 Medical Terminology — An introduction to the language of medicine. Basic rules of medical terminology, medical abbreviations, medical specialties, hospital services and hospital statistical definitions are included. There will be a detailed study of medical prefixes, roots and suffixes, with emphasis on analysis and word-building.

HITA 102 Health Record Laboratory — Provides practical experience in the basic clerical and technical tasks performed in a health record department. The course coordinates with HITA 100 Health Record Science, and is conducted in a simulated health record department on campus.

HITA 103 Health Record Laboratory — Transcription practice with medical, obstetrical, pathological and surgical reports. The course includes an introduction to the electronic typewriter with limited memory capacity, as well as an introduction to word processing. The emphasis is on accuracy of transcription and increasing competence with electronic equipment. Prerequisite: HITA 101.

HITA 200 Health Record Science — See HITA 100. Prerequisite: HITA 100.

HITA 201 Concepts of Disease Processes — An introduction to the concepts of pathophysiology. Common diseases for each body system are studied in detail relating each to medical and surgical treatments. Diseases studied will be correlated with patient records in laboratory assignments. Prerequisite: HITA 101.

HITA 202 Health Record Practicum

HITA 210 Health Information Processing — Deals with data collection, analysis, and presentation. Topics include classification systems, information systems (with emphasis on HMRI), data quality control, statistical formulae for health information, and an introduction to quality assurance. Labs consist of practice in coding and abstracting and in the retrieval and presentation of data from PAS and HMRI printouts. Prerequisite: HITA 100, HITA 102, OR HITT 104.

HITA 300 Health Record Administration — These second year courses emphasize the problem-solving approach to certain aspects of health record administration. Areas of advanced study include specialized hospitals (patient records, statistics and accreditation), the problem oriented record, medicolegal and ethical aspects, the health care delivery system and the health record profession. Health record policies, procedures and forms design; administrative committees; office space and environmental planning; administration of the Admitting and Outpatient Departments are also studied. Prerequisite: HITA 200.

HITA 303 Health Record Technological Developments — Examines the technological advances found in health record departments today. Some of the "office of the future" areas discussed are computerized coding and abstracting, computerized CR/ADT, electronic mail and advances in word processing. Emphasis is on implementation and evaluation of these systems. Prerequisite: HITA 103.

HITA 310 Health Information Processing — Emphasizes the management and use of health information. After a review of HITA 210 (particularly quality assurance and coding principles), the student will learn about the role of the Health Record Department (HRD) in a risk management program. Data collection and presentation will be studied and the student will be able to produce timely, effective, useful reports. Quality assurance, using a criteria audit system, will be reviewed and students will practice data retrieval and reporting with this methodology. An introduction to quality assurance for HRDs will be studied next with emphasis on the coding and abstracting functions. Weekly labs in coding and abstracting will be conducted throughout the term. Prerequisite: HITA 210.

HITA 400 Health Record Administration — See HITA 300. Prerequisite: HITA 300.

HITA 410 Health Information Processing — Examines the principles and practices of research and epidemiology. The development, implementation and maintenance of a quality assurance program for the health record department will be studied in depth. Prerequisite: HITA 310.

HITA 420 Health Information Practicum — All courses must be successfully completed prior to participating in this practicum. Practical experience in the health record departments of general and specialized hospitals and other health facilities is provided, under the supervision of the director of health record services and a faculty member. After orientation to the clerical and technical duties, emphasis is placed on providing practice and instruction in the duties commonly performed by a health record administrator. Prerequisite: HITA 400 or HITA 410.

HITA 430 Health Labor Relations — A discussion of the development of labor relations in the health care environment, with detailed study of the basic principles of union practices, the application of collective agreements, the grievance procedure, and the collective bargaining process. Prerequisite: HITA 300.

HITT 104 Health Record Laboratory — See HITA 102 (includes medical and surgical transcription).

HITT 204 Health Record Laboratory — A continuation of HITT 104 with increased emphasis on productivity and experience on word processing equipment. A major project concerned with the concepts, applications and evaluation of word processing services in the health record department is included. Prerequisite: HITT 104.

HITT 205 Health Record Practicum — See HITA 202. Prerequisite: HITT 100 or HITT 101.

HITT 305 Health Record Practicum — An advanced, five-week practicum for health record technician students. The course provides concentrated, practical experience in coding and abstracting in the health record departments of provincial hospitals. Students spend two weeks at the same site as the HITT 205 practicum and three weeks at a different site. All courses must be successfully completed prior to participation in this practicum. Prerequisite: HITT 200, HITT 210, HITT 201, HITT 205.

MATH 180 Basic Mathematics and Statistics for Health Information — Rates ratios, proportions, and percentages. Death rates, and measures of fertility and morbiditiy. Cartesian coordinate system, the straight line and its graph, and the least squares line. Exponential/logarithmic theory, common and natural logarithms and logarithmic/semilogarithmic graphs. Frequency distributions and their graphical presentation. Measures of central tendency and variation, percentiles, quartiles and skewness.

MATH 280 Statistics 2 for Health Information — Probability theory and laws. Random variables, mathematical expectation, discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Method of least squares, regression and correlation. Nonparametric statistics.

MLAB 107 Introduction to Clinical Laboratory — An introduction to clinical lab procedures in the fields of clinical chemistry, urinalysis, hematology, histotechnology and immunohematology for the purpose of interpreting lab reports in reference to documentation on the health record, abstracting, and quality assurance studies.

OPMT 169 Management Engineering 1 — Management principles are related to the health care industry in such areas as health care financing, a systems approach to health care, organizational structure, planning, organizing, directing and controlling. Quantitative approaches to the management function are stressed.

OPMT 269 Management Engineering 2 — A continuation of the scientific principles of management as applied to work improvement and innovation in health care including problem solving, data collection and analysis, methods of work measurement and work sampling techniques, and implementation strategies.

Prosthetics and Orthotics

Department of Health Engineering Services

Prosthetists and orthotists help people who have become disabled or who were born with physical defects by fitting them with artificial limbs or supports. The prosthetist designs, constructs and fits artificial limbs, while the orthotist designs, constructs and fits orthopaedic braces and supports. Both work closely with doctors, physiotherapists and others in rehabilitation medicine. After assessing the needs of a patient, the prosthetist or orthotist may assemble the components of an artificial limb or support, or may develop specifications for its construction by a technician. The device is then fitted and adjusted to the patient. From time to time, repairs and maintenance work must also be done.

Job Opportunities

Prosthetists and orthotists work in rehabilitation hospitals and ambulatory care services, in special treatment facilities such as arthritis centres, and in private practice. Starting salaries are about $18,000 per year, rising to about $25,000 after certification.

The Program

The two year course of studies combines lectures, labs and practical experience in local health agencies. The curriculum equips graduates to recognize patient problems, assess individual needs, design and construct appliances, select appropriate materials and deal with the emotional difficulties of patients.

The Prosthetics and Orthotics Program is jointly funded by three western Canadian provinces: B.C., Alberta and Saskatchewan. Applications are accepted every second year on a pro-rated basis from each of the three provinces.

The next intake of students is set for September, 1986.

Post-graduation

After three year's work experience under the guidance of a certified orthotist or prosthetist, graduates may write the national certificate examination of the Canadian Board of Certification for Prosthetists and Orthotists.

Prerequisite

Algebra 12 and Physics 11 are course requirements for this program. Metalwork and woodwork courses are recommended. Applicants should have a good academic background, manual dexterity, mechanical aptitude and good interpersonal skills. Patience and inventiveness are of considerable importance.

Expenses

In addition to tuition fees, students need approximately $600 for textbooks and supplies for the two year program. Students are also responsible for costs of travel to and from agencies where practicums are held, and should be prepared to purchase certain small hand tools.

Faculty and Staff

G. Eisler, M.A.Sc., P.Eng., B.B.A., Department Head
I. Dyck, C.P.(C)
Wm. J. McGuinness, M.A., C.P.O., Program Head

PROGRAM: Prosthetics and Orthotics

Level 1		Credit
BHSC 110	Anatomy and Physiology Systems	4.0
HCOM 111	Technical Writing for Prosthetics and Orthotics	3.0
MATH 184	Basic Technical Mathematics for Prosthetics and Orthotics	4.0
P/OT 100	Prosthetics and Orthotics 1	15.0
PHYS 121	Physics for Prosthetics and Orthotics	4.0

Level 2		Credit
BHSC 210	Anatomy and Physiology Systems	4.0
BHSC 211	Regional Anatomy 1	3.0
BHSC 242	Behavioral Science	4.0
CHSC 284	Materials Workshop	3.0
GNNU 183	Patient Care	1.5
HCOM 206	Technical Writing for Prosthetics and Orthotics	4.5
MATH 284	Basic Technical Mathematics for Prosthetics and Orthotics	3.0
P/OT 200	Prosthetics and Orthotics 2	14.5
P/OT 202	Practicum	6.0
P/OT 220	Biomechanics	1.5

Level 3		Credit
BHSC 310	Pathology and Pathophysiology	2.5
BHSC 311	Anatomy and Physiology Regional	3.0
BMET 384	Electronic Circuits	7.0
P/OT 300	Prosthetics and Orthotics 3	12.0
P/OT 302	Practicum	6.0
P/OT 320	Biomechanics	1.5

Level 4		Credit
P/OT 400	Prosthetics and Orthotics 4	28.0
P/OT 401	Business Practices	3.5
P/OT 402	Practicum	10.0
P/OT 410	Patient Assessment and Care	3.5

Course Descriptions

BHSC 110 Anatomy and Physiology Systems — This course, together with BHSC 210, follows a systems approach to the study of the structure and function of the human body. The course deals with the physiology of the musculo-skeletal and nervous systems. Also included are the basic cytological and embryological principles relevant to these systems.

BHSC 210 Anatomy and Physiology Systems — A continuation of BHSC 110. Of primary concern is the study of the organization and function of the nervous system with particular reference to motor control and the basic anatomy and physiology of the circulatory, respiratory, digestive, urinary, endocrine and reproductive systems. Prerequisite: BHSC 110.

BHSC 211 Regional Anatomy 1 — This is a laboratory course which together with BHSC 311 follows a regional approach to the study of human anatomy. The major emphasis in this course is on the study of the muscles and skeletal structure of the lower limb. Prerequisite: BHSC 110.

BHSC 242 Behavioral Science — In a series of lectures, discussions and planned experiences, students are given a greater understanding of how various people react to physical loss or illness, and of the role to be played in assisting the handicapped to reintegrate into society. Topics include the psychology of being ill, understanding stress behavior, pain management, interpersonal communication, adjustment in self-image, the disabled person in society and relationships among health care professionals.

BHSC 310 Pathology and Pathophysiology — Students explore basic concepts of the disease process, and the nature of the various disorders they are most likely to see in their prosthetic/orthotic practices. Topics such as cellular injury and death, trauma, inflammation and healing are covered. Specific disorders include bone, joint and muscle pathologies, neurological and hemodynamic disorders, metabolic and congenital abnormalities and neoplasia.

BHSC 311 Anatomy and Physiology Regional — This course is a continuation of BHSC 211 and follows a regional approach to the study of human anatomy. Emphasis is placed on the muscles and skeletal structures of the upper limb and trunk.

BMET 384 Electronic Circuits — The student is introduced to basic and modern electronic principles and utilizes these principles in the operation, building and laboratory testing of control systems. Students become familiar with the basic theory and operation of DC and AC circuits, techniques for measuring electrical quantities, and the basics of modern electronics used in control systems including analog and digital control systems. To supplement and implement the theory, strong emphasis is placed on "hands-on" training. Prerequisite: MATH 284.

CHSC 284 Materials Workshop — Provides a basic coverage of the structures, properties and applications of common engineering materials with emphasis on those used in prosthetic and orthotic devices. Concepts such as tensile and yield strength, fatigue, hardness and deformation will be explored both in theory and in the testing laboratory. The aim is to provide an appreciation of the materials which are or may be used in prosthetic/orthotic devices, and to explain at least some of the factors involved in selecting a material for a specific purpose.

GNNU 183 Patient Care — Before their first Practicum assignments, students are instructed in the basic safety and comfort needs of patients requiring their services. The course treats such topics as proper procedures for lifting or transferring patients, medical and surgical asepsis, and appropriate interventions in emergency situations.

HCOM 111 Technical Writing for Prosthetics and Orthotics — Through a series of lectures and projects, students improve their ability to express themselves clearly and appropriately to patients and their families, health care professional groups such as government and fee-paying agencies. Topics include basic skills in writing instructions, memorandums, letters and reports and effective public speaking. Library orientation and research techniques are also emphasized.

HCOM 206 Technical Writing for Prosthetics and Orthotics — A continuation of HCOM 111. Students write routine and persuasive reports and proposals. An oral presentation is also included. The emphasis is on communication applications in the prosthetics and orthotics field.

MATH 184 Basic Mathematics for Prosthetics and Orthotics — Functions and their graphs. Systems of linear equations, determinants and matrices. Trigonometric functions of any angle, solution of triangles, radian measure and graphs of trigonometric functions. Complex numbers and their graphical representation and application.

MATH 284 Basic Technical Mathematics for Prosthetics and Orthotics — Exponential/logarithmic theory, common and natural logarithms, logarithmic/semilogarithmic graphs, exponential growth and decay. Organization and graphical presentation of data, frequency tables, histograms, ogives, measures of central tendency and variation. Statistical inference.

P/OT 100 Prosthetics and Orthotics 1 — Initially, students are oriented to the terminology, general concepts and devices commonly prescribed in the field. The area of Lower Limb Orthotics is then treated in detail, with the aim of developing competence in the materials, components and tools commonly used in the construction of lower limb orthoses.

P/OT 200 Prosthetics and Orthotics 2 — The area of Lower Limb Prosthetics is examined in detail. Design principles underlying the patellar-tendon-bearing prosthesis, its variants are analyzed. Students design, construct, fit and align a variety of prostheses for trams-tibial and Syme's amputees. While casting techniques, fitting procedures and alignment principles are emphasized, attention is also given to proper use of materials, acceptable workmanship and cosmetic finishing. Prerequisite: P/OT 100.

P/OT 202 — Practicum — Students are given the opportunity to apply their knowledge of design principles and fitting procedures to a variety of patients under the supervision of a practicing prosthetic or orthotic clinician. Participation in clinical activity and discussion of unusual fitting problems are encouraged. Specific projects aimed at amplifying work done in the Prosthetic and Orthotic courses are required. Prerequisite: P/OT 200, P/OT 220, BHSC 210, BHSC 211.

P/OT 220 Biomechanics — Normal human locomotion is studied in some detail. Force tolerance and mobility of the skeletal system are examined in detail to determine the functional loss associated with various physical disorders or amputations, and the residual function upon which a lower limb prosthesis or orthosis can be based. Prerequisite: PHYS 121.

P/OT 300 Prosthetics and Orthotics 3 — Lower Limb Prosthetics is completed with the treatment of Trans-Femoral and Total Leg Prostheses. Prerequisite: P/OT 202.

P/OT 302 Practicum — Students are given the opportunity to apply their knowledge of design principles and fitting procedures to a variety of patients under the supervision of a practicing prosthetic or orthotic clinician. Participation in clinical activity and discussion of unusual fitting problems are encouraged. Specific projects aimed at amplifying work done in the prosthetic and orthotic courses are required.Prerequisite: P/OT 300, P/OT 320, BHSC 310, BHSC 311.

P/OT 320 Biomechanics — Force tolerance and mobility of the skeletal system are examined in detail to determine the functional loss associated with various physical disorders or amputations and the residual function upon which a prosthesis or orthosis can be based. The effect of pressure on soft tissue is also explored. Various spines and upper limb devices are analyzed from the viewpoint of the mechanical forces at work and their effect on the disabled person. Prerequisite: P/OT 202.

P/OT 400 Prosthetics and Orthotics 4 — The area of Spinal Orthotics is covered from the principles involved in fitting a corset to the construction of CTLSO, Milwaukee type. Biomechanical principles and fitting guidelines will be emphasized more than construction technqiues. The area of Upper Limb Prosthetics and Orthotics is then treated with each student constructing and fitting a variety of devices, including Myoelectric Prostheses. Prerequisite: P/OT 302.

P/OT 401 Business Practices — Students receive a basic understanding of the planning, organization, directing and controlling functions of business management. Topics such as human relations, management of time, budgeting and accounting, record

keeping and labor relations will be covered, with examples drawn from actual prosthetic/orthotic facilities. The ethical and legal concerns of a health care professional will also be presented.

P/OT 402 Practicum — See P/OT 202. Prerequisite: P/OT 400, P/OT 401, P/OT 410.

P/OT 410 Patient Assessment and Care — A series of presentations and projects help students learn how to evaluate patients from the viewpoint of functional loss, select appropriate devices to restore function, and design solutions to specific needs not met by available componentry. Basic principles and procedures for handling the disabled are also covered.

PHYS 121 Physics for Prosthetics and Orthotics Technology — This general level physics course emphasises physics applications in prosthetics and orthotics. The course covers mechanics, and includes topics in kinematics, dynamics, statics, simple machines, energy and fluid mechanics. Measurement and problem solving techniques are stressed. The mathematical treatments require algebra and trigonometry.

Medical Laboratory

The Medical Laboratory Technologist

The medical laboratory technologist, as a member of the Health Care Team, performs the many, varied and complex laboratory testing procedures on blood samples, tissue specimens and body fluids which are used by physicians as important aids in the diagnosis and treatment of a wide range of medical disorders and conditions. Rapid and continuous advancement in the techniques, procedures and instrumentation involved in the practice of medical laboratory technology make it an ever expanding and challenging field for the technologist.

Employment Opportunities

Medical laboratory technology offers a variety of scientific pursuits within the modern hospital, the private clinic and the research laboratory. These pursuits include Clinical Chemistry, Clinical Microbiology, Hematology, Histotechnology and Immunohematology. The trained Medical Laboratory Technologist may pursue a career in any one or a combination of these fields after training.

The Program

The training program at BCIT is a two year Diploma prgram consisting of one year of academic studies at the Institute followed by a twelve month clinical training period spent in one of the clinical facilities (hospital or private lab) associated with the program. All participating laboratories are accredited for training purposes conjointly by the Canadian Medical Association and the Canadian Society of Laboratory Technologists. After successful completion of the two year training program, the student is eligible to write the Certification Examinations of the Canadian Society of Laboratory Technologists, which lead to the qualification of Registered Technologist, the nationally-recognized qualification for employment in a Medical Laboratory.

Affiliate Clinical Training Facilities

There are ten clinical training Laboratories affiliated with the MLT program. Six of the laboratories are located in the Lower Mainland (Vancouver and surrounding area), three are on Vancouver Island and one is in the Interior of B.C.

Prerequisite

The following First Year University-level courses (or their equivalent in a Community College) are the prerequisites for entry into the Medical Laboratory Technology program:

Biology	UBC 101 or 102
Chemistry	UBC 110 or 120
Physics	UBC 110 or 115
English	UBC 100*
Mathematics	UBC 3 credits at the Math 100 level**

* No specific Mathematics courses are recommended. However a toral of 3 UBC credits at the Math 100 level (or its equivalent) are required. Calculus or statistics courses are acceptable. Applicants should be aware that, in the event that their application to the Medical Laboratory Technology is not successful, Calculus courses are required for entry into most second year university science programs.

A complete First Year Science Program, 15 credits at UBC, (or its equivalent in a Community College) is required for entry into the program. Applicants who do not have the appropriate courses and credits (or their equivalents) will not be considered eligible.

Color blindness precludes admission to the MLT program.

Final acceptance to the program will be based on the results of a personal interview with a senior staff member of one of the affiliated clinical laboratories.

Starting Date and Length of the MLT Program

The Medical Laboratory Technology program will start on August 5th, 1986. Note that this is an earlier start than most of the other programs at BCIT. The academic year will finish at the end of May. The Clinical training year will begin in June 1987 and continue for fifty two weeks.

Faculty and Staff

Jannie Scriabin, B.Sc. (Hons)., M.Sc., A.R.T. (Clin.Chem)., Department Head

Faculty:
Wendy W. Basford, R.T.
Paul Bradbury, F.I.M.L.S., A.R.T. (Hist)., Senior Instructor
Frank L. Curtis, F.I.M.L.S., A.R.T. (Immunohaem.)
Lavena J. Marshall, A.R.T. (Clin.Micro.)
Karen E. Nicolson, B.Sc., A.R.T. (Clin.Micro.)
Lloyd Simandl, A.R.T. (Hematol.)
Evelyn A. Whiteside, B.A., R.T., Senior Instructor
Dorothy Yarema, B.Sc., R.T.

Technical Staff:
Elinor Hudon, R.T.
K. Patricia MacCulloch, R.T.
Heather A. Pedlar, R.T.
Milena Petrovic
Linda Preston
G. Marcia Sealy, R.T.

Course of Studies

Year 1
Human Anatomy and Physiology
Immunology
Medical Technology Fundamentals
Clinical Chemistry
Clinical Microbiology
Hematology
Histotechnology
Immunohematology

Year 2
Clinical training in an affiliated clinical facility in the Vancouver area (Lower Mainland), Vancouver Island or the Interior of B.C.

Course Descriptions

Human Anatomy and Physiology — A systematic approach to the study of human anatomy and physiology for Medical Laboratory Technology students. The course includes basic cytology and an introduction to the skeletal, muscular, nervous, circulatory, respiratory, digestive, urinary and reproductive systems.

Introductory Principles of Immunology — A basic course designed to give the Medical Laboratory Technology student encountering immunology for the first time, a general background in this broad field of study. The course deals with body defenses against disease; types of immunity and their physiological characteristics; biologicals used; nature and function of antigens and antibodies; the basic principles and mechanics of in vitro immunologic diagnostic tests; hypersenstivities, their characteristics and management; immune deficiency diseases and auto-immunity.

Medical Laboratory Technology Fundamentals — An introductory course for the Medical Laboratory Technology student with emphasis on general techniques, equipment (various types of microscopes, balances, centrifuges, electrophoretic and chromatographic separation equipment, water purifying equipment, automatic pipettes and dilutors; instrumentation (potentiometry, spectrophotometry); laboratory safety, specimen handling, disinfection and sterilization; laboratory math, reagent preparation and other basic knowledge that applies to most medical laboratory departments. Professionalism, medical terminology, concepts of quality control and quality assurance, general principles of laboratory policies and laboratory information flow are also covered.

Clinical Chemistry — An introduction to the various laboratory instruments used in the chemical analysis of biological specimens with emphasis on principles, components, operation and maintenance of these instruments, forms the initial part of this course. The latter and major portion of the course deals with the analysis of various constituents of body fluids including protein and related nitrogenous substances, electrolytes and blood gases, enzymes, carbohydrates and lipids. Emphasis is placed on the metabolism, function, measurement and relationship of the levels of these various substances to disease states.

Hematology — This course is designed to enable the student to become proficient in the manipulative skills required to perform hematological laboratory tests and to acquire the theoretical and practical knowledge to interpret the data resulting from these tests. It provides a detailed study of the origin, development and function of blood and its cellular components; a study of blood diseases and blood coagulation. The theory and practical application of hematological instrumentation is also studied in detail.

Histotechnology — A detailed study of the theory and practical applications of the techniques used in the histopathology laboratory to preserve and prepare body tissues for microscopic examination and diagnosis. The course is designed to introduce students to the principles of normal histology and microanatomy, to provide the opportunity to perform techniques in current use and to examine the results, to prepare students to work in the histopathology laboratory.

Medical Radiography

Department of Radiological Technical Services

The medical radiographer is an x-ray technologist who works as part of a health team composed of radiologists, internists, surgeons, nurses, laboratory technologists, biomedical technologists and other specialists. X-rays are widely used as an aid in making medical diagnoses. A radiograph (x-ray picture) may be a routine film of the chest or a broken finger, or it may form part of the sophisticated examinations used in the detection of heart, blood vessel or brain abnormalities. X-ray technologists work under the direction of a medical specialist (a radiologist), and may work in the hospital x-ray department, at the patient's bedside or in the operating room. Radiographers are also employed in private x-ray clinics. Medical radiography is not a hazardous occupation The dangers of radiation are well-recognized and rigidly controlled. The conscientious radiographer can derive much personal satisfaction as a contributor to the success of the health team and the well being of the patient. Medical Radiography is a field suited to both men and women.

Prior to enrolment at BCIT, a one-week orientation period in a hospital x-ray department is required. Arrangements for this orientation will be made by the program head of the Medical Radiography department.

During training, medical radiography students receive intensive theoretical and practical instruction in lectures, labs and tutorials at BCIT, as well as practical experience in hospitals. In the second year, students spend alternate 2 week periods at BCIT and in a hospital. A third year of in-service training must be completed at one of the participating hospitals (five in the Lower Mainland; two in the Interior; one on Vancouver Island). This additional training is a prerequisite for writing the certification examination set by the Canadian Association of Medical Radiation Technologists.

Job Opportunities

BCIT graduates in medical radiography find employment in hospitals and private clinics, which may employ from one to thirty-five technologists. Most x-ray technologists work a thirty-five hour week with the usual statutory holidays. Night work and on-call duty may be necessary, depending on the requirements of the department. It is also possible to work outside Canada since certification by the Canadian Association of Medical Radiation Technologists is recognized in the U.K. and several other countries.

Prerequisite

Algebra 12, two science 11s (Physics and Biology preferred) and one science 12 are the course requirements for this program. A C+ plus average in the final year of secondary school is required. Experience has shown that Physics 11 is an advantage, and Computer Science 11 is an asset.

Applicants must have a strong sense of responsibility, an interest in the welfare of others, particularly the sick and injured, and meticulous work habits.

Students must complete an immunization program. A preadmission interview with the program head of Medical Radiography is conducted to assess the applicant's suitability for this field. Students are expected to be competent in written and oral English.

Faculty and Staff

Mr. R. Mabbett, R.T., Department Head
Mrs. S.G. Hundvik, R.T.
Miss A. McMillen, R.T., Dipl. Hlth. Care Mgt., Program Head
Mr. E. Seeram, B.Sc., R.T.
Mr. R.J. Smith, M.S.R., R.T.
Miss O.H. Triska, A.C.(R), (N.M.)
Mrs. L. Tanner, R.T.
Mrs. I. Williamson, R.T.
Mrs. A. Viznowski, R.T.
Miss M. Morasky

PROGRAM: Medical Radiography

Level 1		Credit
BHSC 107	Basic Anatomy and Physiology	6.0
HCOM 102	Communication for Health Tech-Med Rad	4.0
MATH 172	Basic Technical Mathematics for Radiography	4.0
MRAD 101	Radiographic Technique	5.0
MRAD 102	Medical Imaging	6.0
PHYS 109	Physics for Medical Radiography	5.0

Level 2		Credit
GNNU 180	Patient Care	2.0
MRAD 201	Radiographic Procedures 1	13.0
MRAD 202	Medical Imaging	6.5
MRAD 203	Radiographic Anatomy and Physiology	10.0
MRAD 206	Clinical Experience	6.0
PHYS 209	Physics for Medical Radiography	7.5

Level 3		Credit
GNNU 280	Patient Care for Medical Radiographers	3.0
MRAD 301	Radiographic Procedures 2	6.0
MRAD 302	Medical Imaging	4.0
MRAD 305	Emergency Care	2.0
MRAD 306	Clinical Experience	12.0
MRAD 307	Pathology	2.0
MRAD 311	Specialized Procedures	1.0

Level 4		Credit
BHSC 439	Human Behavior	3.0
MRAD 402	Medical Imaging	3.0
MRAD 403	Radiation Biology	2.0
MRAD 404	Management and Instructional Skills	1.5
MRAD 405	Radiation Protection	1.5
MRAD 406	Clinical Experience in Medical Radiology	29.0
MRAD 407	Pathology	2.0
MRAD 408	Radiography Evaluation	1.0
MRAD 411	Specialized Procedures	2.0

Course Descriptions

BHSC 107 Basic Anatomy and Physiology — A systematic study of the basics of human anatomy and physiology which prepares the student for MRAD 203, Radiographic Anatomy and Physiology. Included are basic physiological chemistry, cytology and histology.

BHSC 439 Human Behavior — An introduction to the basics of the psychological and social environments of health care organization, with the aim of understanding how communication patterns affect task activities. Prerequisite: BHSC 339.

GNNU 180 Patient Care — Introduces students to the basic safety concepts of patient care. It includes observational and communication skills, body mechanics, fire safety and medical and surgical asepsis.

GNNU 280 Patient Care for Medical Radiographers — Provides the student with advanced concepts and techniques necessary to meet the comfort and safety measures of patients undergoing x-ray. Emphasis is placed on patients who have complex problems such as altered consciousness, altered body sensation, various traction, drainage and suction devices and problems that require emergency action. Prerequisite: GNNU 180.

HCOM 102 Communication for Health Technologists — Emphasizes clear, correct, health-oriented technical writing for medical radiographers. Students will learn how to organize and sequence information, how to communicate effectively with patients orally and in writing, how to document patient care obejectively and concisely, and how to plan and write effective memos.

MATH 172 Basic Technical Mathematics for Radiography — Functions and their graphs, variation and exposure problems. Plane geometry, trigonometric ratios, image formation and vectors. Exponential/logarithmic theory and transformations, common logarithms and logarithmic/semilogarithmic graphs as applied to medical radiography. Exponential growth and decay and natural logarithms with application to radiation. Sinusoidal waveforms and applications.

MRAD 101 Radiographic Technique — Introduces the student to the basic principles of radiography and positioning. Sessions in the x-ray laboratory allow the student to produce radiographs in an experimental setting and practice positioning skills.

MRAD 102 Medical Imaging — Introduces students to the standard equipment used in the production of a radiograph. Fundamentals of the photo-recording system are introduced. Also studied are the basic factors of x-ray exposure, transformers, simple electrical controls, x-ray film construction and the various film holders, automatic processing and sensitometry. Laboratory work related to all these subjects is included.

MRAD 201 Radiographic Procedures 1 — The radiographic procedures related to the upper and lower extremities, vertebrae, thoracic cage and contents, and abdomen are studied including the radiography of the digestive, urinary and biliary systems. Five hours each week in the x-ray laboratory allow the student to practice positioning and x-ray the phantoms in the areas covered in class. Two hours a week are devoted to radiograph technique and evaluation. Prerequisite: MRAD 101.

MRAD 202 Medical Imaging — Rectification, control circuits, x-ray tubes image amplifiers, C.C. television, video-recording and body section radiography comprise the apparatus studied in this course. The image-recording portion covers special processes, artifacts and image presentatation.

MRAD 203 Radiographic Anatomy and Physiology — In the first half of this course a detailed study is made of the human skeleton. In the second half, the body organs, glands, vessels and nerves are studied according to region. Throughout the course, much attention is given to surface anatomy and the radiographic apearance of structures. Emphasis is placed upon those details of structure and function which are pertinent to radiographic procedures. Prerequisite: BHSC 107.

MRAD 206 Clinical Experience — The student acquires a basic knowledge of medical radiographic techniques by applying classroom and laboratory training to clinical situations in the affiliated hospitals.

MRAD 301 Radiographic Procedures 2 — The skull is studied in detail with special emphasis on acquiring the necessary positioning skills. Students are expected to reinforce the classroom material in the x-ray laboratory. One hour a week is devoted to radiograph evaluation. This course runs concurrently with MRAD 306. Prerequisite: MRAD 201.

MRAD 302 Medical Imaging — The equipment used in serial-radiography, cine and mobile units is studied. The basics of digital image processing technology are introduced including: digital angiography, subtraction technique, C.T. scanning and magnetic resonance imaging. Prerequisite: MRAD 202.

MRAD 305 Emergency Care — Instruction is given in basic first-aid procedures and skills required during an emergency situation where no professional help is present. Instruction is also provided in basic life support procedures that enable the student to recognize respiratory and cardiac arrest and start proper application of cardio pulmonary resuscitation.

MRAD 306 Clinical Experience — See MRAD 206. Prerequisite: MRAD 206.

MRAD 307 Pathology — Students are introduced to pathologic terminology and the basic mechanisms underlying disease processes. The balance of the course deals with pathological conditions of bone.

MRAD 311 Specialized Procedures — Includes discussion of the specialized radiographic procedures utilized to demonstrate the vascular tree, the central nervous system and the digestive, biliary and genito-urinary tracts. Also included is a brief discussion of pediatric radiography and C.T. scanning.

MRAD 402 Medical Imaging — See MRAD 302. Prerequisite: MRAD 302.

MRAD 403 Radiation Biology — The student is reintroduced to the basic interactions of radiation with matter. An in-depth study of intracellular responses to radiation is made. The latter part of this course deals with radiation pathology and human experience with radiation injury.

MRAD 404 Management and Instructional Skills — The management skills portion of the course explores some of the technical skills required for today's medical radiography supervisor. It is intended to complement BHSC 440 Human Behavior given in terms 4A and 4B. The instructional skills portion of the course presents a broad overview of the teaching/learning process with specific emphasis on clinical teaching skills in order to facilitate maximum student learning through effective student teaching.

MRAD 405 Radiation Protection — The aims and objectives of radiation protection are discussed, as well as the various organizations responsible for establishing protection standards. The course then deals with regulations governing the use of diagnostic radiation and methods of reducing exposure to the patient, the technologist and fellow workers.

MRAD 406 Clinical Experience in Medical Radiology — The student is expected to apply the didactic knowledge and positioning skills gained at BCIT to the clinical situation. Experience is gained in patient interactions, body mechanics, patient positioning, patient care and emergency procedures. Special emphasis is placed on good interpersonal relationships and meticulous work habits.

MRAD 407 Pathology — This course, which follows MRAD 307, deals with pathological conditions affecting the remainder of the body. The student is also made aware of how pathology will affect technical factors used in the production of a diagnostic radiograph.

MRAD 408 Radiography Evaluation — A systematic review of the radiographic examinations taught during Radiographic Procedures 1 and 2, is carried out during Term 4. The student evaluates radiographs for positioning, image quality and structures demonstrated.

MRAD 411 Specialized Procedures — See MRAD 311. Prerequisite: MRAD 311.

MRAD 511 Computed Tomography — Flexible entry correspondence course introduces a broad framework of theory and principles of Computed Tomograpy that provides the foundation for the practical aspects of CT scanning. The course enables the student to build the vocabulary necessary to understand CT literature. Equivalent to CE Computed Tomography. Accredited by the Canadian Association of Medical Radiation Technologists.

PHYS 109 Physics for Medical Radiography — An introductory course which emphasizes the application of physical phenomena in medical radiography. It includes the structural and physical properties of matter, static electricity, direct and alternating current, magnetism, mechanics, energy, wave motion, sound, thermodynamics, optics, quantum concepts, production of x-rays, interaction of x-rays with matter, radioactivity, x-ray tubes, radiation detection and the basics of digital radiography.

PHYS 209 Physics for Medical Radiography — See PHYS 109.

Nuclear Medicine Technology

Department of Radiological Technical Services

Nuclear medicine is the application of radioactive materials to the diagnosis and management of disease in humans. It is a relatively young diagnostic speciality and one of the most challenging and exciting branches of medicine.

Radioactive atoms are chemically identical to stable atoms of the same species and can be introduced into the basic chemical structure of many compounds. The radiation that is emitted from the radioactive atoms in the compound permits the detection and measurement of the compound even within the human body. This provides a means of investigating normal and abnormal functions of specific chemical and physiological processes within a human being while those processes are going on. Virtually all physiological processes within the body are now measurable and can be "seen" using radio-compounds and sophisticated instrumentation. Nuclear technology is also employed to assay the extremely small concentration of certain substances in blood plasma and other body materials.

Nuclear medicine is responsible for a host of revolutionary, safe, non-invasive diagnostic procedures that are now available to physicians in all branches of medicine.

Job Opportunities

A nuclear medicine technologist performs the diagnostic procedures of nuclear medicine. Certified graduates work primarily in the nuclear medicine departments of hospitals. In addition to performing a wide variety of tests on patients, the technologist may also perform lab tests on patients' samples, prepare radiopharmaceuticals for injection into patients, record test results, receive, handle, record, store and measure radioactive materials and perform quality control procedures on a wide variety of instrumentation and imaging devices.

The Program

Designed to prepare graduates to function as technologists in nuclear medicine departments, the program is a combination of lecture and lab instruction at BCIT and clinical experience in the nuclear medicine departments of clinical facilities presently affiliated with the program.

The student will spend terms 1 and 2 of first year at BCIT for lectures and labs in basic subjects applicable to nuclear medicine technology and patient care. The Institute is equipped with a lab containing facilities and equipment commonly used in nuclear medicine departments. The student spends the summer term of first year in the nuclear medicine department of a hospital.

In the second year at BCIT, the student spends alternate weeks at BCIT and the nuclear medicine department of one of the Lower Mainland hospitals. The summer term of second year is spent in a nuclear medicine department gaining further clinical experience.

On successful completion of the two year (six term) program, the student receives the BCIT Diploma of Nuclear Medicine Technology and is eligible to write national certification examinations.

Post-graduation

Graduates of the BCIT program are eligible to take the National Certification Examinations set by the Canadian Association of Medical Radiation Technologists. Successful candidates may use the designation R.T. (N.M.) after their names and work as registered nuclear medicine technologists anywhere in Canada or in many parts of the world. An Advanced Certification is now available for those technologists wishing to advance in the field.

Prerequisite

Algebra 12, Chemistry 11 and 12 and one other science 11 are course requirements for this program, preference is given to those applicants who have Physics 11. Since the work is highly technical and exacting, the student must feel comfortable with complex instruments, possess manual dexterity and meticulous work habits. Applicants must have a strong sense of responsibility and a desire to work with patients of all age groups. Applicants are expected to be competent in oral and written English. The Nuclear Medicine Technology is open to men and women.

A preadmission interview is conducted with members of the Nuclear Medicine Program staff to assess the applicant's suitability for the field. Students must undergo a medical examination by their own physician and a complete updating of immunizations. Students are required to complete the St. John Ambulance Safety Oriented First Aid course "Emergency First Aid" or its equivalent prior to admission, or during the first term of the program.

Faculty and Staff

Mr. R. Mabbett, R.T., Department Head
Ms. B. Clark, R.T., (T. & N.M.), Program Head
Miss J. Miki, R.T. (N.M.), R.T. (C.S.L.T.)
R.A. Singer, R.T.(N.M.)
Miss M. Morasky

PROGRAM: Nuclear Medicine

Level 1		Credit
BHSC 106	Anatomy and Physiology	4.0
BHSC 126	Basic Medical Microbiology and Immunology	2.0
CHEM 106	Chemistry for Nuclear Medicine Technology 1	6.0
MATH 174	Basic Technical Mathematics for Nuclear Medicine	5.0
MLAB 109	Clinical Laboratory Orientation	3.0
NMED 107	Radioassay Procedures	4.0
PHYS 105	Basic Physics for Nuclear Medicine Technology	6.0

Level 2		Credit
BHSC 206	Anatomy and Physiology	6.0
CHEM 206	Chemistry for Nuclear Medicine Technology 2	9.0
GNNU 181	Patient Care	4.0
MATH 274	Statistics for Nuclear Medicine Technology	7.5
NMED 204	Applied Physiology	2.0
NMED 205	Radiobiology and Protection	2.0
NMED 207	Radiopharmaceuticals	4.0
PHYS 205	Radioactivity and Instrumentation	10.5

Summer		Credit
NMED 209	Clinical Experience in Diagnostic Procedures	15.0

Level 3		Credit
BHSC 306	Pathophysiology	4.0
HCOM 103	Communication for Health Technologists	1.5
NMED 304	Applied Physiology	9.0
NMED 305	Clinical Experience in Diagnostic Procedures	11.5
NMED 308	Imaging	1.0
PHYS 305	Radioactivity and Instrumentation	3.0

Level 4		Credit
BHSC 439	Human Behavior	3.0
HCOM 202	Communication for Health Technologists	3.0
NMED 404	Applied Physiology	12.0
NMED 405	Clinical Experience in Diagnostic Procedures	21.0
PHYS 405	Radioactivity and Instrumentation	6.0

Summer Credit

NMED 409 Clinical Experience in Diagnostic Procedures ..15.0

Course Descriptions

BHSC 106 Anatomy and Physiology — An examination of human structure and function based on a systems approach. Included are basic cytology and histology, and the endocrine, nervous and skeletal systems. Remaining systems are covered in BHSC 206.

BHSC 126 Basic Medical Microbiology and Immunology — Deals with basic properties of medically important micro-organisms, the communicability of infection, host-parasite relationships, methods of destruction and control of micro-organisms, with particular attention to the safe preparation of radio pharmaceuticals used for injection. The course also deals with basic immunologic concepts including their related in-vitro applications.

BHSC 206 Anatomy and Physiology — This is a continuation of BHSC 106 and covers the cardiovascular, lymphatic, respiratory, digestive, urinary and reproductive systems. Emphasis is placed on homeostatic control systems. Prerequisite: BHSC 106.

BHSC 306 Pathophysiology — An introduction to the principles of pathology based on a disease process approach. Some systems pathology commonly investigated by nuclear medicine procedures is discussed along with some complex patterns of disease. Prerequisite: BHSC 206.

BHSC 439 Human Behavior — An introduction to the basics of the psychological and social environments of health care organization, with the aim of understanding how communication patterns affect task activities. Prerequisite: BHSC 339.

CHEM 106 Chemistry for Nuclear Medicine Technology 1 — This course covers basic general chemistry. It includes stoichiometry, nomenclature, concentrations of solutions (molarity, molality, equivalent weight, PPM, percent), acid-base chemistry (strong and weak electrolytes, buffers, hydrolysis of salts) and electrochemistry (oxidation, reduction, voltaic cells, nernst equation). The laboratory part of the course which runs parallel with the lectures consists of quantitative analysis, both gravimetric and volumetric.

CHEM 206 Chemistry for Nuclear Medicine Technology 2 — Gives an introduction to organic and biochemistry. The naming, properties and main reactions of the major classes of organic compounds are discussed. Coordination compounds are studied with emphasis on the chelating agents used in nuclear medicine. The biochemistry includes both the chemistry and metabolism of fats, proteins and carbohydrates. Lab work includes techniques and synthesis in organic chemistry and biochemical techniques frequently encountered in the clinical lab, e.g.: spectrophotometry, chromatography, electrophoresis. Prerequisite: CHEM 106.

GNNU 181 Patient Care — Assists the student to understand the hospital environment and the health problems of the patient. Emphasis will be placed upon observation and communication appropriate to the nuclear medicine technologist. The nursing lab will be used to practice basic technical skills and procedures required in emergency situations.

HCOM 103 Communication for Health Technologists — Introduces student s to the communication needs of the nuclear medicine profession — communicating with supervisors and patients. The course includes organizing and explaining information, objectiv and subjective descriptions, specialized journal research, information memos and oral briefings. It also covers medical terminology.

HCOM 202 Communication for Health Technologists — A continuation of HCOM 103. The course covers the specific communication tasks required of nuclear medicine technologists: short reports and action memos, persuasive presentations and meetings. It also covers the job package and medical terminology. All assignments are based on nuclear medicine case studies.

MATH 174 Basic Technical Mathematics for Nuclear Medicine — Exponential/logarithmic theory and transformations, common and natural logarithms, logarithmic/semilogarithmic graphs, and exponential growth and decay. Curve stripping, ratio, proportion, and variation. Delta-process, the derivative, differentiation rules including logarithmic and exponential functions, instantaneous rates of change, applied maxima/minima, the differential, antiderivatives, indefinite integral, and definite integral with area under a curve and average value. Differential equations.

MATH 274 Statistics for Nuclear Medicine Technology — Organization and graphical presentation of data, frequency distributions and measures of central tendency and variation. Probability theory and laws. Random variables, mathematical expectation and discrete and continuous theoretical distributions. Estimation and hypothesis testing with both large and small samples. Method of least squares and regression and correlation. Non-parametric statistics.

MLAB 109 Clinical Laboratory Orientation — An introduction to the principles and uses of precision instruments employed in the lab, together with an introduction to hematology pertinent to the nuclear medicine lab.

NMED 107 Radioassay Procedures — Covers the basic principles of radioassay procedures. A study is made of the components of the test system, the practical aspects of performing the tests and data reduction techniques. The clinical significance of routinely performed assays is discussed.

NMED 204 Applied Physiology — Involves familiarization with affiliated Nuclear Medicine departments of lower mainland hospitals, and a series of lectures given by technologists on the clinical applications of nuclear medicine techniques.

NMED 205 Radiobiology and Protection — A detailed study of ionizing radiation and its interaction with matter. The units and safety guidelines of radiation are also discussed. Emphasis is on the practical applications of radiation safety in the working environment.

NMED 207 Radiopharmaceuticals — A study of the preparation and quality control of radiopharmaceuticals in routine use. Emphasizes the radio-nuclide generator. Dosage forms and calculation and dispensing of doses are covered, together with the clinical application of various pharmaceuticals.

NMED 209 Clinical Experience in Diagnostic Procedures — These courses require full-time attendance in the nuclear medicine department of an affiliated hospital. The purpose is to further develop the skills necessary for students to function safely and adequately in a nuclear medicine lab. Hands-on experience will be gained in all aspects of "in vitro" and "in vivo" procedures.

NMED 304 Applied Physiology — The student is instructed in all aspects of current applied physiology including criteria, methodology, instrumentation, patient problems and approach, data collection and manipulation.

NMED 305 Clinical Experience in Diagnostic Procedures — See NMED 209.

NMED 308 Imaging — Designed to familiarize Nuclear Medicine Technology students with the many methods and materials used to visually display the spatial distribution of radioactivity in nuclear imaging procedures. The utilization of optical, photographic, video tape and computer visual displays will be covered in theory and practice.

NMED 404 Applied Physiology — The student is instructed in all aspects of current applied physiology including criteria, methodology, instrumentation, patient problems and approach, data collection and manipulation.

NMED 405 Clinical Experience in Diagnostic Procedures — See NMED 209.

NMED 409 Clinical Experience in Diagnostic Procedures — See NMED 209.

PHYS 105 Basic Physics for Nuclear Medicine Technology — A special introductory level course covering topics of forces and motion, energy, static electricity, DC electricity, magnetism, AC electricity, atomic structure, nuclear structure and nuclides.

PHYS 205 Radioactivity and Instrumentation — The theory portion of this course includes topics on nature and production of x-rays, measures of radioactive decay, modes of decay, and interaction of radiation with matter and nuclear reactions. The measurement portion of the course concentrates on instrumentation. Topics include an in-depth study of scintillation-type detector systems and Anger-type gamma cameras.

PHYS 305 Radioactivity and Instrumentation — Continues the instrumentation work begun in PHYS 205. Topics include sensitivity and resolution in scanning, collimators, liquid scintillation counting, G.M. detectors, proportional counters, ionization detectors, semiconductor detectors, TLD, positron scanning and spectrometry.

PHYS 405 Radioactivity and Instrumentation — Completes the instrumentation work begun in PHYS 205 and PHYS 305. Topics include sensitivity and resolution in scanning, collimators, liquid scintillation counting, G.M. detectors, proportional counters, ionization detectors, semiconductor detectors, TLD, positron scanning and spect. Includes an introduction to computers and their uses in Nuclear Medicine.

Diagnostic Medical Sonography

Third Year Program

Department of Radiological Technical Services

Diagnostic ultrasound is a rapidly emerging, relatively new medical diagnostic technique. Using high frequency sound waves transmitted and reflected through various body parts, it is possible to image organs, masses and fluid collections within the body. The technique provides valuable diagnostic information. Unlike x-rays, ultrasound waves are non-ionizing. Diagnostic ultrasound energy is non-invasive and non-traumatic, to date no significant biological effects have been demonstrated.

The field of Diagnostic Medical Sonography is dedicated to the preservation of life and health by diagnosis and prevention of disease. The diagnostic medical sonographer (ultrasound technologist) is a skilled person, qualified by academic and clinical training to provide patient services using diagnostic ultrasound. Sonographers work under the supervision of a doctor of medicine, qualified in the use and interpretation of ultrasound procedures. Studies performed by the sonographer include: echocardiography, abdominal sonography, obstetrical/gynecological sonography, ophthalmic sonography, and neonatal brain sonography.

Job Opportunities

Graduates in this dynamic new allied health field will assume an important role in maintaining high quality patient care, provide leadership in the development of health programs, and participate in medical research. Employment opportunities exist in hospital ultrasound facilities, or integral sections of other hospital departments, such as radiology, cardiology or obstetrics. A large percentage of hospitals in B.C. have diagnostic ultrasound equipment, and its use is expanding rapidly.

The Program

Due to the entrance requirement of knowledge in allied health, the program is only one year in length. The first term is primarily devoted to the study of the theory of diagnostic ultrasound. The clinical aspects comprise the larger portion of the second term. Clinical training is provided in selected hospitals in B.C. The course of studies includes anatomy and physiology, pathophysiology, physics of ultrasound, instrumentation and applied sonography.

Upon successful completion of the program, the graduate is eligible to write the American Registry of Diagnostic Medical Sonographers examinations.

Prerequisite

Diploma of Technology in an allied health field such as Radiography, Nuclear Medicine, or Registered Nursing, or a Bachelor of Science in an appropriate health related field.

Selection Criteria

Acceptance into the program will be based on: post-secondary education transcripts, previous educational and professional achievements, previous clinical experience, an autobiographical letter outlining the reasons for your interest in Diagnostic Ultrasound as a career, a personal interview, a letter of reference from a physician and/or from a post secondary academic faculty member with whom you have worked.

Faculty and Staff

Mr. R. Mabbett, R.T., Department Head
Ms. K.A. McDiarmid, R.T., R.D.M.S.

PROGRAM: Diagnostic Medical Sonography (3rd year)

Level 5		Credit
BHSC 108	Anatomy and Physiology	3.0
BHSC 109	Pathophysiology	3.0
DSON 101	Applied Sonography	7.0
DSON 105	Clinical Experience	12.5
PHYS 523	Physics of Ultrasound	4.5

Level 6		Credit
DSON 206	Clinical Experience in Echocardiography	20.0
DSON 306	Clinical Experience in Abdominal Sonography	20.0
DSON 307	Clinical Experience in Obstetrical and Gynecological Sonography	20.0

Course Descriptions

BHSC 108 Anatomy and Physiology — Provides an overview of the organ systems of particular clinical interest to sonographers. Special emphasis is placed on the genito-urinary, digestive (including liver, gall bladder and pancreas) and cardiovascular systems. In addition, longitudinal foetal development is discussed and cross-sectional anatomy of the abdominopelvic cavity is examined.

BHSC 109 Pathophysiology — An outline of the etiology and pathogenesis of those diseases commonly investigated by ultrasonography. The course is divided into three equal sections: obstetric gynecologic pathology, abdominopelvic organ pathology and cardiography. General principles of the disease process and complex syndromes will also be discussed.

DSON 101 Applied Sonography — Encompasses an in-depth study of techniques required for competency in echocardiography, abdominal sonography and obstetrical and gynecological sonography. Image production and the recognition of normal and abnormal patterns are stressed, as well as examination protocols for all major areas of interest.

DSON 105 Clinical Experience — Time is spent in hospital ultrasound Departments to obtain clinical and practical experience in support of classroom studies.

DSON 206 Clinical Experience in Echocardiography — The student will acquire the skills to carry out sonographic examinations and the ability to recognize normal and abnormal sonographic patterns in the heart.

DSON 306 Clinical Experience in Abdominal Sonography — The student will acquire the skills to carry out sonographic examinations and the ability to recognize normal and abnormal sonographic patterns in the abdomen.

DSON 307 Clinical Experience in Obstetrical and Gynecological Sonography — The student will acquire the skills to carry out sonographic examinations and the ability to recognize normal and abnormal sonographic patterns in the female pelvis.

PHYS 523 Physics of Ultrasound — Introduces students to the instrumentation used in ultrasound, and to the nature of the imaging process and the biological effects of ultrasound. Course topics include the physics of acoustic waves, transducers, ultrasonic fields, ultrasonic imaging, basic pulse echo instrumentation, real time systems, cathode ray tubes, doppler effect, acoustic power measurement, testing and calibration and biological effects.

General Nursing

Department of General Nursing

Today's registered nurse assists people in meeting health needs in collaboration with other members of the health care team including dietitians, occupational therapists, pharmacists, physicians, physiotherapists and social workers. Demands made upon nursing professionals range from providing information on health concerns to promoting proper health care, preventing disease, providing restorative care and emotional support. Proficiency is required in problem-solving and decision-making and in interpersonal, communicative and psychomotor skills. Although it is a high-stress profession, both men and women find general nursing a rewarding career.

Job Opportunities

Registered nurses are employed in general hospitals and community agencies. Positions for the new graduate are available mainly in medicine and surgery.

The Program

The Program is approved by the Registered Nurses' Association of British Columbia. Graduates are eligible to write the registration examinations of the Association. Graduates are prepared for employment in general hospitals or other health care agencies where comparable levels of patient care and nursing judgement are required. It provides 22 months of instruction during a 2.33 year period. Enrolment in the program is in January or August of each year. The program provides instruction in Nursing, Basic Health Sciences and English. Learning opportunities include: independent study, lectures, laboratories, tutorials, and experience with medical, surgical, obstetrical, pediatric and psychiatric patients and families.

Students will complete a program consisting of five terms. Each term is 17 weeks in length. The fall term extends from mid-August to mid-December and the winter term from January to mid-May. Students are free of studies from mid-May to mid-August.

Admission Requirements

Applicants who meet all the admission requirements at least one month prior to registration, will be given priority for a seat.

A. **Applicants under 23 years of age at the time of entry into the program:**

1. Senior secondary school graduation, with:
   a) Chemistry 11 and either Chemistry 12 or Biology 12 (preferred) with a minimum of C+ standing in both courses.
   b) Algebra 11 with a minimum of C standing.
   c) English 12 with a minimum of C+ standing.
2. A valid St. John Ambulance standard First Aid certificate or equivalent is required by the end of term 1, and preferably prior to entry into term 1. Currency must be maintained thorughout the program.
3. CPR course (Basic 1), valid and current, prior to entry into Term 4.
4. Completion of the immunization program is required before final acceptance into the program.
5. A physical examination by a physician of the applicant's choice, indicating satisfactory health.
6. A satisfactory interview with a member of the General Nursing Department who will assess the applicant's:
   — knowledge of and motivation towards a nursing career
   — financial preparation
   — communication skills
   — experience with patients in the health care field as a volunteer and/or employee.
   — general hospital, private hospital or extended care facility preferred.

B. **Applicants over 23 years of age at the time of entry into the program:**

1. Senior secondary school of graduation or equivalent e.g. G.E.D. or BTSD, with:
   a) Chemistry 11 and either Chemisty 12 or Biology 12 (preferred) to be completed within two years prior to enrolment with minimum of C+ standing in both courses.
   b) English 12 with a minimum of C+ standing.
   c) Part-time or full-time employment in the health care field prior to entry into the program. (A reference will be requested from the agency in which the applicant's latest experience was obtained).
2. A valid St. John Ambulance standard First-Aid certificate or equivalent by the end of term 1 and, preferably, prior to entry into term 1. Currency must be maintained throughout the program.
3. CPR course (Basic 1), valid and current, is required prior to entry into Term 4.
4. Completion of the immunization program is required before final acceptance into the program.
5. A physical examination by a physician of the applicant's choice, indicating satisfactory health.
6. A satisfactory interview with a member of the General Nursing Department, who will assess the applicant's:
   — knowledge of and motivation towards a nursing career
   — financial preparation
   — communication skills
   — experience with patients in the health care field as a volunteer and/or employee.
   — general hospital, private hospital or extended care facility preferred.

Notes:

1. Applications are accepted for review beginning January 2 for the August class and June 1 for the January class.
2. Applicants with baccalaureate degrees within two years will be assessed on an individual basis to determine equivalency with academic criteria.

Expenses

In addition to tuition fees, students will spend approximately $700 for textbooks and other learning materials during the program. Uniforms and shoes are about $250. The student is responsible for transportation to hospitals and other community agencies. It is highly recommended that students have the use of a car two days per week for transportation to these agencies. Most students purchase a graduation pin for approximately $150.

Financial Assistance

BCIT has a comprehensive financial assistance program — scholarships, loans and bursaries. Details are available from Student Financial Services in the Counselling department.

Post-graduation

Following completion of the nursing diploma program, students write the Canadian registration examinations in order to obtain the R.N. (Registered Nurse) designation. The fee for these examinations is $118. After gaining some experience, graduates may elect to undertake one of many post-basic programs available in Canada or the U.S. to further their knowledge and skills in specialty areas of nursing. Most universities in the major cities also offer Bachelor of Nursing programs for graduates from diploma programs.

Certificate of Credit in Nursing

The Basic Health Science and English courses of the diploma nursing curriculum are offered through independent study as well as on campus. Applicants who meet all the academic entrance requirements may wish to complete some of these courses prior to enrolment to lighten their study loads during the program.

For information write to Health Part-time Studies, BCIT, 3700 Willingdon Avenue, Burnaby, B.C. V5G 3H2. These courses are offered in fall, winter and spring terms.

Faculty and Staff

Mrs. M. Neylan, M.A., B.S.N., R.N., R.P.N., Department Head
Mrs. L. Barratt, B.A., Diploma Psychiatric Nursing, R.N.
Ms. M.J. Belfry, M.Sc., B.N., R.N.
Mrs. D.M. Belyk, B.S.N., R.N.
Mrs. E. Carr, B.S.N., R.N.
Ms. V. Cartmel, B.S.N., R.N.
Ms. K. Doyle, B.N., Diploma Counselling Psychology, R.N.
Mrs. K. Edwards, B.S.N. (Honors), R.N.
Mrs. L. Field, B.Sc.N., R.N.
Ms. E.M. Fraser, B.S.N., R.N.
Mrs. S. Gallo, B.Sc., Ph.N., R.N.
Mrs. N. Goad, B.S.N., R.N.
Mrs. S. Grasset, B.Sc., Ph.N., R.N.
Mrs. H.D. Hintz, B.S.N., Diploma Counselling Psychology, R.N.
Mrs. A. Kenney-Lee, B.N., M.Ed., R.N.
Mrs. M. LaBelle, B.N., Diploma P.H., R.N.
Ms. B.A. Lawes, B.Sc.N., R.N.
Mrs. M.E. Martin, B.S.N., R.N.
Ms. A.J. Mazzocato, M.S.N., B.N., R.N.
Ms. L.P. Meredith, M. Adult Ed., B.S.N., R.N.
Mrs. L. Milligan, R.N., B.S.N.
Mrs. K. Negoro, Diploma Nrsg. Ed., R.N.
Mrs. A.L. Novada, B.S.N., Diploma T.S.
Mrs. M. Olson, B.S.N., R.N.
Mrs. K. Quee, B.Sc.N., R.N.
Ms. M.N. Renwick, B.S.N., Diploma T.S., R.N.
Ms. A. Rose, B.Sc., R.N.
Mrs. A. Taylor, M.A., B.S.N., R.N.
Mrs. J. Verner, B.S.N., R.N.
Mrs. M. Walmsley, M.Ed., B.S.N., R.N.
Ms. M.W. Whitehead, M.A. (Educ.), B.S.N., R.N. Diploma Obs., R.N.
Ms. P.V. Zabawski, B.Sc.N., R.N.
Mrs. D. Zimka, B.Sc.N., R.N.

Support Staff

Mrs. P. Mushens
Mrs. P. Ord
Ms. C. Themmen
Mrs. C. Smith

PROGRAM: General Nursing

Level 1		Credit
BHSC 105	Anatomy and Physiology	4.0
BHSC 118	Personal Fitness Management	3.0
BHSC 140	Human Development 1	4.0
GNNU 100	Nursing 1: Theory and Clinical	26.5

Level 2		Credit
BHSC 205	Physiology	6.0
BHSC 225	Microbiology	1.5
BHSC 226	Immunology	1.5
BHSC 239	Sociology	2.0
BHSC 240	Human Development 2	4.0
GNNU 200	Nursing 2: Theory and Clinical	26.5

Level 3		Credit
GNNU 300	Nursing 3: Theory and Clinical	34.5
HCOM 107	Writing for General Nurses	3.0

Level 4		Credit
GNNU 400	Nursing 4: Theory and Clinical	34.5
HCOM 109	Modern Literature for General Nurses	3.0

Level 5		Credit
GNNU 450	Nursing 5: Theory (1 wk) Clinical (for 16 wks of term)	30.0

Course Descriptions

BHSC 105 Anatomy and Physiology — A survey of the basic structure and function of human body systems. An introduction to the basic principles of genetics is also included.

BHSC 118 Personal Fitness Management — A combined theory and practice course designed to emphasize the relationship of physical fitness to lifestyle patterns. The focus is placed on the student's own activity pattern.

BHSC 140 Human Development 1 — After an initial treatment of the topic of death and loss, this course focuses on the processes of growth and development from conception through adolescence. Physical, cognitive, affective and social development are surveyed with emphasis on relating developmental concepts to health care.

BHSC 205 Physiology — A study of physiological regulation and control based on the fundamentals established in BHSC 105. Prerequisite BHSC 105.

BHSC 225 Microbiology — Provides an introduction to basic microbiological concepts, including the distinguishing characteristics of micro-organisms, methods of controlling infectious diseases and host-parasite relationships. Prerequisite: BHSC 105.

BHSC 226 Immunology — Provides an understanding of the immune response as applied to immunity, surveillance, homeostasis, hypersensitivity, autoimmunity and immunohematology. The course progresses from discussions on the components and biological activities of the immune response to the immune response role in protective as well as disease conditions. Prerequisite: BHSC 105, BHSC 225.

BHSC 239 Sociology — An introduction to the study of human behavior. Basic terminology and concepts of sociology are presented. Emphasis is placed on the study of the family as a social institution, as well as on other forms of group processes and collective behavior. The relationship between behavioral sciences and problems of health care is examined.

BHSC 240 Human Development 2 — Focuses on growth and development from young adulthood to aging adult. Physical, cognitive, affective and social development are surveyed. Emphasis is placed on relating developmental concepts to health care. Prerequisite: BHSC 140.

GNNU 100 Nursing 1: Theory and Clinical — An overview of the nursing curriculum and the study of individuals who require minimal or no assistance to satisfy needs. Emphasis is placed on the normal requirements for need satisfaction and the stressors associated with lifestyle patterns. The student is introduced to the basic concepts of the nursing process: communication and the nurse-patient relationship; organization and responsibilities of the professional nurse. Concurrent theory, laboratory and clinical practice will focus on basic assessment, communication and psychomotor skills. Clinical experience is provided in hospital settings, in medical and extended care units, and in other community agencies.

GNNU 200 Nursing 2: Theory and Clinical — The study of individuals of adult age who require assistance to satisfy needs, and to develop appropriate responses to stressors. Emphasis is placed on stressors associated with stages and tasks of growth and development and selected unanticipated events. Concurrent theory, laboratory and clinical practice will focus on the nursing skills required to assist individuals to satisfy their needs. Emphasis is placed on developing comfortable relationships with individuals and their family members. Clinical experience is provided in hospital settings, general surgical units and other community agencies. Prerequisite: GNNU 100, BHSC 105, BHSC 140.

GNNU 300 Nursing 3: Theory and Clinical — The study of individuals of all ages whose responses to stressors may be appropriate and/or inappropriate. Emphasis is placed on the stressors associated with both selected unanticipated events and the growth and development tasks related to childbearing. Concurrent theory, laboratory and clinical practice will focus on the nursing skills required to assist individuals to satisfy their needs. Emphasis is placed on developing supportive relationships with individuals and their family members. Clinical experience is provided in hospital settings, on family-centered obstetrical units and on pediatric units. Community visits are integrated throughout the course. Prerequisite: GNNU 200, BHSC 205, BHSC 225, BHSC 226, BHSC 240.

GNNU 400 Nursing 4: Theory and Clinical — The study of individuals of all ages whose responses to stressors are inappropriate. Emphasis is placed on the stressors associated with selected unanticipated events. Concurrent theory, laboratory and clinical practice will focus on the nursing skills required to assist individuals to satisfy their needs. Emphasis is placed on developing therapeutic relationships with individuals and their family members. Clinical experience is provided in hospital settings and psychiatric and general medical-surgical units. Community visits are integrated throughout the course. Prerequisite: GNNU 300.

GNNU 450 Nursing 5: Theory and Clinical — Emphasizes the integration of previously presented knowledge and skills. Theory focuses on leadership skills and the responsibilities of the graduate nurse. Clinical experience is provided in general medical-surgical units. Students are assigned to full-time registered nurses, who act as preceptors to the student. During this term, students learn to assume the role of a registered nurse. Prerequisite: GNNU 400, HCOM 107, HCOM 109, BHSC 118, BHSC 239.

HCOM 107 Writing for General Nurses — Nurses and student nurses spend several hours each day writing: completing assignments, documenting patient care, writing letters and memos, preparing written information for clients, writing procedures, completing reports and preparing oral presentations. This course teaches students the planning, writing and revising skills they need to perform these tasks efficiently and effectively.

HCOM 109 Modern Literature for General Nurses — Presents four genres of modern literature: the short story, drama, the novel and poetry. Students will be encouraged to use the literature, the classroom discussions and the assignments as ways of expanding their experience, developing empathy and detachment, clarifying judgement and reflecting on their values and assumptions.

School of Management Studies

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Administrative Management Systems

Many people who are contemplating a career in business management would like to acquire a solid core of knowledge and skills which can then be fitted to any area of the business community. Administrative Management Technology provides such an opportunity, and is particularly valuable to those who have a special interest in small or self-owned businesses.

Job Opportunities

Graduates of the Administrative Systems Option work in planning, banking, finance, production, marketing or real estate. Many now operate their own businesses.

Graduates of the Personnel and Industrial Relations Administration Option become involved in manpower selection and placement, manpower training and development, labor-management relations, job evaluation, and organization renewal and development.

The Program

Following a year of general studies, students select one of two options: Administrative Systems, or Personnel and Industrial Relations Administration.

All students in Administrative Management take a first year of general studies covering a cross section of business oriented courses. Upon completion of their first year, students then elect to enter either the Systems Option or the Personnel and Industrial Relations Option.

Students planning to enter the Administrative Management program will follow the course of studies shown as levels 1 through 4. However, students might expect to encounter some slight changes in the offerings and order of courses from those listed as the department revises and updates the program to keep abreast of changes in the business area.

Prerequisite

Algebra 11 and English 12 both with C + are course requirements for this program. Enrolment is limited. Applicants should apply early stating full details of work experience, outlining extra-curricular activities. Appropriate business experience and/or other successful post-secondary education will greatly strengthen applications. Applicants should be good communicators and people oriented with a willingness to work effectively with fellow workers and the public.

Admission may be granted to mature students who can provide evidence of probable success in the program.

Specific Prerequisites

Those students wishing to enter the Personnel and Industrial Relations Option from the first year of the technology program should have maturity and relevant work experience as well as competence in communication skills, as demonstrated by a minimum of 70% standing in the first year communication courses.

Advanced Standing

Direct entry into the second year of the technology in either option is possible provided students have the equivalent of the first year of the program.

Post-graduation

Graduates may earn advance credit towards designation as a Chartered Accountant, a Certified General Accountant, or a Registered Industrial Accountant. Advance credit is also given by the Institute of Chartered Secretaries and Administrators.

Faculty and Staff

C. Clark, B.A., M.A., Acting Department Head
R.A. Cradock, B.Comm., M.B.A., R.I.A., F.S.M.A.C., Acting Dean, School of Management Studies
S. Ayinde, B.A., M.A.
G.E. Bissell, B.Comm., M.A.
D. Davis, B.A., M.A., LL.B.
C.J. Dickhoff, B.A., M.A., (Econ.), M.A. (Public Admin.)
H.G.J. Herron, B.A. (Cert. Public Admin.)
R.W. Hooker, B.A., B.Sc., M.A., LL.B., Senior Instructor
C.L.R. Jaques, B.A., M.A.
L.E. Johnson, B.A., M.B.A.
L. Jones, B.Sc., M.Sc.
T.P. Juzkow, B.A.Sc., M.B.A., P. Eng., Program Head
A.G. Liddle, M.B.A.
D. Pepper, B.A., Ph.D.
D. Schram, B.Comm., M.Sc. (Intn. Bus.)
R.M. Sharp, B.A.Sc., M.B.A., P.Eng.
G. Storey, B.A., M.Sc.
N.E. Stromgren, C.D., B.A., M.Ed. (Admin.)
B. van der Woerd, B.A., Program Head
F.C. Williams, B.A. (Hons), M.A.
R.A. Yates, LL.B, M.B.A., Program Head

TECHNOLOGY: Administrative Management Systems

Level 1 — Classroom hours per week

ADMN 100	Micro Economics	3.0
ADMN 220	Organizatonal Behavior	3.0
BCOM 102	Business Communication for Administrative Management	3.0
COMP 100	Data Processing, Introduction	3.0
FMGT 101	Accounting 1	4.0
OPMT 110	Business Mathematics	4.0

Level 2 — Classroom hours per week

ADMN 200	Macro Economics	3.0
ADMN 216	Management	3.0
ADMN 217	Workshop	2.0
BCOM 202	Business Communication for Administrative Management	3.0
COMP 120	Computers in Business	3.0
FMGT 201	Accounting 2	4.0
MKTG 102	Introduction to Marketing	3.0
OPMT 130	Business Statistics	4.0
ADMN 190	Skills Enrichment	3.0

PROGRAM: Administrative Systems

Level 3 — Classroom hours per week

ADMN 310	Management 3	3.0
ADMN 330	Industrial Relations	3.0
ADMN 340	Personnel Administration	3.0
ADMN 360	Microcomputer Software Systems	3.0
ADMN 385	Business Law	4.0
FMGT 304	Management Accounting	4.0
FMGT 307	Finance 1	4.0
MTKG 311	Real Estate Management 1	3.0

Level 4		Classroom hours per week
ADMN 410	Management	3.0
ADMN 460	Microcomputer Software Applications	3.0
ADMN 490	Directed Studies	6.0
FMGT 404	Finance 2	4.0
FMGT 451	Principles of Credit	*4.0
MKTG 411	Real Estate Management 2	3.0
OPMT 170	Management Engineering	4.0
TDMT 352	Transportation	4.0

PROGRAM: Personnel and Industrial Relations

Level 3		Classroom hours per week
ADMN 310	Management 3	3.0
ADMN 321	Interpersonal Skills Development	2.0
ADMN 330	Industrial Relations	4.0
ADMN 340	Personnel Administration	3.0
ADMN 341	Human Resource Planning and Analysis	4.0
ADMN 360	Microcomputer Software Systems	3.0
ADMN 385	Business Law	4.0
FMGT 307	Finance 1	4.0

Level 4		Classroom hours per week
ADMN 410	Management	3.0
ADMN 430	Collective Bargaining	3.0
ADMN 440	Personnel Management Systems	3.0
ADMN 441	Interviewing Skills	*4.0
ADMN 442	Training and Development	*4.0
ADMN 490	Directed Studies	6.0
FMGT 404	Finance 2	4.0
OPMT 170	Management Engineering	4.0

* Half term courses

Course Descriptions

ADMN 100 Micro Economics — The major areas studied are the product and resource market. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored.

ADMN 190 Skills Enrichment — Currently this course offers an introduction to business applications on the microcomputer as part of changes in the program content. Future decisions on content and offering of the course will depend upon an ongoing assessment of student needs.

ADMN 200 Macro Economics — Develops an understanding of the organization and operation of the Canadian Economy in an International setting. The theoretical tools of the economist are used to expend the concepts of national income employment, inflation, money and banking international trade, and growth. An appreciation of the relationship between economic theory and economic policy is provided.

ADMN 216 Management — A study of management functions and practices — planning, organizing, leading and controlling. Included are such topics as forms of business ownership, strategic and tactica planning, decision-making, organizational structure, staffing, delegating, production planning and control, and control techniques (with some variation of emphasis depending on the technology for which the course is provided). Student are given the opportunity to develop analytical and communications skills by analyzing and proposing solutions to typical business problems.

ADMN 217 Workshop — Students, working in small groups, contact a business or service organization, gather complete information on that organization — its history, organization structure, financial background, product or service, scope of operation, and marketing strategy. This information is presented to the class using audio/visual techniques. Benefits to the students are a better understanding of the application of the management theory and practice in formal class presentation.

ADMN 220 Organizational Behavior — The study of factors that either influence or are influenced by people at work. The course will focus on macro factors such as organizational structure, technology and environment; group factors such as conflict and decision making; and micro or individual factors such as attitudes, perception and motivation.

ADMN 310 Management 3 — Emphasizes the use of decision-making models in business. It is designed to train students in the use of quantitative methods in the choice of alternatives in the decision-making process. Prerequisite: ADMN 210.

ADMN 321 Interpersonal Skills Development — This lab concentrates on the development of skills for personnel problem solving. It emphasizes role-play training with students in advisory capacities, helping management and employees to resolve human resource management problems.

ADMN 330 Industrial Relations — A detailed analysis of selected labor/management problem areas with emphasis on the solution of practical existing problems in industrial relations.

ADMN 340 Personnel Administration — An introduction to the fundamentals of personnel management, including organization of the personnel function, salary administration, fringe benefits, training, management development and performance appraisal, constructive discipline, grievances and morale.

ADMN 341 Human Resource Planning and Analysis — An introduction to the skills and concepts associated with employee data collection and analysis for strategic and human resource planning purposes. Employment planning models, job analysis techniques and statistical methods of measurement are addressed.

ADMN 360 Microcomputer Software Systems — Instruction and practise with commercially advanced microcomputer software systems. Topics currently include integrated programs, exposure to the MacIntosh and MS-DOS environments, and databases.

ADMN 385 Business Law — A one-term, condensed course which acquaints the business student with a basic knowledge of Canadian law including the legal system, contracts, torts, sale of goods and consumer protection, secured transactions and creditors' remedies, employment law and agency, business organizations, negotiable instruments, real estate and administrative law.

ADMN 410 Management — An analysis of business policy formulation designed to give the student practice, experience and confidence in handling business situations, including those of a complex nature where basic policy decisions are necessary to assist in problem solving. Comprehensive business cases will be selected covering such fields as finance, control, personnel, production, marketing and general management, for study and discussion. The course is designed to acquaint the student with the role of top management and the interrelationships between these fields. Prerequisite: ADMN 310.

ADMN 430 Collective Bargaining — An introductory analysis of the fundamental issues and facts of labor-management relations. Special emphasis is given to collective agreement content and interpretation, bargaining and basic labor economics.

ADMN 440 Personnel Management Systems — Develops competence in several key personnel practitioner areas, including job evaluation techniques, wage and salary administration functions, and performance appraisal techniques. Two hours a week of microcomputer applications laboratory time are included, for preparation of course assignments that use microcomputer applications.

ADMN 441 Interviewing Skills — A skills development course emphasizing the interpersonal skills necessary for successful selection interviews. Training techniques include role-playing, individual counselling and feedback.

ADMN 442 Training and Development — Develops ability to design and implement a training program with emphasis on practical problems of training in industry.

ADMN 460 Microcomputer Software Applications — A continuation of Microcomputer Software Systems, with emphasis on the solution of practical problems. Familiarity with the programs is developed enabling students to use them in other course areas.

ADMN 490 Directed Studies — Designed to give students some practical application of concepts learned in major program areas by engaging in problem-solving projects in business or government. Students must pass all subjects in year 1 or have permission of the Department Head prior to enrolling in Directed Studies.

BCOM 102 Business Communication for Administrative Management — This is an applied business communication course for Administrative Management. Students develop the skills required to write effective letters and memos used in business and industry. Students also receive instruction in preparing and giving oral presentations.

BCOM 202 Business Communication for Administrative Management — Gives further instruction and practice in the principles taught in BCOM 102. The course concentrates on more sophisticated forms of written communication: the job application package, informational and analytical reports and research proposals. It also includes modules on graphics, questionnaires, telephone techniques, organizing and running meetings and using word processors.

COMP 100 Data Processing — Introduction — Offers training in basic data processing principles to develop recognition of the application of these principles to industry. The principal functions of data processing are illustrated and practised with an H.P. minicomputer operating interactively. Elementary computer programs are written and tested on the computer. Use of flow-charting and elementary data processing systems design will illustrate the achieving of data processing objectives.

COMP 120 Computers in Business — Designed to give the student an understanding of business computer systems. Topics include computer hardware — types, usage, evaluation; systems development — feasibility studies, analysis, design, implementation; packaged software — use and evaluation. Emphasis will be placed on particular areas of interest to the specific technologies.

FMGT 101 Accounting 1 — Permits persons with little or no accounting background to become familiar with the techniques of working through the full accounting cycle. It provides theoretical and practical training in basic accounting as preparation for FMGT 201. Topics include accounting as an information system; introduction to accounting theory; income measurement; traditional record-keeping procedures; the accounting cycle; special journals; cash; investments and receivables.

FMGT 201 Accounting 2 — The follow-up to FMGT 101, topics include inventory, long-lived assets, liabilities, forms of business organizations, cash-flow and working capital analysis, manufacturing accounting, management accounting, consolidated statements, analysis of financial statements and price level changes. Prerequisite: FMGT 101.

FMGT 304 Management Accounting — The management accountant's role in decision making, planning and control of company operations through budgeting, standard costing and evaluation systems. Emphasis is on alternative methods of product costing, cost allocations, performance measurement and decision-making models. Prerequisite: FMGT 201.

FMGT 307 Finance 1 — Those with little or no knowledge of financial management will study the various methods of optimizing the economic position of a firm. Middle management people in business finance will learn to make the best decisions on the financing of a firm. Topics include control and financial management of the business firm, profit planning, cash and capital budgeting and inventory control. Prerequisite: FMGT 201.

FMGT 404 Finance 2 — Instructs students in raising capital to finance a firm. Topics include the cost of capital; short, medium and long term financing leasing; refinancing; security analysis; the Canadian capital and money markets and pension portfolios as they affect business decisions of the Canadian firm. Prerequisite: FMGT 307.

FMGT 451 Principles of Credit — An overview of the principles and procedures of various types of credit and their use by retail business, financial institutions, commercial enterprises and consumers. Includes sources of information, credit policy, control, and collections. A continuing case problem approach is used.

MKTG 102 Introduction to Marketing — Includes a detailed study of the basic marketing functions, marketing research, product planning, selection of trade channels, merchandising, advertising, sales promotion and salesmanship. Marketing of consumer goods as well as industrial goods will also be covered.

MKTG 311 Real Estate Management 1 — The real estate function includes law, estates and interests in land, and the personal and business management decision process. The economic characteristics of urban real estate and the market, city growth and development, locational factors in influencing the determination of land use and ownership, institutional lenders, the mortgage market and the functions of the real estate agency, salesman and appraiser are covered. This is a credit course recognized by the Real Estate Council of British Columbia and the Department of Real Estate Studies at UBC. It exempts the student entering the real estate brokerage business from the salesman's pre-licensing course.

MKTG 411 Real Estate Management 2 — see MKTG 311. Prerequisite: MKTG 311.

OPMT 110 Business Mathematics — Review of basic mathematics applicable to business and industry. Mathematics of finance including retail operations, simple and compound interest, discounts, annuities, financial papers and depreciation methods. Emphasis is on practical applications to business administration.

OPMT 130 Business Statistics — Major emphasis is on descriptive statistics, including numerical and graphical presentation of data, measures of central tendency and dispersion, elementary probability, index numbers and time series. Introduction to inferential statistics through selected topics such as sampling, confidence limits of the mean, hypotheses testing and simple linear regression.

OPMT 170 Management Engineering — Systems Option — Industrial engineering approach to problem solving with particular application to administrative management problems. Includes method study, charting and analysis, work measurement, facility layout. Also provides training in production and inventory management.

TDMT 352 Transportation — Designed to give students a basic understanding of the operation of the four modes of transportation. The course highlights municipal, provincial and federal regulations/deregulations and introduces students to the essentials of freight rate applications and waybill audit. The course is tailored to users of transportation services.

Business Administration

Third Year Program

Administrative Management Systems

Following some experience in the work force, engineering and health technologists may assume supervisory and managerial responsibilities. Although well-versed in the technical aspects of their fields, they could, in most cases, benefit from further training in business management to be effective administrators. To fullfill this traning need, BCIT has developed a full-time diploma program in business management for graduates from health and engineering technologies or equivalent.

The Program

The nine month program includes such basic business subjects as management accounting, economics, personnel administration, data processing and marketing, to give students a thorough understanding of current business practices, which will enable them to apply a disciplined and professional approach to management. Lectures are supplemented by case studies and group discussions throughout the program. All students are required to carry a full course load each term.

Prerequisite

Diploma of Technology in Health or Engineering, or equivalent. Applicants should be interested in supervisory or managerial positions. Previous business experience is preferable, but not mandatory.

Post-graduation

Graduates of this diploma program may work towards accreditation as a Certified Administrative Manager through the Administrative Management Society.

Faculty and Staff

R.A. Cradock, B.Comm., M.B.A., R.I.A., F.S.M.A.C., Acting Dean of Management
T.P. Juzkow, B.A.Sc., M.B.A., P.Eng., Program Head
G. Storey, B.A., M. Sc.
R.A. Yates, LLB., M.B.A.

PROGRAM: Business Administration (3rd Year Program)

Level 5		Classroom hours per week ➧
ADMN 100	Micro Economics	3.0
ADMN 310	Management 3	3.0
ADMN 342	Human Resource Management	3.0
ADMN 360	Microcomputer Software Systems	3.0
BCOM 501	Advanced Business Communication	4.0
FMGT 519	Financial Management 1	4.0
OPMT 510	Business Mathematics	4.0

Level 6		Classroom hours per week ➧
ADMN 200	Macro Economics	3.0
ADMN 620	Organizational Behavior	3.0
ADMN 410	Management	3.0
ADMN 460	Microcomputer Software Applications	3.0
ADMN 385	Business Law	3.0
COMP 213	Computers and Information Systems	4.0
FMGT 619	Financial Management 2	4.0
MKTG 102	Introduction to Marketing	3.0

Course Descriptions

ADMN 100 Micro Economics — The major areas studied are the product and resource market. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored.

ADMN 200 Micro Economics — Develops and understanding of the organization and operation of the Canadian Economy in an International setting. The theoretical tools of the economist are used to expend the concepts of national income employment, inflation, money and banking international trade, and growth. An appreciation of the relationship between economic theory and economic policy is provided.

ADMN 310 Management 3 — Emphasizes the use of decision-making models in business. It is designed to train students in the use of quantitative methods in the choice of alternatives in the decision-making process. Prerequisite: ADMN 210.

ADMN 342 Human Resource Management — An introduction to the major personnel and industrial relations programs applicable to the British Columbia workplace with emphasis on the value of the worker and the overall effectiveness of modern human resource management. It develops understanding of the skills required for selection interviews, performance appraisals, compensation reviews, labor contract negotiations, training and development programs, grievance and collective agreement administration and reviews relevant employment law.

ADMN 361 Microcomputer Software Systems — An introduction to the use of applications software on the microcomputer. Topics include word processing, business graphics, spreadsheets, and databases on one or more operating systems.

ADMN 385 Business Law — A one-term, condensed course which acquaints the business student with a basic knowledge of Canadian law including the legal system, contracts, torts, sale of goods and consumer protection, secured transactions and creditors' remedies, employment law and agency, business organizations, negotiable instruments, real estate and administrative law.

ADMN 410 Management — An analysis of business policy formulation designed to give the student practice, experience and confidence in handling business situations, including those of a complex nature where basic policy decisions are necessary to assist in problem solving. Comprehensive business cases will be selected covering such fields as finance, control, personnel, production, marketing and general management, for study and discussion. The course is designed to acquaint the student with the role of top management and the interrelationships between these fields. Prerequisite: ADMN 310.

ADMN 460 Microcomputer Software Applications — A continuation of Microcomputer Software Systems, with emphasis on the solution of practical problems. Familiarity with the programs is developed enabling students to use them in other course areas.

ADMN 620 Organizational Behavior — The study of factors that either influence or are influenced by people at work. The course will focus on macro factors such as organizational structure,

technology and environment; group factors such as conflict and decisions making; and micro or individual factors such as attitudes, perception and motivation.

BCOM 501 Advanced Business Communication — As future managers, students learn to retrieve, extract and report information efficiently. Building on skills acquired in previous Communication courses, this course emphasizes improving persuasive writing and speaking skills, especially proposal writing.

COMP 213 Computer and Information Systems

FMGT 519 Financial Management 1 — Basic accounting procedures; closing the books; adjustments; working papers; merchandise operations; statement and ledger organization; special journals; forms of business organization; accounting principles; introduction to cost accounting; analysis of financial data; working capital; departmental and branch operations; consolidations.

FMGT 619 Financial Management 2 — see FMGT 519. Prerequisite: FMGT 519.

MKTG 201 Introduction to Marketing — A continuation of MKTG 101. An introduction to the marketing environment and marketing institutions. Detailed study of the basic marketing functions, marketing research, product planning, selection of trade channels, merchandising, advertising, sales promotion and salesmanship. Embraces marketing of consumer goods, as well as industrial goods. Prerequisite: MKTG 101.

OPMT 510 Business Mathematics — Review of basic mathematics applicable to business and industry; mathematics of finance, including retail operations, simple and compound interest, discounts, annuities, financial papers and depreciation methods. Emphasis is on practical applications to business administration.

Broadcast Communications

The Broadcast Communications program was initiated through the combined efforts of the private sector of the industry and the Canadian Broadcasting Corporation in this province. The need for trained personnel continues to grow in broadcast journalism, radio and television production, and related areas. Those interested in entering fields other than mass communications through broadcasting, i.e. audio and video production, public relations or cablecasting, will find much of the basic technical background included.

The educational emphasis is upon versatility so that a graduate may find employment in a variety of occupations within the broadcast industry. Students will enrol in one of the three options: Radio, Television or Broadcast Journalism.

Job Opportunities

Graduates are employed throughout British Columbia and in all parts of the world, wherever radio, television, cable facilities or audio and video production operations exist.

The Program

Radio

A detailed background is provided in AM and FM radio. Detailed instruction is given in announcing, on-air work, commercial copywriting and production, as well as other areas of radio operations, including sales and management. Students also receive as much practical experience as can be given in the time available, via structured operational simulations in first year, and operation of the campus radio station, CFML, in second year.

Television

This option concentrates on the production tools and operational methods of a modern television broadcast station, cable facility or video production house. Full use of color, and experience in producing all types of modern television productions is provided so that students may work their way through a variety of positions in television and video operations.

Broadcast Journalism

This option prepares students for careers as news reporters, newscasters and editors in radio and television. Training includes basic news broadcasting skills and academic courses. Skills such as news writing, audio and video editing, and announcing are combined with substantial knowledge of politics, economics, and other topics. Actual newsroom and field reporting operations give the student experience in skill development and judgment.

General Information

Students must pass audition and aptitude tests, where applicable, *and must be able to type 25 correct words per minute* to qualify for entrance into the technology. Normally only qualified applicants will be interviewed.

In each of the options students are graded against industry and professional standards and must achieve such standards within their period of study.

Prerequisite

Graduation from senior secondary school is a general prerequisite. Only a limited number of students can be accepted each year and applicants should apply early. Information meetings are held on the last Monday of August and the first Monday of each month during the school year (September — June) at 1730 in room 129, just off the north foyer in building 1A. Where the first Monday of a month is a holiday, the meeting is held on the second Monday. If on-campus interviews are not possible, please write to the Department Head and an interview in the field may be arranged. In making application, full details on related experience and extracurricular courses or aptitudes should be included. Prior to final acceptance, all qualified applicants are given formal interviews and are dealt with individually. No waiting list is established.

The prospective student is expected to have a thorough knowledge of English. Previous studies in the areas of political science, history and other humanities as well as current events, will also prove of value. Note: All applicants must submit a short essay (approximately 500 words) detailing their reasons for choosing broadcasting as a career. This essay must accompany the application, with all pertinent documents, letters of reference and recommendations, transcripts, etc.

Faculty and Staff

B. Antonson, Dipl. T., Department Head (Acting)
J.W. Ansell, Dipl. T., Program Head (Radio)(Acting)
H. Dorfman, B.A.
T. Handel, Dipl. T., Dipl. Adult Ed.
M. Hesketh, Program Head (Broadcast Journalism)
J.R. Jonasson
J.J. Kemp
R. Liepert
B. McMaster, B.A., M.A.
K.J. Mitchell
P. Munoz (on leave)
R.H.B. Nason, B.A., M.P.S.
B. O'Neill, Senior Maintenance Engineer
R. Riskin, Dipl. T., Program Head (Television)
D.W. Short
S. Smolar, B.A. (Comms.), A.Sc.T.
R. Taylor
J. Yount

TECHNOLOGY: Broadcast

PROGRAM: Radio

Level 1		Classroom hours per week
ADMN 320	Interpersonal Relationships	3.0
BCOM 101	Communication for Broadcasters	3.0
BCST 100	Industry Organization	2.0
BCST 101	Technical Basics	2.0
BCST 103	Copywriting	3.0
BCST 110	Radio Operations	9.0
BCST 111	Radio Announcing	6.0
BCST 112	Awareness	2.0
BCST 113	Introduction to Broadcast Journalism	2.0

Level 2		Classroom hours per week
ADMN 381	Broadcast Law	3.0
BCOM 201	Communication for Broadcasters	3.0
BCST 200	Industry Organization	2.0
BCST 203	Copywriting	3.0
BCST 209	*Practicum*	35.0
BCST 210	Radio Operations	9.0
BCST 211	Radio Announcing	6.0
BCST 212	Awareness	2.0
COMP 112	Computers in Broadcast	3.0

Level 3 Classroom hours per week

BCOM 301	Communication for Broadcasters	3.0
BCST 310	Radio Operations	14.0
BCST 311	Radio Management	14.0
OPMT 319	Statistics for Broadcasters	3.0

Level 4 Classroom hours per week

ADMN 101	Economic Issues	3.0
BCOM 401	Communication for Broadcasters	3.0
BCST 409	Practicum	35.0
BCST 410	Radio Operations	14.0
BCST 411	Radio Management	14.0

TECHNOLOGY: Broadcast

PROGRAM: Television

Level 1 Classroom hours per week

ADMN 101	Economic Issues	3.0
ADMN 320	Interpersonal Relationships	3.0
BCOM 101	Communication for Broadcasters	3.0
BCST 100	Industry Organization	2.0
BCST 101	Technical Basics	3.0
BCST 103	Copywriting	3.0
BCST 120	Television Introduction	11.0
BCST 121	Picture Basics	2.0

Level 2 Classroom hours per week

ADMN 381	Broadcast Law	3.0
BCOM 201	Communication for Broadcasters	3.0
BCST 200	Industry Organization	2.0
BCST 203	Copywriting	3.0
BCST 209	Practicum	35.0
BCST 220	Television Introduction	20.0
BCST 221	Photography and Darkroom Techniques	1.0
BCST 222	Color Television	2.0

Level 3 Classroom hours per week

BCOM 301	Communication for Broadcasters	3.0
BCST 320	Television Production	20.0
BCST 321	Television Production Theory	2.0
BCST 322	Television News	4.0
BCST 323	Television Production Planning	3.0
BCST 324	Educational Television Production	4.0
COMP 112	Computers in Broadcasting	3.0

Level 4 Classroom hours per week

BCOM 401	Communication for Broadcasters	3.0
BCST 409	Practicum	35.0
BCST 420	Television Production	20.0
BCST 421	Television Theory	2.0
BCST 422	Television News	4.0
BCST 424	Educational Television	8.0
MKTG 100	Marketing 1	3.0

TECHNOLOGY: Broadcast

PROGRAM: Journalism

Level 1 Classroom hours per week

ADMN 101	Economic Issues	3.0
BCOM 101	Communication for Broadcasters	3.0
BCST 130	Introduction to News Reporting	2.0
BCST 131	Introduction to Announcing	3.0
BCST 132	Introduction to Radio	2.0
BCST 133	Introduction to Television	2.0
BCST 134	News Writing	4.0
BCST 135	Municipal Government	2.0
BCST 136	Picture Basics	4.0

Level 2 Classroom hours per week

BCOM 201	Communication for Broadcasters	3.0
BCST 209	Practicum	35.0
BCST 230	News Reporting	2.0
BCST 231	News Announcing	3.0
BCST 232	Radio News	6.0
BCST 233	Television News	4.0
BCST 235	Government and Politics	4.0
COMP 112	Computers in Broadcasting	3.0

Level 3 Classroom hours per week

BCST 330	Investigative Reporting	2.0
BCST 331	Media Law	2.0
BCST 332	Radio News	10.0
BCST 333	Television News	10.0
BCST 335	History and Social Science	2.0

Level 4 Classroom hours per week

BCST 409	Practicum	35.0
BCST 430	Documentaries	2.0
BCST 431	Labor and Business	2.0
BCST 432	Radio News	10.0
BCST 433	Television News	10.0
BCST 435	History and Social Science	2.0
BCST 437	Industry Preparation	2.0

Course Descriptions

ADMN 101 Economic Issues — The intent of this course is to expose students to the application of various economic principles to the study of particular problems. Topics vary depending upon the instructor and the technology receiving the course.

ADMN 320 Interpersonal Relationships — Broadcasting involves unusually close interaction among its participants, who work together to provide information, entertainment and station revenues. The course explores the importance of harmonious relationships and how to achieve them.

ADMN 381 Broadcast Law — An introduction to the Canadian legal system emphasizing contracts, torts (including defamation and privacy), criminal law, court procedure and contempt, secured transactions, government agencies, employment law, forms of doing business and negotiable instruments.

BCOM 101 Communication for Broadcasters — Through lectures, labs and industry examples, this course examines some of the basic differences between writing for print and writing for the ear. Students completing this course should be able to apply some of these principles to a variety of standard broadcast features such as reviews, profiles, etc., written in clear, concise and correct language.

BCOM 201 Communication for Broadcasters — A continuation of BCOM 101, this segment of the course will apply the principles of television writing. Students will work individually and in groups to produce a number of presentations and scripts including a documentary feature. Prerequisite: BCOM 101.

BCOM 301 Communication for Broadcasters — Emphasis is on the writing and research skills needed by professionals in broadcasting. Writing skills will be developed through writing scripts for reviews and critiques, writing powerful business letters and memos and developing effective program and story ideas. Research skills will be developed through units on speed reading, time management and advanced research techniques.

BCOM 401 Business Communication for Broadcasters — Emphasis is on skills needed to sell writing to broadcasters and to sell students' abilities and training to employers. Skills will be developed through units on covering letters, resumes and job interview techniques; copyright law; writing effective proposals,

queries and sales presentations, and translating students' work into several media. Students will be required to produce broadcast material written to professional industry standards.

BCST 100 Industry Organization — Introduction to the development of the Canadian Broadcasting System, policies and institutions from their beginnings, through their evolution to contemporary standards and practices. The aim is to achieve a better understanding of today's broadcast industry through an historical perspective and scrutiny. Areas of discussion include regulations, associations, political considerations, ratings systems, music licensing, broadcast history, regulatory bodies, etc.

BCST 101 Technical Basics — Students are introduced to the basics of electricity, magnetism, batteries and other principles which are then applied to the equipment they will be working with. The origin of sound is traced through the entire processing and transmission system to its ultimate reception in the listener's home. The same is done with the sending and receiving of television pictures. This is an elementary introduction to explain "how things work".

BCST 103 Copywriting — Familiarizes students with advertising techniques, particularly in the broadcast media. Lectures and workshop sessions relate to the writing and evaluation of radio and television commercials. Basic marketing concepts, the function of advertising in society and the economics of broadcast are related. Commercials are studied in detail. Special emphasis is placed on developing the student's ability to work within a group situation. While students may not become writers, the course could lead to a position in copywriting, broadcast sales or promotion.

BCST 110 Radio Operations — An introduction to the equipment and techniques used in radio broadcasting. Starting with station organization, the student continues with a study of microphones, radio control boards, tape machines and broadcast accessories, and develops the manual dexterity needed in the operation of this equipment.

BCST 111 Radio Announcing — An introduction to effective oral communication for radio using lectures, exercises and practical application of the techniques of the various specialized forms taught. Individual and classroom critiques are employed and auditions and assignments measure progress. Broadcast regulations and program scheduling are also included in the announcer-related areas of practical responsibilities.

BCST 112 Awareness — It is essential that a broadcaster be credible to the listener by exhibiting concerns and interests close to the individual and the community. As broad a base of external knowledge as possible must be acquired reflecting the local, regional, national and international scene. Lectures and practical exercises assist in acquiring and building the knowledge base and using it effectively.

BCST 113 Introduction to Broadcast Journalism — Introduces the radio student to the basic fundamentals and principles of news broadcasting. The course will instruct students in the gathering, handling, and dissemination of news and sports information and will make them more aware of the importance of information programming in the broadcast industry.

BCST 120 Television Introduction — Understand the basic components of a television production and how each interrelates with the others. Equipment explanations include cameras, switchers, audio equipment, video tape recording, and EFP/ENG usage. Manual dexterity is developed in the operation of studio and control room production equipment. The course is divided into approximately 8 hours lab (orientation/practical) and 3 hours lecture. This may fluctuate from time-to-time.

BCST 121 Picture Basics — Covers the fundamentals of picture taking, including the practical aspects of focus, lighting, etc., and creative aspects — how to tell stories with pictures. The course provides the conceptual base for later work in electronic news gathering (ENG) techniques.

BCST 130 Introduction to News Reporting — Introduces the student to the basic principles of radio and television news gathering and dissemination. The course will give the student a grounding in the systems, issues, and policies of the broadcast news industry and will prepare the student for the more detailed and involved aspects of the succeeding news course.

BCST 131 Introduction to Announcing — The student is introduced to basic concepts of voice use, announcing techniques and news reading skills. Stress is placed on daily practice and students receive both individual and group coaching.

BCST 132 Introduction to Radio — Broadcast journalism and engineering students are introduced to radio broadcast equipment and production techniques. The course is designed to give the student a basic appreciation and understanding of the operational side of radio broadcasting. Much practical work complements classroom instruction.

BCST 133 Introduction to Television — Introduces broadcast journalism students to television educational techniques, preparing for future work in this industry by providing an understanding of television operations that occur while they are "on camera".

BCST 134 News Writing — Trains and prepares students to write radio and television news copy. Two hours per week are devoted to lecture and basic writing theory. Two hours are directed at "in-class" writing and re-writing practice for both media. The course relies heavily on "in-class" practice and critique. Occasionally, students will take part in critiques of their own work, and that of others. Guest lecturers from within the broadcast industry are utilized from time-to-time.

BCST 135 Municipal Government — This course follows a lecture format, with practical assignments, and covers the fundamental operations, structures and problems of local government in B.C. The focus is related directly to news reporting work.

BCST 136 Picture Basics — Students examine the language of pictures and their use to convey information. Topics include the history of pictorial communications, social context, the relationship between picture making technologies, picture communications and picture use in television news. The course objective is conceptual stimulation rather than "button pushing". While some familiarity with 35mm. photography is assumed, there are ample opportunities to learn "the basics".

BCST 200 Industry Organization — Building on the understanding of Canadian broadcasting developed in BCST 100, this course closely examines the broadcast policies, institutions, and regulations that affect both private and public sectors of the Canadian Broadcast system. Prerequisite: BCST 100.

BCST 203 Copywriting — see BCST 103. Prerequisite: BCST 103.

BCST 209 Practicum — This is a four week practical exercise to end first term. Radio and journalism students will operate radio station CFML twenty-four hours per day during this period, while the television students produce a series of program segments. Television and journalism students will produce television newscasts through the weeks.

BCST 210 Radio Operations — A continuation of BCST 110, the major emphasis for the student will be on honing the technical operations skills learned in term one. Commercial production,

radio station operations, audition tapes, and the use of lightweight, portable equipment are topics for instruction in this term. Emphasis is placed on practical applications of theory. Prerequisite: BCST 100.

BCST 211 Radio Announcing — Effective oral communication of ad-lib and written material is strengthened this term, along with timing, up-grading to acceptable on-air standard, and continued classroom drills, exercises and practice. Basis for correct foreign language pronunciation is provided. Operations in conjunction with radio operations labs serve to bring reality to course objectives. Prerequisite: BCST 111.

BCST 212 Awareness — Building on the knowledge base attained in term one seminars, lectures and oral communication exercises further develop even broader areas of specific listener-oriented subjects and concerns, and the application in various broadcast forms. Organization of facts and concise communication delivery form is stressed. Prerequisite: BCST 112.

BCST 220 Television Introduction — Understand the basic components of a television production and how they interrelate. Equipment explanations include cameras, switchers, audio equipment, video tape recording, and EFP/ENG usage. Manual dexterity is developed in the operation of studio and control room production equipment. The course is divided into approximately 8 hours lab (orientation/practical) and 3 hours lecture. This may fluctuate from time-to-time. Prerequisite: BCST 120.

BCST 221 Photography and Darkroom Techniques — Designed for TV students, the course concentrates on 35 mm photography in TV stations where the production of slides for news and commercial use is often extensive. Students learn how to take good pictures and to develop and print them.

BCST 222 Color Television — Begins with the psychophysics of human color vision and explains how the eye sees and adapts to colored objects. This theory is then applied to the N.T.S.C. color television system used on this continent. The course explores how the television system processes the color signal, how to properly set up and match color cameras and how to properly adjust a color picture monitor.

BCST 230 News Reporting — This course gets the student involved in the identification, researching and gathering of news material in an organized manner. The student is introduced to beat and filing systems, the courts, the police, organized labor, business, and politics. Prerequisite: BCST 130.

BCST 231 News Announcing — After initial voice training in term one, the student is now ready for advanced radio and TV news reading. Through additional training and coaching, the student is expected to polish voice skills and become proficient at ad-lib techniques and interviewing. The student must develop proficiency in news presentation for both radio and TV. Prerequisite: BCST 131.

BCST 232 Radio News — This is the first opportunity for students to work in a newsroom environment. The class is divided into small groups for personal instruction on operating newsroom equipment. This is followed by several weeks of practice where students write, compile and read newscasts as well as honing their ability to use newsroom equipment. Prerequisite: BCST 134.

BCST 233 Television News — Students learn the process by which a story idea is transformed into a television news story. They learn to gather visual materials that tell their story, to write a script that works with their visuals, and to edit visuals together with script to create a comprehensible television news story. Some attention is given to newscast make-up and presentation. Prerequisite: BCST 133.

BCST 235 Government and Politics — Since a broadcast journalist is frequently dealing with political issues, this course acquaints the student with the structure of the Canadian Federal and Provincial governments. It also provides the student with an opportunity to research political issues and be involved in interaction with other students on current issues.

BCST 310 Radio Operations — Having gained basic competence in radio broadcast technique, students now apply their knowledge to regular practical work through operation of the campus radio station. All work is done to industry standards and individual and group performance is evaluated and critiqued. In lecture situations, students receive training in station systems and operations, multi-track recording and advanced production techniques. This training is then put into practical use via assignment and the day-to-day operations of the radio station. The course is demanding and stimulating. Prerequisite: BCST 110 or BCST 210 or BCST 111 or BCST 211.

BCST 311 Radio Management — Detailed studies are made in a number of topic areas that affect broadcasters attitudes toward the industry and their abilities to perform within it. These include basic business concepts, announcing skills, overviews on programming variables, the roles of information and music in contemporary programming, statistical measures in broadcasting, career development, broadcast sales and management. Prerequisite: BCST 111 or BCST 211 or BCST 110 or BCST 210.

BCST 320 Television Production — Upon successful completion of this course, students will be able to demonstrate their professional competency as members of a television production team as they rotate through all respective positions. Studio, field and post-production activities will be assigned to meet the production of a variety of program formats. Students will assume all managerial, production and support function responsibilities. Prerequisite: BCST 120, BCST 220.

BCST 321 Television Production Theory — Upon successful completion of this course, students will be able to organize and conduct a production meeting, provide constructive criticism of their peers performance and accept the same for their own projects, gain an understanding of various aspects of the broadcast industry through contact with professionals, which will provide the basis for oral and written presentations on selected topics. Presentation topics will be assigned by the first week in October.

BCST 322 Television News — This studio activity is assigned to second year television students to provide the routine of airing television newscasts on a weekly basis. Students will be rotated through production crew positions following the Broadcast Journalism rotation schedule. Students are expected to demonstrate professional competence in all crew positions as they "air" TV newscasts. Prerequisite: BCST 221.

BCST 323 — Television Production Planning — Upon successful completion of this course, the student will be able to plan all the elements necessary to guarantee a production which meets the professional standards of the television production industry, and organize and conduct pre and post production meetings as the producer/director of a proposed series pilot. Prerequisite: BCST 220.

BCST 324 Educational Television Production — This studio activity is assigned to second year television students in order to provide them with the opportunity to prove their professional competence as members of the BCIT Television production team for BCIT Knowledge Network productions and other educational video programming. These programs will be either "live" transmissions or pre-taped.

BCST 330 Investigative Reporting — Even though all reporting involves an investigative process, this course prepares the student for specialized reporting in public affairs and consumer research. The student is taught interviewing and research techniques and is expected to complete a major investigative project. Prerequisite: BCST 235.

BCST 331 Media Law — It is important for a broadcaster to be trained to function within the Canadian judicial system. This course explains the inner workings and the various levels of courts and it familiarizes students with Canadian criminal law and the laws of libel and slander. Prerequisite: BCST 232 or BCST 233.

BCST 332 Radio News — Students now begin performing in structured newsroom operations. They are divided into groups to operate the student radio station and the two newsroom labs. Some students are also given off-campus assignments to give them experience as beat reporters at courthouses, city and municipal halls and police headquarters. Students are given frequent individual and class critiques on their performance. Prerequisite: BCST 232.

BCST 333 Television News — Students bring ideas for news stories to class where these ideas are produced to fit the formats of television news. While most of the emphasis will be on ENG production, occasional stories may warrant the use of available studio and graphic facilities. Stories are incorporated into news programs that are produced in conjunction with the television production option. Prerequisite: BCST 233.

BCST 335 History and Social Science — Students are introduced to concepts from the social sciences — especially group membership, society, culture, ethnicity, alienation and deviance. Topics are related to recent news stories from British Columbia and Canada, and include B.C. history, ethnic groups, Canadian regional economic development, and issues in Canadian society. Class time is divided between lectures, discussions and student presentations.

BCST 409 Practicum — During the last month of the final term, students are located in industry positions to observe, practice, work and learn in actual industry situations. This "real world" experience complements the training and experience received in the past two years, providing a final preparation for assuming paid positions as a start to their broadcast careers. Prerequisite: All appropriate option courses.

BCST 410 Radio Operations — Using the operation of the campus radio station as a base, students specialize in desired work areas and are fine-tuned in preparation for entering the industry. Much emphasis is placed on preparation for job applications and industry interviews. Under the co-operative education program, eligible students may enter full-time, paid positions in industry while continuing their studies via correspondence assignments. The course concludes in mid-April, at which time students commence practicum assignments. Industry practices and standards prevail throughout the course. Prerequisite: BCST 110, 210, 310.

BCST 411 Radio Management — Considerable time is spent preparing students for their chosen roles in industry. The functioning of the student in day-to-day operations of radio station CFML takes on increasing importance in this final term of formal training. The course examines contemporary station management practices plus current roles and responsibilities surrounding the members of a modern management team. Prerequisite: BCST 111, 211, 311.

BCST 420 Television Production — see BCST 320. Prerequisite: BCST 320.

BCST 421 Television Theory — see BCST 321. Prerequisite: BCST 321.

BCST 422 Television News — see BCST 322. Prerequisite: BCST 322.

BCST 424 Educational Television — see BCST 324.

BCST 430 Documentaries — Research, reading and class discussion on topical subjects are designed to deepen the student's understanding of news-related issues and methods of approaching them. Prerequisite: BCST 330.

BCST 431 Labor and Business — As the student approaches graduation, it is important that he or she have a good understanding of labor unions and the management structure. This course explains the structure of unions as well as the labor laws of BC and Canada. The second part of the course explores the complexities of business, finance and the stock market. Prerequisite: BCST 332 or BCST 333.

BCST 432 Radio News — This is the advanced course in newsroom operations and students continue to practice the skills of reporting, writing and announcing. Students continue to work in the field as well as operating the student radio station and the news labs. The major thrust of this course is to identify student weaknesses and to assist them in strengthening their performance for entry into the industry. Prerequisite: BCST 332.

BCST 433 Television News — This course is a continuation of the third term television news lab. While the format for both courses is the same, the standards of evaluation in the fourth term are raised to reflect the expectations of professional broadcast journalism. Prerequisite: BCST 333.

BCST 435 History and Social Science — Students are divided into research teams for intensive research into the historical backgrounds of major international news stories; these teams report to class members. The report takes the form of a debate between team members. Following the debate, participants handle questions from the class in a news conference format.

BCST 437 Industry Preparation — This course is designed to give the student final preparation for graduation and employment. Students prepare a resume and audition package which is distributed to radio and TV stations in western Canada. Part of the course familiarizes students with sales, marketing and newsroom management. Prerequisite: BCST 331.

COMP 112 Computers in Broadcasting — The computer is an important servant of broadcast communication. Topics include application processing for the radio, journalism and television fields along with general systems analysis and design for the business area of broadcasting including program logs, record library, computer graphics and word processing.

MKTG 100 Marketing 1 — A comprehensive study of the foundations and principles of marketing for those students pursuing a concentrated marketing based program. Covers basic marketing functions, marketing research, product planning; distribution, sales and promotion activities. Examines marketing in relation to all types of consumer, industrial and service firms.

OPMT 319 Statistics for Broadcasters — Examines the elements of descriptive statistics. These comprise techniques for collecting, summarizing and treating data so as to facilitate its use and comprehension. Graphic presentation is emphasized. Forecasting techniques are discussed, as is the construction of basic index numbers, with emphasis on the Canadian Consumer Price Index and its ramifications. The B.B.M. and Nielsen ratings, opinion polling and station rate cards are also covered in detail.

Broadcast Engineering

Third Year Program

Broadcast Communications Technology

This post-diploma program is designed to meet the increasing need for highly skilled maintenance engineers in the broadcast and cable industries, and related fields.

The Program

Three main course areas are supplemented with a co-operative education component.

Television studio systems and equipment provide the student with detailed experience in the maintenance of highly specialized equipment used in modern television and cable stations. Particular emphasis will be placed upon the servicing of video tape equipment, including studio, portable and remote equipment. Time will also be devoted to preventative maintenance schedules and systems design.

Radio studio systems and equipment will give students extensive practice in applying electronic skills to modern radio, monaural and stereo broadcast equipment. Special emphasis will be placed on new technology in radio broadcasting, keeping in mind the complexity of older equipment presently in use.

AM television and FM transmission systems and equipment maintenance will comprise the third course area.

Those from outside greater Vancouver will be given preference in their home locations with respect to co-op education assignments.

Prerequisite

Diploma of Technology in Electronics, or equivalent experience in the work force.

Faculty and Staff

B. Antonson, Dipl. T., Acting Department Head
S. Smolar, B.A. (Comms.), A.Sc.T., Program Head

TECHNOLOGY: Broadcast

PROGRAM: Broadcast Engineering (3rd Year program)

Level 1		Classroom hours per annum ➧
BENG 501	Basic Audio Production	38
BENG 502	Audio Technology	152
BENG 503	AM and FM Transmitters	76
BENG 504	Basic TV Production	76
BENG 505	Video Technology 1	190

Level 2		Classroom hours per annum ➧
BENG 603	TV Transmitters	30
BENG 605	Video Technology 2	190
BENG 609	Practicum	120

Course Descriptions

Level 1

BENG 501 Basic Audio Production — Operation familiarization and production techniques for sound studios. Students are introduced to radio broadcast equipment and production techniques. The course is designed to give the student a basic appreciation and understanding of radio operations.

BENG 502 Audio Technology — The nature of sound: principles of hearing; definition and relationship of loudness and sound pressure levels; definitions and applications of white and pink noise; octave and third octave band filtering; noise criterion curves and applications; good design practice for noise control; sound level measurements; definition and significance of reverberation time; standing waves; absorption factors; measurement and control of reverberation time; good design practice for studio acoustics. Audio signal sources; microphone types and characteristics; signal levels and impedances; typical control systems, amplifier performance criteria; input noise level and head-room; attennator networks; mixing and bridging networks; VU meter characteristics and calibration; program and graphic equalizers; artificial reverberation systems; signal distribution systems; audio monitoring systems; audio system test equipment and measurements. Audio recording systems; reel/reel systems, principles and alignment techniques; NAB cartridge systems, principles and alignment techniques; disc recording principles and playback criteria; stereophonic signal control and processing; advanced audio signal processing techniques; peak limiters; volume compressors; selective processing; line transmission of audio signals; design criteria; advanced audio system test equipment and measurements.

BENG 503 AM and FM Transmitters — AM transmission standards and channel assignments; typical AM transmitting systems; AM stereo, AM modulation techniques including high-level, dougherty and phase/amplitude; DOC monitoring requirements; transmitter test and alignment techniques; selection and use of RF transmission lines for AM systems; antenna array design criteria; DOC/FCC protection requirements; horizontal pattern determination; vertical pattern determination; array alignment techniques; DOC proof of performance requirements; supplementary proof requirements; test equipment calibration. FM transmission standards and channel assignments; typical FM transmitting systems; FM modulation techniques; stereo multiplexing principles and techniques; SCA multiplexing techniques; DOC monitoring requirements; transmitter test and alignment techniques; selection and use of RF transmission lines for FM systems; transmitting antenna selection criteria; antenna performance measuring techniques; DOC initial commissioning requirements.

BENG 504 Basic TV Production — Studio equipment operation and familiarization with production techniques.

BENG 505 — Video Technology 1 — The television signal format; principles of interlaced scanning; review of imaging devices, system limitations and critical parameters; typical monochrome camera system; typical monochrome control and distribution system; monochrome monitoring equipment; elementary video signal analysis. Principles of color signal encoding; color matrixing techniques; system limitations and critical parameters; typical 3 tube color camera system; camera fault analysis and alignment techniques; color signal control and processing; advanced color video signal analysis; vertical interval test signals.

Level 2

BENG 603 TV Transmitters — TV transmission standards and channel assignments; principles of vestigial sideband transmission and signal recovery, principle of negative modulation; DOC transmission standards and monitoring requirements; principles and merits of various forms of visual trasmitter modulation — low-level, high-level and IF modulation; detailed analysis of typical transmitter circuitry; transmitter test and alignment techniques;

equipment servicing exercises; selection and use of RF transmission lines for TV transmission; transmitting antenna selection criteria; antenna system performance measurements.

BENG 605 Video Technology 2 — Principles of helical scan video recording; detailed analysis of typical recorders; equipment test and alignment techniques; equipment servicing exercises; principles of quadruplex video recording; detailed analysis of typical recorder; principles of electronic video editing; analysis of typical editing system C format video recorders, 3/4" and 1/2" video recorders. Principles of digitizing video signals; advantages and limitations of digital signal processing; typical time-base correction system; typical digital frame store system; frame store applications including standards conversion.

BENG 609 Practicum — Practical experience working in and with the broadcast industry.

Financial Management

No enterprise can survive without the means for funding and financial control and in modern business the techniques of financial management — financial planning, budget preparation and financial control — have gained increasing importance as management tools. BCIT students may specialize in accounting or finance.

Job Opportunities

Specialists in accounting commonly enter middle management positions in financial accounting, cost accounting, internal audit and budget preparation.

Graduates in finance are placed in a variety of positions — in banks, trust companies, insurance companies and finance companies, as well as in the finance departments of businesses, industries and government. After gaining appropriate experience, finance specialists may rise to the managerial level and beyond.

The Program

Following a year of general studies in business, students will enter one of two options: Accounting or Finance.

The Accounting Option is concerned with management accounting systems, financial reporting and auditing. The second year courses in this option build upon the accounting, data processing and computer systems fundamentals introduced in the first year with increased concentration on financial and cost accounting.

The Finance Option deals with the intricacies of funding business operations. In addition to a thorough grounding in financial accounting, students in this option make an in-depth study of financial decision making in their second year of the Financial Management program.

Prerequisite

Algebra 11 and English 12 both with C+ are the course requirements for this program. Applicants must have an inquiring and logical mind, a capacity for hard work, excellent communication skills and the ability to work well with others. Candidates who do not meet this requirement are to include with their application, a letter (with references) outlining their career objectives and reasons for selecting Financial Management to enable the departmental selection committee to consider their application.

Professional Accreditation

The accounting profession, through its professional bodies, recognizes a wide variety of accounting subjects offered in the program. The Canadian Institute of Chartered Accountants, the Canadian Certified General Accountants' Association, the Society of Management Accountants and the Canadian Credit Institute give credit for various subjects.

In addition to the professional bodies, universities will give credit for subjects taken in the program where students wish to continue their training and qualify for a university degree. For example, graduates of the Financial Management Diploma program are eligible to transfer to the Open Learning Institute Bachelor of Arts in Administrative Studies program to continue their studies toward a degree.

Faculty and Staff

R.A. Cradock, B.Comm., M.B.A., R.I.A., F.S.M.A.C., Acting Dean, School of Management Studies
G.H. Farrell, Dipl. T., M.B.A., R.I.A., F.S.M.A.C., Acting Department Head
R.C. Bell, B.A. (Econ.), C.G.A.
C.M. Briscall, B.Com., M.B.A., R.I.A., F.S.M.A.C., Program Head
J. Cairns, C.G.A.
D.K. Chan, B.Comm., M.B.A., C.A.
A.D. Cobbett, Dipl. T., M.B.A., R.I.A.
J.R.H. Curtis, B.Com., M.B.A., A.M.B.I.M., Leave of Absence
R.J. Dolan, B.B.A., M.B.A., Program Head
J.V. Gibson, R.I.A.
K.M. Hamm, B.Com., R.I.A., Chief Instructor
E.M. Iannacone, B.Com., M.B.A., R.I.A., F.S.M.A.C.
R.W. Jackson, M.C.I.
J.L. Johnston, Dipl.T., C.G.A.
H.M.J. Lawson, B.Sc. (Econ.), M.B.A., Leave of Absence
J.C. McAdam, B.A.Sc., M.B.A., P.Eng.
R.B. McCallum, B.Eng., M.B.A., R.I.A., Leave of Absence
R.G. Murphy, Dipl.T., R.I.A.
R.C. Nichols, B.Com., R.I.A., Chief Instructor
J.F. Porteous, R.I.A.
C. Priester, B.Comm., M.A., F.C.B.A., Senior Instructor
C.J. Trunkfield, B.A., M.B.A., F.C.G.A.
P.J. Woolley, B.A., M.A., C.A.
H.B. Yackness, B.Com., M.B.A., C.A., Chief Instructor
I. Zelechowsky, B.Sc., Dip. Acct'g., M.B.A.

TECHNOLOGY: Financial Management

Level 1 — Classroom hours per week

ADMN 100	Micro Economics	3.0
ADMN 220	Organizational Behavior	3.0
BCOM 104	Business Communication for Financial Management	3.0
COMP 100	Data Processing — Introduction	4.0
FMGT 101	Accounting 1	4.0
MKTG 102	Introduction to Marketing	3.0
OPMT 112	Business Mathematics	4.0

Level 2 — Classroom hours per week

ADMN 200	Macro Economics	3.0
ADMN 216	Management	3.0
BCOM 204	Business Communication for Financial Management	3.0
COMP 120	Computers in Business	3.0
FMGT 106	Credit and Collections	3.0
FMGT 201	Accounting 2	4.0
OPMT 132	Statistics for Financial Management	4.0

PROGRAM: Accounting

Level 3 — Classroom hours per week

ADMN 385	Business Law	4.0
FMGT 301	Cost and Managerial Accounting 1	4.0
FMGT 302	Financial Accounting 1	4.0
FMGT 307	Finance 1	4.0
FMGT 310	Auditing 1	3.0
FMGT 311	Quantitative Methods in Finance	4.0
FMGT 313	Taxation 1	3.0
FMGT 318	Microcomputer Software Systems	4.0

Level 4 — Classroom hours per week

FMGT 401	Cost and Managerial Accounting 2	4.0
FMGT 402	Financial Accounting 2	4.0
FMGT 404	Finance 2	4.0

FMGT 406	Auditing 2	3.0
FMGT 407	Microcomputer Applications	4.0
FMGT 409	Taxation 2	3.0
FMGT 411	Projects in Industry	4.0

PROGRAM: Finance

Level 3		Classroom hours per week
FMGT 385	Business Law	4.0
FMGT 302	Financial Accounting 1	4.0
FMGT 307	Finance 1	4.0
FMGT 308	Security Analysis 1	4.0
FMGT 311	Quantitative Methods in Finance	4.0
FMGT 313	Taxation 1	3.0
FMGT 318	Microcomputer Software Systems	4.0
FMGT 331	Money and Banking 1	4.0

Level 4		Classroom hours per week
FMGT 402	Financial Accounting 2	4.0
FMGT 404	Finance 2	4.0
FMGT 406	Security Analysis 2	4.0
FMGT 407	Microcomputer Applications	4.0
FMGT 409	Taxation 2	3.0
FMGT 411	Projects in Industry	4.0
FMGT 431	Money and Banking 2	4.0

TECHNOLOGY: Financial Management — January intake

Level 1		Classroom hours per week
ADMN 100	Micro Economics	3.0
ADMN 112	Management 1L	3.0
BCOM 108	Business Communication	3.0
COMP 106	Introduction to Data Processing 1L	4.0
FMGT 106	Credit and Collections	3.0
FMGT 115	Accounting 1L	4.0
MKTG 102	Introduction to Marketing	3.0
OPMT 112	Business Mathematics	4.0

Level 2		Classroom hours per week
ADMN 200	Macro Economics	3.0
ADMN 220	Organizational Behavior	3.0
BCOM 208	Business Communication	3.0
COMP 125	Computers in Business	3.0
FMGT 215	Accounting 2S	4.0
OPMT 112	Business Mathematics	4.0

Course Descriptions

ADMN 100 Micro Economics — The major areas studied are the product and resource market. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored.

ADMN 200 Macro Economics — Develops an understanding of the organization and operation of the Canadian economy in an international setting. The theoretical tools of the economist are used to expand the concepts of national income employment, inflation, money and banking, international trade and growth. An appreciation of the relationship between economic theory and economic policy is provided.

ADMN 216 Management — A study of management functions and practices--planning, organizing, leading and controlling. Included are such topics as forms of business ownership, strategic and tactical planning, decision-making, organizational structure, staffing, delegating, production planning and control, and control techniques (with some variation of emphasis depending on the technology for which the course is provided). Students are given the opportunity to develop analytical and communications skills by analyzing and proposing solutions to typical business problems.

ADMN 220 Organizational Behavior — The study of factors that either influence or are influenced by people at work. The course will focus on macro factors such as organizational structure, technology and environment; group factors such as conflict and decision making; and micro or individual factors such as attitudes, perception and motivation.

ADMN 385 Business Law — A one-term, condensed course which acquaints the business student with a basic knowledge of Canadian law including the legal system, contracts, torts, sale of goods and consumer protection, secured transactions and creditors' remedies, employment law and agency, business organizations, negotiable instruments, real estate and administrative law.

BCOM 104 Business Communication for Financial Management — Prepares students to meet the business communication demands of financial management positions. They learn to plan, organize and write effective business letters and memos. They will also prepare and present oral reports.

BCOM 108/208 Business Communication — January Intake for Financial Management — This course covers the topics from BCOM 104/204 but in a different sequence.

BCOM 204 Business Communication for Financial Management — Gives further instruction and practice in the principles taught in BCOM 104. In this term, instruction will concentrate on how to write short and long reports, prepare more complex oral presentations and conduct meetings and interviews. Prerequisite: BCOM 104.

COMP 100 Data Processing — Introduction — Training in basic data processing principles to develop recognition of the application of these principles to industry. The principal functions of data processing are illustrated and practised with an H.P. minicomputer operating interactively. Elementary computer programs are written and tested on the computer. Use of flow-charting and elementary data processing systems design will illustrate the achieving of data processing objectives.

COMP 106 Introduction to Data Processing — This course combines all of the topics included in COMP 100 together with the business systems analysis topics from COMP 120. (The remaining topics from COMP 120 are covered in COMP 125.)

COMP 120 Computers in Business — Designed to give the student an understanding of business computer systems. Topics include computer hardware — types, usage, evaluation; systems development — feasibility studies, analysis, design, implementation; packaged software — use and evaluation. Emphasis will be placed on particular areas of interest to the specific technologies.

COMP 125 Computers in Business — Topics covered include computer systems analysis and design, hardware and software evaluation and hands-on use of various application software packages available on microcomputers.

FMGT 101 Accounting 1 — Permits persons with little or no accounting background to become familiar with the techniques of working through the full accounting cycle. The course provides theoretical and practical training in basic accounting as preparation for FMGT 201. Topics include accounting as an information system; introduction to accounting theory; income measurement; traditional record-keeping procedures; the accounting cycle; special journals; cash; investments and receivables.

FMGT 106 Credit and Collections — A detailed examination of credit granting, collection techniques and credit philosophy in all levels of business prepares the student to assist the credit manager of a large or small business in any area of the subject. Topics include determining credit risk; credit instruments and collateral security; types of consumer credit and credit cards; sources of consumer credit information; collections; credit department management.

FMGT 115 Accounting 1L — Enables students to start the basic course in accounting in January. It is the equivalent of FMGT 101 and the first six weeks of FMGT 201 for a total of 18 weeks of the 30 week presentation. The balance of the course may be taken in either May or September FMGT 201. For a description of the course content see FMGT 101/201.

FMGT 201 Accounting 2 — The follow-up to FMGT 101, topics include inventory, long-lived assets, liabilities, forms of business organizations, cash-flow and working capital analysis, manufacturing accounting, management accounting, consolidated statements, analysis of financial statements and price level changes. Prerequisite: FMGT 101.

FMGT 215 Accounting 2S — Follow-up course to FMGT 115, enabling students to complete the last 12 weeks of the basic accounting course. See FMGT 201 for details. Prerequisite: FMGT 115.

FMGT 301 Cost and Managerial Accounting 1 — Emphasizes the role of the management accountant, cost terms and purposes, cost-volume-profit relationships, job order accounting, budgeting, responsibility accounting and standard costs. Prerequisite: FMGT 201 or 215.

FMGT 302 Financial Accounting 1 — For students with basic accounting knowledge to broaden their understanding of the accounting process and its underlying theory. This course and FMGT 402 prepare them for career advancement and advanced study in accounting. Topics cover development of financial information for external circulation; the accounting process from a more analytical standpoint; the income statement and balance sheet; cost, valuation, presentation and income measurement problems associated with current assets and current liabilities. Prerequisite: FMGT 201 or 215.

FMGT 307 Finance 1 — Those with little or no knowledge of financial management will study the various methods of optimizing the economic position of a firm. Middle management people in business finance will learn to make the best decisions on the financing of a firm. Topics include control and financial management of the business firm, profit planning, cash and capital budgeting and inventory control. Prerequisite: FMGT 201 or 215.

FMGT 308 Security Analysis 1 — This is an introductory level course in investments. The first part examines the impact of economic activity on financial assets and provides a macroeconomic framework for an understanding of the interaction of these markets. The second portion deals with land investments with particular attention paid to their nature, analysis and valuation. The final section introduces the student to common stock investing. Prerequisite: FMGT 201 or 215.

FMGT 310 Auditing 1 — Discusses auditing principles, specific techniques in analytical auditing and some asset classifications. Students study the meaning and purpose of the audit function and are introduced to techniques and procedures. Topics include history, professional ethics, internal control, auditing EDP systems, gathering evidence, audit work papers. Prerequisite: FMGT 201 or 215.

FMGT 311 Quantitative Methods in Finance — An explorative study of some of the approaches used in analyzing and solving a number of problems commonly encountered in business. Quantitative techniques such as Linear Programming, Waiting Line Theory, Simulation Decision Trees and Probability are a few of the sophisticated techniques covered in the course. Prerequisite: FMGT 201 or 215.

FMGT 313 Taxation 1 — Introduces individuals with little or no income tax knowledge to the basics of Canadian income tax. The course constitutes the first half of taxation with FMGT 408 completing it. Topics include tax information sources, residency, classes of taxpayers, employment income, business income, investment income, capital cost allowance and capital gain rules. Prerequisite: FMGT 201.

FMGT 318 Microcomputer Software Systems — Students will receive instruction and practice in the use of commercially available microcomputer software systems and will use these systems to solve business problems. Typical programs will involve word processing, electronic worksheets, data base management and business graphics. Prerequisite: COMP 120 or 215.

FMGT 331 Money and Banking — The study of money and money substitutes, supply of currency, creation of credit; functions and uses of money; practices, policies, functions and services of commercial banks; financial assets and financial market.

FMGT 401 Cost and Managerial Accounting 2 — Enables the student who has completed FMGT 301 to understand cost accounting techniques which will assist management in planning, control, income determination and decision making. The course emphasizes direct costing, relevant costs, cost allocation, capital budgeting, inventory planning and valuation, joint and by-product costs, process costing, payroll; factory ledgers and decentralization and transfer pricing. Prerequisite: FMGT 301.

FMGT 402 Financial Accounting 2 — Completes the study of intermediate accounting necessary for employment in more responsible accounting positions. Topics include cost, valuation, presentation, income measurement problems associated with long term assets and liabilities (where appropriate), shareholders' equity accounts, income tax allocation, statement of charts in financial position, statements from incomplete data, accounting changes and price-level and fair-value accounting. Prerequisite: FMGT 302.

FMGT 404 Finance 2 — Instructs students in raising capital to finance a firm. Topics include the cost of capital; short, medium and long term financing leasing; refinancing; security analysis; the Canadian capital and money markets and pension portfolios as they affect business decisions of the Canadian firm. Prerequisite: FMGT 307.

FMGT 405 Security Analysis 2 — Techniques and principles of security analysis; valuation of securities; analysis of risks inherent in all types of security investments. Emphasizes the investment setting, the securities market, financial statement analysis, investment timing and portfolio analysis of both individual and institutional investors. Prerequisite: FMGT 308.

FMGT 406 Auditing 2 — Follow-up to FMGT 310. The student studies general auditing principles and specific audit procedures and learns to critically assess accounting procedures. Topics include auditing assets, liabilities, owner's equity, revenues, cost, expenses, financial statements and audit reports. A short audit case will be undertaken. Prerequisite: FMGT 310.

FMGT 407 Microcomputer Applications — A continuation of FMGT 318 emphasizing the solution of practical problems. It is expected that the course will develop a level of familiarity with the programs such that the students will use them in other course areas. Prerequisite: FMGT 318.

FMGT 409 Taxation 2 — Students expand on their study of Canadian income tax begun in FMGT 313 and become aware of the complexities and problem areas involved in tax planning. Topics include tax on individuals (including proprietors and partners), corporations and trusts, corporate surplus distributions, international income, appeal procedures, tax planning and tax avoidance versus tax evasion. Prerequisite: FMGT 313.

FMGT 411 Projects In Industry — To provide experience in the practical application of concepts learned in their program, students work directly on a problem-solving project provided by a company or government agency. Prerequisite: FMGT 311.

FMGT 431 Money and Banking 2 — Examines central banking and monetary control; objectives and techniques of monetary policy and debt management; money and the international economy. Prerequisite: FMGT 331.

MKTG 102 Introduction to Marketing — Includes a detailed study of the basic marketing functions, marketing research, product planning, selection of trade channels, merchandising, advertising, sales promotion and salesmanship. Marketing of consumer goods as well as industrial goods will also be covered.

OPMT 112 Business Mathematics — Review of basic mathematics applicable to business and industry. Simple and compound interest, financial instruments and discounting, annuities; mortgages, loans, sinking funds, leases. Depreciation methods, capitalised costs. Cash flow analysis, NPV, IRR. Emphasis is on maximum use of preprogrammed calculator, and practical application from the business field of financial management.

OPMT 132 Statistics for Financial Management — Will enable students to acquire skills in summarizing and analyzing data using descriptive and inferential statistical techniques. Topics include graphical presentation of data, measures of location and variation, elementary probability, estimation, hypotheses testing, linear regression, correlation, index numbers and time series. Emphasis is on practical applications in the field of Financial Management.

Hospitality and Tourism Administration

Rapid expansion in the hospitality and tourism industry continues, resulting in a high demand for professionally educated staff who are able to plan for future requirements and to adapt to rapidly changing conditions.

Job Opportunites

Hotel, Motel and Food Service graduates are employed in hotels, motels, restaurants, department stores, industrial and airline catering firms, and in a wide variety of other organizations involved in food services and housing such as hospitals and universities. Travel and Tourism graduates may find employment in travel agencies, tour agencies, as tour operators, with surface or air transportation companies, or government agencies involved in travel promotion.

The Program

Students enter a common first year heavily oriented to general business management subjects applied, where practical, in a hospitality and tourism industry setting. The balance of the first year program provides introductory courses directly related to the hospitality and tourism field. At the end of first year students will choose to continue in second year in either the Hotel, Motel and Food Service option, or the Travel and Tourism option. However, there may be a limited number of seats in the Travel and Tourism option. Regardless of option selected, each student must complete a 500 hour work practicum in some aspect of the hospitality and tourism industry between date of registration and graduation.

Prerequisite

English 12 and Algebra 11 both with C + are course requirements for this program. High School graduates who have succesfully completed the Career Preparation Program (C.P.P.) in Hospitality and Tourism should so indictate on their BCIT application for possible special consideration.

Applicants should be reasonably familiar with the components and careers available in the hospitality and tourism industry. Preference will be given to applicants with a minimum of 6 months (1,000 hours) of industry-related practical work experience.

Applicants should be good communicators and people-oriented, with a willingness to relate harmoniously and effectively with the public and fellow workers. Upon entering the industry, they should be prepared to work irregular hours.

Informational meetings about the program and career opportunities in the hospitality and tourism fields, may be offered from February through May. Applicants may also be invited to an interview with a faculty member, and may be required to write a short essay outlining their reasons for applying to the Hospitality and Tourism Technology.

Faculty and Staff

J. Bateman, Director
R. Agon
R.A. Brett
E.J. Cooke
F.N. Daniels
B. Ellsworth
B.J. Fernandes
L. Lous
C. Morelli
R. Oliver

TECHNOLOGY: Hospitality and Tourism

Level 1		Classroom hours per week
ADMN 100	Micro Economics	3.0
BCOM 105	Business Communication	3.0
COMP 100	Data Processing — Introduction	4.0
FMGT 101	Accounting	4.0
FMGT 106	Credit and Collections	4.0
HOSP 101	Lounge Operations	2.0
HOSP 102	Food Operations	2.0
HOSP 111	Oral Communication	3.0
OPMT 111	Business Mathematics	4.0

Level 2		Classroom hours per week
ADMN 200	Macro Economics	3.0
BCOM 205	Business Communication	3.0
COMP 120	Computers in Business	3.0
FMGT 201	Accounting	4.0
HOSP 201	Food Preparation and Service	2.0
HOSP 202	Food Operations	2.0
HOSP 206	Rooms Management	4.0
HOSP 231	Introduction to Tourism	3.0
OPMT 165	Basic Management Engineering	3.0

PROGRAM: Hotel, Motel and Food Service

Level 3		Classroom hours per week
HOSP 302	Food and Beverage Management	2.0
HOSP 305	Food Production and Service	6.0
HOSP 313	Food and Beverage Cost Control	4.0
HOSP 316	Human Relations	2.0
HOSP 325	Marketing and Sales Promotion	5.0
HOSP 330	Tourism Plant Design	4.0
OPMT 131	Business Statistics	4.0

Level 4		Classroom hours per week
ADMN 385	Business Law	3.0
HOSP 402	Food and Beverage Management	2.0
HOSP 405	Food Production and Service	6.0
HOSP 413	Hospitality Industry Accounting	3.0
HOSP 416	Human Relations	2.0
HOSP 425	Marketing and Sales Promotion	5.0
HOSP 450	Directed Studies	4.0
HOSP 500	Work Practicum	—

PROGRAM: Travel and Tourism

Level 3		Classroom hours per week
HOSP 320	Organizational Behavior	3.0
HOSP 326	Travel Marketing	4.0
HOSP 330	Tourism Plant Design	4.0
HOSP 341	Recreational and Resource Development	3.0
HOSP 342	Transportation Modes	3.0
HOSP 343	Tourism Destinations	3.0
MKTG 310	Transportation Economics and Regulations	3.0
OPMT 131	Business Statistics	4.0

Level 4		Classroom hours per week
ADMN 385	Fundamentals of Business Law	3.0
HOSP 413	Hospitality Industry Accounting	4.0
HOSP 420	Organizational Behavior	3.0
HOSP 426	Travel Advertising and Sales	4.0
HOSP 442	Transportation Modes	3.0
HOSP 443	Tourism Destinations	3.0
HOSP 450	Directed Study	4.0
HOSP 500	Work Practicum	—
MKTG 410	Transportation Economics and Regulations	3.0

Course Descriptions

ADMN 100 Micro Economics — The major areas studied are the product and resource market. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored.

ADMN 200 Macro Economics — Develops an understanding of the organization and operation of the Canadian Economy in an international setting. The theoretical tools of the economist are used to expand the concepts of national income, employment, inflation, money and banking, international trade and growth. An appreciation of the relationship between economic theory and economic policy is provided.

ADMN 385 Business Law — A one-term condensed course to acquaint the business student with a basic knowledge of Canadian law including the legal system, contracts, torts, sale of goods and consumer protection, secured transactions and creditors' remedies, employment law and agency, business organizations, negotiable instruments, real estate and administrative law.

BCOM 105 Business Communication for Hospitality and Tourism — An applied writing course concentrating on effective letters and memos. Topics and case assignments are selected to develop the skills necessary for successful management communication in the hospitality and tourism industries.

BCOM 205 Business Communication for Hospitality and Tourism — Adds report design techniques to the skills learned in BCOM 105. Students write several types of informational, periodic and analytical reports designed to meet specific management needs. Prerequisite: BCOM 105.

COMP 100 Data Processing — Introduction — Offers training in basic data processing principles to develop recognition of the application of these principles to industry. The major functions of data processing will be illustrated and practised with a minicomputer operating interactively. Elementary programs will be written and tested on the computer. Use of flow-charting and elementary data processing systems design will illustrate the achievement of data processing objectives.

COMP 120 Computers in Business — Designed to give the student an understanding of business computer systems. Topics include computer hardware — types, usage, evaluation; systems development — feasibility studies, analysis, design, implementation; packaged software — use and evaluation. Emphasis will be placed on areas of particular interest to the specific technologies.

FMGT 101 Accounting 1 — Permits persons with little or no accounting background to become familiar with the techniques of working through the full accounting cycle. It provides theoretical and practical training in basic accounting as preparation for FMGT 201. Topics include accounting as an information system; introduction to accounting theory; income measurement; traditional record-keeping procedures; the accounting cycle; special journals; cash; investments and receivables.

FMGT 106 Credit and Collections — A detailed examination of credit granting, collection techniques and credit philosophy in all levels of business prepares the student to assist the credit manager of a large or small business in any area of the subject. Topics include determining credit risk; credit instruments and collateral security; types of consumer credit and credit cards; sources of consumer credit information; collections; credit department management.

FMGT 201 Accounting 2 — The follow-up to FMGT 101, topics include inventory, long-lived assets, liabilities, forms of business organizations, cash-flow and working capital analysis, manufacturing accounting, management accounting, consolidated statements, analysis of financial statements and price level changes. Prerequisite: FMGT 101.

HOSP 101 Lounge Operations — Covers the basic requirements needed to operate a lounge or bar successfully. Subject areas include layout and design, B.C. Liquor Act, liquor classification process, liquor control, bar systems. Practical mixology in preparation of cocktails, pouring techniques, garnishes and bar set up are also covered.

HOSP 102 Food Operations — Background of industry; sanitation; meal planning and menu preparation; selection of foods; purchasing methods; principles of food preparation; equipment layout and specifications; service of foods; menu writing, administrative requirements; organization of the catering department. The course also covers the development of basic skills, attitudes and knowledge required for the identification, handling and cooking of food items found on a restaurant menu; care and handling of tools and restaurant equipment; preparation of stocks, soups, sauces, seafoods, meats, vegetables and speciality items. Also includes an industry practicum. Cocktail lounge operations, including the care and handling of glassware, types of beverages, dispensing devices, inventory procedures and practical mixology sessions are also covered.

HOSP 111 Oral Communication Skills — Speech construction; types of speeches; speaking before groups; introducing and thanking speakers, chairing meetings and interviewing; practice in preparation and delivery of talks to groups.

HOSP 201 Food Preparation and Service — Develops the basic skills and techniques required for food preparation and service and will lay the groundwork for the more advanced second year course. It will enable the participants to operate kitchen equipment safely, apply sanitation procedures, read, follow and prepare recipes, apply quality standards of food preparation, classify and prepare soups, stocks, sauces, fish and shellfish, meat, poultry, and breakfast items. Basic service techniques are also practiced.

HOSP 202 Food Operations — see HOSP 102.

HOSP 206 Rooms Management — This course will be segmented into the two component parts of Rooms Operations: housekeeping functions and hotel front desk operations. The housekeeping portion covers housekeeping organization and duties; control forms; supplies and equipment; specifications for purchasing equipment and linen and laundry operations. The hotel front desk operations section involves front office organization and psychology; materials, equipment and supplies; rooms salesmanship; reservations; registration and front office accounting for various size hotels; handling of cash and credit transactions and processing accounts.

HOSP 231 Introduction to Tourism — An introduction to the Travel and Tourism industry including why tourism is growing in domestic and international markets; functions and inter-relationships of the various industry sectors; major organizations and associations and their influence on tourism; exploration of career opportunities in all facets of tourism; economic import of tourism and government initiatives in encouraging growth; current trends in travel; social and environmental impacts of tourism.

HOSP 302 Food and Beverage Management — An exploraton of the main facets of professional food and beverage operations through lectures, student projects and seminars. Functions of

management, personnel and training, purchasing, menu management, food service systems (specialty restaurants, fast-food, airline catering, hospitals, employee feeding and contract catering, convenience foods, current and future industry trends, wines. Includes industry practicum.

HOSP 305 Food Production and Service — An exploration of the main facets of professional food and beverage operations through lectures, student projects and seminars. Functions of management, personnel and training, purchasing, menu management, food service systems (specialty restaurants, fast-food, airline catering, hospitals, employee feeding and contract catering, convenience foods, current and future industry trends, wines. Includes industry practicum.

HOSP 313 Food and Beverage Cost Control — Fundamentals of internal controls and information systems for food and beverage operations. The course covers techniques of effective purchasing, receiving and production; sales controls; food and beverage cost calculations; the sales mix and its effect on costing. Course emphasis is on interpretation of data for effective and profitable decision-making.

HOSP 316 Human Relations — Systematic approach to personnel problems in today's business organizations including human needs and wants, motivation process, social systems, leadership, unions, management techniques, communication problems, staff hiring and appraisal, training and incentives. Lab discussions based on real-life cases help develop ability to make decisions upon critical analysis of available facts.

HOSP 320 Organizational Behavior — Examines personnel problems regarding people at work in all kinds of organizations. Includes human resource recruitment and selection, training and development, career planning, employee motivation, health and safety, discipline, stress, collective agreements, personnel audit. Includes industry participation.

HOSP 325 Marketing and Sales Promotion — Explores the relative positions of all components of the tourism industry — travel agent, tour operator, air/surface carrier, recreation facilities and accommodation. How and where they depend on each other, how they buy and sell between themselves and finally, how they get their individual or combined products to the market place.

HOSP 326 Travel Marketing — Emphasis is on applying general marketing concepts and techniques to the travel industry, including government marketing agencies, air and surface carriers, tour operators and travel agencies; how and where they inter-relate, consumer demand and competition to serve; product definition and product packaging; consumer awareness of travel; marketing use of audiovisual aids, are some of the topic areas that will be studied.

HOSP 330 Tourism Plant Design — A study of language in the building and construction fields as related to physical design; blueprint reading elements and design interpretation; zoning and municipal bylaw conformity; fundamentals of building, room design and esthetics; building maintenance and preventative maintenance factors; use of color, light and sound in themes and atmosphere.

HOSP 341 Recreational and Resort Development — Explores the need and the resources necessary for establishing a strong regional attraction for the recreational, sport and vacation traveller. Topics include development of resort locations; fishing, hunting and sport resorts; ski and water resorts; seasonal developments; promotion of tourist regions depending on recreational travel. While the emphasis may be strongly B.C., in-bound, popular resort areas including Hawaii, Florida, Mexico and Nevada will also be discussed.

HOSP 342 Transportation Modes — Covers transportation modes such as ferries, cruise ships, bus, rail, rental cars and taxis. Major emphasis in this course is on air travel and the ability to quote both normal and special fares and produce schedules and tickets for airline customers. The course will also teach the use of ticketing terminology and passenger rules and regulations.

HOSP 343 Tourism Destinations — Provides a survey of the major tourism destinations frequented by the travelling public. These destinations include North and South America, Europe, the South Pacific and Pacific Rim. Subject areas include historical and geographical knowledge of the areas as well as culture, dress and language; social traditions; economic conditions and currency; foods; industry and educational standards; tourist attractions.

HOSP 402 Food and Beverage Management — see HOSP 302.

HOSP 405 Food Production and Service — see HOSP 305.

HOSP 413 Hospitality Industry Accounting — Preparation, interpretation and analysis of balance sheets and profit and loss statements; budgeting and forecasting; feasibility studies; financing and cash flow; cost-volume-profit analysis; investment decision-making.

HOSP 416 Human Relations — see HOSP 316.

HOSP 420 Organizational Behavior — see HOSP 320.

HOSP 425 Marketing and Sales Promotion — see HOSP 325.

HOSP 426 Travel Advertising and Sales — This course is an extension of Travel Marketing with greater emphasis on promotion, personal selling techniques and salesmanship. Topics will include making personal client presentations, services and itinerary planning, dealing with media and advertising agencies, developing advertising pieces for creative promotion, communication of the printed word and pictures; understanding client behaviors, implications of budget on the selling function.

HOSP 442 Transportation Modes — see HOSP 342.

HOSP 443 Tourism Destinations — see HOSP 343.

HOSP 450 Directed Studies — One day a week will be set aside for an independent study project. It is expected that some instructor or coordinator input will be generated for up to three hours per week during the term, to set direction and tone for projects.

HOSP 500 Work Practicum — During the first month of Term 1, Year 1, each student will receive a "Career Passport of Hospitality & Tourism Experience" in which practical work experience will be recorded. The objective of the practicum is to provide each student with a minimum of 500 hours of proven work experience in the industry prior to graduation. Some credit may be given for work experience prior to registering at BCIT. No grade is assigned to this practicum.

MKTG 310 Transportation Economics and Regulation — Deals with transport costing, economic regulation and other types of regulation. The modes involved will include air, highway,

rail and water. The course will emphasize the economics, liabilities and regulations of passenger travel and passenger possessions (baggage). An overview of cargo, including dangerous commodities, will also be given. Topics include cartels and conferences, governmental cooperation, United Nations Committees concerning travel and aspects of immigration and customs.

MKTG 410 Transportation Economics and Regulation — see MKTG 310.

OPMT 111 Business Mathematics — Provides a review of basic mathematics applicable to business and industry and enables the student to acquire skills in solving practical financial and mathematical problems encountered in business. Topics in the area of Mathematics of Finance will emphasize retail operations, discounts, simple and compound interest and annuities.

OPMT 131 Business Statistics — Major emphasis on descriptive statistics, including survey planning, questionnaires design, numerical and graphical presentation of data. Measures of central tendency and dispersion. Introduction to statistical inferences through sampling, confidence intervals hypothesis testing, linear regression. Emphasizes managers applications in industry.

OPMT 165 Management Engineering — Management Engineering is concerned with achieving business goals through the most effective use of resources by objective decision-making. It is a general management course designed to supplement the specialized management courses given in the Hospitality Program. The course covers the decision-making process in four areas of application: time management, productivity improvement, project management and facility planning.

Marketing Management

Marketing is the task of making available the service a firm or organization can offer to satisfy the needs of its customers or patrons. This means that people with marketing skills are needed in a wide range of organizations to perform many different functions. Manufacturers, professional services and non-profit institutions depend on marketing to sustain a viable, efficient operation.

Marketing managers concentrate on product development, market research sales or promotion or they may find their jobs require the broad skills of all these areas.

The Marketing Technology is designed to equip the graduate with a solid generalist background, plus allowing the student to concentrate on the unique skills associated with specific sectors of our economy. These include the technical consumer or industrial product/service sector; the Real Estate industry; the international trading sector and the business communications industry.

Job Opportunities

The ***Advanced Technology Marketing*** program leads to career positions in manufacturing, wholesale and retailing firms, with emphasis on advanced technology products and services.

The ***Professional Sales*** program prepares individuals for positions in distribution companies that sell their products and services to commercial buyers and purchasing agents.

The ***Real Estate Studies*** program prepares the gruaduate for sales, agent, mortgage brokerage, appraisal, property management, investment analyst postions. Graduates may choose to pursue either licenced or non-licenced positions within the Real Estate industry.

Advertising and Sales Promotion graduates are employed in advertising agencies, broadcasting companies, publishing firms and in-house promotion operations.

The ***Small Business Development*** program is ideally suited to individuals planning to start their own businesses or becoming general managers in an established small firm.

The Program

In the first year, all Marketing Technology students complete the same course of studies covering general business and economic principles. The second year program offers specialization. ***Technical Sales and Marketing*** emphasizes sales skills, new product development and entrepreneurship. ***Real Estate Studies*** addresses residential and commercial property sales and investment analysis skills. ***Advertising and Sales Promotion*** courses develop creative communication skills and campaign planning.

Prerequisite

Algebra 11 and English 12 both with C + are course requirements for this program. Completion of grade 11 and 12 science courses enhances applicants success in the program.

Candidates **must** state program preference when applying for admission to first year of the Marketing Technology. Business experience and/or other successful post-secondary education is an asset. Admission may be granted to mature students provided they have completed high school at least 2 years prior to date of entry, or can complete pre-entry preparatory programs, or have acquired prerequisite work experience. Upon completion of the first year, candidates will be screened for appropriate second year option placement.

Faculty and Staff

R.W. Vandermark, B.A., Department Head
G.H. Abbott, B.Comm., M.B.A.
P. Cherry, B.Comm.
D.K.N. Chowdhury, B.Sc., M.B.A., Ph.D.
J.O. Hicks, R.I. (B.C.), F.R.I., Program Head, Real Estate Studies
G.T. Jacobs, B.A. (Hist. & Econ.), B.A., (Bus. Admin.), M.B.A.
C.G. Nelson, B.A.
G.S. Rees, M.B.A.
M.I. Shacker, B.A., B.B.A., Program Head, Technical Sales and Marketing
R.A. Venne, B.Comm., (Hons. Econ.), M.B.A.
W.A.E. Walley, B.A.
T. Winder, B.A., M.B.A., Program Head, Advertising and Sales Promotion.

TECHNOLOGY: Marketing

Level 1 — Classroom hours per week

ADMN 100	Micro Economics	3.0
ADMN 102	Management 1	3.0
BCOM 106	Business Communication for Marketing	3.0
COMP 100	Data Processing Introduction	4.0
FMGT 101	Accounting 1	4.0
MKTG 100	Marketing 1	3.0
OPMT 110	Business Mathematics	4.0

Level 2 — Classroom hours per week

ADMN 200	Macro Economics	3.0
BCOM 206	Business Communication for Marketing	3.0
COMP 120	Computers in Business	3.0
FMGT 201	Accounting 2	4.0
MKTG 103	Sales Skills	3.0
MKTG 200	Marketing 2	3.0
OPMT 130	Business Statistics	4.0

PROGRAM: Professional Sales

Level 3 — Classroom hours per week

MKTG 203	Sales Management	4.0
MKTG 301	Quantitative Methods/Computer Applications in Marketing	4.0
MKTG 302	Industrial Marketing	4.0
MKTG 305	International Trade	4.0
MKTG 308	Advertising and Sales Promotion	4.0
MKTG 309	Marketing Research 1	4.0

Level 4 — Classroom hours per week

ADMN 385	Business Law	4.0
FMGT 403	Marketing Management Accounting	3.0
MKTG 401	Marketing Planning	4.0
MKTG 402A	Advanced Sales Techniques	2.0
MKTG 409	Marketing Research 2	3.0
MKTG 418	Directed Studies	4.0
MKTG 430	Distributive Systems	3.0
MKTG 403B	Industrial Sales Practicum	2.0

PROGRAM: Advanced Technology Marketing

Level 3 — Classroom hours per week

MKTG 203	Sales Management	4.0
MKTG 301	Quantitative Methods/Computer Applications in Marketing	4.0
MKTG 304	Market Strategies	4.0

MKTG 305	International Trade	4.0
MKTG 308	Advertising and Sales Promotion	4.0
MKTG 309	Marketing Research 1	4.0

Level 4 Classroom hours per week

ADMN 385	Business Law	4.0
FMGT 403	Marketing Management Accounting 2	3.0
MKTG 401	Marketing Planning	4.0
MKTG 404B	Information Systems Practicum	2.0
MKTG 406	Product Development	2.0
MKTG 409	Marketing Research 2	3.0
MKTG 418	Directed Studies	4.0
MKTG 430	Distributive Systems	3.0

PROGRAM: Small Business Development

Level 3 Classroom hours per week

MKTG 203	Sales Management	4.0
MKTG 301	Quantitative Methods/Computer Applications in Marketing	4.0
MKTG 305	International Trade	4.0
MKTG 306	Principles of Small Business Management	4.0
MKTG 308	Advertising and Sales Promotion	4.0
MKTG 309	Marketing Research 1	4.0

Level 4 Classroom hours per week

ADMN 385	Business Law	4.0
FMGT 403	Marketing Management Accounting	3.0
MKTG 401	Marketing Planning	4.0
MKTG 407A	Case Studies/Entrepreneurship	2.0
MKTG 408B	Business Planning Practicum	2.0
MKTG 409	Marketing Research 2	3.0
MKTG 418	Directed Studies	4.0
MKTG 430	Distributive Systems	3.0

PROGRAM: Real Estate Studies

Level 3 Classroom hours per week

MKTG 308	Advertising and Sales Promotion	4.0
MKTG 309	Marketing Research 1	4.0
MKTG 311	Real Estate Management 1	4.0
MKTG 312	Economics of Real Estate Markets	4.0
MKTG 313	Introduction to Real Estate Analysis	4.0
MKTG 330	Real Estate Practice	4.0

Level 4 Classroom hours per week

ADMN 385	Business Law	4.0
FMGT 403	Marketing Management Accounting 2	3.0
MKTG 409	Marketing Research 2	3.0
MKTG 411	Real Estate Management 2	4.0
MKTG 412	Intro to Real Estate Appraisal and Investment Analysis	4.0
MKTG 413	Mortgage Finance	3.0
MKTG 418	Directed Studies	4.0

PROGRAM: Advertising and Sales Promotion

Level 3 Classroom hours per week

MKTG 203	Sales Management	4.0
MKTG 301	Quantitative Methods/Computer Applications in Marketing	4.0
MKTG 309	Marketing Research 1	4.0
MKTG 316	Principles of Advertising	4.0
MKTG 317	Promotional Marketing	4.0
MKTG 318	Media Planning	4.0

Level 4 Classroom hours per week

ADMN 385	Business Law	4.0
FMGT 403	Marketing Management Accounting	3.0
MKTG 401	Marketing Planning	4.0
MKTG 409	Marketing Research 2	3.0
MKTG 416	Advertising Internship	6.0
MKTG 417	Design Production	4.0

Course Descriptions

ADMN 100 Micro Economics — The major areas studied are the product and resource market. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored.

ADMN 102 Management 1 — Marketing Technology — An orientation to the nature of business in the private enterprise system embracing forms of business ownership, organization, leadership, management techniques and business elements of production. Typical cases taken from industry are studied to encourage students to think and decide for themselves.

ADMN 200 Macro Economics — Develops understanding of the organization and operation of the Canadian Economy in an International setting. The theoretical tools of the economist are used to expend the concepts of national income employment, inflation, money and banking international trade, and growth. An appreciation of the relationship between economic theory and economic policy is provided.

ADMN 385 Business Law — A one-term, condensed course which acquaints the business student with a basic knowledge of Canadian law including the legal system, contracts, torts, sale of goods and consumer protection, secured transactions and creditors' remedies, employment law and agency, business organizations, negotiable instruments, real estate and administrative law.

BCOM 106 Business Communication for Marketing — Introduces students to the fundamentals of business writing. Students study various marketing communications, including letters, memos, questionnaires and news releases.

BCOM 206 Business Communication for Marketing — Extends the material covered in BCOM 106 and deals with both written and oral presentations. Short and long reports, job application packages, research techniques and graphic techniques are covered. Emphasis is on practical aspects of professional marketing communication. Prerequisite: BCOM 106.

COMP 100 Data Processing — Introduction — Offers training in basic data processing principles to develop recognition of the application of these principles to industry. The principal functions of data processing are illustrated and practised with an H.P. minicomputer operating interactively. Elementary computer programs are written and tested on the computer. Use of flow-charting and elementary data processing systems design will illustrate the achieving of data processing objectives.

COMP 120 Computers in Business — Designed to give the student an understanding of business computer systems. Topics include computer hardware — types, usage, evaulation; systems development — feasibility studies, analysis, design, implementation; packaged software — use and evaluation. Emphasis will be placed on particular areas of interest to the specific technologies.

FMGT 101 Accounting 1 — Permits persons with little or no accounting background to become familiar with the techniques of working through the full accounting cycle. It provides theoretical and practical training in basic accounting as preparation for FMGT 201. Topics include accounting as an information system; introduction to accounting theory; income measurement; traditional record-keeping procedures; the accounting cycle; special journals; cash; investments and receivables.

FMGT 201 Accounting 2 — The follow-up to FMGT 101, topics include inventory, long-lived assets, liabilities, forms of business organizations, cash-flow and working capital analysis, manufacturing accounting, management accounting, consolidated statements, analysis of financial statements and price level changes. Prerequisite: FMGT 101.

FMGT 403 Marketing Management Accounting — Emphasis is upon profit planning, pricing strategies and control in the marketing environment. Also studied are cost-accounting control concepts and applications, inventory management techniques, cash and capital planning techniques and revenue reporting systems. The course ends with a study of the implications for managerial decision-making of accounting reporting methods and policy. Prerequisite: FMGT 303.

MKTG 100 Marketing 1 — A comprehensive study of the foundations and principles of marketing intended for those students pursuing a concentrated marketing based program. Covers basic marketing functions, marketing research, product planning, distribution activities, sales and promotion activities. Examines marketing in relation to all types of consumer, industrial and service firms.

MKTG 103 Sales Skills — Introduction to professional selling. Emphasizes practical problems of locating and qualifying prospects, use of depth approach and improving sales preparation and organization. Some examination also given to improving interpersonal communications in non-selling situations.

MKTG 200 Marketing 2 — a continuation of MKTG 100. Prerequisite: MKTG 100.

MKTG 203 Sales Management — General principles of sales management. Emphasis is given to the human resource, with stress placed on selection, assimilation, training and supervision. Examination of sales research, planning, organization and analysis is made. Computer applications in sales management are also covered.

MKTG 301 Quantitative Methods/Computer Applications in Marketing — An examination of decision support systems now available utilizing mathematical modelling methods, data bank access, and computer based information. Prerequisite: MKTG 101, MKTG 201.

MKTG 302 Industrial Marketing — An examination of the complex purchase process faced by companies selling to industry, government and institutions. Alternative distribution and pricing strategies are considered. Emphasis is on understanding the growing British Columbia industrial base. Prerequisite: MKTG 100, MKTG 200.

MKTG 304 Market Strategies — The development of strategies suited to high technology products and services to achieve productivity improvement. Prerequisite: MKTG 101, MKTG 201.

MKTG 305 International Trade — An examination of import/export procedures, particularly in relation to sophisticated technology products and services. Trading patterns and forecasts are thoroughly covered. Prerequisite: MKTG 101, MKTG 201.

MKTG 306 Principles of Small Business Management — Examination of the planning stages involved in starting a new business including market, financial and legal feasibility requirements. Prerequisite: MKTG 101, MKTG 201.

MKTG 308 Advertising and Sales Promotion — Covers fundamentals of mass communications, media characteristics, message design and campaign planning. Prerequisite: MKTG 101, MKTG 201.

MKTG 309 Marketing Research 1 — Examines the basic approaches to marketing research. It discusses the techniques and tools of this research and relates these tools to the decision-making process. Emphasis is placed on the use of marketing research in the total marketing decision concept. Special applications of marketing research to simulated real-life situations are examined. Prerequisite: MKTG 101, MKTG 201.

MKTG 311 Real Estate Management 1 — The real estate function includes law, estates and interests in land, and the personal and business management decision process. The economic characteristics of urban real estate and the market, city growth and development, locational factors in influencing the determination of land use and ownership, institutional lenders, the mortgage market and the functions of the real estate agency, salesman and appraiser are covered. This is a credit course recognized by the Real Estate Council of British Columbia and the Department of Real Estate Studies at UBC. It exempts the student entering the real estate brokerage business from the salesman's pre-licensing course.

MKTG 312 Economics of Real Estate Markets — Lays the foundation for a sound education in property management. The course thoroughly familiarizes the student with the basic theories and techniques of managing real estate investment. On completion of the course, the student will have an insight into the long-range welfare of the investment property and be familiar with the day-to-day skills necessary to manage residential and commercial properties. Students obtain credit for this course toward the designation of Certified Property Manager with the Institute of Real Estate Management. Prerequisite: MKTG 311, MKTG 411.

MKTG 313 Introduction to Real Estate Analysis — Presents the tools and techniques for analysis that assist decision making in specific real estate problems including investment (purchase or sale), financing, development or redevelopment, leasing, income and property taxation and property management. In each of these areas, the use of mathematics of finance is central to analysis of the situation, the analysis of alternative courses of action and the comparison of costs/benefits, both today and in the future. Prerequisite: MKTG 311, MKTG 411.

MKTG 316 Principles of Advertising — Examines the evolution and function of advertising and sales promotion within the contexts of society and the business system. The topic is surveyed rigorously, with consideration being given to its application in the fields of retailing, wholesaling, manufacturing, professional and industrial activities. Prerequisite: MKTG 101, MKTG 201.

MKTG 317 Promotional Marketing — A study of all promotional support activities such as trade shows, publicity, special events, direct response marketing and promotional specialities. Emphasis is on when and how to use them. Prerequisite: MKTG 316 MKTG 317, MKTG 318.

MKTG 318 Media Planning — Emphasis is placed on development and execution of the media plan. Close contact is maintained by students with agency media buyers and other industry factors to ensure a practical direction to the course. Quantitative media planning techniques are evaluated in light of most recent computer applications. The main objective of this course is to provide marketable skills in media planning and buying to qualify students for career entry consideration in advertising agencies. Prerequisite: MKTG 101, MKTG 201.

MKTG 330 Real Estate Practice — Designed to apply the principles learned in real estate management on a practical basis. Students will learn to complete contracts required in real estate transactions; the forms of legal documentation concerning interests in land; land registration procedures; and how to search a title of real property at a land title office. Prerequisite: MKTG 311.

MKTG 401 Marketing Planning — Examines how to develop a formal marketing plan including situation analysis, market and competitive conditions research, objective setting and action scheduling using computer based management systems. Prerequisite: MKTG 100, 200.

MKTG 402A Advanced Sales Techniques — Professional selling skills utilizing buyer behavior, product knowledge, time management and sales call planning tools. Prerequisite: MKTG 101, MKTG 201, MKTG 103.

MKTG 403B Industrial Sales Practicum — Field work experience with the sales force of a sponsoring firm. Full evaluation of on-the-job performance is included. Prerequisite: MKTG 103, MKTG 402.

MKTG 404B Information Systems Practicum — Examines the hardware/software systems, data sources, and resources available to marketers of high-tech products in gathering and dispensing needed information. Prerequisite: MKTG 301, MKTG 304.

MKTG 406A Product Development — A study of effective processes for generating product ideas, design planning, performance evaluation and market testing. Commercialization of highly innovative products is emphasized. Prerequisite: MKTG 301, MKTG 304.

MKTG 407A Case Studies/Entrepreneurship — An analysis of both successful and unsuccessful ventures to reveal the role of the entrepreneur. Prerequisite: MKTG 306.

MKTG 408B Business Planning Practicum — Involves the student in the detailed prepartion of a business prospectus. The student is required to demonstrate the legal markets and financial feasibility of a selected new venture. Prerequisite: MKTG 306, MKTG 407.

MKTG 409 Marketing Research 2 — Examines the basic approaches to marketing research. The course discusses the techniques and tools of this research and relates these tools to the decision-making process. Emphasis is placed on the use of marketing research in the total marketing decision concept. Special applications of marketing research to simulated real-life situations are examined. Prerequisite: MKTG 309.

MKTG 411 Real Estate Management 2 — see MKTG 311. Prerequisite: MKTG 311.

MKTG 412 Introduction to Real Estate Appraisal and Investment Analysis — Designed for use by appraisers, real estate brokers, lenders, builders and assessors. On completion of the course the student will have learned how to apply appraisal principles and techniques to actual residential appraisal problems. To become a professional appraiser, the student completing this course must add meaningful practical appraisal experience and further advanced training. The material covered will include such topics as principles of real estate, elements of urban land economics, nature and principles of real estate value, appraising as applied economics analysis, etc. For students seeking credit in recognized programs of professional appraising societies. Prerequisite: MKTG 312, MKTG 313.

MKTG 413 Mortgage Finance — Will enable students to demonstrate a knowledge of the macro-economic aspects of Canada's mortgage market; structure and analyse both residential and commercial mortgage loan applications and be familiar with loan management; analyse preferred refinancing vehicles from the perspectives of borrower and lender; be familiar with loan management; analyse preferred refinancing vehicles from the perspectives of borrower and lender; be familiar with contemporary repayment arrangements, development financing, participation loans, leasehold financing and appraisal for mortgage lending. Prerequisite: MKTG 312, MKTG 313.

MKTG 416 Advertising Internship — An assigned work experience position with a lower mainland advertising, promotion, broadcasting, print or graphic services operation. On-the-job performance is fully evaluated. Prerequisite: MKTG 316, MKTG 317, MKTG 318, MKTG 417.

MKTG 417 Design Production — Creative advertising starts with a powerful idea built upon a sound business strategy. The execution of the strategy can polish effective advertising into brilliance. This is a practical "how-to" course that starts with business direction and finishes with actual print and broadcast advertising. It examines computer graphics, laser separations as well as basic art design techniques. Of interest to those in advertising positions, media sales and graphic/printing sales as well as those with a general interest in the area. Prerequisite: MKTG 101, MKTG 201.

MKTG 418 Directed Studies — One day a week of the student's timetable is allocated to carry out a major project. The project will be in a marketing area of the student's choice, carried out under the guidance of assigned faculty members. Prerequisite: MKTG 101, MKTG 201, MKTG 309, MKTG 409.

MKTG 430 Distributive Systems — A study of the channels and supporting infrastructure necessary to move products from manufacturer to consumer, including coverage of new technology applications to retailing and merchandising systems. Prerequisite: MKTG 101, MKTG 201.

OPMT 110 Business Mathematics — Review of basic mathematics applicable to business and industry. Mathematics of finance including retail operations, simple and compound interest, discounts, annuities, financial papers and depreciation methods. Emphasis is on practical applications to business administration.

OPMT 130 Business Statistics — Major emphasis is on descriptive statistics, including numerical and graphical presentation of data, measures of central tendency and dispersion, elementary probability, index numbers and time series. Introduction to inferential statistics through selected topics such as sampling, confidence limits of the mean, hypotheses testing and simple linear regression.

Operations Management

The department offers *two diploma programs:* Operations Management and Transportation Distribution Management which has an International Trade option in its 4th level. **Note:** Potential students should scrutinize these two programs carefully to ascertain which field of studies they wish to pursue.

Operations Management Program

We offer our students a stimulating, practical 2-year program which combines engineering and business. Our graduates possess the sought after skills that help industry become more productive.

During your time with us, you will be taking courses in industrial engineering, human dynamics, materials management and computer systems. This program stresses productivity improvement so that, upon graduation, you will be prepared to solve business problems and become a valued member of the management team.

Operations Management Program graduates are excellent candidates to pursue professional membership in:

— The Institute of Industrial Engineers,
— The American Production and Inventory Control Society,
— International Material Management Society,
— Data Processsing Management Association,
— Project Management Institute

Job Opportunities

Graduates have found career opportunities in a variety of industries including manufacturing, service, distribution and government.

Operations Management program graduates may work in a variety of dynamic, highly paid management careers such as: production scheduler, inventory manager, industrial engineer, systems analyst, production supervisor, data processing manager, management engineer, programmer analyst, inventory planner, quality control inspector, buyer, materials manager, purchaser, work study analyst, project planner, warehouse supervisor, terminal manager

Students applying for admission to Operations Management program should ask themselves the following questions:

Do I want to be a manager?
Do I enjoy a challenge?
Do I like working with people?
Do I want to work with computers?
Do I welcome the opportunity to improve performance by changing present systems?
Do I want to develop systematic problem-solving ability?

If the answer is yes — then apply to the Operations Managment Technology program of your choice and start charting your future.

Prerequisite

Algebra 11 with a C+ (Physics II is desirable for Operations Management program). This requirement may be waived for mature students on approval by the Department Head. If your mathematical skills are in doubt, it is recommended that you take Preparatory Business Math OPMT 099. It is also recommended that potential students acquire basic typing skills due to the extensive use of computer input terminals in the program.

Faculty and Staff

B.R.M. Morrow, B.Comm., Department Head
C. Chan, M.B.A.
B. Curtis, M.B.A., Chief Instructor
S.E. Dudra, B.Comm., M.B.A., C.P.I.M., Program Head
F.L. Gruen, B.Mgt.Eng., M.A.Sc., Senior Instructor
P.R. Harrison, M.B.A., P.Eng., M.I. Mech.E
K.C. Hartley, B.A.Sc., P.Eng., C.P.I.M.
A.S. Lee, B.Eng., P.Eng., M.Ed.
J.E. Lloyd, M.Ed., P.Eng.
P. McSorley
D.W. Malcolm, B.Sc., A.Sc.T.T.
D.J. Mallory, B.A.Sc., M.A., Ph.D.
E. Mason, B.A.Sc., P.Eng.
J.A.I. Millette, B.A., M.Ed.
G.W. Murray, Dipl.T.
H.T. Prevecz, Dipl.T., B.Econ., Chief Instructor
J. Ribic, B.I.E.
W.J. Sheriff, B.A., B.Sc., Chief Instructor
L.A. Smith, Dipl.T., C.A.M.
C.V. Spong, Dipl.T
J. Young, B.Sc., M.B.A., P.Eng.

TECHNOLOGY: Operations Management

Level 1		Classroom hours per week ➧
BCOM 107	Business Communication	3.0
CHSC 122	Engineering Concepts	3.0
COMP 100	Data Processing — Introduction	4.0
FGMT 102	Introduction to Financial Accounting	3.0
MECH 102	Drafting	2.0
OPMT 100	Applied Mathematics 1	4.0
OPMT 140	Introduction to Operations Management	3.0
OPMT 150	Introduction to Microcomputers	2.0
OPMT 160	Method Study 1	3.0
PHYS 117	Bacic Science for Operations Management	3.0

Level 2		Classroom hours per week ➧
ADMN 200	Macro Economics	3.0
ADMN 221	Organizational Behavior Fundamentals	2.0
BCOM 207	Business Communication for Operations Management	3.0
FMGT 202	Introduction to Managerial Accounting	3.0
MECH 207	Engineering Concepts	3.0
OPMT 120	Applied Mathematics 2	4.0
OPMT 240	Industrial Engineering	4.0
OPMT 241	Systems Analysis and Design	3.0
OPMT 250	Computer Programming — Applied BASIC	3.0
PHYS 217	Basic Science for Operations Management	3.0

Level 3		Classroom hours per week ➧
ADMN 100	Micro Economics	3.0
ADMN 343	Personnel Fundamentals	2.0
FMGT 306	Cost Accounting-Operations Management	3.0
OPMT 244	Performance Measurement	4.0
OPMT 300	Quantitative Methods 1	5.0
OPMT 340	Applied Industrial Engineering 1	5.0
OPMT 348	Production and Inventory Management	5.0
OPMT 350	Computers and Information Processing 1 and 2	3.0

Level 4A		Classroom hours per week ➧
ADMN 330	Industrial Relations	0.0
OPMT 156	Supervision	2.0
OPMT 157	Marketing Research	2.0
OPMT 245	Quality Assurance	2.0
OPMT 400	Quantitative Methods 2	7.0

OPMT 440	Applied Industrial Engineering 2	9.0
OPMT 448	Production and Inventory Management	5.0
OPMT 449	Industrial Engineering Concepts	0.0
OPMT 450	Computers and Information Processing 2	3.0

Level 4B Classroom hours per week

ADMN 330	Industrial Relations	4.0
OPMT 156	Supervision	2.0
OPMT 157	Marketing Research	2.0
OPMT 245	Quality Assurance	0.0
OPMT 400	Quantitative Methods 2	3.0
OPMT 440	Applied Industrial Engineering 2	0.0
OPMT 448	Production and Inventory Management	2.0
OPMT 449	Industrial Engineering Concepts	17.0
OPMT 450	Computers and Information Processing 2	0.0

TRANSPORTATION AND DISTRIBUTION PROGRAM

INTERNATIONAL TRADE OPTION

The Transportation/Distribution program emphasizes systematic analysis for cost reduction/control within an organization, while increasing customer service and strengthening its market position through a more effective distribution system.

Students in the Transportation and Distribution Management programs study both the "buying" (distribution and management) of a service, and the "selling" (supply of transportation facilities) for the movement of goods and people.

Job Opportunities

Graduates from the Transportation and Distribution program have found jobs in various transportation related activities such as traffic managers, customs brokers, distribution managers, logistics analysts.

Prerequisite

Algebra 11 with a C+. This requirement may be waived for mature students on approval by the Department Head. If your mathematical skills are in doubt, it is recommended that you take Preparatory Business Math OPMT 099. It is also recommended that potential students acquire basic typing skills due to the extensive use of computer input terminals in the program.

PROGRAM: Transportation/Distribution Program and International Trade Option

Level 1 Classroom hours per week

ADMN 100	Micro Economics	3.0
ADMN 385	Business Law	3.0
BCOM 107	Business Communication for Operations Management	3.0
COMP 100	Data Processing — Introduction	4.0
FGMT 101	Accounting 1	3.0
MKTG 102	Introduction to Marketing	3.0
OPMT 101	Business Mathematics	4.0
OPMT 150	Introduction to Microcomputers	2.0
TDMT 101	Geography of Trading 1	3.0

Level 2A Classroom hours per week

ADMN 200	Macro Economics	3.0
BCOM 207	Business Communication for Operations Management	3.0
FMGT 201	Accounting 2	3.0
MKTG 103	Sales Skills	3.0
OPMT 121	Business Statistics	4.0
OPMT 241	Systems Analysis and Design	3.0
OPMT 250	Computer Programming Applied BASIC	3.0
TDMT 100	Transportation Methods	4.0
TDMT 201	Geography of Trading 2	0.0

Level 2B Classroom hours per week

ADMN 200	Macro Economics	3.0
BCOM 207	Business Communication for Operations Management	3.0
FMGT 201	Accounting 2	3.0
MKTG 103	Sales Skills	3.0
OPMT 121	Business Statistics	4.0
OPMT 241	Systems Analysis and Design	3.0
OPMT 250	Computer Programming Applied BASIC	3.0
TDMT 100	Transportation Methods	0.0
TDMT 201	Geography of Trading 2	4.0

PROGRAM: Transportation/Distribution

Level 3 Classroom hours per week

ADMN 382	International Law	3.0
OPMT 143	Management Engineering	4.0
OPMT 301	Quantitative Methods/Computer Applications	3.0
OPMT 350	Computers and Information Processing 1	3.0
TDMT 202	Transportation Regulations	4.0
TDMT 203	Transportation Economics	4.0
TDMT 305	International Trade	4.0
TDMT 306	Transportation Marketing	3.0
TDMT 309	Marine Shipping and Insurance	3.0

Level 4A Classroom hours per week

ADMN 331	Industrial Relations	4.0
ADMN 340	Personnel Administration	2.0
FMGT 442	Domestic and International Corporate Finance	3.0
OPTM 156	Supervision	0.0
OPMT 245	Quality Assurance	2.0
OPMT 401	Quantitative Methods/Computer Applications 2	2.0
TDMT 307	Traffic Management	4.0
TDMT 308	Transportation Management	4.0
TDMT 409	Exporting and Importing	2.0
TDMT 410	Logistics	4.0
TDMT 411	Industry Project	0.0
TDMT 414	Manufacturing Methods	0.0
TDMT 420	Customer Analysis	3.0

Level 4B Classroom hours per week

ADMN 331	Industrial Relations	0.0
ADMN 340	Personnel Administration	0.0
FMGT 442	Domestic and International Corporate Finance	3.0
OPTM 156	Supervision	4.0
OPMT 245	Quality Assurance	0.0
OPMT 401	Quantitative Methods/Computer Applications 2	0.0
TDMT 307	Traffic Management	0.0
TDMT 308	Transportation Management	0.0
TDMT 409	Exporting and Importing	2.0
TDMT 410	Logistics	4.0
TDMT 411	Industry Project	15.0
TDMT 414	Manufacturing Methods	2.0
TDMT 420	Customer Analysis	0.0

PROGRAM: International Trade Option

Level 3 Classroom hours per week

ADMN 382	International Law	3.0
MKTG 301	Quantitative Methods/Computer Applications	4.0
MKTG 309	Marketing Research 1	4.0
OPMT 350	Computers and Information Processing 1	3.0
TDMT 202	Transportation Regulations	4.0

TDMT 203	Transportation Economics	4.0
TDMT 305	International Trade	4.0
TDMT 306	Transportation Marketing	3.0
TDMT 309	Marine Shipping and Insurance	3.0

Level 4A Classroom hours per week

ADMN 340	Personnel Administration	2.0
ADMN 331	Industrial Relations	4.0
FMGT 442	Domestic and International Corporate Finance	3.0
MKTG 401	Marketing Planning	4.0
MKTG 409	Marketing Research 2	3.0
OPMT 156	Supervision	2.0
OPMT 445	Quality Assurance	2.0
TDMT 307	Traffic Management	4.0
TDMT 409	Exporting/Importing	2.0
TDMT 410	Logistics	4.0
TDMT 411	Industry Project	0.0

Level 4B Classroom hours per week

ADMN 340	Personnel Administration	0.0
ADMN 331	Industrial Relations	0.0
FMGT 442	Domestic and International Corporate Finance	3.0
MKTG 401	Marketing Planning	4.0
MKTG 409	Marketing Research 2	3.0
OPMT 156	Supervision	2.0
OPMT 445	Quality Assurance	0.0
TDMT 307	Traffic Management	0.0
TDMT 409	Exporting/Importing	2.0
TDMT 410	Logistics	4.0
TDMT 411	Industry Project	12.0

Course Descriptions

ADMN 100 Micro Economics — The major areas studied are the product and resource markets. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored.

ADMN 200 Macro Economics — Develops understanding of the organization and operation of the Canadian Economy in an international setting. The theoretical tools of the economist are used to expand the concepts of national income employment, inflation, money and banking international trade, and growth. An appreciation of the relationship between economic theory and economic policy is provided.

ADMN 221 Organizational Behavior Fundamentals — Studies human behavior and attitudes in an organizational setting; the organization's effect on the person's perceptions, feelings and actions; and the person's effect on the organization, particularly how behavior affects the achievement of the organization's purposes. Concepts of leadership, communications, power, authority, change and conflict will be examined.

ADMN 330 Industrial Relations — A detailed analysis of selected labor/management problem areas with emphasis on the solution of practical problems in industrial relations.

ADMN 331 Industrial Relations — An introductory analysis of the fundamental issues and facts of labor-management relations. Special emphasis is given to collective agreement content and interpretation, bargaining and basic labor economics.

ADMN 340 Personnel Administration — An introduction to the fundamentals of personnel management, including organization of the personnel function, salary administration, fringe benefits, training, management development and performance appraisal, constructive discipline, grievances and morale.

ADMN 343 Personnel Fundamentals — An introduction to the fundamentals of personnel management, including human resource planning; recruiting and selection techniques; job analysis, descriptions and evaluation; compensation administration; performance appraisal systems; training; employee safety and health. Includes a review of current employment legislation.

ADMN 382 International Law — This course will examine conflicts of law, international sale of goods contracts, international arbitration, etc. Provides the student with an overview of central legal issues which arise from conducting business across national boundaries.

ADMN 385 Business Law — A one-term, condensed course which acquaints the business student with basic knowledge of Canadian law including the legal system, contracts, torts, sale of goods and consumer protection, secured transactions and creditors' remedies, employment law and agency, business organizations, negotiable instruments, real estate and administrative law.

BCOM 107 Business Communication for Operations Management — An applied communication course for Operations Management students. It covers the basic writing and oral communication skills necessary in business and industry. Students learn how to write effective letters and memos and how to prepare and make oral presentations. The course also includes a unit on using word processors.

BCOM 207 Business Communication for Operations Management — Gives further instruction and practice in the skills learned in BCOM 107. In this term, the focus is on job application, functional reports, telephone techniques and meetings. Prerequisite: BCOM 107.

CHSC 122 Engineering Concepts — Examines comparative properties of all classes of engineering materials including metals, alloys, polymers, concrete wood and ceramics. Common causes: of failure in service including fatigue, weathering, embrittlement and corrosion.

COMP 100 Data Processing — Introduction — Training in basic data processing principles to develop recognition of the application of these principles to industry. The principal functions of data processing are illustrated and practised with an H.P. minicomputer operating interactively. Elementary computer programs are written and tested on the computer. Use of flow-charting and elementary data processing systems design will illustrate the achievement of data processing objectives.

FMGT 101 Accounting 1 — Permits persons with little or no accounting background to become familiar with the techniques of working through the full accounting cycle. The course provides theoretical and practical training in basic accounting as preparation for FMGT 201. Topics include accounting as an information system; introduction to accounting theory; income measurement; traditional record-keeping procedures; the accounting cycle; special journals; cash; investments and receivables.

FMGT 102 Introduction to Financial Accounting — Includes a survey of the accounting process and a review of basic accounting theory. Preparation and analysis of financial statements and the reporting of financial information to outsiders is covered in depth. Also covered is accounting for assets, liabilities and owner's equity.

FMGT 201 Accounting 2 — The follow-up to FMGT 101, topics include inventory, long-lived assets, liabilities, forms of business organizations, cash-flow and working capital analysis, manufacturing accounting, management accounting, consolidated statements, analysis of financial statements and price level changes. Prerequisite: FMGT 101.

FMGT 202 Introduction to Managerial Accounting — Covers the preparation and utilization of financial information for internal management purposes. Volume-profit analysis, capital budgeting, depreciation, return on investment, budgeting systems, common dollar accounting and funds flow analysis will also be considered. Prerequisite: FMGT 201.

FMGT 306 Cost Accounting — Operations Management — Concentrates specifically on cost accounting for operations management. Topics will include basic cost concepts, systems of cost accumulation, accounting for manufacturing overhead, standard cost systems and the analysis of cost variances. Variable costing is also dealt with. Prerequisite: FMGT 201 or 215.

FMGT 442 Domestic and International Corporate Finance — Familiarizes students with the role finance plays in business and industry. Students will obtain a basic understanding of the interrelationships of finance with the other functional aspects of business. Teaches students common decision-making tools in finance to enable them to react intelligently under varying conditions within a business environment of ever-increasing complexity. Special emphasis will be given to the services provided by financial institutions to firms that take part in international trade.

MECH 102 Drafting — Introduces students to engineering drawings as a method of communication. Students will learn how to read various types of blueprints and how to communicate using drawings. Emphasis is on visualization, dimensioning and freehand sketching.

MECH 207 Engineering Concepts — A study of applied mechanics and design concepts. Topics include metallurgy, forces, moments, couples, frames, beams, centroids, friction and elementary dynamics.

MKTG 102 Introduction to Marketing — Includes a detailed study of the basic marketing functions, marketing research, product planning, selection of trade channels, merchandising, advertising, sales promotion and salesmanship. Marketing of consumer goods as well as industrial goods will also be covered.

MKTG 103 Sales Skills — Introduction to professional selling. Emphasizes practical problems of locating and qualifying prospects, use of depth approach and improving sales preparation and organization. Examines improving interpersonal communications in non-selling situations.

MKTG 301 Quantitative Methods/Computer Applications in Marketing — An examination of decision support systems now available utilizing mathematical modelling methods, data bank access, and computer based information. Prerequisite: MKTG 101, 201.

MKTG 309 Marketing Research 1 — Examines the basic approaches to marketing research. It discusses the techniques and tools of this research and relates these tools to the decision-making process. Emphasis is placed on the use of marketing research in the total marketing decision concept. Special applications of marketing research to simulated real-life situations are examined. Prerequisite: MKTG 101, 201.

MKTG 401 Marketing Planning — Examines how to develop a formal marketing plan including situation analysis, market and competitive conditions research, objective setting and action scheduling using computer based management systems. Prerequisite: MKTG 100, 200.

MKTG 409 Marketing Research 2 — see MKTG 309. Prerequisite: MKTG 309.

OPMT 100 Applied Mathematics 1 — Covers basic mathematics applied to industry and commerce. Topics include basic algebra, trigonometry, break-even analysis, simple and compound interest, annuities and methods of evaluating investments.

OPMT 101 Business Mathematics — Covers the basic mathematics applied to industry and commerce. Topics include basic algebra, break-even analysis, simple and compound interest, annuities, and methods of evaluating investments.

OPMT 120 Applied Mathematics 2 — Covers fundamental statistics used in business and industry. Topics include descriptive statistics, probability theory and major distributions, sampling, confidence intervals, tests of hypotheses, applications to quality control, correlation and linear regression.

OPMT 121 Business Statistics — Covers fundamental statistics used in business and industry. Topics include descriptive statistics, probability theory and major distributions, sampling, confidence intervals, tests of hypotheses, acceptance sampling, correlation and linear regression.

OPMT 140 Introduction to Operations Management — Provides an introduction to the role of business in the British Columbia economy. It considers the management of business and emphasises the types of careers available to Operations Management graduates in B.C. business.

OPMT 143 Management Engineering — A basic productivity engineering course for transportation and distribution students. Course covers the basic industrial engineering approach to productivity improvement including work measurement and facility layout. Examples and projects are oriented to the TND side of the economy.

OPMT 150 Introduction to Microcomputers — Provides an introduction to the role of personal computers in business. Emphasis is on learning to use standard software products for financial modelling (spreadsheet) word.

OPMT 156 Supervision — Introduces the student to some of the skills required to survive the initial period of promotion to a first line supervisory position. Topics include role of the supervisor, functions of management, authority relationships, design and implementation of "on the job training" programs, how to lead, delegate, discipline and evaluate, as well as dealing with day to day operations including grievances.

OPMT 157 Marketing Research — Designed to give the student a basic appreciation of marketing functions and the role of market research in an organization.

OPMT 160 Method Study 1 — This introductory course in industrial engineering presents a six step systematic approach to methods improvement. The student will learn specific industrial engineering techniques.

OPMT 240 Industrial Engineering — Builds on OPMT 160 to provide the student with a comprehensive knowledge of industrial engineering techniques to solve problems in an industrial setting.

OPMT 241 Systems Analysis and Design — In business, systems analysis and design refers to the process of examining a business situation with the intent of improving it through better procedures and methods. Course includes determining system requirements, decision analysis and design of input output reports.

OPMT 244 Performance Measurement — Gives the student an appreciation of the physical work performed by both industrial and office workers. The student will learn two forms of work measurement — predetermined motion time systems and time study. He will also learn performance ratings and how to establish standard times.

OPMT 245 Quality Assurance — Modern concepts of quality management for the manufacturing and service industries. Management levels and topics include inspection, quality control and quality assurance; organization; system functions and documentation requirements; technical, economic and legal aspects of quality assurance management; supplier quality assurance; product reliability; Canadian national standards for quality programs.

OPMT 250 Computer Programming — Applied BASIC — Instruction in the use of advanced BASIC to solve problems common to the Operations Management discipline. Topics include arithmetical operations, input/output, loops, sub-routines, files, arrays, strings, and functions.

OPMT 300 Quantitative Methods 1 — Applications of mathematical and computer modelling to decision-making in business and industry. Topics include model building, break-even analysis, decision theory, inventory control, linear programming, queuing theory, simulation models, demand analysis and computer applications (main-frame, mini and micro).

OPMT 301 Quantitative Methods/Computer Applications — Following basic training in mathematics of finance and statistics, students are introduced to the solution of more complex business problems by mathematical processes. Forecasting methods are examined with computerized analysis of data. Some aspects of management science that are particularly useful in the transportation business are examined manually and through the computer. These include linear programming, the transportation model simulation and line analysis. Considerable effort is in interpretation of results and preparation of management oriented reports.

OPMT 340 Applied Industrial Engineering 1 — Enables the student to understand the role of manufacturing automation in the productivity improvement process including CAD/CAM and robots. The concepts of flexible manufacturing systems, group technology and computer integrated manufacturing are explored.

OPMT 348 Production and Inventory Management — Provides the student with a comprehensive knowledge of production and inventory management in business. Topics include forecasting, aggregate inventory, MRP, MPS and CRP. The total closed loop system is covered in detail. Critical Path Method is covered in Term 4B.

OPMT 350 Computers and Information Processing 1 — Introduction to computer systems design and the application of the computer to the Operations Management field. Topics include computer hardware, computer software, computer systems flowcharts, selected application packages, file organization techniques and computer resources in the community. At the conclusion of this course, students will have gained a broad appreciation of the current and potential application of the computer to the business world.

OPMT 400 Quantitative Methods 2 — see OPMT 300. Prerequisite: OPMT 300.

OPMT 401 Quantitative Methods/Computer Applications 2 — see OPMT 301. Prerequisite: OPMT 301.

OPMT 440 Applied Industrial Engineering 2 — see OPMT 340.

OPMT 445 Quality Assurance — A quality assurance course related to the transport and distribution industries covering three main areas: quality control maintenance planning for operating equipment, quality assurance support for the procurement function and the evaluation of suppliers, and quality management programs that affect the business performance of a company with respect to its trading opportunities in local, national and international markets.

OPMT 448 Production and Inventory Management — see OPMT 348. Prerequisite: OPMT 348.

OPMT 449 Industrial Engineering Concepts — A comprehensive external study in a local firm requiring the application of material from various recordings and analysis of data from the field, terminating in a written report and an oral presentation of the project.

OPMT 450 Computer and Information Processing 2 — see OPMT 350.

PHYS 117 Basic Science for Operations Management — A survey course which covers topics of physics as they relate to the operations management technology. A brief chemistry component facilitates the study of handling and storage of hazardous materials. Emphasis is on how the basic laws of physical science affect and limit activities in the technology.

PHYS 217 Basic Science for Operations Management — see PHYS 117.

TDMT 100 Transportation Methods — Introduces students to the various ways of moving commodities, including air, highway, pipeline, rail and water carriers. Economic costs of operation and selection of equipment are also covered.

TDMT 101 Geography of Trading 1 — Transportation is the basis of all economic systems including agricultural production, industrial location, settlement patterns, marketing systems and consumer shopping. This course studies in detail the role of transportation, major trading routes and ports and other factors in the development of resources for the world and Canada. Emphasis is placed on Canada as a major resource producer, particularly in the emerging Pacific Rim.

TDMT 201 Geography of Trading 2 — Designed to give students a basic understanding of world resource industries — agriculture, raw materials, energy sources as well as the flow of commodities, trade routes, trading patterns and the degree of inter-dependence among the nations. As well, the course will cover the characteristic of each mode of transport on the six continents. Prerequisite to International Trading Strategies.

TDMT 202 Transportation Regulations — Familiarizes the student with transportation regulations at federal, provincial, and regional levels. The Acts governing intra and inter-provincial transportation, and regulation of common, contract and private carriers, including their rights and responsibilities, and the deregulated U.S. transportation industry.

TDMT 203 Transportation Economics — Covers a variety of transportation services and their cost factors including carrying capacity, load factors, fuel cost, etc., concluding with profit oriented rate making. Costing methods relating to various modes of transportation are discussed considering distance, flow of goods and backhaul.

TDMT 305 International Trade — To develop an understanding of international logistics, this course deals with the economic and trading characteristics of nations as they relate to the Canadian economy. An overview of comparative advantage and disadvantage introduces the student to the protectionism and intricacies of international trading. INCO terms and pricing, floating and pegged exchange rates will be discussed together with the movement of international inventories. The course also covers information on counter trade. Prerequisite to Import/Export. Prerequisite: TDMT 201.

TDMT 306 Transportation Marketing — The student learns to relate the services of a transportation company to client requirements. The increasing impact of intermodalism is examined while

the student develops the ability to analyse the competitive position of his carrier (employer), to assure effective participation in the market.

TDMT 307 Traffic Management — Acquaints the student with the broad responsibilities of a traffic manager in an industry requiring transportation services. Includes negotiating with common carriers, criteria for carrier selection, rate negotiations, routing, consolidation, documentation, handling claims, tracing, expediting and carrier performance analysis for future carrier selection.

TDMT 308 Transportation Management — The operation departments of a transportation company are described in detail. Freight tariffs as applicable to commodity, special and ancillary services, routing, misrouting, claim prevention, and the organization and control of the company are examined.

TMDT 309 Marine Shipping and Insurance — This course is designed to familiarize the student with the basics of the principles and problems of ships, navigation and cargo, trends in shipping, containerization/unitization and the port as a sea transport interface. Marine Insurance will deal with the types of policies, the fundamentals of coverage, the analysis of the policy and claim handling.

TDMT 409 Exporting/Importing — Practical application of previously learned theories acquaints students with the terminology and interpretation of the Customs Act, customs tariff, excise tax, and Antidumping Act. Gives the student thorough understanding of fair market value, dumping, countervailing duty, the GATT, tariffs and the increasing use of non-tariff barriers including present new devices. Documentation for importing and exporting, entries, drawbacks, refunds, appeals and classification is covered.

TDMT 410 Logistics — An overview of the total distribution concept. Adding to previously learned information the course examines distribution facility location analysis, information systems, control systems and distribution economics and profitability. With heavy emphasis on customer services and profitability, the course prepares the student to conduct a transportation audit, customer service audit and a complete distribution audit.

TMDT 411 Industry Project — The course is an opportunity to apply the knowledge from the program to a specific industry project at the client's place of business.

TDMT 414 Manufacturing Methods — A study of the processes involved in the making of consumables. Physical, chemical and electrical principles are reviewed with special emphasis on the handling, care and disposal of hazardous products.

School of Academic and Vocational Studies

The School of Academic and Vocational Studies consists of the Chemistry, Communication, Mathematics, Physics, Vocational programs and Continuing Education departments. It offers courses and services to all students enrolled in technology programs offered by the Schools of Computing and Electro-Mechanical Studies, Construction and Natural Resource Studies, Health Sciences Studies and Management Studies, as well as courses and services for part-time students. It also offers non-credit preentry courses to students who need to upgrade their academic prerequisites for admission to BCIT.

Courses taught by the Academic support departments include the "core" of knowledge and skills, both theoretical and applied, which students need in order to understand and make the best use of their specialized technological training. Academic support courses are developed in conjunction with technology departments and advisory committees, and maintain an appropriate balance between applied and theoretical content.

Faculty and Staff

Henry Arthur, B.A.(Hons.), M.A., Dean

Department of Chemistry

C. Barnetson, B.Sc., Department Head
N. Abdurahman, B.Sc., M.Sc., Ph.D.
G.C. Anderson, M.I.S.T. (U.K.), A.Sc.T.
D.W. Conder, B.Sc., M.Sc.
C. Heady, Dipl. Tech.
T. Mepham, A.R.I.C., M.Sc.
M. Pickering
S.M. Reynolds, B.A., M.Sc.
J. Salvo, B.Sc., B.Ed.
R. Tam
E.E. Tang, B.Sc.
L.V. Tolani, B.Sc., M.Sc., D.I.C., C.Chem., M.R.I.C.
W. Whalen, Dipl. Tech.

Department of Mathematics

K.A. Yakel, B.Sc. (Hons.), M.Sc., Acting Department Head
M.C. Bojadziev, Dip. Ing.
J.W. Brown, B.Sc. (Hons.), M.A.
A.K. Chu, B.A.Sc., P.Eng.
G. Cocksedge, B.Sc.For., M.Eng.
C.A. Copping, B.Sc.
A. Ellingsen, B.Sc.
A.S. Farooqui, B.Sc. (Hons.), M.Sc. (Applied Math), M.Sc. (Pure Math), Ph.D.
E. Hiob, B.Sc., M.Sc., Ph.D.
P.M. Hobbins, B.Sc., Assistant Department Head
C.C. Lawrence, B.Sc. (Hons.)
R.D. Lynn, B.Sc. (Hons.), M.S.B.A., A.F.I.M.A.
E.R. Martin, B.Sc., M.Ed.
J. Meisen, B.Sc., M.S., Ph.D.
J.E. Reyes-Voight, Dipl. Tech., B.Eng., B.Ed., M.Sc.
L. Routledge, B.A., B.Ed.
D. Sabo, B.Sc. (Hons.), Ph.D.
V. Sawadsky, B.A., B.Sc. (Hons.)
S.P. Slinn, B.A.Sc.
A.A. Springer, B.Sc.
E.L. Toth, B.Sc.
B.L. Turner, B.Sc.
C.S. Williston, B.Sc. (Hons.), Ph.D.

Department of Physics

K.A Yakel, B.Sc. (Hons.), M.Sc., Acting Department Head
G. Bodnar
C. Deurzen, B.Sc., M.A., Ph.D.
F. DiSpirito, B.A.Sc., P. Eng.
L. Greenwood, B.Eng., B.A., Cert.Ed.
H.D. Hecker, Dipl. Tech.
D.E.A. Kenyon, B.Sc.
A. Kshatriya, B.Sc., M.Sc., C.P.G.S.(Cantab.), M.Ed.
A. MacArthur, B.Sc.(Hons.), Cert.Ed.(Cantab.)
D. MacDuff, B.Sc.
U. Olcay, B.Sc.
W.V. Olson, B.Sc., M.Sc.
G. Parkinson, B.Sc. (Physics), B.Sc. (Geophysics)
G.R. Paulson
J.R. Saunders, B.Sc., M.Sc.
G. Schellenberg, Dipl. Tech.
W. Swetlishoff, B.Ed.
D.E. Thom, B.Sc.
L. Warren, B.A., M.A.
W.T. Withers

Preparatory Programs

Technology Fundamentals Program

David Sabo, B.Sc., Ph.D., Chief Instructor
Rick Inrig, B.Ed., M.Ed. (on leave)
Eva Longman, Program Assistant

Communication Department

Richard Lund, B.A. (Hons.), M.A., Department Head
May Archer, B.A. (Hons.), M.A.
Ken Brambleby, B.A.
Patrick Burns, B.A., M.A.
Rider Cooey, B.A. (Hons.)
Grant Douglas, M. Ed.,
Sue Fahey, B.A.
David Hamilton, B.Sc.
David Helgesen, B.A., M.B.A.
Douglas Horan, B.Journ., B.A. (Hons.)
Valda Johnston, B.A., B.Ed.
Wayne Kean, B.A., M.A.
David Kipling, F.E.T.C., A.L.A. (U.K.)
Ron Knott, B.A. (Hons.), M.Ed.
Greg Layton, B.A.
David McNeal, B.A., M.A., Ph.D.
Maureen Moore, B.A., M.A.
Jennifer Nachlas, B.A. (Hons.), M.A., Ph.D.

Bill Oaksford, B.A., M.A.
Michael Otte, B.A. (Hons), M.A.
Trudy Ramsay, B.A.
Barbara Schillinger, B.A., M.A.
Jean Scribner, B.A., M.A.
Judy Segal, B.A. (Hons.), M.A.
Rudy Spence, B.Comm., B.A., M.Ed.
Don Steele, B.A. (Hons.)
Eileen Stephens, B.A., M.A.
Dixie Stockmayer, B.A. (Hons.)
Patrick Thomas, B.A., B.Ed., M.A.
David Vale, B.A., B.Ed., M.Ed.
Kathy Vance, B.A. (Hons.), M.A., Ph.D.
Anita Willson, B.A., M.A.

The School of Academic and Vocational Studies offers Communication, Chemistry, Mathematics and Physics course components for full-time and part-time programs.

Pre-entry courses are offered throughout the year to students needing entrance requirements for BCIT. These courses will be of interest to mature students who need the courses as refresher, or to students who do not have the necessary prerequisites for entrance into BCIT programs.

Academic support courses are offered throughout the year in many forms:

- — as individual part-time evening classes
- — as individual part-time day-time classes (usually in the summer term)
- — as concentrated 15 week packages (through Technology Fundamentals, in both September and January)
- — as part of full-time program requirements.

Interested students are encouraged to call 432-8842 for further information.

Special In-House Communication Courses

All Communication courses can be delivered in-house for interested groups in 3-day, week-long, or other flexible formats. Special courses can also be designed to meet company communication requirements. Instructors will conduct needs assessments in the company and design relevant course materials. Please call the Communication Department at 432-8387 for more information.

English Language Proficiency Requirement

Students enrolling in Part-time Communication courses who have severe language difficulties may be referred to other, more appropriate courses.

Pre-entry Courses

Pre-entry courses are individual day or night courses available for students who lack the necessary prerequisites to apply for their chosen technology programs, or for those who wish to prepare for their full-time workload.

Pre-entry courses are available in each of the BCIT terms: September, January, April and throughout the summer months (check the Part-time Studies flyer for dates, or phone 432-8842).

The following Pre-entry courses are available for those who need prerequisites or who wish to up-grade their existing grades:

Technical Mathematics-Introduction — (For School of Health Sciences Studies and the Schools of Engineering Studies)

Mathematics for Business — (For School of Management Studies)

Introductory Computer Programming for Engineering Technologies — (For the Schools of Engineering Studies)

Effective Writing Independent Learning Skills — (Preparation courses for every Technology)

Comprehensive Reading, Writing and Learning Skills — (English 12 for every Technology)

Technical English as a Second Language — (English 12 for English as a Second Language students)

Chemistry 1 — (Chemistry 11)

Chemistry 2 — (Chemistry 12)

Physics — (Physics 11)

Course Descriptions

BIOLOGY

BHSC 001 Biology 1 — An upgrading and refresher course for those whose background in biology is weak or those who have not studied biology for some time. The course meets the Biology 11 entrance requirement for BCIT. **non credit**

BHSC 002 Biology 2 — An upgrading and refresher course for those whose background in biology is weak or those who have not studied biology for some time. This course meets the Biology 12 entrance requirement for BCIT. **non credit**

CHEMISTRY

CHEM 001 Pre-entry Chemistry 1 — An upgrading course for people whose background in chemistry is weak, and a refresher course for those who have not studied chemistry for several years. Meets the Chemistry 11 program entrance requirements for BCIT. **non credit**

CHEM 002 Pre-entry Chemistry 2 — A further upgrading course for those whose background in chemistry is weak or a refresher course for those who have not studied chemistry for some time. The course meets the Chemistry 12 entrance requirement for BCIT. **non credit**

COMMUNICATION

COMM 001 Effective Writing — Develops the basic skills needed for the business and technical writing at BCIT. This 24-hour course prepares you for the heavy writing requirements in the Communication and Technology courses offered through full-time day school programs. You will find this course especially useful if you are uncertain of your skills in business and technical writing. The course addresses organization of written material, paragraph development and effective sentences in letter and memo writing. **non credit**

COMM 002 Independent Learning Skills — This course teaches you how to study on your own, manage your time, cope with heavy work loads and get the most from new instructional techniques. It includes textbook reading, learning from objectives, using computer managed learning packages, reading efficiently, completing assignments, taking exams successfully and managing your time. A **must** for students entering BCIT — especially for Electrical options. **non credit**

COMM 003 Comprehensive Reading, Writing and Learning Skills — An integrated course which emphasizes the reading, writing and study skills needed for entering a full-time program of studies at BCIT. This course covers all the topics outlined in COMM 001 and COMM 002 as well as speed reading, reading comprehension, library research and short report format. NOTE: if your mark in B.C. high school English 12 does not meet BCIT admission requirements, a mark requirement of 65% or better in

this course will meet the C + English 12 entrance requirement for BCIT full-time day school programs. **non credit**

COMM 004 Technical English as a Second Language — This 80-hour course is for students whose first language is not English, who have studied English, but need practice in applying their language skills to technical studies or need to upgrade their English to meet the Institute's English language requirement. This integrated language course focuses on the reading, writing, listening and speaking skills required for technical communication and will include reading efficiency, vocabulary expansion, sentence and paragraph development. A mark of 65% or better in this course will meet the C + in English 12 entrance requirement for BCIT full-time day school. **non credit**

MATHEMATICS

MATH 001 Technical Mathematics — An upgrading and/or refresher course for students who have not completed high school math, or have completed it more than three years previously, or whose math background is otherwise weak. This course meets Algebra 12 entrance requirements at BCIT. Students intending to enter a technology which requires an Algebra 12 grade of C + or better, must achieve a final mark of 65% or higher in MATH 001. Prerequisite: C or better in Algebra 11 or approved equivalent math course. **non credit**

MATH 002 Technical Mathematics — Introduction (Correspondence) — Flexible entry correspondence course that satisifies the Algebra 12 entrance requirements for BCIT. Students intending to enter a BCIT technology which requires an Algebra 12, grade of C + or better must achieve a final mark of 65% or higher in MATH 002. Students who have difficulty with mathematics or those who have been away from school more than three years are advised to take the classroom course (see P/T offering — MATH 001). Prerequisite: a pass in Algebra 11 or an approved equivalent mathematics course. **non credit**

PHYSICS

PHYS 009 Pre-entry Physics — This course is designed for those students who lack the physics prerequisite to enter their chosen technologies or those who anticipate difficulty in passing the physics course associated with their technology. The course offers an introduction to physics, its basic principles and common applications. Approximately two-thirds of the course deals with mechanics, the remainder with heat and geometric optics. Problem solving techniques are emphasized. Prerequisite: you are advised to have completed any necessary mathematics upgrading courses BEFORE taking PHYS 009. **non credit**

Technology Fundamentals Program

Technology Fundamentals is an upgrading program to assist day school applicants who lack some or all of the prerequisites for admission into BCIT programs.

Technology Fundamentals is a full-time, day school program (Monday through Friday) beginning in September and January, and running for 15 weeks.

Applicants for admission into Technology Fundamentals **must** indicate which BCIT Technology program they are applying for and which session (September or January) of the Technology Fundamentals program they wish to enroll in. Technology Fundamentals application forms must also have all necessary documents attached.

Technology Fundamentals students may be guaranteed entry to their full-time technology programs, subject to successful completion of the Technology Fundamentals program. The participating technologies include:

Biological Sciences
Building
Civil and Structural
Forest Resources
Mechanical/Mechanical Systems
Mining
Natural Gas and Petroleum
Chemical Sciences
Lumber and Plywood
Survey
Electrical/Electronics

For further information contact 432-8842.

Part-time Studies

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General Information

This calendar contains details of all part-time studies programs, courses and workshops offered by the Schools of Academic and Vocational Studies, Computing and Electro-Mechanical Studies, Construction and Natural Resource Studies, Health Sciences Studies and Management Studies at the British Columbia Institute of Technology.

Suggested programs of study leading to the granting of Certificates and Diplomas are described, which offer the student both an educational goal and a valuable credential for employment and career advancement.

Academic Terms — Term 1 (Fall) September to December
Term 2 (Winter) January to March
Term 3 (Spring) April to June
Term 4 (Summer) July, August

Administrative Personnel

School of Management Studies
Lorne A. Fingarson, B.Comm., Department Head
K. Douglas Smith, B.A., M.B.A., Assistant Department Head

School of Computing and Electro-Mechanical Studies

School of Construction and Natural Resource Studies
P.M. O'Reilly, B.Sc., Department Head
M. Woolley, Dipl.T., C.E.T., Program Consultant

School of Health Sciences Studies
Patricia D. Wolczuk, Ph.D., Department Head

School of Academic and Vocational Studies
David Sabo, B.Sc., Ph.D., Chief Instructor

Office of the Registrar

IMPORTANT DATES

Summer 1986 — Term 4

July 2 (Wednesday) — Summer Term begins
August 1 (Friday) — Registration for Health Sciences Guided Learning courses starting September 2
August 4 (Monday) — B.C. Day

Fall 1986 — Term 1

August 11 (Monday) — Extended hours for registration begin
August 15 (Friday) — Recommended deadline for mail registrations for September courses
September 1 (Monday) — Labor Day
September 2 (Tuesday) — Health Sciences Guided Learning courses begin
September 8 (Monday) — Health Sciences Classroom courses begin
September 15 (Monday) — Management, Engineering Technology, Academic Studies courses begin. Health Sciences 10–12 week full-time courses begin
September 20 (Saturday) — Refund deadline for Health Sciences courses starting September 8
September 27 (Saturday) — Refund deadline for most Management and Academic Studies courses
October 13 (Monday) — Thanksgiving Day
November 11 (Tuesday) — Remembrance Day
November 24–29 — Last week for Health Sciences courses started September 8
December 1 (Monday) — Registration for Health Sciences Guided Learning courses starting January 5
December 1–5 — Last week for most Management, Engineering and Academic Studies courses (12th week — Burnaby Campus and Downtown Education Centre)
December 15–19 — Last week for remaining classes (Burnaby Campus and the Downtown Education Centre)
December 19 (Friday) — Recommended deadline for mail registrations — January courses

Winter 1987 — Term 2

January 2 (Friday) — Health Sciences courses begin
January 5 (Monday) — Engineering Technology courses begin
January 12 (Monday) — Management and Academic Studies courses begin. Health Sciences 10 — 12 week full-time courses begin
January 17 (Saturday) — Refund deadline for most Health Sciences courses
January 25 (Saturday) — Refund deadline for most Management and Academic Studies courses
March 2 (Monday) — Registration for Health Sciences Guided Learning courses starting April 1
March 23–28 — Last week for most Engineering and Health Sciences courses (12th week — Burnaby Campus)
March 30–April 4 — Last week for most Management and Academic Studies courses (12th week — Burnaby Campus and Downtown Education Centre)

Spring 1987 — Term 3

April 1 (Wednesday) — Health Sciences Guided Learning courses begin
April 6 (Monday) — Management, Engineering, Academic Studies, and Health Sciences classroom courses begin
April 6–10 — Last week for most Term 2 Engineering and Academic Studies courses at the Downtown Education Centre
April 13 (Monday) — Health Sciences 10 — 12 full-time courses begin
April 17 — GOOD FRIDAY
April 18 (Saturday) — Refund deadline for most Term 3 courses
April 20 — EASTER MONDAY
April 21 (Tuesday) — Management courses begin in Surrey
April 21–24 — Academic Studies courses begin at the Downtown Education Centre
April 25 (Saturday) — Refund deadline for most Term 3 Academic Studies courses at the Downtown Education Centre
May 25 (Monday) — Victoria Day
June 22–27 — Last week for most Management, Academic Studies, Engineering, and Health Sciences courses

Subject to confirmation at time of printing

Admission

Part-time Studies courses are taught at a level which assumes students have completed senior secondary school (Grade 12). Some courses have specific prerequisites or special conditions for entry; these prerequisites or conditions are presented with each course description in this calendar. Proof of prerequisite completion must be shown at the time of registration.

Applicants who are not Canadian citizens, must provide official proof of Landed Immigrant Status or a Student Authorization.

Registration

Registration is course-by-course on a first-come, first-served basis. Students must complete a registration form and return it by mail or in person. Mail registration should be forwarded to: Office of the Registrar, BCIT, 3700 Willingdon Avenue, Burnaby, B.C. V5G 3H2

Students may register in person at the Burnaby Campus, 3700 Willingdon Avenue, or at the Downtown Education Centre, 549 Howe Street, Vancouver. The recommended deadline for registration in person is 2 weeks before classes commence.

Fees must accompany the registration form. When student fees are to be paid by the employer, written authorization on company letterhead must accompany the registration form.

Late Registration

Late registrations are accepted if space is available. Students must obtain written permission from the instructor before registration will be accepted after the first two sessions of a course.

Cancellation and Restricted Enrolment

The Institute will make every effort to offer all courses as listed in the calendar. Nevertheless, the Institute reserves the right to limit enrolment, to select candidates, to cancel courses, to combine classes or to alter time of instruction, without prior notice. Students must fill in a refund form, or transfer paid fees to another course, when a course is cancelled.

Part-time Day

Students may register in courses given in full-time programs subject to the approval of the technology head and space being available. A student making application for part-time day classes must obtain the signature of the technology head and the instructor of each course, using the form "Application for Part-Time Day Courses" available from the Office of the Registrar. Fees must be paid upon presentation of the *completed* form to the cashier. Part-time day applicants to the Electrical Technology *are not* required to obtain signatures from technology departments. Completed part-time day applications must be submitted to the full-time admissions office to determine prerequisite completion and seat availibility. Fees must be paid on acceptance into the part-time day program.

Course Format

Credit and non-credit courses and seminars are offered in a variety of time frames and formats throughout the year at the Burnaby Campus, the Downtown Education Centre and in Surrey.

The most common course formats are:

Total Hours	Course Format
18	6 weeks, 1 night/week Weekend, 2½ days
36	6 weeks, 2 nights or one day/week 12 weeks, 1 night/week 1 week (5 days)
54	18 weeks, 1 night/week 9 weeks, 2 nights/week
72	12 weeks, 2 nights/week 24 weeks, 1 night/week 2 weeks (10 days)
90	30 weeks

Some courses travel — that is they are available upon request at centres throughout B.C. Call 434-1610, ask to speak to the appropriate department head or call the Downtown Education Centre at 687-4666, for information on courses and seminars of interest to you.

Fees

Fees are subject to change each academic year. Fee information is available in our advertising supplements and from registration locations. All fees must be paid in full at the time of registration. Payments can be made by cheque, money order, cash, Mastercard or VISA. Payments may also be made by mail, in person or by using the drop box in the cashier's area.

Refunds

On Withdrawal: students who withdraw from a regular evening course may be granted a refund provided that the "Application for Refund" form is completed and submitted to the registration desk on or before the prescribed deadline date for refunds. It is the student's responsibility to ascertain refund deadline dates. This information may be obtained at the information or registration areas in the Registrar's Office.

A non-refundable processing fee of $25 (1985-86), subject to change (1986-87), is withheld for each course from which a student withdraws. Refund cheques will become available 6 weeks after the commencement of classes.

On Cancelled Courses: fees for courses cancelled by the Institute are refunded in full unless students re-register in another course within the same term, in which case the fees are applied to the other course fee. To ensure that your refund is processed, please complete an official Application for Refund form.

Refund Deadline — Important

It is the student's responsibility to check the refund deadline dates. This information may be obtained at the information or registration areas in the Registrar's Office.

Tax Receipts (1986/87) subject to change.

An official tax receipt will be mailed by the Finance Office on or before February 28. To allow for normal mail delivery, students should wait until March 31 before contacting the Finance Office if a tuition fee tax receipt has not been received. A charge will be levied for duplicate receipts.

NOTE: To ensure that the receipts are sent to the correct address, students should notify the Student Records Office immediately of any changes of address.

Financial Obligation to the Institute

No Statement of Marks, diploma or certificate will be issued until the student has cleared up all financial obligations to the Institute.

Additional Expenditures

Textbooks, Instruments and Supplies

Costs vary according to the program and are approximately $350 to $800. The Institute bookstore carries a complete line of drafting and writing supplies. Students are advised not to make any purchases until they have received a book list showing the required texts. Some technologies require purchase of a pocket calculator costing approximately $150 to $250.

Field Trips

In some technologies, periodic field trips are part of the program. These expenses are the responsibility of the student. Accommodation and food costs vary from $25 to $100.

Financial Assistance for Part-time Students

A number of bursaries are available to students in part-time programs or in full-time programs of short duration. Since procedures vary, reference should be made to the individual listings that follow. For further information contact Financial Aid and Awards. Telephone 432-8327.

The Canadian Institute of Management

A $250 annual bursary is available to a student aspiring to a Part-time Studies Certificate in Administrative Management, Financial Management, Marketing Management, Operations Management, or the Canadian Institute of Management Certificate program. Application forms and information are available from Douglas Smith, Management Part-time Studies. **Deadline:** December 1

The Pacific Association for Continuing Education

Several bursaries of $50 to $100 are available to part-time or short-term adult students who are residents of B.C., show evidence of financial need with limited or no access to other scholarship or bursary funds, and are pursuing a continuing education plan or job upgrading goal which will benefit themselves and the community. Applications are available from Financial Aid and Awards. **Deadline:** January 31, April 30, July 30, September 30

The Purchasing Management Association of Canada

Three annual bursaries or $230 are available to the top students in business courses required for the PMAC Certificate Program. Applications and information are available from Douglas Smith, Management Part-time Studies. **Deadline:** December 1

The Harry H. Stevens Memorial Fund

The Kiwanis Club established this fund to assist BCIT students enrolled in part-time programs or full-time programs of short duration. Applicants must have resided in B.C. for at least one year and be taking a course to upgrade skills or re-train in a technical, supervisory or management area. Applications are available from Financial Aid and Awards. **Deadline:** March 15 (Spring/Summer terms); August 15 (Fall term); December 15 (Winter term)

Certificates and Diplomas

Although BCIT has recently changed over from a system of **units** to the **credit** system as defined above, we are still in the process of reviewing our certificates and diploma requirements in terms of number of credits.

Transfer from Full-Time Studies to Part-time Studies

A student transferring to part-time studies from a full-time diploma program will generally be granted credit exemption for all courses successfully completed prior to withdrawal from full-time studies. A student who fails one or more subjects in the full-time program is encouraged to consider part-time studies programs before withdrawal from full-time studies.

Examinations, Grading and Marks

Formal examinations are written at the end of each term. Students are required to take the examinations for each course at the time set by the Institute. Students unable to write examinations due to special circumstances should first contact their instructor; then, if necessary, consult the Department Head.

External Examinations — Part-time Studies only

We will attempt to co-operate with any **part-time** student who cannot write an examination because of absence from the city, by allowing the student to write the examination at a set time in another centre under an invigilator acceptable to the Institute.

Return of Examinations

For full-time students, mid-term and Christmas examination papers may be returned to students ten school days after the official institute distribution schedule for the Statement of Marks. Only those examinations designated as "restricted exams" by the Dean shall not be returned.

Part-time students wishing to have their examination papers returned should make arrangements with their course instructor.

Determination of Standing

Final standing is determined on the basis of term progress and examination results. Full-time students subject standings are reviewed by a Divisional Marks Review Committee where final standing is determined. Subject standing is as follows:

1 — First class	80% or more
2 — Second class	65% to 79%
3 — Pass	50% to 64%
4 — Failure	less than 50% or unapproved/unofficial withdrawal from subject or program.

When an "F" appears beside a course it indicates one of the following:

1. Failure in the subject
2. Withdrawal after the deadline (refer to section on Withdrawal from Program Courses.)
   A full-time student whose transcript bears such a standing is generally not permitted to proceed to the next term unless granted special permission by letter from the Registrar, after approval by the Divisional Marks Review Committee.

A Aegrotat — A pass standing based on term marks.

CH Challenge Credit — Challenge exam written for the course.

C Course Credit Granted — Recognition of approved equivalent studies and/or experience.

EC Exempt Course — Recognition of previous course completion at BCIT.

PP Provisional Pass — Will be changed to Pass or Fail depending on performance in a subsequent specific course.

P Provisional Pass Fulfilled — Provisional Pass conditions achieved.

AP Adjudicated Pass — Standing based on overall performance in the term.

N Not Complete — Course requirements not completed.

X No examination or grade given for this course.

S Satisfactory — Course requirements fulfilled, no mark assigned.

U Unsatisfactory — Course requirements not fulfilled, no mark assigned.

AU Audit — Attended course, no credit assigned.

W Withdrawal — Approved withdrawal from a course or program.

Distribution of Marks

Students will not be provided with marks prior to the issuance of a Statement of Marks by the Registrar's Office. Marks will not be released over the telephone.

Marks, including the result of December examinations, will be mailed to students by the Office of the Registrar. **Note:** A full-time student who has failed a term ending in December (also April and August for Computer Systems, Financial Management, Marketing Management and Electrical) will be advised by telegram prior to the commencement of the next term. A letter indicating the student's status, and the student's Statement of Marks follows the telegram.

Transcripts resulting from final examinations are mailed to graduating students by the Office of the Registrar. All other students will receive a Statement of Marks for the term.

Additional Transcripts

A fee of $4 for the first copy and $1 for each additional copy is charged for transcripts. The fee is due at the time the request is made.

Withholding Statement of Marks

No Statement of Marks, transcript, diploma or certificate will be issued until the student has cleared up all financial and other obligations to the Institute such as tuition fees, library fines, rent. These documents may also be withheld on such other grounds as the Board of Governors may from time to time direct.

Marks Reassessments

It is the policy of the Institute that students shall be dealt with fairly in all decisions affecting their academic standing. A student who is not satisfied with the final mark award is cautioned that the grade has been reviewed carefully and, aside from clerical error, reassessments seldom result in a higher mark.

A student wishing a reassessment of his/her academic standing must first discuss the matter with the instructor responsible for the initial assessment and, if dissatisfied with the result of that discussion, with the Teaching Department Head.

Failing a resolution of the problem, the student may then submit a Request for Reassessment on the Institute form available from the Office of the Registrar. **ALL PARTS OF THE FORM MUST BE COMPLETED AND MUST REACH THE REGISTRAR'S OFFICE WITHIN 7 SCHOOL DAYS AFTER THE START OF CLASSES IN THE NEXT TERM, OR WITHIN 30 CALENDAR DAYS AFTER THE MAILING OF MARKS FROM THE INSTITUTE, WHICHEVER IS LESS.**

There is a fee of $25 for each subject reassessed. If the mark or standing is favorably adjusted, the fee will be refunded.

The Registrar will inform the student by letter of the result of the reassessment.

Marks Appeals

A student who is dissatisfied with the outcome of a reassessment may appeal the decision to the President.

The student must first discuss the problem with the Dean of the appropriate School. The Dean must provide the Registrar with a written statement confirming the outcome of the discussion.

If the student then decides to proceed with the appeal, the student must complete and sign a Request to Appeal form and submit it to the Registrar's Office, along with the $25 fee, WITHIN TWO WEEKS OF THE MAILING OF THE REASSESSMENT RESULT TO THE STUDENT.

An Appeal Committee will be formed to deal with the Appeal according to procedures approved by the Education Council for that purpose.

The President will inform the student by letter, of the result of the appeal.

NOTE: A student who has been permitted to audit classes during the reassessment may continue to do so during the appeal.

Auditing

A student may audit a course with the permission of the instructor. An audit student is not formally evaluated and does not write examinations. However, the student is expected to take an active part in classroom discussions and laboratory exercises, maintain satisfactory attendance and pay the full course fee.

An auditing student does not receive credit for the course, but will receive a Statement of Marks with "Audit" indicated. A student may change his status in the course from audit to credit, with written permission of the instructor during the course, but will not receive credit by applying after the course is completed.

Attendance

Part-time Studies — Students are required to attend at least 50% of the scheduled classes and laboratory sessions. Failure to meet the attendance requirement will result in a grade of "N" — not complete.

Course Credit

A credit is defined as one classroom hour per week over a 12-15 week term. Therefore, a course taught for three hours per week for 12 weeks would normally be assigned three credits.

It is recognized that in assigning credits to courses, other criteria are also considered, such as:

— course content
— learning outcomes
— whether it is a lab (clinical or practicum).

Transfer Credit

Transfer credit is a means whereby a student may acquire recognition for academic work completed at another recognized post-secondary institution **NOT PREVIOUSLY USED AS PART OR WHOLE REQUIREMENT FOR A DIPLOMA OR DEGREE WHICH HAS BEEN CONFERRED OR GRANTED.** The course work for which the student is requesting transfer of credit must be related to the student's program of studies at BCIT. Credit for 50% of the course work required for a Certificate must be completed through BCIT.

Transfer Credit Application Procedure

Students must apply in writing to the program consultant and MUST provide the following:

(1) An official transcript from the institution where the courses were taken, photocopies are not acceptable.

(2) A course description which outlines
  (a) the topic covered
  (b) the number of hours of classroom and laboratory study
  (c) the types and number of assignments and examinations completed
  (d) the name, author and publisher of the texbooks used.

(3) A completed application form for program approval identifying the certificate program, courses to be completed at BCIT, and the courses for which transfer credit is requested.

  Note: it is the responsibility of the student to provide the documentation for a transfer credit application. Failure to submit the required documentation may result in rejection of the transfer credit application.

  Please allow 4-6 weeks for processing.

"In-House" Training for Credit toward BCIT Certificates

BCIT students may obtain transfer credits for approved courses taken within, or sponsored by a company, government body or organization associating with BCIT in a joint development program for the student-employee. This program is an additional service to students and recognizes that many worthwhile "in-house" training courses are conducted either through internal resources or by hiring reputable outside agencies. However, these organizaions may lack the resources to present a totally well-rounded program such as is available at BCIT.

Any company or organization wishing to have credit granted to employees for "in-house" training should submit details to the appropriate continuing education department for approval before

making a commitment to the employee. Application should include course content, duration, qualifications of the instructor and any pertinent data. This need only be done once, unless there is a change. Courses for credit should be related to one or more BCIT Certificate Programs (see those within this calendar) and normally represent a transferable skill. For example: "Principles of Supervision" would be acceptable, whereas a course on company policy and procedures, or interpretation of the company labor agreement would not be acceptable. On-the-job training , skill or techniques unique to the company, would also not be appropriate for recognition.

Requests for transfer credit may be submitted by individual employees to the Part-time Studies program consultant, at any time after completion of BCIT course work. Such submissions should be supported by the employer's documentation of successful completion.

It is anticipated that this interest and encouragement to employees to develop and upgrade their qualifications will be rewarding to both employee and employer. Enquiries should be directed to: The Office of the Registrar, BCIT, 3700 Willingdon Avenue, Burnaby, B.C., V5G 3H2.

Challenge Exams for Credit

Students may acquire credit recognition for knowledge and skills obtained through independent study and/or work experience. By challenging a course, students claim they already have the knowledge and abilities to be gained from taking the BCIT course. Because of the learning format of some courses, not all are considered challengeable.

Where approval has been granted to challenge a course, a formal evaluation procedure will take place. The student's abilities will be assessed through a written and/or oral examination, research paper or other means, as the evaluator sees fit. Challenge credit will be recorded only after the student has completed a specified number of credits of course work at BCIT. Only a specified number of challenge credits will be allowed for each program.

Challenge credit is not considered as work completed at BCIT, but when a course is successfully challenged the number of credits required for a Certificate will be reduced. If a student is successful the Code of CH EXAM will appear beside course name, and a grade recorded.

Fees to challenge a course must be paid before the formal evaluation takes place. The fee for challenge is 50% of the course fee.

A student may challenge a course by applying in writing to: Program Consultant, Continuing Education, BCIT, 3700 Willingdon Avenue, Burnaby, B.C., V5G 3H2.

Certificate Program Approval

Suggested Certificate Programs are presented within the Certificate Program section of this calendar beginning on page ??. These Certificate Programs are made up of courses representing the basic certificate. These certificates are attainable over a three year period, which is flexible.

Although most of these suggested programs are preapproved, it is advisable and often essential to submit them to a program consultant for approval. Students may amend these recommended programs to suit their individual career needs; amendments must be approved by a program consultant.

Program approval assures the student that his/her academic efforts will result in the desired certificate.

Program approval is required:

- — when a student wishes to modify a certificate program outlined in the calendar
- — when a student wishes to amend an approved program
- — when a student requests a transfer credit
- — for all Special Certificates, Senior Certificates, Certificates of Technology and National Diplomas of Technology
- — for all combined Engineering Technology and Management Certificates
- — whenever challenge credit is requested
- — when an elective is included in a program
- — when alternative courses are included in a program.

A student must apply for program approval in a written submission detailing the proposed courses and programs. Forward submissions to: Program Consultant, Engineering or Management or Health Sciences (as applicable). Part-time Studies, BCIT, 3700 Willingdon Avenue, Burnaby, B.C., V5G 3H2. Please allow 4-6 weeks for processing.

Program Consultation

Program consultants are available to assist students in course selection and program planning appropriate to their individual career needs. Students are advised to confer with a program consultant prior to entering a program of studies at BCIT. Although many of the suggested Certificate Programs are preapproved, it is recommended that proposed programs be submitted to a program consultant for approval.

At the **Burnaby Campus,** program consultants are available throughout the year. Call 434-1610 for additional information.

At the **Downtown** Education Centre, assistance with Management Courses and Certificate Programs is available. For information call 687-4666.

Career Search Workshops

These BCIT workshops of four sessions each are designed for adults who have been in the work force for at least two years, who wish to examine their career paths and lifestyles in terms of direction and satisfaction.

The workshops include standardized testing, exploration of career training opportunities, educational resource materials and discussion. Participants are encouraged to clarify their interests, values and abilities, specify goals and develop plans of action.

The workshops are limited to 15 participants. Contact Information at 434-1610 for registration information.

Management, Engineering, or Health Sciences Certificates

Outlines of certificate programs in the various technologies are located in the Certificate section of the calendar.

Senior Management Certificates

After completing the basic Management Certificate, a student may earn a Senior Certificate in Management by completing additional approved course credit.

The courses required for a senior Certificate are published for some technologies. In technologies where no Senior Certificate program is published, the student must seek assistance from a program consultant. All Senior Certificate programs of studies **must** be approved in advance.

Certificates of Technology Programs — Engineering Technology

Engineering technology part-time programs in the new BCIT are based on the former BCIT part-time programs leading to the Engineering Technician Certificate and the Senior Engineering Technician Certificate. The new programs now lead to the award of the Certificate of Technology and the Intermediate Certificate of Technology.

- The Certificate of Technology is awarded for successful completion of an approved program of study of at least 75 credits;

  Certificate of Technology programs are technician-level programs developed in response to the needs of students who cannot, or do not wish to, follow a technologist program. Most of these programs will not be exactly equivalent to Year 1 of the corresponding BCIT full-time technology program, but it will be possible for part-time students to ladder into the Diploma program on completion of appropriate courses and to progress to the Diploma full-time, or in certain technologies, part-time. This will help more part-time students progress to a Diploma;

- The Intermediate Certificate of Technology is awarded for successful completion of an approved program of study of at least 45 credits. This certificate will be awarded at the same point as the former Engineering Technician Certificate.

If you are presently enrolled in a BCIT Engineering Technician Certificate program, you will be awarded the Intermediate Certificate of Technology on successful completion of your program. However, in order to provide a transition period for those completing existing programs, if you started your program before July 1, 1985, you may choose to receive either the Engineering Technician Certificate or the new Intermediate Certificate of Technology. This grandfathering option will be available only until September 1, 1987. After this date you will be eligible only for the Intermediate Certificate of Technology.

The grandfathering arrangements for Electrical/Electronics students who have been following programs previously published by BCIT are somewhat different. If you started an Electrical/Electronics part-time program before July 1, 1985, you will receive the Engineering Technician Certificate only and not the new Intermediate Certificate of Technology unless you complete the additional courses in Programming, Communication and Physics as required for the latter program. This option will be available only until September 1, 1987. After this date only the Intermediate Certificate of Technology will be available.

If you are presently enrolled in a Senior Engineering Technician Certificate program your academic standing may be reviewed to see if you have received 75 credits of appropriate courses. If you have, you will be awarded the Certificate of Technology. If not, your program may be modified with a view to awarding the Certificate of Technology on completion.

BCIT no longer offers part-time programs in Forest Resources Technology, Fish, Wildlife and Recreation, Chemical Laboratory Technician, Energy Technology, Process Piping Design, Natural Gas and Petroleum Technology because demand for these programs was extremely low. Courses are still offered in these areas however, and will continue to be offered as long as there is demand. Occasionally, courses may be offered in alternate years to ensure that there will be sufficient students for classes to run.

If you have any questions about your existing program and the programs published in this calendar, please contact one of the Technology representatives listed in the Programs section.

Combined Management and Engineering Technology Certificates

BCIT will award combined Management and Engineering Certificates to students who successfully complete a program of study drawn from both departments. The object of these certificates is to provide a course of studies with a general business base and the flexibility to include engineering courses to suit the interest of each individual. Students **must** have a complete program approved in advance. These programs are not intended to lead to advanced level certificates.

Special Certificates

Students with a National Diploma of Technology, a University Degree, College Diploma or Professional designation may study for a Special Certificate. Graduates may receive a Special Certificate when a pre-approved program of study has been completed. A Special Certificate is available in most, but not all, technologies.

The Special Certificate is intended to complement existing academic credentials. The program of studies will consist of supplementary course work not completed in the diploma or degree program.

Students wishing to pursue a Special Certificate **must** confer with a program consultant to discuss individualized programs of studies. Students should, at the time of the appointment, provide official transcripts of their diploma or degree programs. BCIT graduates need not provide transcripts of BCIT studies.

Diploma of Technology

After completing the Special Certificate program, the student may advance to an approved National Diploma. The student may be required to complete additional approved course work. The amount of course work a student is required to complete after the Special Certificate will vary, depending on previous academic course work completed. Transfer credit will not be recognized in the diploma completion program.

Students must confer with a program consultant and obtain program approval before beginning a diploma program.

Note:

(a) course credits from a completed degree or diploma program cannot be transferred;
(b) students with a national Diploma of Technology are not eligible for a Technicians certificate or a second Diploma of Technology in the same technological area.

Application for Certificates

The responsibility for applying for a certificate lies with the student. Application should be made only when the student has completed the requirements listed on the Program, approved in advance (see section on Program Approval).

An application form is available at the Records Control and Information desks of the Burnaby Campus and Downtown Education Centre.

Distance Education

The Institute offers career-oriented and non-credit correspondence courses. For further information contact the appropriate part-time studies Departments at BCIT, 3700 Willingdon Avenue, Burnaby, B.C. V5G 3H2

School of Management Studies

Business Continuing Education, 432-8581

School of Health Sciences Studies

Health Continuing Education, 432-8376

School of Construction and Natural Resource Studies

MOTH courses — Transportation Systems Department, 432-8234
BRIDGE courses — Forest Resources Department, 432-8270

School of Academic and Vocational Studies, 432-8475

Teleconferencing

BCIT provides instruction to groups of off-campus students by telephone teleconferencing. Most teleconferencing classes are arranged by instructors of part-time studies courses. BCIT's teleconferencing system is available to outside groups for educational and administrative meetings on the Burnaby campus and at the Downtown Education Centre. Contact the School of Health Sciences, Part-time Studies for further information. Telephone: 432-8376.

Homebound Program

Many part-time studies courses and programs are available to students who are home or institution-bound for medical reasons. Speaker telephones are used to connect students with a regular classroom to allow them to listen to the class presentation, ask questions and be part of the give-and-take of class discussion. Homebound students are full members of the class. Course materials are sent to the student's residence by courier as required from Management Part-time Studies. Special courses may be arranged by request. For information telephone 434-1610.

Knowledge Network

BCIT produces a number of non-credit, general information courses for the Knowledge Network. Consult local programming for details on these fine programs.

Engineering Technology Part-time Programs

How to get started

If you are a new student, choose the area you are interested in, and look at the appropriate program and course descriptions. Once you have chosen the combination of subjects you are interested in, complete an application for Program Approval (forms available from the Registrar's Office). Make an appointment to discuss your plans with the Program Consultant.

Approval of your program may take several weeks, especially at term start, but you may register for any courses without having received this approval.

Students who have already taken courses but who have not yet sought program approval should make an appointment with their Technology Coordinator or the Program Consultant to ensure that they are following a suitable combination of courses to be eligible for a Certificate.

If you are a student on an existing program and wish to confirm your plans, either contact the Technology Coordinator or the Program Consultant.

How to get information

General Information About BCIT Part-time Programs

This Calendar contains complete information about all of BCIT's programs, policies, etc.

Basic Information About Part-time Engineering Technology Courses, Programs, Dates, Fees, Etc.

BCIT's ISIS system has the most up-to-date information on the status of courses, fees, cancellations, etc. Information from ISIS is available to students who are registering for courses at the Registration Desk at Burnaby or at the Downtown Education Centre, 549 Howe Street, Vancouver.

Detailed Course Information

Course outlines are available for examination at the registration area in Burnaby. All registered students receive a course outline on the first night of classes.

Program Information

This calendar contains the most up-to-date printed information for the 1986/87 Academic Year. However, each program application must be presented to the Program Consultant for approval.

Technology Coordinators and the Program Consultant are available at all times to provide information, and for program consultation, and will be on duty during the period mid-August to mid-September by appointment to 2030 hours each evening. Phone ahead to make an appointment. Similar arrangements are in effect during start-up week in January and April terms.

Information Phone Numbers

Information and Registration	434-1610
Program Consultant	432-8467
Technology Coordinators	Listed under program area
Technology Department Heads	Listed under program area
Part-time Studies Department	432-8521

How to register in a course

Registration is course-by-course on a first-come, first-served basis. You must complete a registration form and return it by mail or in person. Mail registration should be sent 3 weeks ahead of the start date to: Office of the Registrar, BCIT, 3700 Willingdon Avenue, Burnaby, B. C., V5G 3H2.

You may register in person at the Burnaby Campus, 3700 Willingdon, or at the Downtown Education Centre, 549 Howe Street.

Fees must be paid at the time of registration. If your fees are to be paid by your employer, written authorization on company letterhead, or an official purchase order must accompany the registration form.

If you have attended a BCIT part-time course since September 1984, you may register by phone, using your VISA or Mastercard. The direct line to the registration desk for phone-in registration is: 432-8328.

Late registrations are accepted if space is available. You must obtain written permission from the instructor for your registration to be accepted after the first two sessions of a course.

Prerequisites

First-level courses are taught at a level that assumes you have completed senior secondary school (Grade 12). Many courses have specific prerequisites or special conditions for entry — please refer to the course descriptions in this calendar.

When registering for a course you will be asked for confirmation that you have the necessary prerequisites. If you have taken courses recently at BCIT your record may be available on ISIS, but copies of transcripts or evidence of course completion will speed up the registration process.

If you do not have the formal prerequisites as stated here, you may be able to obtain waiver of the prerequisites from the Technology Department. Ask for the Prerequisite Waiver form and discuss your request with the Technology Coordinator or the Program Consultant.

Refunds

Cancelled courses: Fees paid for cancelled courses will be refunded in full unless you register in another course in the same term, in which case they are applied to the other course fee. To ensure that your refund is processed, please complete an official Application for Refund form.

Withdrawal from course: If you withdraw from an engineering technology course you are eligible for a refund only if you withdraw before noon of the day following the first class. To be eligible for a refund you must complete the Application for Refund form and return it to the Registration Desk on or before this deadline. To be fair to all students, this rule will be rigorously interpreted, so please do not ask for exceptions.

It is your responsibility to ascertain the refund deadline, and to ensure that you have received sufficient information about a course before enrolling.

Will your class run?

In previous years, prior to term start-up, there has been uncertainty over whether or not courses would run. Because all part-time courses are run on a cost-recovery basis, low enrolments caused some courses to be cancelled on short notice. This year we are guaranteeing engineering technology classes as follows:

- All classes with 12 or more students will run;
- All classes with 8 or more students will run, but there will be a surcharge added to the fee. The surcharge will be $25 per 12 week course and pro-rata for other courses. Students will be required to pay the surcharge by the second week of classes. Failure to pay the surcharge will result in witholding of statements of marks or certificates;
- No classes with fewer than 8 students will run except by special arrangement with the students;
- No classes will be cancelled before the first night on account of low enrolments. Irrespective of the number of students registered, the first night of classes will be scheduled and an instructor will be available to teach, or a Technology Coordinator will be present to advise you of your best options in the event of cancellation due to low enrolment.

NOTE: You are reminded that you must register before attending class. Instructors will require proof of registration, so please bring along your Tuition Fee Receipt.

Financial Hardship?

A number of awards are available to students in part-time programs. Since procedures vary, reference should be made to the individual listings elsewhere in this Calendar. For more information contact Student Financial Services. Telephone: 432-8327.

As a result of the amalgamation of sequential courses, the up-front cost of many of our courses is greater than in previous years. If you are deterred from enrolling in a course because of severe financial hardship, please discuss your circumstances in confidence with the Program Consultant. In certain cases, it may be possible to arrange for deferred fee payment.

Still need more information?

If you have been unable to get sufficient information from this calendar, the Information Desk, the Technology representatives or the Program Consultant, please contact the Department of Part-time Engineering Technology Programs. Telephone: 432-8521.

Professional Agencies of Interest to Part-time Students

Applied Science Technologists and Technicians of British Columbia

Most part-time engineering technology courses offered through BCIT Part-time Studies are recognized for credit toward certification with the Association. If you are unsure as to whether you will gain credit toward certification and want to ensure you are embarking on an acceptable program, please contact the Association office.

ASTTBC is a professional association which registers and certifies technicians and technologists in the fields of agrology, architecture, engineering, forest resources and surveying. Certification with the association is primarily dependent on academic qualifications in accordance with national standards, however, credit is granted for extensive experience.

There are four levels of membership:

Applied Science Technologist (A.Sc.T) — persons who have completed an accredited program of technological study (usually a Diploma of Technology or the academic equivalent), and who have at least two years of contemporary practical experience and are employed in an occupation which reflects the level of their technological training;

Certified Technician (C.Tech.) — persons who have completed an accredited technician certificate program (usually a Certificate of Technology or academic equivalent), and who have at least two years of contemporary practical experience and are employed in an occupation which reflects the level of their technical training;

Associate Member — persons who are employed in an applied science occupation and/or who are engaged in programs of study which will eventually satisfy the requirements for Technologist or Technician membership. Persons may have the academic qualifications for "A.Sc.T." or "C.Tech." but lack the experience, or may have extensive experience but lack the academic qualifications;

Student Member — persons who are registered as full-time students in a technologist or technician program accredited (approved) by the Association. A special application form must be used.

In evaluating applications for membership and certification the ASTTBC Board of Examiners, which is comprised of Applied Sciences Technologists, Professional Engineers, Professional Agrologists, Professional Foresters and others, takes into consideration career training other than that received at BCIT, including qualifications from foreign institutes.

The Board of Examiners is responsible for recommending certification levels and providing applicants with the program of studies required to progress to the next certification level. The board therefore recommends that to ensure full credit toward certification, applications be submitted to the Association before beginning a program of studies.

Please note that the processing of applications generally takes four to six months.

Objectives of ASTTBC

- Professional certification and registration;
- professional practice including a code of ethics and disciplinary procedures;
- accreditation of technology programs;
- services for business and industry, government and the general public, particularly in the areas of technology we represent.

Benefits of Membership

In addition to the professional status and recognition granted by ASTTBC, benefits of membership and services provided include:

- enhanced career options because of professional recognition;
- professional development through continuing education programs;
- education standards maintained at colleges and institutes through an accreditation program which is national in scope;
- distinctive member certificate;
- employment assistance and referral services;
- monthly newsletter and other communications;

— biennial salary survey;

— distinctive stamp or seal for all qualified members (to be introduced in 1986);

— group life insurance program that cannot be matched.

In accordance with these general objectives, the Association actively represents technicians and technologists in B.C. Its activities include the promotion of technological programs offered by BCIT Part-time Studies and community colleges; the presentation of briefs leading to the development of an accreditation program to aid in the maintenance of the highest educational standards; involvement with the Anik 'C' Satellite project wherein the Association is working with industry to provide short technical seminars throughout the province; and, most recently, working toward appropriate recognition in law for its members.

Persons interested in the Association should write to: Director of Membership Services, ASTTBC, Discovery Park, 3700 Gilmore Way, Burnaby, B.C., V5G 4M1, or telephone (604) 433-0548.

The Institute of Naval Architects of British Columbia

The Institute of Naval Architects of British Columbia has made arrangements with BCIT to enable students to take courses leading towards the requirements for membership in the Institute.

The Institute of Naval Architects of British Columbia was formed in 1975 as a controlling agency for the organization and development of the profession of Naval Architecture.

Prospective students who are now employed in the shipbuilding industry are advised to register with the Institute as student members. Interested students may contact the Institute by mail at 2206 West 33rd Avenue, Vancouver, B.C., V6M 1C2, or by telephone at (604) 261-9102.

The Association of Professional Engineers of British Columbia

The Association of Professional Engineers of British Columbia has a formal examination system leading to registration for students who, after careful consideration and investigation, find they cannot attend university. It should be stressed that this program of Association examinations is not an easy way to qualify academically as a professional engineer. The program comprises about 26 examinations, which cover approximately the same material as a four-year engineering course at a university. To complete the whole program a candidate would require years of home study.

The Association does not offer courses to prepare candidates for these examinations. Some courses offered at BCIT provide one method of assisting students to prepare for the examinations. However, the student should note that the diploma courses at BCIT were not designed specifically for this purpose. A student embarking on the Association's examination program should seek advice from the Association of Professional Engineers to ensure that a course taken at BCIT will provide a reasonable amount of assistance in studying for a course in the Association's syllabus. The syllabus contains course outlines so that comparison of content may be made with the content of BCIT courses. For further information contact: The Association of Professional Engineers of British Columbia, 2210 West 12th Avenue, Vancouver, B.C., V6K 2N6, or telephone (604) 736-9808.

Fundamental Examination Tutorials

The School of Engineering Technology and the School of Academic and Vocational Studies are prepared to offer tutorials for fundamental examination candidates if sufficient demand is shown.

1 Calculus
2 Vector Analysis and Differential Equations
3 Linear Algebra and Numerical Analysis
4 Computer Science
5 Probability and Statistics
6 Physics
7 Chemistry
8 Statics and Dynamics
9 Mechanics of Fluids
10 Thermodynamics
11 Engineering Materials
12 Theory of Circuits and Power Engineering
13 Strength of Materials
14 Organic Chemistry

Interested people must indicate their intention to take specific tutorials by sending a $50 commitment fee per tutorial **prior to mid July**. This fee is fully refundable if insufficient demand is shown. Fees are payable in full by August 12. They are estimated to range between $200 and $500 depending on tutorial length and number of students attending.

For further information contact:

Program Assistant, Engineering Technology. Telephone: 432-8521, or
Program Consultant, Engineering Technology. Telephone: 432-8467.

Association of British Columbia Professional Foresters

The Association of British Columbia Professional Foresters was founded in 1947 under enabling legislation entitled the British Columbia Foresters Act, April 3, 1947. The act was revised subsequently and the Association now operates under authority of the British Columbia Professional Foresters Act — 1970 and the Association's by-laws which were amended in January, 1975 and again in January, 1977.

Some of the requirements for registration include appropriate academic qualifications, a minimum of four years of acceptable forestry experience in the opinion of the Board of Examiners, Canadian citizenship or permanent resident status and references from at least one Registered Professional Forester (RPF) and two other references as sponsoring foresters. All applicants for registration are required to write a special examination. Pupils are also required to submit a "Professional Report".

Briefly, the objectives of the Association are as follows:

— to ensure that the forests of British Columbia are managed by professionally qualified foresters;
— to promote those policies of integrated use of forest land for timber production, recreation wildlife and water management which ultimately provide the greatest social and economic returns to society;
— to advise the public and government of implications of policies affecting uses of forest land.

To date, the Association's objectives have been implemented in various ways including the submission of recommendations to appropriate authorities on numerous topics such as inventories, protection, timber management, water management, fish and wildlife management, range management, forest research, forest taxation and forest education.

Arrangements exist whereby students may prepare themselves to become professional foresters, in part through courses at BCIT. Interested students are advised to contact the Association of B.C. Professional Foresters, Suite 406-837 West Hastings Street, Vancouver, B.C., V6C 1B6, or telephone (604) 687-8027.

The Architectural Institute of British Columbia

The Architectural Institute of British Columbia, in association with the Royal Architectural Institute of Canada, has an apprenticeship system generally referred to as the Syllabus of Studies Program.

BCIT day school graduates receive credit for a number of syllabus courses. The program will take a BCIT graduate from 5 to 8 years to complete. Entry to the program is restricted to applicants in the employ of a registered architect.

The program is generally completed by self-study, however syllabus students nay elect to take BCIT part-time courses for credit towards syllabus subjects.

Before signing for any subjects at BCIT, you must obtain approval of prospective credit from The Registrar, Royal Architectural Institute of Canada, Syllabus program. The Registrar may be contacted at The Architectural Institute of British Columbia, 3rd Floor, 1134 Homer Street, Vancouver, B.C., V6B 2X6, or telephone (604) 669-9830.

The Canadian Institute of Quantity Surveyors

The Canadian Institute of Quantity Surveyors through the Quantity Surveyors Society of B.C. has an academic program comprising 22 separate subjects. Credit may be obtained as follows:

1. Graduates from the full-time day school Building Technology (Economics Major) at BCIT receive credit for 13 of the 22 subjects. Candidates for these 13 subjects may arrange to attend BCIT day school if there is space in the program.
2. Credit will be granted for seven of the remaining nine subjects for successful completion of part-time courses through BCIT.
3. Preparatory courses for writing the CIQS final examination for the remaining two subjects are also held in the evening by BCIT.

Before signing for any subjects at BCIT, you must obtain approval of prospective credit from: The Chairman, Education Committee, Quantity Surveyors Society of B.C., 1250 Homer Street, Vancouver, B.C.. V6B 2Y5, or telephone (604) 681-0296.

The Corporation of Land Surveyors of the Province of British Columbia

The Corporation of Land Surveyors of British Columbia is the controlling agency for professional land surveyors within the province and has a board of examiners that sets formal examinations for entry into the profession.

Some of the credit courses at BCIT are designed to enable candidates to take these examinations. In addition non-credit tutorials are offered every March.

Enquiries about B.C. Land Surveyors examinations and courses from: The Corporation of Land Surveyors of B.C., 101-655 Douglas Street, Victoria, B.C., V8V 2P9, or telephone (604) 382-4323.

The Building Owners and Managers Association

BOMI is the Building Owners and Managers Institute International, a non-profit organization whose distinct purpose is to professionalize the industry by providing educational programs for BOMA members. These programs are usually operated in cooperation with the regional BOMA Office. The SMA (Systems Maintenance Administrator) program confers two levels of proficiency; SMT (Systems Maintenance Technician) after completion of the first five courses and SMA after completion of the remaining three. These courses are specifically designed for building operating employees. The Institute also offers the RPA (Real Property Administrator) program through this office, which is an extensive and intense course designed to train the modern property manager in the essential specialties of building systems, design economics, marketing, accounting, finance, etc.

The SMA program has been fully endorsed by the employer members of BOMA B.C., and current candidates enrolled in the program are employed by British Columbia Building Corporation, B.C. Tel, Block Bros. Property Management, Sears and Dominion Management among others. For the SMA graduate, the benefits are compelling. Becoming more proficient in your current role, this is obvious. Being able to manage ALL operating systems in almost any kind of facility opens the door to an expanded career. The opportunities are unlimited.

Students who have successfully completed courses 1, 3, 4 and 5 of the SMA Program are eligible to write the examination for the British Columbia Boiler Operators Certificate of Competency and receive four months credit toward the required period of employment.

How to get started

The first step is to enroll in the Institute. Enroll at the BOMA Vancouver office. The second step is to choose one of the study options available. Look at the description of the options below and send the appropriate forms back to begin your program.

Program option

CLASSROOM: In the Vancouver area, SMA classes are held at BCIT (British Columbia Institute of Technology). The date, time and particular courses offered are shown in the calendar (prefix BOMA). Note that not all courses are given concurrently. You may take the courses in any order.

SELF STUDY: Individuals in areas where it is not convenient to get to Vancouver on a regular basis can take the SMA program on a self-study basis. A student will receive the course material which is set up for self-study with each lesson having a pre-test which indicates to the student what should be learned from the lesson, several mid-lesson tests and a final lesson test. A sample lesson will be sent on request. All SMA examination arrangements are made with a community college convenient to the students.

All program information from: SMA Program, BOMI B.C., #601 — 325 Howe Street, Vancouver, B.C., V6C 1Z7, or telephone (604) 684-3916.

School of Computing and Electro-Mechanical Studies

CAD/CAM Technology

The program leading to the award of the Diploma of Technology in CAD/CAM Technology consists of CAD/CAM courses plus mandatory core courses and other technology courses to the required total credits. The program is equivalent to Year 2 of the full-time program, i.e. it contains courses that are equivalent to all the CAD/CAM related courses taken by a student in the second year of the full-time Diploma program.

The program may be completed in four years of part-time study, and the courses will be offered in a sequence each term to facilitate logical progression through the program. Course enrolment is restricted to about 20 students. Courses will definitely run with as few as 12 students. A surcharge may be levied to run courses with fewer than 12 students.

The prerequisite for entry into the program is: an approved Certificate of Technology or equivalent in an engineering technology from a recognized educational institute, plus satisfactory completion of a pre-entry CAD training course, CDCM 201. (This course is the only CAD course given in year 1 of the full-time program.) Approval must be sought from BCIT before entry to the program. Applications should be submitted to the program consultant for approval by the Technology Department.

Faculty and Staff

S.C. Todd, M.I. Mech. E., C. Eng., F.I.E.D., P. Eng., Department Head. Telephone: 432-8329

C. Goodbrand, B.A., Program Co-ordinator. Telephone: 432-8488

M. Woolley, Dipl. T., A.Sc.T., Program Consultant. Telephone: 432-8467

Diploma of Technology

Prerequisite: approved Certificate of Technology or equivalent in an engineering technology, plus CDCM 201.

		Credit
CDCM 101	Computer Science 1	3.0
CDCM 201	CADraft 1	3.0
CDCM 302	Computer Science 2	6.0
CDCM 303	CAM	4.0
CDCM 304	Engineering Design	4.0
CDCM 311	3-D CAD Drafting	4.0
CDCM 312	Graphics Language Programming	5.0
CDCM 400	CAD/CAM Projects	16.5
CDCM 406	Computer Systems	6.0
CDCM 404	CAD Design	4.5
CDCM 411	Systems Management	3.0
CDCM 412	Systems Acquisition	3.0
ELEC 470	CNC and Robotics Languages	5.0
MATH 349	CAD Math 3	4.0
MATH 460	CAD Math 4	6.0

Course Descriptions

CDCM 101 Computer Science 1 — Introduction to Computer Science and Programming using the BASIC language. Emphasis will be on engineering problems using structured problem solving techniques. **3 credits**

CDCM 201 CAD Drafting 1 — Rudiments of Computer Aided Drafting. Machine Log-on procedures, simple 2-D drawings. Stress on orthographic projections, dimensioning, annotations and standard assemblies. Prerequisite: MECH 140 or other appropriate drafting experience. **7.5 credits**

CDCM 302 Computer Science 2 — Introduction to FORTRAN programming. Emphasis will be on the solution of engineering problems and graphics problems using structured problem solving techniques. Prerequisite: CDCM 101 or equivalent. **6 credits**

CDCM 303 Computer Aided Manufacture — Introduction to Computer Aided Manufacturing, computer integrated manufacturing and automated process control. Generation of machine instructions from computerized 3D models. Prerequisite: CDCM 311 and ELEC 470. **4 credits**

CDCM 304 Engineering Design — An introductory course in engineering design. The emphasis is on mechanical and structural applications through analysis, and conceptual drawing and design. Prerequisite: CDCM 311 and MECH 219 or other approved technology courses. **4 credits**

CDCM 311 3D Drafting — A continuation of Cadraft 1. Elementary 3D modelling, auxilliary, isometric and perspective projections using a computer. Prerequisite: CDCM 201. **4 credits**

CDCM 312 Graphics Programming — A continuation of 3D drafting. Symbol library creation and graphics programming in 3 dimensions. Prerequisite: CDCM 311. **5 credits**

CDCM 400 CAD/CAM Projects — Student managed projects with applications in students area of interest. Projects integrate programming in graphics, data base integration and engineering problem solving. Prerequisite: CDCM 406 and CDCM 404. **16.5 credits**

CDCM 404 CAD Design — Understanding how computers can help in the design process. Interaction with software packages using surfaces and/or solids modelling. Prerequisite: CDCM 304. **4.5 credits**

CDCM 406 Computer Systems — An introduction to integrated graphics/programming environments. Emphasis will be on file systems (sequential, direct, keyed) and data base systems (hierarchical network). Prerequisite: CDCM 302, CDCM 312 and MATH 460. **6 credits**

CDCM 411 Systems Management — Systems management techniques for a modest CAD/CAM shop. Day to day system operations procedures. Prerequisite: CDCM 406. **3 credits**

CDCM 412 Systems Acquisition — Requirements analysis, evaluations and acquisition of CAD/CAM equipment. Disciplined acquisition studies. Prerequisite: CDCM 411. **3 credits**

ELEC 470 CNC and Robotic Languages — Introduces the student to current CNC and Robot languages such at APT and VAL. Investigates the integrated manufacturing centre. Prerequisite: CDCM 101, MECH 130 and MECH 435 or equivalents. **5 credits**

MATH 349 CAD Mathematics 3 — Numerical integration, numerical solution of differential equations, iterative solution of equations, linear programming (simplex) and an introduction to computer programming. Prerequisite: MATH 204 or equivalent. **4 credits**

MATH 460 Introduction to Probability Theory — Algorithms of computer graphics. Introduction to geometric modelling and finite element method. Prerequisite: MATH 349. **6 credits**

Computer Systems

Business Certificate in Computer Systems

This program is designed for people working in or seeking employment in the Data Processing Industry. Graduates will qualify to work as programmers, programmer/analysts, or junior systems analysts. All programs must be submitted to the program consultant for approval by the Computer Systems Department.

Faculty and Staff

F.J. Martin, B.A.(Hons.), M.Sc., F.L.M.I., C.D.P., Department Head. Telephone: (604) 434-5734, local 5785

R. Long, C.G.A., Coordinator. Telephone: (604) 434-5734, local 5230

Chris Lloyd, Dipl.T., Program Consultant. Telephone: (604) 432-8829

Mandatory Courses

		Credit
COMP 101	Data Processing — Introduction OR	3.0
COMP 103	Introduction to Data Processing — Micro OR	3.0
COMP 105	Introduction to Data Processing — Micro IBM PC	3.0
COMP 130	Computer Programming — Assembler 1	3.0
COMP 160	Computer Systems — Introduction 1	3.0
COMP 260	Computer Systems — Introduction 2 OR	3.0
COMP 261	Computer Systems Development 1	3.0
COMP 361	Computer Systems Development 2	3.0
FMGT 101	Accounting 1	4.0
FMGT 201	Accounting 2	6.0

Plus five Computer Programming "high level" languages selected from list below.

Electives Business (non-computer)

The specified courses shown above (other than electives) are normally required for the basic certificate. Business (non computer) courses may be selected from the Electives list. 5 "high-level" language courses are required. These courses may be selected, in any combination, from the following list.

COMP 131	BASIC — Interactive Programming 1	3.0
COMP 132	FORTRAN IV — Introduction	3.0
COMP 135	RPG II — Introduction	3.0
COMP 231	BASIC — Interactive Programming 2	3.0
COMP 232	FORTRAN IV — Intermediate	3.0
COMP 233	Computer Programming — COBOL — Introduction	3.0
COMP 234	Computer Programming PL/1-Introduction	3.0
COMP 236	Computer Programming — Pascal	3.0
COMP 332	FORTRAN IV — Advanced	3.0
COMP 333	Computer Programming — COBOL — Advanced	3.0
COMP 334	Computer Programming PL/1 — Advanced	3.0

At least 6 courses (including Accounting) must be non-computer courses.

Students working on a high-level certificate such as the Senior Business Certificate should choose not more than 50% of their courses from non-computer electives.

Note:

1. Students with a university degree or graduates from BCIT with a National Diploma of Technology may receive a Special Certificate by taking further part-time studies. Please read the policies regarding special certificates in the general information section of this calendar.
2. Students with programming experience or managerial experience in a business environment should consider taking COMP 261/361 Computer Systems Development instead of COMP 160/260 Computer Systems Introduction. For clarification, read the course descriptions in this calendar and contact the Computer Systems program co-ordinator.

Prerequisite Exemptions

Students wishing to apply for an exemption from the required prerequisite must submit sufficient documentation to the program consultant, at least four weeks prior to registration. Documentation should include official transcripts and course outlines or a letter from your employer outlining present job duties and functions.

Suggested Electives

Electives should be chosen to complement career goals. The following electives are suggested as a guide for a standard path of studies. All programs must be submitted to the program consultant for approval by the Computer Systems Department.

		Credit
ADMN 100	Micro Economics 1	4.0
ADMN 110	Management 1	4.5
ADMN 200	Macro Economics 2	6.0
ADMN 211	Management 2	4.0
COMM 160	Business and Technical Communication	3.0
COMM 196	Writing User-Friendly Manuals	1.5
FMGT 301	Cost and Managerial Accounting 1	4.0
FMGT 401	Cost and Managerial Accounting 2	6.0
MKTG 102	Introduction to Marketing	3.0
MKTG 323	Public Speaking and Oral Communication 1	3.0
OPMT 188	Management Information Systems	3.0
OPMT 197	Statistics for Business and Industry	4.5

Courses in the Schools of Engineering may be selected with approval of the program consultant. In selecting electives, students are advised to read this calendar and determine what courses they feel would be appropriate for their certificate programs.

Course Descriptions

ADMN 100 Micro Economics — The major areas studied are the product and resource market. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored. **4 credits**

ADMN 110 Management Fundamentals — An insight into the basic nature of business problems and the administrative process involved in handling them, with emphasis on the personnel management function. Study and discussion of actual business situations illustrating problems frequently met in industry requiring managerial analysis, decision and action. **4.5 credits**

ADMN 200 Macro Economics — Develops an understanding of the organization and operation of the Canadian Economy in an international setting. The theoretical tools of the economist are used to expand the concepts of national income, employment,

inflation, money and banking, international trade, and growth. An appreciation of the relationship between economic theory and economic policy is provided. **6 credits**

ADMN 211 Management 2 — A continuation of the study of functions of management begun in ADMN 110. Prerequisite: ADMN 110. **4 credits**

COMM 160 Introduction to Business and Technical Communication — Introduces students to the basics of communicating in business and industry. It offers practical techniques for planning, organizing, selecting and presenting information. Using effective business and technical style is also covered. Students apply these skills to communications common to most office jobs — writing routine memos, instructions, procedures and summaries. Presenting information orally is also covered. Practical "case" assignments are used. The combination of COMM 160, 170 and 171 taken in sequence is equivalent to first year Business Communication in day school. COMM 160, 180 and 183 are equivalent to first year Technical Communication. **3 credits**

COMM 196 Writing User Friendly Manuals — This 18-hour course is for anyone who writes user manuals. It covers planning, researching, organizing, formatting and writing the manual and testing and packaging the finished product. It emphasizes techniques for translating technical material for the non-technical reader. The course is offered in weekend and 3-day formats at the Burnaby and Downtown campuses. **1.5 credits**

COMP 101 Data Processing — Introduction — Introduces the principles and concepts of business data processing to people with little or no programming experience. It may be useful to those who need a better understanding of computer operations in their firms. A prerequisite for most systems and programming courses. Lectures and laboratory sessions with "hands-on" computer practice include an introduction to the computer: input/output, hardware, computer use; background, data representation, applied systems, files, magnetic tape and disk, master and transaction files, data entry and control, batch processing, on-line data entry, computer programming, flowcharting, input/output, processing, decision, arithmetic and branching. Students will write and test five programs in BASIC programming language. **3 credits**

COMP 102 Data Processing — Introduction — A one-week intensive course covering material presented in COMP 101. Full days (0900-1700) plus some evening work required. See COMP 101 for course content. **3 credits**

COMP 103 Introduction to Data Processing — Microcomputers Apple — Introduces the principles and concepts of business data processing to people with little or no programming experience and those needing a better understanding of computer operations in their firms. As a prerequisite for most of our systems and programming courses, this course includes lectures and laboratory sessions with "hands-on" microcomputer experience as an introduction to the computer: input/output, hardware, uses of computers, data representation, applied systems; files, magnetic tape and disk, master and transaction files, data entry and control, batch processing, on-line data entry; computer programming, flowcharting, input/output, processing, decisions, arithmetic and branching. Students write and test five programs in BASIC language. **3 credits**

COMP 104 Computers in Business — For those with a basic understanding of programming and computer systems who are not directly involved in data processing, but require familiarity with current terminology and concepts used in the computer industry. Students learn to communicate effectively with data processing personnel, recognize the potential use of computers in a business environment and understand the implications of installing an in-house computer or data centre system. Topics include "state of the art" computer equipment and programming; data entry techniques; batch on-line and distributed processing; telecommunications; control and security; criteria for evaluating and selecting computer systems for a medium-sized company and the simplifications computers have on the financial and staff resources of companies. Prerequisite: COMP 101/102/103/105. **3 credits**

COMP 105 Introduction to Data Processing — Microcomputer — IBM PC — Introduces the principles and concepts of business data processing to people with little or no programming experience. See COMP 101 and COMP 103 for a detailed description. Students receive "hands-on" microcomputer experience using the IBM PC. **3 credits**

COMP 130 Computer Programming — Assembler 1 — An introduction to programming for persons intending to become computer programmers. IBM Assembler language is used which familiarizes the student with the programming steps taken by the computer. Students learn to produce working, fully documented Assembler programs for elementary business problems, and to write, test and debug a series of Assembler programs illustrating the problems encountered in the business data processing field. Topics include computer storage devices; Assembler instruction set; decimal, binary and hexa-decimal number systems; character and packed data; decimal arithmetic operations; problem analysis; flowcharting; coding and testing; debugging; programming standards; documentation, control and validation of data; data controls; multi-level totals. Prerequisite: COMP 101/102/103/COMP 105 (65% or better) or equivalent data processing experience. **3 credits**

COMP 131 BASIC Interactive Programming 1 — Introductory programming for those intending to use the BASIC language on an interactive computer terminal system. On successful completion, students will produce working programs for elementary business problems and develop a reasonable knowledge of BASIC language. Using a combination of lectures and "hands-on" experience on the Hewlett-Packard computer, students write, test and debug a series of programs that illustrate the problems encountered in the business data processing field. Topics include logical development of a program, problem analysis, flowcharting, coding and testing, debugging, validation of data, data totals, two levels of totals, print formating, system commands and sequential disk storage. Prerequisite: COMP 101/102/103/105. **3 credits**

COMP 132 FORTRAN IV — Introduction — Students with introductory experience of computers and computer programming study a "high-level" programming language. Students already familiar with another programming language find the course helpful in understanding computing in general. As preparation for COMP 232 FORTRAN IV — Intermediate, this course provides sufficient knowledge and experience to design, flowchart, write, test and debug simple computer programs as assigned using FORTRAN IV. Additional topics include the syntax and use of a subset of the statements comprising the FORTRAN IV language, application of these statements to solve simple numeric problems, preparation and submission of programs to available computer. Prerequisite: Grade 12 mathematics and COMP 101/102/103/105. **3 credits**

COMP 135 RPG II — Introduction — Teaches the fundamentals of programming in RPG II to people with an understanding of data processing concepts. Presents RPG II programming concepts and techniques as applied in business batch processing. Students learn to write programs of medium complexity and will develop, write, test and run three batch programs. Topics include disk and card input, printed output, the basic RPG II logic cycle,

control breaks, matching records, arrays, tables and programming techniques. Prerequisite: COMP 101/102/103/105. **3 credits**

COMP 137 C Programming Language — Level 1 — A first course in the C Programming Language. Basic data types, control constructs, operators and syntax are covered first. The course then discusses functions, arrays and pointers. A brief introduction to the Standard C Library functions is also provided. The course will consist of lectures and labs, with a number of programming assignments. Knowledge of an Assembler language or PASCAL is required for maximum benefit from this course. Prerequisite: COMP 130 or COMP 236 or equivalent. **3 credits**

COMP 140 Microcomputer Programming — Applesoft BASIC — Covers the operation of a microcomputer and its peripherals, and provides an understanding of Applesoft II BASIC and Apple II DOS. Material includes screen control, printer operations, strings, substrings, sequential and random access files, one and two dimensional arrays and structured programming. Prerequisite: COMP 101/102/103/105. **3 credits**

COMP 144 Microcomputer Programming — Assembler (IBM PC) — An introduction to programming for persons intending to program in the Assembler language on the IBM PC microcomputer. Lectures and practical "hands-on" experience using IBM PC's introduce the fundamentals of the PC Assembler Language. Prerequisite: COMP 103/105. **3 credits**

COMP 145 Microcomputer Programming — BASIC (IBM PC) — Teaches the operation of a microcomputer and its peripherals and provides an understanding of MS BASIC and MS DOS as used on the IBM PC microcomputer. Lectures and practical "hands-on" experience using IBM PC's cover DOS commands; structured programming in BASIC: screen control, printer operation, strings and sub-strings, sequential and random/direct access files, one and two dimensional arrays, program documentation. Prerequisite: COMP 101/102/103/105. **3 credits**

COMP 160 Computer Systems — Introduction 1 — Introduces the basic definition and design of computer systems. Emphasis is on the fundamentals of systems analysis including development of system objectives, problem definition, information gathering, effective written and verbal communication (particularly with user department personnel) about their systems problems and possible computer solutions. The course presents the systems development process and covers basic systems theory, the systems development cycle, information gathering, flowcharting, report writing, forms design and presentation techniques. Additional techniques and their applications to common business systems are presented in COMP 260 Computer Systems — Intro 2. Prerequisite: COMP 101/102/103/105. **3 credits**

COMP 162 Microcomputers Using dBASE — Broadens the knowledge of microcomputer users in the field of data base management using a well established data base system for microcomputers. Topics include identifying how a data base system can be utilized in a day-to-day office or home environment; how to use the dBASE management system; developing programs for repetitive tasks using the dBASE management system. Prerequisite: COMP 101/102/103/105. **3 credits**

COMP 163 Computer Operations Management — Intended for experienced operators, shift supervisors, or operations management candidates, by providing theoretical and practical training in operations management. The student studies commonly used techniques and the responsibilities of computer operations management. Topics include standards policy; department organization and training; budgeting, estimating and costing; planning, forecasting and scheduling; performance measurement; personnel evaluation; security. Prerequisite: practical operations experience. **3 credits**

COMP 164 Managing Word Processing — Discusses processing and office systems concepts including evolution and current applications. Students study the terminology and concepts associated with this technology; the role of management and secretarial staff; how to analyze, select, implement and maintain word processing systems. Topics include defining word processing and office systems, evolution in word processing; dictation equipment evolution; office systems as a functional unit; applications in text editing; word volume surveys; statistical analysis of typing and administrative tasks; work flow case studies; office equipment selection process; introducing word processing and office systems to others; the importance of record keeping; the management role in office systems. Note: this course is not designed to train students to operate word processing equipment. **3 credits**

COMP 165 Office Automation (Office of the Future) — Presents the latest equipment and techniques for office automation. Emphasis is on identification of areas for improvement, feasibility studies, cost benefit analysis, equipment/supplier selection criteria. The student learns to actively lead or participate in studies involving office automation and the office of the future. Topics include information transfer, information retrieval, conferencing, personal processing and activity management. Prerequisite: working experience in an office environment, preferably in a supervisory position and COMP 101/102/103/105. **3 credits**

COMP 230 Computer Programming — Assembler 2 — A continuation of COMP 130 offering more detail of IBM Assembler language and computer architecture. On completion, students will know the architecture and principles of IBM computer operation and how to use Assembler language in common business programming. Topics include Assembler instruction formats; binary instructions; registers, base/displacement addressing; tables and table look-up techniques; sub-routines and program structure; IOCS: file definition and imperative macros. Prerequisite: COMP 130. **3 credits**

COMP 231 BASIC Interactive Programming 2 — Provides advanced programming for persons who expect to work with the BASIC language on an interactive computer terminal system. The course includes lectures and practical "hands-on" experience on the Hewlett-Packard minicomputer. Topics include tape and disk storage; file processing; sequential and direct disk accessing; print formatting; arrays; BASIC instruction set; system commands; functions; subroutines; program efficiency; the interpreter concept. Prerequisite: COMP 131. **3 credits**

COMP 232 FORTRAN IV — Intermediate — Provides progression into aspects of FORTRAN IV language beyond those covered in COMP 132. Students study the use of FORTRAN IV to design, flowchart, write, test and debug assigned programs and programs within their own fields of endeavor, and follow the logic of programs written by others. Topics include the syntax and use of FORTRAN IV statements related to double precision and logical constants; variables and expressions; subroutine, function and block data sub-programs; processing sequential files on tape and disk devices; the application of these statements to solving both numeric and non-numeric problems; preparation and submission of programs to computer. Prerequisite: COMP 132. **3 credits**

COMP 233 Computer Programming — COBOL Introduction — Presents business computer programming using the popular "high-level" COBOL language. Suitable for accountants or accounting students wanting to understand programming in a data processing environment. Serves as preparation for COMP 333 Advanced COBOL for COBOL programming as a career. The

student learns to apply the basic principles and practices of business computer programming and to write simple programs in COBOL. Topics include programming methods; structured programming; documentation standards; flowcharting; report design; sequence checks; page overflow, and control breaks. COBOL topics include all language components required to write simple business report programs. Students will write, compile and run COBOL programs on IBM computer. Prerequisite: COMP 101/103/105. **3 credits**

COMP 234 Computer Programming PL/1 — Introduction — Students with previous programming experience learn the PL/1 "high-level" language using typical business programming techniques including coding, testing and debugging PL/1 programs of a relatively complex nature. Lectures and lab sessions cover data declaration; record and stream I/O; PL/1 arithmetic; structures; arrays; built-in functions; procedure and begin blocks. Prerequisite: COMP 130. **3 credits**

COMP 236 Computer Programming — PASCAL — PASCAL is a structured language which is rapidly gaining popularity, particularly on mini and microcomputer systems. This course is intended for students who have had significant exposure to other languages and understand general programming principles but wish to add PASCAL to their repertoire. The entire Pascal instruction set is covered. Students learn characteristics and advantages of structured and modular programming and to read and write structured programs in PASCAL. Students are encouraged to choose programming assignments relevant to their own particular needs, subject to instructor approval, or they may select assignments provided by the instructor. Programs are entered online. Topics include structured programming; modularity; basic and complex data types and structure including arrays, trees, lists and pointers; control statements and structures including recursion, procedures and functions, and Pascal syntax diagrams. Prerequisite: work experience in programming and/or one of the following BCIT language courses (or equivalent) COMP 234/130/132/231/233. NOTE: COMP 101/102/103/105 is not a sufficient prerequisite to this course. **3 credits**

COMP 237 C Programming Language — Level 2 — For programmers with a good working knowledge of C. Topics include data structures, advanced use of pointers, machine level operations, programming style, portability and efficiency. A special emphasis will be placed on the development and use of program libraries and software tools in the C environment. Prerequisite: COMP 137 or equivalent. **3 credits**

COMP 241 Data Communications Concepts — As an introduction to the analysis and design of business and data communications systems and with the rapid changes in telecommunications, this course is valuable to systems programmers and analysts including those involved in the communications and computer industries. Students become conversant with data communications and able to assist in analyzing and designing data communications systems for business applications. Topics include basic principles of data communications; various types and characteristics of terminal equipment; line facilities and service offerings provided by common carrier companies, the economics of these services and equipment; the methods and techniques necessary to develop data communications systems and computer teleprocessing; time sharing concepts. Prerequisite: programming or systems design experience. **3 credits**

COMP 242 Microcomputers: Exploring Technical Aspects — A theoretical perspective of the microcomputer field which exposes the student to the capabilities and limitations of a number of real microprocessor devices and microcomputer systems; the wide range of microcomputer applications, including logic design and control as well as traditional data processing applications; microcomputer software — operating systems, languages, program development systems and applications, software and microcomputer technology. Topics include definition of microcomputer, microprocessor; LS or VLS technology; micro CPU concepts; microcomputer families, popular real devices; introduction to the pin-outs of a microprocessor, data-bus, address bus, control lines, clock memory (RAM, ROM, PROM); integration of microcomputer system, connection of memory, I/O ports, common buses (e.g. S-100), power supplies, peripherals, other hardware; hierarchy of levels of computer description: system, PMS, programming (A/L), register transfer (RT), Boolean logic, circuit, device physics; comparing some real micro systems (Apple vs North Star vs IBM PC, etc.); software, operating systems, languages, compile vs interpretation, CPM, Pascal, BASIC, Pilot, FORTH, C, LOGO, etc.; trends, costs, chips, manufacturers, Who's Who in Silicon Valley. Prerequisite: minimum of COMP 101/102/103/105. An understanding of the computer field from COMP 130 or other computer language courses is highly recommended. **3 credits**

COMP 243 Microcomputer — Apple Projects — Students learn to develop medium sized systems on microcomputers (BCIT's Apple II). The student becomes familiar with the basic programming language as applicable to Applesoft BASIC. Where appropriate, the features of other versions of BASIC are also discussed. Topics include structures analysis, program documentation, machine code and assembler language, program optimization and graphics. Prerequisite: COMP 140. **3 credits**

COMP 246 Computer Programming — APL — APL (A Programming Language) is a simple yet extremely powerful computer language. Heavy CPU usage and high storage requirements have restricted its domain to mainframe computers, but newer, simpler microcomputer versions present new opportunities. APL functions and operations for an IBM PC are covered in detail and students also learn how to design and edit functions and are encouraged to write APL programs in their own fields of interest. Topics include standard APL operations; order of execution; monadic and dyadic functions; function definition and editing; character handling and report formating; variable sharing and file handling. Prerequisite: COMP 101/102/103/105 and COMP 132. **3 credits**

COMP 247 Computer Programming — LISP — This course is intended for practicing professionals to learn how LISP can enable them to do things which are impossible or impractical with other languages. Students may choose programming assignments relevant to their own particular needs, subject to instructor approval, or select from assignments provided. Programs are entered on IBM PC microcomputers. Topics include LISP origins and development; language characteristics and unique features; LISP syntax, including standard built-in predicates and functions, user-defined functions, input/output functions, error handling and other miscellaneous functions; the LISP editor and LISP application suggestions. Prospective students are cautioned that LISP is very different from most conventional computer languages and that they may find this course particularly time-consuming. Prerequisite: at least one and preferably both BCIT language courses COMP 130 and COMP 236 or permission of the instructor. COMP 248 is a useful companion course to this course. **3 credits**

COMP 248 Computer Programming — PROLOG — PROLOG, the language for the new Japanese "Fifth Generation" computer projects, is being billed as the language of the future for Artificial Intelligence (AI) applications. In conventional languages, the programmer specifies how a problem is to be solved — in PROLOG, the programmer gives a detailed problem description and lets the language solve it through its built-in inference mechanisms. As PROLOG interpreters become available for the new large memory microcomputers, even very small organizations will be able to

take advantage of the unique characteristics of this powerful language. This course is intended for practicing professionals who already understand general programming principles and want to learn how PROLOG can do things impossible or impractical with other languages. Students learn the history and characteristics of the language, including strengths and problem areas, and to read and write programs in PROLOG. Students are encouraged to choose programming assignments relevant to their needs, subject to instructor approval, or select assignments provided by the instructor. Other topics include underlying mechanisms including Predicate Calculus, clausal form, the Resolution Principle, backtracking and CUT; PROLOG syntax, including standard built-in predicates, user-defined rules, input-output and other miscellaneous features; PROLOG advantages and drawbacks and PROLOG application suggestions. Prerequisite: at least one and preferably both BCIT language courses COMP 130 and COMP 236 or permission of the instructor. Most students will find that COMP 247 is a useful companion course to this course. Prospective students are cautioned that PROLOG is very different from most conventional computer languages, and that they may find it particularly time consuming. **3 credits**

COMP 260 Computer Systems — Introduction 2 — Expands on the fundamentals learned in COMP 160 and develops analytical skills and basic computer systems design techniques. Includes common business applications as processed on small to medium-sized computers. Students learn to gather and organize systems data, prepare systems flowcharts, design files, set up an implementation schedule and other documentation. Coding structures and application systems, i.e. invoicing accounts payable and accounts receivable, are discussed in detail and the roles of data communications, data base usage and small computers in systems design are also discussed. A major systems project utilizes the material presented in COMP 160/260. Scheduling techniques such as Gantt charts, PERT/CPM are introduced. Prerequisite: COMP 160. **3 credits**

COMP 261 Computer Systems Development 1 — Provides a working knowledge of systems analysis and develops job skills related to the design of information processing systems, including the ability to contribute actively to the investigation, analysis and design phases of systems development projects. Implementation phases of the systems development life cycle are covered in COMP 361. Lectures, discussion and extensive case study practice guide students through feasibility studies, fact finding and analysis. Design alternatives include forms design, hardware considerations, standards and documentation. Prerequisite: COMP 160/260 or an advanced programming course. **3 credits**

COMP 262 Data Base Concepts — Introduction — Data processing personnel study evaluation, selection and implementation of principles of management systems. Introduces the purpose, functions and facilities of data base systems. Students become familiar with various approaches taken to data base software and the procedures for installing a data base management system. Topics include evaluation of data structures, advantages and disadvantages of data base, existing data base applications and insights into the various data base management systems on the market. The role of the data base administrator is developed. Prerequisite: programming or systems design experience. **3 credits**

COMP 266 Microcomputers: Business Applications — Introduces the use and potential of microcomputers in the business environment. Students need some prior understanding of accounting, general business practice and a basic knowledge of data processing. Evaluation and selection of microcomputer hardware and software for use in business applications is discussed. Lectures and "hands-on" sessions using LOTUS 1-2-3 cover hardware — microcomputers and peripheral devices, selection criteria and sources of information; software — PC operating systems, business application packages, selection and usage criteria and sources of information; business application packages such as LOTUS 1-2-3, electronic spread sheets, word processing and business graphics. Prerequisite: COMP 101/102/103/105 and an Accounting course (equivalent to BCIT's FMGT 101), or appropriate business experience. **3 credits**

COMP 267 Microcomputer — Package Implementation — Provides the knowledge and experience for the successful installation of a microcomputer business application package. Using lectures, hands-on experience and actual data, students will be guided through all phases of the installation of a comprehensive business package. Hands-on experience will be gained through use of the IBM PC microcomputer and an up-to-date accounting package which meets today's requirements. Topics will include: review of the operating systems (DOS) and hardware requirements as they relate to a package implementation; integration of accounting applications such as receivables; inventories together with spreadsheets (LOTUS 1-2-3 or VISICALC) and word processing; financial reporting, data entry, monthend processing and yearend closing; internal controls required to facilitate balancing. Prerequisite: COMP 101/102/103/105. **3 credits**

COMP 284 Decision Support Systems 1 — Forecasting and Simulation — Although computers are used extensively for accounting procedures and transaction processing, greater benefits can be achieved by using the computer in decision making. Many computer models are available to help the manager explore the effects of possible decisions in business. This course begins with the use of simple spread-sheet models on microcomputers and progresses rapidly to forecasting and simulation methods which take into account uncertainty and risk. Example problems will be provided, but students are encouraged to bring their own applications to the classroom as a course project. Prerequisite: COMP 101/102/103/105. **3 credits**

COMP 330 Computer Programming — Assembler 3 — Offers advanced study of IBM Assembler language and the opportunity to develop the ability to write extensive programs in this language. Persons already employed in programming find this course helpful in broadening their understanding of programming concepts and IBM operating systems. Students study input/output control and operating interfaces, learn to use the Assembler macro language and magnetic tape and disk storage devices. Lectures and laboratory exercises provide practical experience and cover operating systems interfaces, tape and disk storage, macro writing sub-programs, and logical IOCS operations. Prerequisite: COMP 230. **4.5 credits**

COMP 332 FORTRAN IV — Advanced — Continuation of study of FORTRAN IV language beyond COMP 232. On successful completion, students will be able to make a meaningful contribution to projects assigned in industry with a minimum of supervision. Emphasis is on students developing programs within their fields of endeavor rather than on assigned projects. Topics include the syntax and use of FORTRAN IV statements related to areas such as complex variables, constants and expressions; varying dimensions of arrays and formal elements during processing of a program; processing direct access files on disk devices; the application of statements to solving both numeric and non-numeric problems; preparation of submission of programs to an available computer. Prerequisite: COMP 232. **3 credits**

COMP 333 Computer Programming — COBOL — Advanced — Designed for persons who want to write COBOL programs in a data processing environment using disk and tape files. Students develop an understanding of tape file organization and the

COBOL instructions associated with tape files; disk file organizations, including indexed-sequential and random access files and the COBOL instructions associated with their use; utility programs and proper libraries; special techniques. Topics include efficient COBOL programming techniques; sequential and binary table look-ups; subprograms; overlay techniques; multiple disk and tape file handling; indexed sequential and direct (random) file organizations, and all the associated COBOL instructions. Disk libraries, DOS utility support, and sort programs are also taught. Students write a number of programs applying these techniques. Prerequisite: COMP 233 or previous programming experience in COBOL. **3 credits**

COMP 334 Computer Programming PL/1 — Advanced — Students learn the PL/1 "high-level" language using typical business programming including coding, testing and debugging PL/1 programs of a relatively complex nature. The course is a continuation of COMP 234 and includes tapes and disk processing, more advanced programming techniques and language features. Prerequisite: COMP 234. **3 credits**

COMP 346 FOCUS — Productivity is a key concern in the data processing industry. The recent introduction of 4th generation languages promises to speed up the process of developing and implementing information systems. Information centres also use 4th generation languages to meet user needs for fast response for information. FOCUS is a tool to meet these requirements. This course will teach students how to create, update, and report from FOCUS data bases using FOCUS commands. In addition, the FOCUS productivity aids, TABLETALK and FILETALK will be used. This course should be of interest to data processing professionals who want to assess the potential of this 4th generation language tool. Classes will be scheduled for weekend sessions to allow for the required computer access. Prerequisite: COMP 262 and one high level language. **3 credits**

COMP 361 Computer Systems Development 2 — Expands on material covered in COMP 261 and provides a working knowledge of systems analysis. The course develops the job skills for the documentation and implementation of information processing systems. Lectures and discussion, and a continuation of the case study from Term 1, cover controls, communication techniques, scheduling systems conversion and post implementation auditing. Prerequisite: COMP 261. **3 credits**

COMP 362 Data Base Concepts — Advanced — For persons involved in the logical and physical design of data bases. Information modelling, logical object analysis and normalizing relationships are addressed and students are confronted with problems related to design compromises and performance optimization. They are also encouraged to investigate details of specific DBMS and present conclusions. Prerequisite: COMP 262. **3 credits**

COMP 384 Decision Support Systems 2 — Resource Allocation — Until recently, computer assisted allocation of scarce resources has been limited to firms and institutions who employ specialists in computers and operations research methods. This course (a companion course to COMP 284) explores the use of methods such as linear programming and graphics as aids in decision making. Examples of resource allocation problems are provided, but students are encouraged to bring their problems to the classroom as course projects. Where possible, use will be made of microcomputers such as the IBM PC to make the approaches appropriate to small firms and to individuals. Prerequisite: COMP 101/102/103/105. **3 credits**

COMP 385 Applied Artificial Intelligence: Design of Expert Systems — One aspect of the rapidly maturing field of Artificial Intelligence (AI) is the development of so-called Expert Systems which capture the knowledge of a human expert practitioner and encode it on a computer to be made available to other people. Expert Systems now exist in many domains, at various levels of complexity, and the rules for developing them are well understood. Modern microcomputer capabilities allow Expert Systems to be developed on relatively inexpensive hardware, making small-scale systems practical for many new applications. This course is intended for practicing professionals who already know the languages LISP or PROLOG, and who wish to learn how to design and implement an expert system. Students learn how to select an expert system application for development, how to acquire relevant knowledge from a contributing expert, how to encode the knowledge in an appropriate computerized form and how to write the necessary programs. Students are encouraged to choose projects relevant to their particular needs, subject to instructor approval, or select from provided projects. Prerequisite: one and preferably both COMP 247 and COMP 248 or permission of the instructor. **3 credits**

COMP 440 CICS — This course will teach experienced PL/1 and COBOL programmers how to design and code on-line programs using CICS. Topics will include screen mapping, and the CICS commands to handle required processing. Prerequisite: COMP 333/334 or equivalent experience. **3 credits**

COMP 903 Word Processing 1 — This course will teach experienced PL/1 and COBOL programmers how to design and code on-line programs using CICS. Topics will include screen mapping, and the CICS commands to handle required processing. Prerequisite: COMP 333/334 or equivalent experience. **non credit**

COMP 904 Word Processing 2 — Our second workshop will expand your knowledge of word processing capabilities by introducing you to the use of spelling checkers (magic words) and mail/merge packages (magic mailers). Techniques acquired here are invaluable for creating an efficient word processing environment. **non credit**

COMP 908 Inventory Planning and Control — This introductory level course is designed for small business proprietors and operators wanting to learn the basic principles of inventory planning and control using a microcomputer. Of interest to managers contemplating the installation of a state-of-the-art inventory planning and control system. **non credit**

COMP 909 Value Engineering — Designed to encourage students to utilize microcomputers for up to date situational analysis, the course will offer effective management in industry. Products managers wanting to attain cost effectiveness and improve profit margins would enjoy this course. **non credit**

COMP 912 Level 1 — Lotus 1, 2, 3 — Designed to expose the student to one of the most popular integrated business software packages. The student will master the spreadsheet and database as well as learning how to create presentation type graphics. Also demonstrates the advantages and disadvantages of integrated software packages. **non credit.**

COMP 913 Level 2 — Framework — Framework can best be described as an integrated word processing system. Consisting of a word processor, a spreadsheet, a database, a business graphics generator and a telecommunications system. Upon completion of this course, the student will be able to prepare business reports using the major features of this program. Ideally suited for the person preparing a business plan or similar report. **non credit**

COMP 918 Effective Business Presentations — Each student learns to prepare written presentations, technical and professional reports, sales presentations, letters and memoranda using up to date computer applications to make their presentations. Students will also give oral presentations. **non credit**

COMP 920 Multiplan/Chart-Advanced Fluency — Demonstrates how the Macintosh can be used by the businessman. The student will be given an introduction to the machine and will be taught how to use Multiplan, a popular spreadsheet program and Chart, a business graphics program. Data will be transferred from Multiplan to Chart and out of the Imagewriter printer. **non credit**

COMP 921 Multiplan — Advanced Models — This short course is designed for those familiar with Multiplan and Chart. The course will develop more sophisticated financial models using lookup tables, index numbers and financial formulas. The course will also develop models using linear regression techniques to establish the relationship between two sets of variables. **non credit**

COMP 923 Small Business Accounting — This hands on course is designed to teach the student how to use a popular accounting program to satisfy the accounting needs of a small business. The course will introduce basic accounting and then move on to using accounting programs on an Apple computer. One student to a computer. **non credit**

COMP 925 Computer Hardware — This detailed course focuses on the essentials of computer hardware and structure enabling the student to readily assess the ever changing computer market-place. The emphasis is on practical aspects — a vital requirement for an adequate understanding and analysis of the available computers. **non credit**

COMP 926 Basic Macintosh Fluency — Designed for the person who is not computer literate, the course will give the student exposure to Macwriter, a word processing package and Macpaint, a graphics package. This course is ideally suited for someone who wishes to evaluate this relatively new and different microcomputer. **non credit**

COMP 979 Children's Graphics Level 2 — For those who have taken Graphics Stage 1, this 12-hour workshop uses high resolution graphics to introduce more advanced BASIC commands. Special projects using this new skill enable participants to produce animation and sound in their graphics. Prerequisite: COMP 980. **non credit**

COMP 980 Children's Graphics Level 1 — A fascinating 12-hour workshop where, through creation of low resolution graphics, children learn simple program construction in BASIC language. **non credit**

COMP 983 Children's Programming: Stage 1 — A 5-hour workshop to teach children to make programming commands to construct simple programs — the first step towards computer know-how. **non credit**

COMP 985 Accounting Software — Using the commercially available Polar Bear software package, students explore and practise general ledger accounting, accounts payable and receivable on the microcomputer. Discusses the capabilites and applications of other packages including Systems Fplus and System Group. **non credit**

COMP 989 Computer Graphics 2 — Students expand their ability to generate still graphics to cover high resolution graphics including movement. Learn how to overcome practical problems and develop knowledge to cover every aspect of graphics systems on the microcomputer. Prerequisite: COMP 990. **non credit**

COMP 990 Computer Graphics 1 — An opportunity for the individual with programming experience to explore initial programming concepts for generating graphics on the Apple II. Discusses relevant hardware including page/work ideas. Prerequisite: COMP 995. **non credit**

COMP 991 Teachers and Computers — The Challenge of the New Technology — A six-hour workshop designed for educators, parents, or anyone wanting to bring children and computers together. An extensive look at Apple LOGO is followed by examination of at least two other educational software packages. Participants have access to an Apple computer and workshop emphasis will focus on "doing". **non credit**

COMP 992 Computerized Record Keeping — Discusses concepts of data management on the microcomputer. Some commercially available data base software programs (CCA, dBase 2, Optimum 1) are examined and reviewed. **non credit**

COMP 993 Word Processing Software — Current usage of word processing on microcomputers is defined. A popular software program is used to illustrate how the computer can accomplish a variety of word processing functions. **non credit**

COMP 994 VISICALC — Students learn and practise the use of this popular software program including modelling and simulation to a diverse range of calculation requirements. **non credit**

COMP 998 Introduction to Computers — Overcome resistance to the use of microcomputers. This workshop discusses the diverse capabilities offered by a microcomputer; jargon, the simplicity of computers as a tool to save hours of tedious work. The student evaluates which computer programs meet specific needs and warrant detailed knowledge. **non credit**

COMP 999 Understand and Evaluate Computer Systems for Small Business — Familiarity with basic computer concepts is essential before embarking on the evaluation, selection and integration of the system best suited to individual business requirements. Designed in conjunction with small business specialists from the Federal Business Development Bank, this 30 hour seminar/workshop combination is a nonthoretical approach to establishing equipment and software needs, approach vendors, and ensuring staff welcome the computer as a timesaving and job enhancing work tool for the decision maker. **non credit**

FMGT 101 Accounting 1 — Permits persons with little or no accounting background to become familiar with the techniques of working through the full accounting cycle. It provides theoretical and practical training in basic accounting as preparation for FMGT 201. Topics include accounting as an information system; introduction to accounting theory; income measurement; traditional record-keeping procedures; the accounting cycle; special journals; cash; investments and receivables. **4 credits**

FMGT 115 Accounting 1L — Enables students to start the basic course in accounting in January. It is the equivalent of FMGT 101 and the first six weeks of FMGT 201 for a total of 18 weeks of the 30 week presentation. The balance of the course may be taken in either May or September FMGT 201. For a description of the course content see FMGT 101/201. **6 credits**

FMGT 201 Accounting 2 — The follow-up to FMGT 101, topics include inventory long-lived assets, liabilities, forms of business organizations, cash-flow and working capital analysis, manufacturing accounting, management accounting, consolidated statements, analysis of financial statements and price level changes. Prerequisite: FMGT 101. **6 credits**

FMGT 215 Accounting 2S — Follow-up to FMGT 101, enabling students to complete the last 12 weeks of the basic accounting course. See FMGT 201 for details. Prerequisite: FMGT 115. **4 credits**

FMGT 301 Cost and Managerial Accounting 1 — Emphasizes the role of the management accountant, cost terms and purposes, cost-volume-profit relationships, job order accounting, budgeting, responsibility accounting and standard costs. Prerequisite: FMGT 201. **4 credits**

FMGT 401 Cost and Managerial Accounting 2 — Enables the student who has completed FMGT 301 to understand cost accounting techniques which will assist management in planning, control, income determination and decision making. The course emphasizes direct costing, relevant costs, cost allocation, capital budgeting, inventory planning and valuation, joint and by-product costs, process costing, payroll; factory ledgers and decentralization and transfer pricing. Prerequisite: FMGT 301. **6 credits**

MKTG 102 Introduction to Marketing — This introduction to the marketing environment and marketing institutions includes a detailed study of the basic marketing functions, marketing research, product planning, selection of trade channels, merchandising, advertising, sales promotion and salesmanship. Marketing of consumer goods as well as industrial goods will also be covered. **3 credits**

OPMT 188 Management Information Systems — Students learn to use a managerial systems approach to the management information area; review, assess and evaluate information processing hardware and software; evaluate management needs for information and integrate those needs into the management system; design and implement a simple management information system. The course is not intended to produce highly skilled MIS practitioners, but to provide an understanding of basic MIS concepts. Students learn how to relate to MIS specialists and managers in large organizations and how to approach a MIS problem in a small organization that would not normally has MIS specialists on staff. **3 credits**

OPMT 197 Statistics of Business and Industry — A comprehensive study of elementary statistical methods as applied to objective decision making, suitable for persons requiring statistics to initiate market research, audit sampling, quality control, inventory control and business forecasting. The course includes an introduction to the use of statistics in business and industry; descriptive statistical techniques — collection and treatment of data; a review of elementary set theory and probability; inferential statistical topics — sampling, estimation, hypothesis testing, goodness of fit, regression analysis, correlation and time-series analysis. **4.5 credits**

Electrical/Electronics Technology

Certificate Programs

Electrical Technology

National Diploma Programs

Control Electronics
Instrumentation and Process Control
Micro-electronics
Power
Telecommunications

The programs leading to the award of the Certificate of Technology, the Intermediate Certificate, or the Diploma of Technology in the above areas of Electrical/Electronics Technology consist of electrical and electronics courses plus mandatory core courses and other technology courses to the required total credits. All programs must be submitted to the program consultant for approval by the Technology Department.

Faculty and Staff

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Intermediate Certificate of Technology in Electrical/Electronics

		Credit
ELEC 100*	Circuit Analysis 1	6.0
ELEC 101	Shop Practice	5.0
ELEC 102	Programming 1	3.0
ELEC 200*	Circuit Analysis 2	5.0
ELEC 201	Printed Circuit Board Fabrication	4.0
ELEC 202	Digital Logic	3.0
ELEC 203	Electronic Circuits 1	6.0
ELEC 208*	Electric Circuits AC/DC	11.0
MATH 143	Basic Technical Mathematics for Electrical	7.0
PHYS 106	Physics 1	6.0
TCOM 104	Technical Writing for Electrical	3.0

Students with previous training may, with written permission of the electrical department, be allowed to take ELEC 208. This course must be taken concurrently with MATH 113. Please read course descriptions.

Certificate of Technology in Electrical/Electronics

		Credit
ELEC 302	Digital Techniques 2	5.0
ELEC 303	Electronic Circuits 2	5.0
ELEC 304	Telecommunications 1	5.0
ELEC 305	Electrical Equipment 1	5.0
ELEC 306	Transducers	5.0
ELEC 307	Pulse Techniques	5.0
MATH 243	Calculus for Electrical	7.0
PHYS 206	Physics 2	6.0

Diploma in Electrical/Electronics — Control Electronics

		Credit
ELEC 402	Digital Systems	6.0
ELEC 403	Industrial Electronics	5.0
ELEC 406	Data Communications	6.0
ELEC 407	Feedback	6.0
ELEC 415	Computer Systems	6.0
ELEC 420	Computer Control Systems	5.0
ELEC 421	CAD Systems	5.0
ELEC 423	Video Graphics	6.0
ELEC 434	Pascal	5.0
MATH 343	Transform Calculus for Electrical	4.0
OPMT 149	Business for Electrical	3.0
TCOM 204	Technical Writing for Electrical	3.0

Diploma in Electrical/Electronics — Power

		Credit
ELEC 402	Digital Systems	6.0
ELEC 403	Industrial Electronics	5.0
ELEC 405	Electrical Equipment 2	5.0
ELEC 406	Data Communications	6.0
ELEC 407	Feedback	6.0
ELEC 414	Power Systems	6.0
ELEC 429	Power Electronics	5.0
ELEC 430	System Design	4.0
ELEC 475	Illumination	3.0
ELEC 476	Industrial Systems	4.0
MATH 343	Transform Calculus for Electrical	4.0
OPMT 149	Business for Electrical	3.0
TCOM 204	Technical Writing for Electrical	3.0

Diploma in Electrical/Electronics — Microelectronics Option

		Credit
ELEC 402	Digital Systems	6.0
ELEC 406	Data Communications	6.0
ELEC 415	Computer Systems	6.0
ELEC 432	CAD/CAE for Microelectronics	6.0
ELEC 433	Hybrid Microelectronics	6.0
ELEC 434	Pascal	5.0
ELEC 436	Analog Integrated Circuit Design	5.0
ELEC 437	Principles of VLSI Design	5.0
ELEC 438	Microelectronic Applications	5.0
MATH 343	Transform Calculus for Electrical	4.0
OPMT 149	Business for Electrical	3.0
TCOM 204	Technical Writing for Electrical	3.0

Diploma in Electrical/Electronics — Telecommunications

		Credit
ELEC 402	Digital Systems	6.0
ELEC 404	Telecommunications 2	6.0
ELEC 406	Data Communications	6.0
ELEC 408	Antennas and Transmission Lines	5.0
ELEC 415	Computer Systems	6.0
ELEC 416	Communication Networks	5.0
ELEC 417	Telecommunications 3	5.0
ELEC 418	Radio Frequency Circuit Design	6.0
ELEC 419	Microwave Principles	5.0
MATH 343	Transform Calculus for Electrical	4.0
OPMT 149	Business for Electrical	3.0
TCOM 204	Technical Writing for Electrical	3.0

Diploma in Electrical/Electronics — Instrumentation and Process Control

		Credit
CHEM 302	Industrial Analysers	5.0
CHSC 341	Unit Operations for Process Control	4.0
ELEC 402	Digital Systems	6.0
ELEC 411	Electronics Co-Interfacing and Signal Conditioning	5.0
ELEC 412	Transducers for Measurements and Control	6.0
ELEC 413	Control Devices and Techniques	6.0
ELEC 420	Computer Control Systems	5.0
ELEC 424	Industrial Processes and Control Systems	6.0
ELEC 426	Microprocessors in Measurement and Control	6.0
ELEC 427	Transducer Systems	5.0
ELEC 428	Instrument Engineering Project	4.0
TCOM 204	Technical Writing for Electrical	3.0

Course Descriptions

CHEM 302 Industrial Analysers — Teaches the student the principles and applications of electronics transducers and circuitry used in the process analysis of liquids and gases. Topics include electro-chemical principles and terminology, selection of transducers, electrolytic conductivity, specific ion probes, specific ion electrodes, flame ionization detectors, chromatographs and spectrophotometers. Lab exercises consist of design, construction and calibration of transducers such as coulometric electrodes and ionization detectors as well as construction of characteristic signal linearization and amplification circuitry. **5 credits**

CHSC 341 Unit Operations — Before suitable measurement and automatic control strategies can be designed and implemented for a process, a detailed knowledge of the behavior of that process is required. Unit Operations fills that requirement by introducing the student to the static and dynamic properties of common industrial processes. Topics include transportation of fluids, fluid dynamics, Bernouli's equation and flow measurements, thermodynamics, heat transfer, heat balance equations, mass and energy balance, evaporation and distillation. Lab exercises involve "hands on" interaction with absorption columns, heat exchangers, flow measuring devices, flue gas analyzers, batch and binary distillation columns, energy balance and energy management. **4 credits**

ELEC 100 Circuit Analysis 1 — Teaches the principles and methods of analysis related to DC circuits. Topics include work, energy, voltage, current, power, resistance, inductance, capacitance, impedance, SI units, and terminology. Methods of analysis include loop, superposition, nodal, Thevenin and Norton. The lab portion of the course provides practice in the use of power supplies, function generators, multimeters and components. Labs are synchronized with lectures so that theory is studied and confirmed by application. Prerequisites: Algebra 12 and Physics 11. **6 credits**

ELEC 101 Shop Practice — Through the design and manufacture of a specific electronic project, students learn the basic skills required in the field of electronics including basic electronic drafting, preparation of detailed drawings, sheet metal cutting and folding, soldering, selection and mounting of connectors such as phono and BNC, basic printed circuit layout and manufacture. Introduces students to the basic discrete passive components used in electronics and to the techniques of layout and fabrication of electronic equipment. Upon successful completion, the student should have a good understanding of the characteristics of components used in electronic equipment, chassis and metal cabinet design, electronic drafting conventions, preparation of detailed drawings, sheet metal cutting and folding, as well as the tools and measurement techniques used in electronic fabrication. **5 credits**

ELEC 102 Programming 1 — Teaches structured computer programming with the BASIC computer language. Topics include the use of a disk based operating system, input and output commands, decision making, repetative programming structures, subroutines, string manipulations and the use of graphics on the IBC PC. **3 credits**

ELEC 200 Circuit Analysis 2 — Introduces the bahaviour of electrical circuits and networks when driven by a single-phase alternating current (AC) source; preparation for courses in electronics and power systems. The course includes the sine wave, average and effective values, power and power factor; resistance, capacitance and inductance as elements in single-phase AC circuits; phasor diagrams, impedance, admittance, voltage, current and power diagrams; analysis of AC circuits with complex algebra; resonance and resonant circuits, high and low pass filters; the application of circuit laws and theorems to single-phase AC circuits, the analysis of two-part networks; coupled circuits. The circuit theory is verified using multimeters, sine wave generators, amplifiers and dual trace oscilloscopes. Prerequisite: MATH 112 or MATH 143 and ELEC 100 or ELEC 104. **5 credits**

ELEC 201 Printed Circuit Board Fabrication — The first 4 weeks of this continuation of Shop Practice, deals with printed circuit board repair and reworking. Topics and work include materials, manufacturing methods, tools used for repair; high reliability soldering, repair of heat damaged and mechanically damaged boards, boards with plated holes and multilayer boards. The last 8 weeks cover the design and fabrication of single-side printed circuit boards. Topics and work include material and equipment requirements, artwork layout from schematic, board processing (etching, drilling and component mounting). Prerequisite: ELEC 101 and ELEC 202. **4 credits**

ELEC 202 Digital Logic — Covers logic gates from the TTL and CMOS families with study of their specifications and data sheets. Noise and loading considerations are introduced. Schematic symbology and development of logic systems are studied. Sequential logic, flip flops (RS, JK, D Type, Master-slave), simple counters, shift registers and timing diagrams are all covered. Emphasis is on thorough understanding of characteristics like propagation delay, clock synchronization and timing sequences. Prerequisite: ELEC 100. **3 credits**

ELEC 203 Electronic Circuits 1 — Explains how electronic circuits work, how to analyse them and how to design, modify and combine them to perform complex functions. Topics include interpretation of bipolar and field-effect transistor characteristic curves; voltage and current amplifying circuits; the transistor as a switch; loadline analysis; choice of Q-point; bias circuits; AC equivalent circuits; frequency response; feedback, oscillation response; oscillator circuits; power amplifiers of various types; heat sink calculations; characteristics and application of switching devices including the unijunction. Prerequisite: ELEC 200 OR ELEC 208, PHYS 131/132 or PHYS 106. **6 credits**

ELEC 208 Circuit Analysis AC/DC — Applicants are required to obtain authorization from the department. This course enables persons with a strong background or education in the electrical field to cover and/or review those topics necessary to take the more advanced courses in the Electrical Program. Students study the basics of how single phase AC and DC circuits work, and how to analyze and design them for particular situations. This course is not intended for those without previous training in electrical theory or advanced math. Prerequisite: Math higher than Algebra 12, Physics 11 and Chemistry 11; entry to this course by written permission of technology only. **11 credits**

ELEC 302 Digital Techniques 2 — Covers logic gates from the TTL families with study of their specifications and data sheets. Noise and loading considerations are introduced. Schematic symbology and development of logic systems are studied. Sequential logic, flip flops (RS, JK, D type, master-slave), simple counters, shift registers and timing diagrams are all covered. Emphasis is placed on thorough understanding of characteristics such as propagation delay, clock synchronization and timing sequences. Also included are analog to digital and D/A conversion techniques. Prerequisite: ELEC 202 and ELEC 203. **5 credits**

ELEC 303 Electronic Circuits 2 — A continuation of ELEC 203 Electronic Circuits 1. One half of the course deals with circuit applications not previously covered including: DC power supplies, voltage and current regulation; small-signal tuned amplifiers, neutralising and the cascade configuration; wide band amplifiers; DC amplifiers; differential amplifiers. The remaining half of the course gives an introduction to linear integrated circuits, particularly the operational amplifier and some of its circuit applications including an introduction to active filters. Prerequisite: ELEC 200, ELEC 203 and MATH 243. **5 credits**

ELEC 304 Telecommunications 1 — Introduces students to the principles of telecommunications. Beginning with the history of communications and the nature of speech and waveform composition, discussion develops into the various modulation techniques. These include amplitude modulation and its derivative. Associated demodulation and detection techniques are discussed for each modulation type. Other topics include frequency generation, frequency multipliers, frequency translation filter circuits. Prerequisite: ELEC 203 and ELEC 200 or ELEC 208 and MATH 243. **5 credits**

ELEC 305 Electrical Equipment 1 — Commences as a continuation of circuit analysis then moves on to the study of motors, generators, transformers and rectifiers. Topics include a review of phasor diagrams, power factor, three phase power and circuit analysis, single and three phase power distribution systems, DC motors and generators, induction motors, synchronous motors and generators, stepper motors, motor control circuits, transformers (single and three phase), and three phase rectification. Prerequisite: ELEC 200 or ELEC 208, MATH 243 or MATH 313 and PHYS 206. **5 credits**

ELEC 306 Transducer Applications — Introduces the student to the electrical and electronic transducers used to interface systems to the real world. Methods used to measure strain, force, position, acceleration, vibration, temperature and pressure will be discussed, and the circuitry used will be described and evaluated. The application of feedback to control a process variable will also be discussed. Theory will be supported by laboratory exercises applying typical industrial equipment to measure the variables studied. Prerequisite: MATH 413 or MATH 243 and PHYS 133/134 or PHYS 206 and ELEC 303. **5 credits**

ELEC 307 Pulse Techniques — Introduces pulse signal circuits such as clippers and clamps, transistor switches, astable and monostable multivibrators, Schmitt triggers, ramp generators, DC to DC converters and phase lock loops. Both discrete transistors (bipolar and FET) and CMOS integrated circuits are used in building all these circuits. Each circuit is analyzed in detail and its practical application is considered. A video raster project is introduced as one application of pulse and ramp generator circuits. Prerequisite: ELEC 202, 203 and MATH 413 or MATH 243. **5 credits**

ELEC 402 Digital Systems — A detailed introduction to microcomputer architecture and machine language programming using the Z80. The student is introduced to a text editor, assembler, linker, and debugger under the LP/M operating system. The CP/M system is used as a development tool to investigate the Z80 memory organization, internal structure, and assembly language programming. A small single board Z800 system is used to investigate Z80 timing, control, buffering, interfacing, interrupts and support chips. Prerequisite: ELEC 102, 302, 303 or 308 and 307. **6 credits**

ELEC 403 Industrial Electronics 1 — Covers DC power supplies and regulators including a major session on switching regulators. DC-to-AC inverters. Triac and SCR phase control is introduced along with SCR and VMOS FET power control for DC circuits. Relay ladder logic circuits are implemented with programmable controllers. Other topics briefly covered include battery characteristics, battery chargers, and electrical hazards. Prerequisite: ELEC 303 or 308, ELEC 305 and ELEC 307. **5 credits**

ELEC 404 Telecommunications 2 — Continues the development of circuits and techniques into transmitters and receivers. Typical AM, FM and SSB transmitters are examined in detail including automatic frequency control, metering and monitoring, input transducers and antenna coupling. Similarly, practical receivers are examined including tuned radio frequency and superheterodyne. Receiver sensitivity, selectivity and fidelity are fully discussed. Other topics include oscillator tracking, beat frequency oscillator, automatic gain and frequency controls, squelch and the audio section. Evaluation of an SSB transceiver in accordance with the appropriate Department of Communications specification. Noise, emphasis, distortion and other transmitter and receiver performance criteria are discussed. The video signal and receiver are also studied. Prerequisites: ELEC 303 or 308 and ELEC 304. **6 credits**

ELEC 405 Electrical Equipment 2 — This course is a continuation of ELEC 305, Electrical Equipment 1. Commencing with a review and expansion of topics on fuses and circuit breakers, the course moves on to a more detailed study of DC and AC motors and their starting equipment. Students will be introduced to electrical protective devices such as instrument transformers, protective relays and lighting arresters. Prerequisite: ELEC 305. **5 credits**

ELEC 406 Data Communications — Introduces the techniques used to communicate digital data from one point to another. Topics include data transmission media: DC loops; voice frequency channels; transmission methods including FSK, PSK, PCM; and time division multiplexing. Interface standards such as RS232C, R5422 and coding techniques such as NRZ, RZ, NRZ1, Manchester are covered. Transmission line theory brings up bandwidth bit rate limitations, error rates and noise. Other topics include protocols such as bisync. SDLC, HDLC and networking schemes including X.25, and Ethernet. Prerequisite: ELEC 302, 303, 307 and 402. (ELEC 402 may be taken concurrently.) **6 credits**

ELEC 407 Feedback — Emphasizes the theory of feedback and its effect on continuous and discrete time linear systems. Topics include signal-flow graph analytic techniques, the transfer function concept and stability criteria for feedback systems. These topics are applied to the analysis and design of oscillators, wideband amplifiers and modern analog filters. The sampling concept (discrete time system) and the complex z-plane are introduced. Several approaches to the realization of a sampled data system are reviewed. Prerequisites: ELEC 303 or 308, 306 and MATH 343. (MATH 343 may be taken concurrently.) **6 credits**

ELEC 408 Antennas and Transmission Lines — Provides practical knowledge of the methods and devices used for the transmission of radio frequency energy. Topics include the characteristic and limitations of open-wire lines, coaxial lines and

waveguides; dipole and simulated dipole antennas; loop antennas; antenna arrays and microwave antennas (horns, slotted lines, parabolic). Prerequisite: ELEC 304. **5 credits**

ELEC 411 Electronics for Interfacing and Signal Conditioning — Deals with the application of analog electronics to process automation and control systems. Topics include: the specification, design and evaluation of amplifiers commonly used in transducer interfacing applications; high accuracy and stability signal conditioning design techniques; analog signal transmission and multiplexing systems with emphasis on the 2-wire current loop. A strong practical approach is ensured by relevant lab exercises and projects. Prerequisite: ELEC 302, 303, 306. **5 credits**

ELEC 412 Transducers for Measurement and Control — Introduces techniques used in the industrial measurement of pressure, flow, level, density and viscosity. Various pressure transducers are discussed including manometers and differential pressure transmitters. Flow measuring elements such as orifice plates, turbine flow meters, magnetic flow meters and ultrasonic flow meters are discussed. Applications of density and viscosity to various processes are examined. Labs consist of the configuration, calibration and testing of various industrial devices. Prerequisite: PHYS 106 or PHYS 133/134, ELEC 306, ELEC 411. (ELEC 411 may be taken concurrently.) **6 credits**

ELEC 413 Control Devices and Techniques — Control Devices and Techniques examines the principles and practices used in the design and application of common industrial process control components and systems. Topics include: automatic process control principles using open and closed loop systems. Basic feedback design principle used with electronic, pneumatic and hydraulic devices used as transmitters, signal converters positioners and power amplifiers. Control valve specification and sizing is also included. Lab exercises will consist of analyzing the design and performance of manufacturers control equipment applied to actual steam and liquid processes. PrerequisiteL ELEC 306, 412. (ELEC 412 may be taken concurrently.) **6 credits**

ELEC 414 Power Systems — Commences with an overview of energy sources and then moves on to the circuit analysis of electrical power transmission and distribution systems. Synchronous machine, transient and subtransient reactances and how they affect symmetrical and asymmetrical fault currents will be studied in detail. Topics may include hydro, thermal, nuclear, solar, wind and tidal power, synchronizing and load sharing of generators and systems, transmission and distribution line parameters, the per unit method of circuit calculation, transmission and distribution line voltage regulation and determination of available short circuit currents. Prerequisite: ELEC 305. **6 credits**

ELEC 415 Computer Systems — Introduces software and hardware concepts and strategies that are essential for development of computer systems. Topics include: top-down design; disk controllers and structures; direct memory access; inter CPU communication; stand alone systems; and memory management. Prerequisite: ELEC 402 and 406. (ELEC 406 may be taken concurrently.) **6 credits**

ELEC 416 Communication Networks — Introduces students to the present-day North American telecommunications network. Topics include evolution of telephone systems, transmission and switching; transmission mediums; frequency division multiplexing; time division multiplexing including pulse code modulation; introduction to data communications and fibre optics; switching systems including step-by-step (strowger), cross-bar-common control; electronic space and time division types; associated signalling, power and traffic considerations. Prerequisite: ELEC 404, ELEC 406 and ELEC 402. **5 credits**

ELEC 417 Telecommunications 3 — Introduces students to the modes of propagation of electromagnetic energy and the types of equipment used to establish telecommunication links. Topics include ground, sky and spacewave propagation; microwave paths; environmental factors; site considerations; point-to-point communications and noise performance of communication systems. Prerequisite: ELEC 404 and ELEC 408. **5 credits**

ELEC 418 Radio Frequency Circuit Design — Teaches the design of HF VHF electronic circuits and introduces the student to proper layout schemes and fabrication of such circuits. Topics include wide-band transformer design, characteristics of wide-band amplifiers, effects of four feedback forms on amplifier input/output and transfer characteristics; high frequency small signal modelling of bipolar and field effect transistors; design of wide-band power amplifiers, computer modelling and computer aided design; practical suggestions for discrete component layout; introduction to thick film circuitry. Prerequisite: ELEC 402, ELEC 404, ELEC 408. **6 credits**

ELEC 419 Microwave Principles — An introduction to microwave principles and devices most frequently encountered in communications, radar and other industries using microwave energy. Topics include sources of microwave, attenuating devices, frequency and power measuring devices, modulators, isolators and amplifiers. Also included is a study of high capacity microwave transceivers and analysis of satellite communication links. Prerequisite: ELEC 404, 408. **5 credits**

ELEC 420 Computer Control Systems — Examines the application of computer systems to the monitoring and control of industrial processes. Topics include real time operating systems, structured programming, and high-level language programming techniques. Data acquisition systems will be examined with attention to the specification of I/O sytems. programmed and interrupt-driven I/D techniques, the sampling theorem, and frequency response. In the lab the student will develop routines to perform graphic displays, keyboard handling and command decoding. Data acquisition and 3-mode process control. Prerequisite: ELEC 102, 402 and 407 or 413. **5 credits**

ELEC 421 CAD Systems — Introduces the student to computer programs used in electronics. Electronic design programs for Digital Logic Simulation and for Printed Circuit Layout are covered with student projects in each. A spreadsheet for costing and accounting is introduced. A computer aided design (CAD) program is used for drafting and schematic drawing. Database management for inventory, staffing and records systems is also covered. This course is mostly lab work with each student learning each program individually. Prerequisite: ELEC 102, 201 and 402. **5 credits**

ELEC 423 Video Graphics — Introduces practical industrial applications of video for acquisition and display of data. The fundamentals of video raster scan and vector displays are reviewed and video cameras are used in image measurement and digital image storage. Image generation on a video monitor is discussed and simple digital circuits are used to generate pictures. The light pen, image storage in RAM, alphanumeric ROM character generators and CRT controllers are all introduced in lectures and in lab projects. Assembly language programming is used with a small Z80 computer to create some graphics displays. Prerequisite: ELEC 303, 307 and 402. **6 credits**

ELEC 424 Industrial Processes and Control Systems — This course examines the practical application of automatic control systems to industrial processes. Common industrial processes are introduced and their basic operating characteristics identified. Appropriate control strategies are discussed for a wide variety of processes, including boiler systems, energy management, batch

processing, multiple effect evaporators, distillation and PH systems. These processes will be used to demonstrate the application of the most common multi-variable control strategies, including 3 mode feedback, cascade, ratio and feedforward systems. Prerequisite: ELEC 412, 413, 427, CHSC 341. (ELEC 427 may be taken concurrently.) **6 credits**

ELEC 426 Microprocessors in Measurement and Control — Investigates the application of the microprocessor to industrial process control systems. Topics include the design of hardware and software systems to implement basic binary control functions as well as more advanced two position and P.I.D. types. This course will also include a discussion of analog controller circuits and a review of the latest commercial products. The lab portion of this course will provide practical experience in microprocessor circuit design, interfacing of analog and digital I/O and software design. Prerequisite: ELEC 402, 411, 413, 420. (ELEC 420 may be taken concurrently.) **6 credits**

ELEC 427 Transducer Systems — Continuation of ELEC 412, industrial measurement techniques for temperature, humidity and dew point are examined. These include psychrometers, hysrometers and vapour equilibrium systems. SAS analysis techniques including chemical absorption, thermal conductivity, paramagnetic, heat of combustion and zirconium oxide analysers are studied. Various advanced process analysers are also included with particular emphasis on industrial applications. Topics include process spectrometry, industrial PH measurement and SAS chromatography. Prerequisite: ELEC 411, ELEC 412 and CHEM 11. **5 credits**

ELEC 428 Instrumentation Engineering Project — Examines process control system design and documentation techniques. By detailed analysis of industrial processes and related control systems, the student acquires a working applications knowledge. Current ISA, SAMA and ASME symbologies are used in the preparation of control system documentation such as process and instrument drawings, functional, loop and installation drawings. Topics such as hazardous area classification and related instrument design practices are also examined. Project work involves all aspects of control system design from concept to evaluation. Prerequisite: CHSC 341, ELEC 424, ELEC 427. (ELEC 424, 427 may be taken concurrently.) **4 credits**

ELEC 429 Power Electronics — A continuation of ELEC 403 Industrial Electronics this course acquaints the student with numerous industrial and utility applications which use programmable controllers, thyristors and power transistors. Topics studied include relay control circuits and their implementation with programmable controllers, thyristor DC motor speed controllers, static excitors, and variable frequency induction motor drives. Other topics may include chopper control of DC traction motors and single and three phase inverters. Prerequisite: ELEC 305, 403, 407. **5 credits**

ELEC 430 Systems Design — Consists of design oriented projects in the area of motor control and lighting systems and in conjunction with ELEC 475 and 476 is designed as preparation for employment in consulting offices. From written descriptions of control circuit operation, students design control schematics to implement relay control systems. From the completed relay control schematics, power and control wiring diagrams are prepared to implement these systems. From written descriptions of commercial building lighting and receptable system requirements, students practice designing and drafting a wiring system acceptable to Canadian Electrical Code regulations. Prerequisite: ELEC 305, 405 and 414. (ELEC 414 may be taken concurrently.) **4 credits**

ELEC 432 CAD/CAE for Microelectronics — Offers an introductory treatment of logic simulation techniques, schematic capture and CMOS integrated circuit layout. This laboratory-oriented course trains students in the use of current electronic CAD/CAE systems. In the first third of the course, the principles of logic simulation are covered and computer simulation exercises (IBM PCs) acquaint students with the use of TTL libraries, ROMs, ALUs and PLAs. Next, students learn to use the Mentor Graphics workstations to create schematics and simulate circuits. The final third of the course is an introduction to CMOS mask level design using interactive graphics and a descriptive language. The fundamentals of MOS operation and manufacture are presented. Students develop small full-custom and standard-cell layouts up to the point where the data base could be used to manufacture parts. Prerequisite: ELEC 102, 302, 303 or 308, 402. (ELEC 402 may be taken concurrently.) **6 credits**

ELEC 433 Hybrid Microelectronics — An introductory course covering the design, fabrication, and application of hybrid (thick film) microcircuits. The course begins with an overview of the thick film production process, the properties and characteristics of thick film materials, and the resulting thick film design guidelines. Students are introduced to IC-GRAPH, an IBM PC software tool for the interactive layout of microelectronic production process masks. Active RC filters are an application area that can take advantage of the precision resistor capabilities of custom thick film circuits. Students are introduced to procedures for generating the modern filter expressions (Butterworth, Chebyshev, Optimum, Bessel, etc.) and active RC circuis that are capable of synthesizing these filters. Lowpass, highpass, bandpass and band reject filters are investigated. Signal Flow Graphs are introduced as a circuits analytic tool and the computer software tool ACNAP is employed for predicting proposed design theoretical performance. Students perform a complete thick film active filter design project. Prerequisite: ELEC 303 or 308, MATH 343. **6 credits**

ELEC 434 PASCAL — Begins with an overview of microcomputer operating systems, programming languages and compilers and interpreters. The IBM personal computer is used throughout the course for interactive student training. The main part of the course covers PASCAL language programming and emphasizes structured programming techniques. Students will gain reasonable proficiency at writing short PASCAL programs and calling external subroutines or DOS functions. Prerequisite: ELEC 102. **5 credits**

ELEC 436 Analog Integrated Circuit Design — An introduction to the analysis and design of analog integrated circuits. The course starts with a review of basic MOS and BJT transistor operation and single transistor linear circuits. Circuit design techniques specific to IC design are then introduced and the course proceeds to techniques needed for combining stages into a complete operational amplifier. The course includes an introductory treatment of frequency response, compensation, pole splitting, and slewing. Students design complete CMOS and BJT op-amps using both algebraic and computer stimulation techniques and then implement their designs using transistor arrays in the laboratory. Prerequisite: ELEC 303, 433. **5 credits**

ELEC 437 Principles of VLSI Design — A continuation from ELEC 432. More advanced topics in logic design, analysis, and simulation are covered including symbol library creation (Mentor) and behavioral language modelling. MOS chip layout nd simulation concepts are further developed with emphasis on the CMOS process. Both full-custom layouts and design with gate arrays (ULAs) are explored. This includes custom PLA techniques and algorithmic design. Design projects are taken to the stage where they could be sent out for manufacture. In addition to layout, students learn to use circuit extraction (MEXTRA) and circuit

simulation (SPICE) programs. In parallel, analytical treatments are presented. Both static and dynamic logic structures are discussed and simulated. Laboratory work is done on Mentor Graphics workstations and IBM PCs. Prerequisite: ELEC 302, 402, 432. **5 credits**

ELEC 438 Microelectronic Application — A continuation of ELEC 433 stressing analog filter design employing *custom CMOS monolithic integrated circuits.* The course begins with the design of doubly terminated lossless ladder networks. Switched-capacitor equivalent circuits are then introduced and explained, allowing the realization of switched-capacitor equivalent ladder networks. The Z-Transform is introduced to allow a more general approach to discrete time (samples) filter circuit design. Through the aid of Bilinear Transform and Z-Plane mapping procedures, students learn to convert any analog (continuous time) filter expression into its equivalent discrete time low pass, highpass, bandpass, or band reject forms and their ultimate synthesis via a cascade of monolithic switched-capacitor biquad circuits. Students design, assemble, and test a switched-capacitor filter. The course terminates by returning to the thick-film hybrid circuit and investigating its potential in the area of high frequency and very high frequency circuit design. Prerequisite: ELEC 433. **5 credits**

ELEC 465 Electro-optics — A course for those with a electronics background who wish to obtain introductory level training in electro-optics. Covers classical optics and diffraction, optical properties of matter, instruments, imaging systems, fibre optics, detectors, lasers, basic holography, photovoltaics, display technology (LED, LCD). **3 credits**

ELEC 475 IES Lighting Fundamentals — This is the IES lighting fundamentals course presented by the Illumination Engineering Society and BCIT Part-Time Studies (evening course). Contents include light and color, lighting needs, lighting sources including characteristics and efficiencies of lamps, luminaires, illuminance calculations, how lighting affects people, exterior lighting and lighting economics. **3 credits**

ELEC 476 Industrial Systems — Deals with the design of electrical systems for industrial plants and commercial buildings. Topics include lighting systems, feeder calculations and ratings, motor branch feeders, motor control centres, switchboards, unit substations, demand factors, voltage levels, grounding, ground fault protection and system protection and co-ordination, together with all appropriate sections of the Canadian Electrical Code. Prerequisite: ELEC 305. **4 credits**

MATH 113 Mathematics for Electrical Technology — An accelerated course based on the material covered in MATH 143. Open only to students currently registered in ELEC 208 and MATH 143 by invitation only. **6 credits**

MATH 143 Mathematics for Electrical Technology — Term 1 covers linear equations including determinants, matrices, elimination methods, methods of least squares. Term 2 covers trigonometry including sine and cosine laws, vectors, trigonometric identities, graphing and complex numbers. Term 3 covers logarithms and exponentials including logarithmic and exponential equations, decibels, graphing on semi-log and log-log paper, transients with electrical and instrumentation applications. Prerequisite: MATH 001 or recent Algebra 12. **7 credits**

MATH 243 Calculus for Electrical — The derivative, differentiation rules, applied maxima/minima, and implicit differentiation with applications to electrical technology. Antidifferentiation, the indefinite integral and the definite integral including area, mean value and RMS value. Differentiation and integration of trigonometric, logarithmic and exponential functions. Prerequisite: MATH 143 or MATH 112 or MATH 113. **7 credits**

MATH 343 Transform Calculus for Electrical — Course description not available at time of printing. Prerequisite: MATH 243 or MATH 414. **4 credits**

OPMT 149 Business for Electrical/Electronics — Course description not available at time of printing. **3 credits**

PHYS 106 Physics 1 — A general level course about physical quantities, their properties, relationships, how they affect each other and their connecting principles. Motion, force, mechanical energy and power are studied concerning translational and rotational motion. Then follows basic electricity, atomic physics and the band theory of solids and its application to semiconductor devices. The lab program emphasizes measurements, data analysis and experimental techniques while confirming and expanding the lecture concepts. Math treatment requires algebra, trigonometry and vectors. Prerequisite: Algebra 12 and Physics 11. **6 credits**

PHYS 206 Physics 2 — Topics include sound, light and optics, basic electricity and magnetism, basic semi-conductor theory, and atomic and nuclear phenomena. Mathematical treatment requires algebra and trigonometry, and possibly some calculus. Prerequisite: PHYS 106. **6 credits**

TCOM 104 Technical Writing — The basics of English communication theory are briefly reviewed and tested in a series of directed self-study lessons. The theory and practice of effective letter writing are thoroughly covered, culminating in an intensive examination of the principles. Students will practice preparing all the documents, needed in the job search; formal and informal reports, with emphasis on the most used forms of technical writing and graphics; and oral reporting, with some emphasis on the use of audiovisual devices. **3 credits**

TCOM 204 Technical Writing — A continuation of TCOM 104 with emphasis on technical report writing and presentations. **3 credits**

Mechanical Technology

Certificate Programs

Mechanical Technology
Mechanical Systems
Naval Architecture

National Diploma Program

Mechanical Technology

Programs leading to the award of the Certificate of Technology, the Intermediate Certificate, or the Diploma of Technology in the above areas of Mechanical Technology will consist of mechanical courses plus mandatory core courses and other technology courses to the required total credits. All programs must be submitted to the program consultant for approval by the Technology Department.

Faculty and Staff

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Intermediate Certificate of Technology in Mechanical Technology

		Credit
CDCM 101	Computer Science 1	3.0
CHSC 156	Metallurgy	6.0
COMM 180	Technical Correspondence	3.0
MATH 101	Technical Mathematics 1 — Trigonometry	3.0
MATH 102	Technical Mathematics 2 — Logarithms and Analytic Geometry	3.0
MATH 108	BASIC 1-Introduction to Microcomputers-Apple II's OR	
MATH 125	BASIC 1-Introduction to Microcomputers-IBM PC's OR	
MECH 110	Mechanical Drafting 1	3.0
MECH 114	Applied Mechanics 1	3.0
MECH 115	Applied Mechanics 2	3.0
MECH 130	Manufacturing Processes — Metal Removal	3.0
MECH 140	Drafting Fundamentals	3.0
MECH 215	Mechanical Drafting 2	3.0
MECH 217	Applied Mechanics 3	3.0
MECH 218	Mechanics of Materials 1	3.0
MECH 219	Mechanics of Materials 2	3.0
MECH 230	Manufacturing Processes — Machine Tools	4.5

Certificate of Technology in Mechanical Technology

Prerequisite: Intermediate Certificate of Technology

COMM 183	Technical Reports	3.0
MATH 203	Mechnical Mathemcatics 3 — Calculus	6.0
MECH 105	Engineering Economics	3.0
MECH 150	Descriptive Geometry	3.0
MECH 221	Thermal Engineering	6.0
PHYS 133/134	Physics 2	6.0
	Elective	3.0

Diploma of Technology in Mechanical Technology

Mandatory Courses		Credit
COMM 160	Introduction to Business and Technical Communications	3.0
MATH 204	Technical Mathematics 4 — Calculus	6.0
MATH 208	Interactive Computer Graphics 1 — Apple II's OR	
MATH 225	Interactive Computer Graphics 2 — IBM PC's	3.0
MECH 222	Mechanics of Fluids	4.5
MECH 301	Machine Design 1	5.0
MECH 304	Manufacturing Processes 3	4.0
MECH 320	Fluid Power 1	3.0
MECH 401	Machine Design 2	8.5
MECH 406	Fluid Systems	4.5
MECH 420	Fluid Power 2	4.5
	Electives	30.0

Optional/Elective Courses		Credit
CDCM 201	CAD Drafting 1	7.5
ELEC 102	Programming 1	3.0
ELEC 150	Illumination	3.0
ELEC 250	Electrical Systems	3.0
ELEC 470	CNC and Robotic Languages	5.0
MATH 209	Interactive Computer Graphics 2 — Apple II's OR	
MATH 226	Interactive Computer Graphics 2 — IBM PC's	3.0
MECH 117	Drafting — Process Piping 1	3.0
MECH 223	Heating and Ventilating 1	3.0
MECH 224	Drafting — Process Piping 2	3.0
MECH 313	Heating and Ventilating 2	3.0
MECH 411	Production Engineering Management	6.0
MECH 414	Metrology and CNC	8.0
MECH 425	Solar Engineering/Practical Design and Economics	7.5
MECH 427	Passive Solar Design	6.0
MECH 432	Automatic Sprinkler System Design 1	3.0
MECH 433	Automatic Sprinkler System Design 2	4.5
MECH 435	CNC — Maching and Programming	6.0
MECH 901	Inventions	0.0
MSYS 101	Plumbing	3.0
MSYS 420	Air Conditioning Systems	9.0
OPMT 193	Quality Control Methods 1	3.0
OPMT 194	Quality Control Methods 2	3.0
OPMT 198	Productivity Engineering 1	3.0
OPMT 292	Facility Layout and Material Handling — Manufacturing	3.0

Intermediate Certificate of Technology in Mechanical Systems

		Credit
CDCM 101	Computer Science 1	3.0
COMM 180	Technical Correspondence	3.0
MATH 101	Technical Mathematics 1 — Trigonometry	3.0
MATH 102	Technical Mathematics 2 — Logarithms and Analytic Geometry	3.0
MECH 110	Mechanical Drafting 1	3.0
MECH 114	Applied Mechanics 1	3.0
MECH 115	Applied Mechanics 2	3.0
MECH 140	Drafting Fundamentals	3.0
MECH 215	Mechanical Drafting 2	3.0
MECH 217	Applied Mechanics 3	3.0
MECH 221	Thermal Engineering	6.0
MECH 222	Mechanics of Fluids	4.5
MECH 406	Fluid Systems	4.5
MSYS 101	Plumbing	3.0

Certificate of Technology in Mechanical Systems

		Credit
ELEC 150	Illumination	3.0
ELEC 250	Electrical Systems	3.0
MECH 105	Engineering Economics	3.0
MECH 223	Heating and Ventilating 1	3.0
MECH 313	Heating and Ventilating 2	3.0
MECH 427	Passive Solar Design	6.0
PHYS 133/134	Physics 2	6.0
	Elective	3.0

Advanced/Optional Courses

		Credit
CDCM 201	CAD Drafting 1	7.5
COMM 160	Introduction to Business and Technical Correspondence	3.0
COMM 183	Technical Reports	3.0
MECH 117	Drafting — Process Piping 1	3.0
MECH 224	Drafting — Process Piping 2	3.0
MECH 425	Solar Engineering/Practical Design and Economics	7.5
MECH 432	Automatic Sprinkler System Design 1	3.0
MECH 433	Automatic Sprinkler System Design 2	4.5
MSYS 420	Air Conditioning Systems	9.0

Intermediate Certificate of Technology in Naval Architecture

		Credit
COMM 160	Business and Technical Communications OR	
COMM 180	Technical Correspondence OR	
COMM 183	Technical Reports	3.0
MATH 101	Technical Mathematics 1 — Trigonometry	3.0
MATH 102	Technical Mathematics 2 — Logarithms and Analytic Geometry	3.0
MATH 108	BASIC 1 — Intro to Microcomputers — Apple II's	3.0
MECH 114	Applied Mechanics 1	3.0
MECH 115	Applied Mechanics 2	3.0
MECH 140	Drafting Fundamentals	3.0
MECH 150	Descriptive Geometry	3.0
MECH 217	Applied Mechanics 3	3.0
MECH 218	Mechanics of Materials 1	3.0
MECH 219	Mechanics of Materials 2	3.0
NAVL 150	Naval Architecture Introduction	3.0
NAVL 152	Naval Architecture Fundamentals	6.0
NAVL 253	Applied Naval Architecture	9.0
NAVL 300	Ship Systems	3.0

Course Descriptions

CDCM 101 Computer Science 1 — Introduction to Computer Science and Programming using the BASIC language. Emphasis will be on engineering problems using structured problem solving techniques. **3 credits**

CDCM 201 CAD Drafting 1 — Rudiments of Computer Aided Drafting. Machine Log-on procedures, simple 2-D drawings. Stress on orthographic projections, dimensioning, annotations and standard assemblies. Prerequisite: MECH 140 or other appropriate drafting experience. **7.5 credits**

CHSC 156 Metallurgy — Includes casting and forming of metals, heat treatment, physical testing, nondestructive testing and metallurgy of welding. Laboratory work involving metallography, heat treatment and corrosion constitutes approximately half of the course. **6 credits**

COMM 160 Introduction to Business and Technical Communication — Introduces students to the basics of communicating in business and industry. It offers practical techniques for planning communication according to the writer's purpose and the reader's needs. Organizing, selecting and presenting information and using effective business and technical style are covered. Students apply these skills to communications common to most office jobs — writing simple memos, instructions, procedures and summaries. Presenting information orally is also covered. Practical "case" assignments are used. Students are encouraged to work on communication problems from their jobs, if appropriate. **3 credits**

COMM 180 Technical Correspondence — Covers correspondence inside and outside the engineering office. The emphasis is on short, informal communications. Topics include memo and letter format, technical writing style, process descriptions, troubleshooting memos, procedures, routine requests and replies. It also covers trip, progress and incident reports. **3 credits**

COMM 183 Technical Reports — Gives writers from technical or industrial backgrounds practice in problem-solving reports. The emphasis is on the communication skills needed to solve engineering problems and to describe methods and products. Specific applications include comparison and feasibility reports, technical proposals, journal reviews, executive summaries and formal report format. Persuasive presentations, meetings, and effective use of graphics are also covered. **3 credits**

ELEC 150 Illumination — An introductory course in illumination which examines electrical systems pertaining to buildings. Deals with the language of lighting, design methods, characteristics and types of light sources and the economics of lighting. As the lighting system is generally designed by the electrical system designer, it is necessary to have a working knowledge of lighting systems when studying the electrical system. Prerequisite: MATH 101 and 102. **3 credits**

ELEC 250 Electrical Systems — Students learn how to plan the electrical system for a specific building, with the electrical designer. How to read and work with common electrical drawings and specifications, understand single and three-phase systems, and power factor correction for minimumal operations costs; recognize and avoid building designs that create costly electrical design problems. Prerequisite: ELEC 150. **3 credits**

ELEC 470 CNC and Robotic Languages — Introduces the student to current CNC and Robot languages such as APT and VAL. Investigates the integrated manufacturing centre. Prerequisite: CDCM 101, MECH 130 and 435 or equivalents. **5 credits**

MATH 101 Technical Mathematics 1 — Trigonometry — A course for students in Engineering Technologies on the application and theory of trigonometric functions including right angle trigonometry, vector and triangle problems, trigonometric identities and graphing, polar co-ordinates, transformations and radian measure. Prerequisite: C+ or better in Algebra 12 or MATH 001. **3 credits**

MATH 102 Technical Mathematics 2 — Logarithms and Analytic Geometry — A study of the theory and applications of common and natural logarithms, and an introduction to analytic geometry. Topics emphasized are the plotting, interpretation and uses of logarithmic and semilogarithmic graphs and the geometrical and practical properties of conic sections. A brief consideration of quadratic surfaces is included. Prerequisite: C+ or better in Algebra 12 or MATH 001. **3 credits**

MATH 108 BASIC 1 — An Introduction to Microcomputers.— APPLE II's — Designed for engineering technology students with no previous BASIC programming or microcomputer experience. Students become familiar with computer terminology and write BASIC programs. Topics include computers, system commands and disk operating systems, BASIC language concepts including input/output; relational operators, subroutines and graphics statements. **3 credits**

MATH 125 BASIC 1 — An Introduction to Microcomputers — IBM PC's — *see* MATH 108.

MATH 203 Technical Mathematics 3 — Calculus — An introductory course in calculus and its technical applications involving the differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions. The course emphasizes the application of calculus to engineering technology problems. Prerequisite: MATH 101 and 102. **6 credits**

MATH 204 Technical Mathematics 4 — Calculus — A continuation of MATH 203. This course continues the work on integration started in MATH 203. Other topics include partial differentiation, an overview of Maclaurin, Taylor and Fourier series and the solution of differential equations. Special consideration is given to the use of Laplace Transforms in the solution of differential equations. Prerequisite: MATH 203. **6 credits**

MATH 208 Interactive Computer Graphics 1 — APPLE II's — An introduction to mathematics and programming of interactive computer graphics, computer aided design and drafting. Microcomputers are used to illustrate the concepts introduced in the course. Prerequisite: MATH 001 and MATH 108 or MATH 125. **3 credits**

MATH 225 Interactive Computer Graphics 1 — IBM PC's — *see* MATH 208.

MATH 209 Interactive Computer Graphics 2 — APPLE II's — The second part of MATH 208/225. Upon completion of both MATH 208/209 or MATH 225/226, the student will understand elementary CAD techniques. Prerequisite: MATH 208 or MATH 225. **3 credits**

MATH 226 Interactive Computer Graphics 2 — IBM PC's — *see* MATH 209.

MECH 105 Engineering Economics — Emphasizes the importance of making sound economic decisions when faced with alternative methods of solving technical problems. The course material provides the basic skills and concepts required to analyze comparative costs and to understand the time value of money (interest), inflation, depreciation, running costs, salvage value and tax considerations. **3 credits**

MECH 110 Mechanical Drafting 1 — Enables students to handle graphical design and problem solving that may be encountered in a mechanical industrial environment. Topics include review of basics, descriptive geometry, intersections and developments, threads and fasteners, weld symbols. Prerequisite: MECH 140. **3 credits**

MECH 114 Applied Mechanics 1 — Topics include dimensions and units, trigonometry review; vectors and scalar forces, components, resultants; moments and couples; free body diagrams, equilibrium; work, energy and power fundamentals; potential and kinetic energy; conservation of energy; torque and shaft power, efficiency; energy requirements in the transportation of fluids. Both English and S1 units are used. Prerequisite: MATH 101. **3 credits**

MECH 115 Applied Mechanics 2 — Topics include two-dimensional force systems; collinear, concurrent, parallel systems; force equilibrium problems; plane trusses: method of joints and method of sections; plane frames, force analysis; friction; coefficient, angle of friction, sliding or tipping; centroids of plane areas; distributed forces: pressure, uniform distribution, varying distribution, forces on submerged surfaces; three-dimensional force systems; three-dimensional moment systems. Prerequisite: MECH 114. **3 credits**

MECH 117 Drafting: Process Piping 1 — Introduces drafting techniques, symbols and dimensioning practices for welded, threaded and flanged piping. The student learns to draw and scale piping layouts using single and double line drafting techniques, and isometric piping with dimension erection sequences and material take-off. Prerequisite: MECH 125, MECH 140, MATH 101. **3 credits**

MECH 130 Manufacturing Processes — Metal Removal — Topics include the machinability of materials, theories of tool geometry, effective cutting speeds, time and productivity related to machine tools, power and forces involved. **3 credits**

MECH 140 Drafting Fundamentals — An introductory course for persons with little or no experience in graphics. **Students are required to purchase drafting equipment and supplies on the first night of class.** Students learn to produce and read simple drawings. Topics include scales, geometric constructions, basic orthographics, detail interpretation, line visibility, dimensioning, auxiliary views, true shape, inclined and skewed surfaces, sections, pictorials, working drawings and freehand sketches. **3 credits**

MECH 150 Descriptive Geometry — Topics include true length lines, parallel and intersecting lines, shortest line between skew lines, line in a plane, true size of plane, dihedral angle, intersection of plane and polyhedron, intersection of surfaces and development of surfaces (prisms, cylinders, cones). Prerequisite: MECH 140. **3 credits**

MECH 215 Mechanical Drafting 2 — Covers more advanced topics and technical applications that may be expected of a Mechanical Technician. Topics include review of MECH 110 topics, limits, fits and surface roughness, geometric tolerances, piping drawings (isometric/orthographic), cams. Prerequisite: MECH 110. **3 credits**

MECH 217 Applied Mechanics 3 — Topics include linear kinematics: graphical acceleration, velocity, displacement; numerical relative values; linear dynamics: Newton's 2nd Law, rectilinear motion, curved motion, normal and tangential forces, inertia force; kinematics of rotation: angular acceleration, velocity, displacement; translational and rotational relationships, centre of rotation; mass moments of inertia; rotational dynamics about a fixed point, rolling; linear and rotational dynamics combined; inertia forces; sliding and tipping; work, energy, power; springs. Prerequisite: MECH 115. **3 credits**

MECH 218 Mechanics of Materials 1 — Designed for mechanical draftsmen, designers and technical sales personnel, to develop a basic understanding of the skills of analysis and design of elementary structural and mechanical members subject to static loading. The course examines the properties and behavior of engineering materials; elementary theory of elasticity related to axial and torsional loading; shear force and bending moment in beams. Prerequisite: MECH 217. **3 credits**

MECH 219 Mechanics of Materials 2 — Enables students to deal with more complex problems of members under static loading than were covered in MECH 218. The course offers further study of beams; beam shear and bending; deflection theory; principle of superposition; columns; trusses; rigid frames; introduction to combined stresses; welded and bolted connections; pressure vessels. Prerequisite: MECH 218. **3 credits**

MECH 221 Thermal Engineering — Topics include energy, temperature, transmission of heat; specific heat, conductivity, convection, radiation, molecular theory, ideal gas, expansion of solids, liquids and gases due to heat, pressure, vacuum; Boyle's Law; the gas equation; thermal properties of liquids and gases; gas processes; psychrometric chart; power cycles; refrigeration; heat transfer fundamentals. Prerequisite: MECH 217. **6 credits**

MECH 222 Mechanics of Fluids — Designed for students requiring a basic understanding of fluid properties and methods of determination of energy losses in fluid systems. Students learn to analyze any fluid process or system for fluid energy losses or power requirements. The course examines the basic properties of fluids; Bernoulli's equation, energy and power transfer; flow measurement and pipe flow characteristics for both liquids and gases; heat and energy losses; laminar and turbulent flow characteristics and forces due to change in fluid flow. Prerequisite: MECH 217.4. **5 credits**

MECH 223 Heating and Ventilating 1 — Introduces heat energy sources; building heat loss estimates; the properties of air using the psychrometric chart; ventilation air requirements; sizing and layout of piping systems for hot water space heating, centrifugal circulating pump performance characteristics. Prerequisite: MECH 222, MECH 221 preferred in addition to MECH 222. **3 credits**

MECH 224 Drafting — Process Piping 2 — The student develops a piping arrangement drawing from preliminary layout to detail design including procedures for designing economical piping systems and layout of main process lines, critical lines and specialized piping. Topics include process flowsheets, project specifications, mechanical, electrical and structural information, piping design standards, vendor equipment drawings, utility piping, pipe racks and access aisles. Prerequisite: MECH 117. **3 credits**

MECH 230 Manufacturing Processes — Machine Tools — An introduction to production engineering, organized processing, breakeven points and equal cost quantities. Detailed knowledge of the basic machine tools, evaluation of design and production features, machine specification, installation and maintenance systems. Prerequisite: MECH 130. **4.5 credits**

MECH 301 Machine Design 1 — The theory in prerequisite courses is covered plus combined stresses with emphasis on solution by Mohr's circle; theories of failure; stress concentration; fatigue phenomena; welded connections; bolted and rivited connections; spur; helical and worm gear drives; speed reducers; belt and roller chain drives; flexible couplings; shafts; antifriction and journal bearing; brakes and clutches; power screws; helical and leaf springs; an introduction to mechanical vibrations with emphasis on the critical speeds of rotating assemblies. Prerequisite: MECH 219. **5 credits**

MECH 304 Manufacturing Processes 3 — Offers a detailed study of processes such as casting, hot and cold forming, extruding, forging, stamping, pressing and material joining, including machines and materials. Quantities/costs will be investigated. Recently introduced manufacturing processes will be discussed. **4 credits**

MECH 313 Heating and Ventilating 2 — Examines hot water space heating equipment including boilers, heating units, expansion tanks, operating valves and trim; air handling equipment including filters, fans, heating coils, central heating and ventilating units; warm air heating systems; ducted air distribution; space air distribution entailing grille and diffuser selection procedures. Prerequisite: MECH 223. **3 credits**

MECH 320 Fluid Power 1 — Provides an understanding of pneumatic control systems. Fluid power components, their symbols, function and construction, are examined and used in the design, construction and testing of simple and sequential control systems. Sizing calculations for system components are also covered. **3 credits**

MECH 401 Machine Design 2 — Basic principles derived in MECH 301 are applied to various design elements. Topics include springs, roller bearings, power screws, spur and helical gearing, level and worm gearing, couplings, brakes, clutches. Prerequisite: MECH 301. **8.5 credits**

MECH 406 Fluid Systems — Covers dimensionless parameters, pump characteristics, operation and maintenance; cavitation; air movement and supply, fan performance and characteristics; duct sizing and networks. Prerequisite: MECH 222. **4.5 credits**

MECH 411 Production Engineering Management — Presents aspects of management and the industrial engineering functions of a manufacturing plant. The course is intended for technologists, engineers, designers, draftpersons and technical sales people who wish to have a clearer understanding of the range of problems and decisions involved in a manufacturing organization. Topics include management and plant organization, plant location and layout, production control, maintenance management, production planning, job design and time standards. **6 credits**

MECH 414 Metrology and C.N.C. — Includes measurement of surface texture and flatness, optical and electrical comparators, metrology of screw threads, precision measuring instruments, fundamentals of inspection, mass production gauging, computer numerical control programming and program verification on a 3-axis CNC mill. Prerequisite: MECH 230. **8 credits**

MECH 420 Fluid Power 2 — Provides an understanding of hydraulic control systems and an introduction to fluidic control systems and control logic. Fluid power components, their symbols, function and construction are examined and used in the design, construction and testing of a variety of hydraulic control systems. Sizing calculations for system components are also covered. Prerequisite: MECH 320. **4.5 credits**

MECH 425 Solar Engineering/Practical Design and Economics — This training course for people in the building industry, covers sizing, costing, installing and operating economic solar systems. It also provides the mechanism for an annual update of the basic skills as applied to the latest developments, with emphasis on Canadian requirements. The Solar Energy Applications Laboratory/Colorado State University training course material which requires all of the first term to complete, is reviewed and expanded upon by using a detailed design case study in the second term. Prerequisite: MECH 221. MECH 222 preferred in addition to MECH 221. **7.5 credits**

MECH 427 Passive Solar Design — Instruction in the fundamentals of energy sensitive building design; effects of site, building form and orientation, building skin, internal and solar gains, and economics are considered. This course covers the fundamental methods of reducing energy use in buildings through proper design; climatic factors, building form and orientation in relation to energy use; thermal properties of the building skin; heating, as well as natural lighting due to passive solar systems. System mathematical modelling is used to optimize design with regard to performance and economics. Prerequisite: MECH 221. MECH 222 preferred in addition to MECH 221. **6 credits**

MECH 432 Automatic Sprinkler Systems Design 1 — For persons involved in engineering, design, supervision or inspection of commercial and industrial automatic sprinkler systems to

gain an understanding of pipe schedule systems and water supply system analysis. The course examines the basics of wet and dry pipe systems; NFPA Standard #13; system components and applications; basic hydraulics of piping systems; water supply system analysis and tests with various examples; quick opening devices. Classroom lectures may be augmented by a Saturday field trip to take water flow tests. Students require an electronic calculator with XY function. Prerequisite: MECH 222. **3 credits**

MECH 433 Automatic Sprinkler Systems Design 2 — Advanced detailed instruction for persons involved in fire service, engineering design, supervision or inspection of automatic sprinkler systems in commercial and industrial buildings. The course examines deluge systems; pre-action systems; combined dry pipe and pre-action systems; water spray systems; special systems; hydraulics of sprinkler systems including tree, looped and gridded systems; computerized calculations; economical design considerations; water tanks; fire pumps, booster pumps, jockey pumps; maintenance of systems. Prerequisite: MECH 432. **4.5 credits**

MECH 435 Computer Numerical Control — Covers the fundamentals of programming and machining to those who require instruction in Computer Numerical Control (CNC) techniques. Emphasis will be on preparing the coded instructions necessary to operate the machine tools. Instruction will also be given on the setting up and operation of CNC machining equipment. Students will have the opportunity to test their programs on the FANUC 5M CNC controlled machine tool available at BCIT. The VAX computer and the Numeridex LC 5000 will be used for preparing tapes. A brief introduction to the APT programming language will also be given. This course will be of interest to machinists and people with experience in metal cutting processes. Prerequisite: MECH 130 and MECH 230 or Machining experience. **6 credits**

MECH 901 Inventions — Explores the practical development and marketing of inventions in Canada. Includes creative problem solving, technical and market evaluations, patents, protection, contracts, government and private financing; selling and/or licensing, and starting your own business. **non-credit**

MSYS 101 Plumbing — Topics include codes; basic engineering principles and graphic presentations related to plumbing systems design; load calculations; piping methods, sizing of system components for storm and sanitary drainage and water distribution. Some drafting skill will be required. Prerequisite: MECH 140. **3 credits**

MSYS 420 Air Conditioning Systems — Properties of air extending use of psychrometric chart to air conditioning comfort criteria and examination of air conditioning processes; refrigeration for air conditioning, encompassing evaporator, compressor, condensor and expansion valve performance characteristics and selection; air conditioning systems, encompassing representative unitary, constant volume and variable volume systems Prerequisite: MECH 313. **9 credits**

NAVL 150 Naval Architecture Introduction — Introduces procedures involved in the major stages of the design and construction of a ship, and the working environment in the industry. Students wishing to continue to NAVL 152 should take MATH 101, MECH 140, MATH 102 and MECH 150 before NAVL 150, but it is not an essential prerequisite. **3 credits**

NAVL 152 Naval Architecture Fundamentals — This course includes calculation for a vessel's displacement, hydrostatic particulars, transverse and longitudinal stability, calculation of weights and strength of connections, properties, use and procedure for drawing hydrostatic and launching curves. Prerequisite: NAVL 150, MECH 114, MATH 101, MECH 140, MATH 102 and MECH 150. (Students must also be enrolled in MECH 114 and MECH 115 or have already taken them). **6 credits**

NAVL 253 Applied Naval Architecture — Development of design requirements for typical small ships and boats relative to weight, space, equipment, general arrangements and functional details. Forms of hull structure, structural components and details, including methods of construction. Introduction to rules and regulations for structure, equipment and operation. Note: a large portion of class will be devoted to sketching and conceptual drawing. Prerequisite: NAVL 152. (Students must also be enrolled in MECH 217 and MECH 218 or have already taken them.) **9 credits**

NAVL 300 Ship Systems — New course under development, description not available at time of printing. Prerequisite: NAVL 152. **3 credits**

OPMT 193 Quality Control Methods 1 — Introduces the basic principles of modern quality control. Students develop insights into the problems and solutions of achieving product quality in industry. The course examines development, planning and organizing for quality; engineering a quality product; reliability and maintainability assurance; material control systems, inspection and non-destructive testing; metrology and quality costs. **3 credits**

OPMT 194 Quality Control Methods 2 — A continuation of Quality Control Methods 1, this course enables the student to handle advanced techniques for quality control and prepares them to write the American Society for Quality Control examinations for Quality Technician and/or Quality Engineer. Topics include management, engineering technology, statistical technology, motivational methods, and application of quality control. Prerequisite: OPMT 193. **3 credits**

OPMT 198 Productivity Engineering 1 — A fundamental course which discusses the systematic approach to problem solving in manufacturing and warehousing operations. Students create a plan for solving problems and learn to apply it to the daily environment. The course examines the principles of systematic scientific problem-solving as related to manufacturing and warehousing operations; economic feasibility; recording techniques, including assembly and display of data for analysis and dissemination; critical examination and development of alternative solutions to design and production problems; installation and maintenance of solutions; implications of human factors to method study; motion economy and workplace design, supplemented by the application of all topics to practical situations. **3 credits**

OPMT 292 Facility Layout and Material Handling — Manufacturing — Presents a systematic procedure for designing layouts and determining alternative material handling systems. Enables students to do layout planning and material handling (both over-all and detailed) for plant and warehouse, in conjunction with determination of material handling systems. Prerequisite: OPMT 198, OPMT 290, OPMT 291 and OPMT 192. **3 credits**

PHYS 133/134 Physics 2 — Topics include waves, sound, light, basic electricity and magnetism, elementary description of semiconductor properties, atomic spectram and nuclear energy. Problem solving is emphasized and consistent effort is directed towards relating physics to its technological manifestations. Prerequisite: PHYS 131/132 Physics 1 or MECH 217. **6 credits**

Recreation Facilities Management

The program leading to the award of the Intermediate Certificate of Technology in Recreation Facilities Management will consist of recreation management courses plus mandatory core courses and other technology courses to the required total credits. At the time of printing of this calendar, it is planned to move the full-time Recreation Facilities Management program from BCIT. However, the part-time program will continue, and students currently enrolled in the program will be able to complete their studies. All programs must be submitted to the program consultant for approval.

Faculty and Staff

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Intermediate Certificate of Technology in Recreation Facilities Management

Mandatory Courses

		Credit
COMM 160	Business and Technical Correspondence OR	
COMM 180	Technical Correspondence OR	
COMM 183	Technical Reports	3.0
COMP 101	Introduction to Data Processing — Mainframe OR	
COMP 103	Introduction to Data Processing — Apple Micros OR	
COMP 105	Introduction to Data Processing — IBM PC	3.0
MECH 140	Drafting Fundamentals	3.0
MKTG 101	Marketing 1 OR	3.0
MKTG 102	Introduction to Marketing OR	3.0
MKTG 201	Marketing 2 OR	4.0
MKTG 309	Marketing Research	4.5
MSYS 101	Plumbing	3.0
RECR 101	Recreation Facilities Management 1 — Administration	3.0
RECR 102	Recreation Facilities Management 2 — Maintenance	3.0
RECR 103	Recreation Facilities Management 3 — Program	3.0
RECR 110	Swimming Pool Operation, Maintenance and Water Chemistry OR	
RECR 111	Artificial Icemaking	3.0

Optional/Elective Courses

		Credit
ADMN 204	Personnel Management	4.0
ADMN 208	Municipal Law	3.0
ADMN 332	Labour Relations 1	4.0
ADMN 432	Labour Relations 2	6.0
ELEC 150	Illumination	3.0
ELEC 250	Electrical Systems	3.0
FMGT 101	Accounting 1	4.0
FSTR 155	Wildland Recreation and Park Management	3.0
HOSP 203	Introduction to Food and Beverage Management	3.0
LAND 204	Parks and Recreation OR	4.5
LAND 205	Management for Landscape OR	3.0
LAND 206	Cost Estimation OR	4.5
LAND 207	Landscape Irrigation OR	3.0
LAND 208	Sports Turfgrass Management	3.0

Course Descriptions

ADMN 204 Personnel Management — An introductory course for those who have recently joined a personnel or industrial relations department or who plan to enter the field. It is also valuable to supervisors or managers who must implement, or are accountable for administering, personnel policies. The student develops an understanding of the personnel function, its relationship to management and responsibility to employees. Topics cover the major functions of the personnel department emphasizing the practical application of personnel policies and procedures; employment wage and salary administration, administration of pension plans and insurances, employee relations. For further in-depth coverage of specific topics supporting courses should be taken. **4 credits**

ADMN 208 Municipal Law — In addition to an overview of the B.C. Municipal Act and other provincial statutes governing local government activities, this course covers areas of administrative law, constitutional law and contract law which have an impact upon municipal administrative practice. Additional topics include municipal powers and duties; municipal councils; elections; by-laws; acquisition and disposal of land; contracts and franchises, revenues; assessment and taxation; actions by and against municipal government; B.C. statutes and case law relating to the principal services provided by municipal authorities. **3 credits**

ADMN 332 Labor Relations 1 — For those involved in or associated with labor relations as members of management or of a union. People in the personnel field, shop stewards, supervisors and managers will find the coverage of the collective bargaining process and day-to-day contract administration extremely useful, and learn to approach their responsibilities for matters covered by collective agreements with more confidence and expertise. Topics include related laws, typical contract clauses, grievance procedures, responsibilities of the supervisors and the shop steward and current activities in the labor relations field. **4 credits**

ADMN 432 Labor Relations 2 — A thorough explanation of collective administration, agreements, wage issues, economic supplements, arbitration, mediation, preparation for collective bargaining and collective bargaining techniques. Prerequisite: ADMN 332. **6 credits**

COMM 160 Introduction to Business and Technical Communication — Introduces students to the basics of communicating in business and industry. It offers practical techniques for planning communication according to the writer's purpose and the reader's needs. Organizing, selecting and presenting information and using effective business and technical style are covered. Students apply these skills to communications common to most office jobs — writing simple memos, instructions, procedures and summaries. Presenting information orally is also covered. Practical "case" assignments are used. Students are encouraged to work on communication problems from their jobs, if appropriate. **3 credits**

COMM 180 Technical Correspondence — Covers correspondence inside and outside the engineering office. The emphasis is on short, informal communications. Topics include memo and letter format, technical writing style, process descriptions, troubleshooting memos, procedures, routine requests and replies. It also covers trip, progress and incident reports. **3 credits**

COMM 183 Technical Reports — Gives writers from technical or industrial backgrounds practice in problem-solving reports. The emphasis is on the communication skills needed to solve engineering problems and to describe methods and products. Specific applications include comparison and feasibility reports, technical proposals, journal reviews, executive summaries and formal report format. Persuasive presentations, meetings, and effective use of graphics are also covered. **3 credits**

COMP 101 Introduction to Data Processing — Mainframe — Introduces the principles and concepts of business data processing to people with little or no programming experience. It may be useful to those who need a better understanding of computer operations in their firms. A prerequisite for most systems and programming courses. Lectures and laboratory sessions with "hands-on" computer practice include an introduction to the computer: input/output, hardware, computer use; background, data representation, applied systems, files, magnetic tape and disk, master and transaction files, data entry and control, batch processing, on-line data entry, computer programming, flowcharting, input/output, processing, decision, arithmetic and branching. Students will write and test five programs in BASIC programming language. **3 credits**

COMP 103 Introduction to Data Processing — Apple Microcomputers — *see* COMP 101.

COMP 105 Introduction to Data Processing — Microcomputers — IBM PC — *see* COMP 101.

ELEC 150 Illumination — An introductory course in illumination which examines electrical systems pertaining to buildings. Deals with the language of lighting, design methods, characteristics and types of light sources and the economics of lighting. As the lighting system is generally designed by the electrical system designer, it is necessary to have a working knowledge of lighting systems when studying the electrical system. Prerequisite: MATH 101 and 102. **3 credits**

ELEC 250 Electrical Systems — Students learn how to plan the electrical system for a specific building, with the electrical designer. How to read and work with common electrical drawings and specifications, understand single and three-phase systems, and power factor correction for minimumal operations costs; recognize and avoid building designs that create costly electrical design problems. Prerequisite: ELEC 150. **3 credits**

FMGT 101 Accounting 1 — Permits persons with little or no accounting background to become familiar with the techniques of working through the full acounting cycle. It provides theoretical and practical training in basic accounting as preparation for FMGT 201 Accounting 2. Persons employed or seeking employment in accounting will find this course helpful in expanding employment possibilities. Students learn basic accounting functions, how to maintain financial records and prepare financial statements of any small business, and accounting history which sets the foundation for accounting procedures. Topics include accounting as an information system, introduction to accounting theory, income measurement, traditional record-keeping procedures, the accounting cycle, special journals, cash investments and receivables. **4 credits**

FSTR 155 Wildland Recreation and Park Management — Examines the importance of recreation and wildland recreation management to the proper planning and administration of Canada's wildlands. The course provides a working knowledge of recreational pursuits on public and private wildlands within B.C., and presents the specific criteria involved in the assessment and management of recreational wildland. The course includes an introduction to recreation, wilderness management, winter-oriented recreation, water-oriented recreation, campsite design, wildlife in parks, interpretation, visual management, public input in decision-making and trail design. **3 credits**

HOSP 203 Introduction to Food and Beverage Management — Persons intending to enter the food service industry with management/ownership as a goal are challenged to consider the many facets and multiple pitfalls of this industry. The student studies basic organization of a food enterprise or department; theory and classification of foods; equipment and supplies needed and purveyors available; basic elements of aesthetics and design; the importance of menu, location, plant layout; basic cost controls; setting of objectives; sanitation and storage principles. **3 credits**

LAND 204 Parks and Recreation — An introductory course in the design of parks and recreational facilities and/or their maintenance. Students study the basic facilities required for public parks and recreation areas; the layout of areas for indoor or outdoor sports and other recreation facilities and maintenance requirements for recreation facilities. Course content includes planning principles, space requirements for sports, art education, etc; facilities, swimming pools, ice arenas, lawn bowling, curling, golf, marinas, resorts, beaches, children's playgrounds; general features, fences, walls, lights, parking, and general maintenance. Students design and make drawings for a major community park. **4.5 credits**

LAND 205 Management For Landscape — Introduces landscape technicians to management skills required in landscape development, including the legal requirements affecting land use, contract documentation, ethics and professional liability. The student studies professional responsibilities in respect to the consultant's relationship to client and contractor; contractor/client relationship; production of contract documents; legal liability; contract supervision. **3 credits**

LAND 206 Cost Estimation — For persons with limited or no experience in cost estimation for landscape projects. An introduction to methods of area and volume survey from landscape plans; study of work capacity; administration and maintenance costs including quantity and capacity as bases for cost estimation; methods of journal keeping and accounting. Topics include mathematics, surface, area, volume; weights and measures; cuts and fills; work capacity, man-hours, equipment; overhead expenses; journals; bookkeeping and an introduction to the metric system. **4.5 credits**

LAND 207 Landscape Irrigation — Provides technical information and basic training for persons associated with or interested in turf and landscape irrigation. Topics include basic hydraulic theory, system design and construction fundamentals; scientific and practical aspects of water application; installation, operating and maintenance procedures for major types of irrigation systems. **3 credits**

LAND 208 Sports Turfgrass Management — An introductory course in turfgrass management for persons associated with maintenance of golf courses, municipal parks and outdoor recreational facilities. Topics include turfgrass botany (classification, nomenclature, identification and utilization); weed, disease and insect problems and control strategies; soils (introduction and classification); soil amendments and fertilizers; tillage and cultivation systems; irrigation principles, equipment design and construction. **3 credits**

MECH 140 Drafting Fundamentals — An introductory course for persons with little or no experience in graphics. Students are required to purchase drafting equipment and supplies on the first

night of class. Students learn to produce and read simple drawings. Topics include scales, geometric constructions, basic orthographics, detail interpretation, line visibility, dimensioning, auxiliary views, true shape, inclined and skewed surfaces, sections, pictorials, working drawings and freehand sketches. **3 credits**

MKTG 101 Marketing 1 — Students will learn to assess market demand for consumer and industrial goods, and apply principles of product planning to capitalize on well defined market opportunities. Students with little or no marketing experience study marketing sales and the role and activities carried out by marketing personnel in business organizations. Topics include market analysis, target market determination, research methods; forecasting, marketing program design and control, determination of buyer behavior, classification of goods and product planning. **3 credits**

MKTG 102 Introduction to Marketing — An introductory course for persons concentrating their studies in other areas who wish limited exposure to the field of marketing. Students will relate many general marketing concepts to their own business situations providing a conceptual framework for marketing as well as a theoretical understanding of the discipline. Topics include market analysis, market concepts, uncontrollable factors, total product, market segmentation, product differentiation, packaging, branding, product classification for consumer and industrial goods, product life cycle, style and fashion, channels of distribution retailing, wholesaling, promotion blending and pricing policies. Students are examined on the textbook readings and prepare out-of-class assignments relating to business situations. **3 credits**

MKTG 201 Marketing 2 — In this continuation of MKTG 101 Marketing 1, the student learns the elements of the marketing mix — product, price, promotion and distribution. The course also introduces industrial marketing, international marketing and marketing of services, and further exposes the student to the decision making process. Prerequisite: MKTG 101. **4 credits**

MKTG 309 Marketing Research — A fundamental course presenting the theoretical and operational aspects of marketing for persons who are, or will be, involved in the marketing research function or its application. Students learn to apply basic marketing research methods and techniques to a variety of marketing problems. Class lectures, discussions, case studies and a field project cover sampling theory and practice, questionnaire design and field interviewing, consumer behavior, media, advertising, product, and industrial marketing research. **4.5 credits**

MSYS 101 Plumbing — Topics include codes; basic engineering principles and graphic presentations related to plumbing systems design; load calculations; piping methods, sizing of system components for storm and sanitary drainage and water distribution. Some drafting skill will be required. Prerequisite: MECH 140. **3 credits**

PHYS 131/132 Physics 1 — Topics include kinematics, statics, linear and rotational dynamics, properties of matter, heat and thermodynamics. Problem solving is emphasized and consistent effort is directed towards relating physics to its technological manifestations. Prerequisite: Algebra 12, (Physics 11 is desirable). **6 credits**

RECR 101 Recreation Facilities Management 1 — Administration — Areas of study include trends in recreation and leisure services management; theory and application of recreation and leisure services management; MBO philosophy; motivation; design of organizations; interpersonal managerial skills; marketing of leisure/recreation services; budgeting; policy making; personnel management for recreation managers. **3 credits**

RECR 102 Recreation Facilities Management 2 — Maintenance — Includes personnel management, legal liability, labor and management, professional interaction under unionization, principles of organization and staffing for efficient maintenance, and vandal management. **3 credits**

RECR 103 Recreation Facilities Management 3 — Program — Includes marketing and promotion of programs including fees and charges; community structure and development as it relates to determining program needs; leisure counselling and programming, and marketing perspective; program development, leadership, development and programming for the public; private agency and commercial facilities. **3 credits**

RECR 110 Swimming Pool Operation, Maintenance and Water Chemistry — Many of the hundreds of swimming pools in use today — public, apartment and backyard — are not properly maintained. Improper water conditions and increased expense result from neglect or misuse of the pool and its accessories. This course covers the efficient operation of the physical plant to produce clear, comfortable water and to maintain the equipment in a safe, sanitary condition. Successful students may take the National (U.S.) Swimming Pool Institute Certificate examination. **3 credits**

RECR 111 Artificial Icemaking — A "methods" course in the effective operation of an artificial ice surface facility. This practical approach covers ice plant operation and maintenance, planning and appropriate energy conservation strategies. On-site visitations are included and successful candidates are eligible for the B.C. Recreation Facilities Association Ice Makers Certificate. **3 credits**

Robotics (Automation) Technology

The programs leading to the award of the Certificate of Technology, or Intermediate Certificate, in Electro-Mechanical Technology, and the Diploma in Robotics Technology will consist of electrical, mechanical and specialized robotics courses plus mandatory core courses and other technology courses to the required total credits. Students who already hold Certificates or Diplomas in Electrical/Electronics Technology or Mechanical Technology may be able to enter directly into the Diploma program after taking the necessary make-up prerequisite courses. All programs must be submitted to the program consultant for approval by the Technology Department.

Faculty and Staff

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Intermediate Certificate of Technology in Electromechanics

		Credit
ELEC 100*	Circuit Analysis 1	6.0
ELEC 200*	Circuit Analysis 2	5.0
ELEC 202	Digital Logic	3.0
ELEC 203	Electronic Circuits 1	6.0
MATH 143	Basic Technical Mathematics for Electrical	7.0
MECH 130	Manufacturing Processes — Metal Removal	3.0
MECH 230	Manufacturing Processes — Machine Tools	4.5
MECH 320	Fluid Power 1	3.0
MECH 420	Fluid Power 2	4.5
PHYS 106	Physics 1	6.0
TCOM 104	Technical Writing for Electrical	3.0

* ELEC 208 Electric Circuits AC/DC. Students with previous training may, with written permission of the Electrical Department, be allowed to take ELEC 208. This course must be taken concurrently with MATH 113.

Certificate of Technology in Electromechanics

		Credit
ELEC 102	Programming 1	3.0
ELEC 302	Digital Techniques 2	5.0
ELEC 303	Electronic Circuits 2	5.0
ELEC 305	Electrical Equipment 1	5.0
ELEC 315	Robot Fundamentals	8.0
MATH 243	Calculus for Electrical	7.0
MATH 343	Transform Calculus for Electrical	4.0
PHYS 206	Physics 2	6.0
TCOM 204	Technical Writing for Electrical	3.0

National Diploma of Technology in Robotics (Automation)

		Credit
ELEC 307	Pulse Techniques	5.0
ELEC 402	Digital Systems	6.0
ELEC 407	Feedback	6.0
ELEC 467	Robot Applications and Gripper Design	5.0
ELEC 468	Robot Servicing and Maintenance	3.0
ELEC 470	CNC and Robotic Languages	5.0
ELEC 471	Digital Control Using Microcomputers	6.0
ELEC 472	Robot Sensors	5.0
ELEC 473	Integrated Manufacturing Cell Design	5.0
ELEC 474	Drafting and Design Project	7.0
OPMT 149	Business for Electrical	3.0
OPMT 460	Industrial Engineering	4.0

Course Descriptions

ELEC 100 Circuit Analysis 1 — Teaches the principles and methods of analysis related to DC circuits. Topics include work, energy, voltage, current, power, resistance, inductance, capacitance, impedance, SI units, and terminology. Methods of analysis include loop, superposition, nodal, Thevenin and Norton. The lab portion of the course provides practice in the use of power supplies, function generators, multimeters and components. Labs are synchronized with lectures so that theory is studied and confirmed by application. Prerequisite: Algebra 12 and Physics 11. **6 credits**

ELEC 102 Programming 1 — Teaches structured computer programming with the BASIC computer language. Topics include the use of a disk based operating system, input and output commands, decision making, repetative programming structures, subroutines, string manipulations and the use of graphics on the IBC PC. **3 credits**

ELEC 200 Circuit Analysis 2 — Introduces the bahaviour of electrical circuits and networks when driven by a single-phase alternating current (AC) source; preparation for courses in electronics and power systems. The course includes the sine wave, average and effective values, power and power factor; resistance, capacitance and inductance as elements in single-phase AC circuits; phasor diagrams, impedance, admittance, voltage, current and power diagrams; analysis of AC circuits with complex algebra; resonance and resonant circuits, high and low pass filters; the application of circuit laws and theorems to single-phase AC circuits, the analysis of two-part networks; coupled circuits. The circuit theory is verified using multimeters, sine wave generators, amplifiers and dual trace oscilloscopes. Prerequisite: MATH 112 or MATH 143 and ELEC 100 or ELEC 104. **5 credits**

ELEC 202 Digital Logic — Covers logic gates from the TTL and CMOS families with study of their specifications and data sheets. Noise and loading considerations are introduced. Schematic symbology and development of logic systems are studied. Sequential logic, flip flops (RS, JK, D Type, Master-slave), simple counters, shift registers and timing diagrams are all covered. Emphasis is on thorough understanding of characteristics like propagation delay, clock synchronization and timing sequences. Prerequisite: ELEC 100. **3 credits**

ELEC 203 Electronic Circuits 1 — Explains how electronic circuits work, how to analyse them and how to design, modify and combine them to perform complex functions. Topics include interpretation of bipolar and field-effect transistor characteristic curves; voltage and current amplifying circuits; the transistor as a switch; loadline analysis; choice of Q-point; bias circuits; AC equivalent circuits; frequency response; feedback, oscillation response; oscillator circuits; power amplifiers of various types; heat sink calculations; characteristics and application of switching devices including the unijunction. Prerequisite: ELEC 200 OR ELEC 208, PHYS 131/132 or PHYS 106. **6 credits**

ELEC 208 Circuit Analysis AC/DC — Applicants are required to obtain authorization from the department. This course enables persons with a strong background or education in the electrical field to cover and/or review those topics necessary to take the more advanced courses in the Electrical Program. Students study

the basics of how single phase AC and DC circuits work, and how to analyze and design them for particular situations. This course is not intended for those without previous training in electrical theory or advanced math. Prerequisite: Math higher than Algebra 12, Physics 11 and Chemistry 11; entry to this course by written permission of technology only. **11 credits**

ELEC 302 Digital Techniques 2 — Covers logic gates from the TTL families with study of their specifications and data sheets. Noise and loading considerations are introduced. Schematic symbology and development of logic systems are studied. Sequential logic, flip flops (RS, JK, D type, master-slave), simple counters, shift registers and timing diagrams are all covered. Emphasis is placed on thorough understanding of characteristics such as propagation delay, clock synchronization and timing sequences. Also included are analog to digital and D/A conversion techniques. Prerequisite: ELEC 202 and ELEC 203. **5 credits**

ELEC 303 Electronic Circuits 2 — A continuation of ELEC 203 Electronic Circuits 1. One half of the course deals with circuit applications not previously covered including: DC power supplies, voltage and current regulation; small-signal tuned amplifiers, neutralising and the cascade configuration; wide band amplifiers; DC amplifiers; differential amplifiers. The remaining half of the course gives an introduction to linear integrated circuits, particularly the operational amplifier and some of its circuit applications including an introduction to active filters. Prerequisite: ELEC 200, ELEC 203 and MATH 243. **5 credits**

ELEC 305 Electrical Equipment 1 — Commences as a continuation of circuit analysis then moves on to the study of motors, generators, transformers and rectifiers. Topics include a review of phasor diagrams, power factor, three phase power and circuit analysis, single and three phase power distribution systems, DC motors and generators, induction motors, synchronous motors and generators, stepper motors, motor control circuits, transformers (single and three phase), and three phase rectification. Prerequisite: ELEC 200 or ELEC 208, MATH 243 or MATH 313 and PHYS 206. **5 credits**

ELEC 307 Pulse Techniques — Introduces pulse signal circuits such as clippers and clamps, transistor switches, astable and monostable multivibrators, Schmitt triggers, ramp generators, DC to DC converters and phase lock loops. Both discrete transistors (bipolar and FET) and CMOS integrated circuits are used in building all these circuits. Each circuit is analyzed in detail and its practical application is considered. A video raster project is introduced as one application of pulse and ramp generator circuits. Prerequisite: ELEC 202, 203 and MATH 413 or MATH 243. **5 credits**

ELEC 315 Robot Fundamentals — Discusses the types of robots and the coodinate systems under which they operate. Investigates accuracy, repeatability in relation to load capability. Investigates various programming options and considers human factors and safety in robot deployment. Prerequisite: MATH 413, PHYS 206, MECH 420 desirable. **8 credits**

ELEC 402 Digital Systems — A detailed introduction to microcomputer architecture and machine language programming using the Z80. The student is introduced to a text editor, assembler, linker, and debugger under the LP/M operating system. The CP/M system is used as a development tool to investigate the Z80 memory organization, internal structure, and assembly language programming. A small single board Z800 system is used to investigate Z80 timing, control, buffering, interfacing, interrupts and support chips. Prerequisite: ELEC 102, 302, 303 or 308, and 307. **6 credits**

ELEC 407 Feedback — Emphasizes the theory of feedback and its effect on continuous and discrete time linear systems. Topics include signal-flow graph analytic techniques, the transfer function concept and stability criteria for feedback systems. These topics are applied to the analysis and design of oscillators, wide-bond amplifiers and modern analog filters. The sampling concept (discrete time system) and the complex z-plane are introduced. Several approaches to the realization of a sampled data system are reviewed. Prerequisite: ELEC 303 or 308, 306 and MATH 343. (MATH 343 may be taken concurrently.) **6 credits**

ELEC 467 Robot Applications and Gripper Design — Discusses applications of robots in automated manufacturing centres and the corresponding gripper and fixture design required for these applications. Prerequisite: ELEC 315, MECH 230, MECH 420. **5 credits**

ELEC 468 Robot Servicing and Maintenance — Discusses maintenance strategies and procedures for the various types of kinds of robots (pneumatic, hydraulic and electric). Prerequisite: ELEC 315, MECH 420, ELEC 302, ELEC 303, ELEC 305 and ELEC 402. (ELEC 402 may be taken concurrently.) **3 credits**

ELEC 470 CNC and Robotic Languages — Introduces the student to current CNC and Robot languages such as APT and VAL. Investigates the integrated manufacturing centre. Prerequisite: ELEC 102 or CDCM 101 and MECH 230 or equivalents. **5 credits**

ELEC 471 Digital Control Using Microcomputers — A continuation of ELEC 407 Feedback 1 where a microcomputer now replaces the analog PID controller. Prerequisite: ELEC 407, ELEC 402. **6 credits**

ELEC 472 Robot Sensors — Investigates techniques and applications where robots are enhanced by the capability of vision and touch. Prerequisite: ELEC 467, ELEC 402. **5 credits**

ELEC 473 Integrated Manufacturing Cell Design — Investigates the integration of NC machine tools with robots for machine loading/unloading. Discusses the complete integrated manufacturing centre with the addition of CAD/CAM down loading to the CNC/Robot controller. Prerequisite: ELEC 467, ELEC 470 and OPMT 460. **5 credits**

ELEC 474 Drafting and Design Project — A graduation paper researched and presented by the student on some aspect of robot design, programming or application. Prerequisite: ELEC 472 and 473. **8 credits**

MATH 113 Mathematics for Electrical Technology — An accelerated course based on the material covered in MATH 143. Open only to students currently registered in ELEC 208 and MATH 143 by invitation only. **6 credits**

MATH 143 Mathematics for Electrical Technology — Term 1 covers linear equations including determinants, matrices, elimination methods, and method of least squares. Term 2 covers trigonometry including sine and cosine laws, vectors, trigonometric identities, graphing and complex numbers. Term 3 covers logarithms and exponentials including logarithmic and exponential equations, decibels, graphing on semi-log and log-log paper, transients with electrical and instrumentation applications. Prerequisite: MATH 001 or recent Algebra 12. **7 credits**

MATH 243 Calculus for Electrical — The derivative, differentiation rules, applied maxima/minima, and implicit differentiation with applications to electrical technology. Antidifferentiation, the indefinite integral and the definite integral including area, mean value and RMS value. Differentiation and integration of trigonometric, logarithmic and exponential functions. Prerequisite: MATH 143 or MATH 112 or MATH 113. **7 credits**

MATH 343 Transform Calculus for Electrical — Description not available at time of printing. Prerequisite: MATH 243 or MATH 414. **4 credits**

MECH 130 Manufacturing Processes — Metal Removal — Topics include the machinability of materials, theories of tool geometry, effective cutting speeds, time and productivity related to machine tools, power and forces involved. **3 credits**

MECH 230 Manufacturing Processes — Machine Tools — An introduction to production engineering, organized processing, breakeven points and equal cost quantities. Detailed knowledge of the basic machine tools, evaluation of design and production features, machine specification, installation and maintenance systems. Prerequisite: MECH 130. **4.5 credits**

MECH 320 Fluid Power 1 — Provides an understanding of pneumatic control systems. Fluid power components, their symbols, function and construction, are examined and used in the design, construction and testing of simple and sequential control systems. Sizing calculations for system components are also covered. **3 credits**

MECH 420 Fluid Power 2 — Provides an understanding of hydraulic control systems and an introduction to fluidic control systems and control logic. Fluid power components, their symbols, function and construction are examined and used in the design, construction and testing of a variety of hydraulic control systems. Sizing calculations for system components are also covered. Prerequisite: MECH 320. **4.5 credits**

OPMT 149 Business for Electrical/Electronics — Description not available at time of printing. **3 credits**

OPMT 460 Industrial Engineering — Planning for and conducting productivity improvement studies in a manufacturing environment. Included in the course are the major topics of CPM and Method Study. Both of these topic areas are supported with commercial and student written microcomputer application. **4 credits**

PHYS 106 Physics 1 — A general level course about physical quantities, their properties, relationships, how they affect each other and their connecting principles. Motion, force, mechanical energy and power are studied concerning translational and rotational motion. Then follows basic electricity, atomic physics and the band theory of solids and its application to semiconductor devices. The lab program emphasizes measurements, data analysis and experimental techniques while confirming and expanding the lecture concepts. Math treatment requires algebra, trigonometry and vectors. Prerequisite: Algebra 12 and Physics 11. **6 credits**

PHYS 206 Physics 2 — Topics include sound, light and optics, basic electricity and magnetism, basic semi-conductor theory, and atomic and nuclear phenomena. Mathematical treatment requires algebra and trigonometry, and possibly some calculus. Prerequisite: PHYS 106. **6 credits**

TCOM 104 Technical Writing — The basics of English communication theory are briefly reviewed and tested in a series of directed self-study lessons. The theory and practice of effective letter writing are thoroughly covered, culminating in an intensive examination of the principles. Students will practice preparing all the documents, needed in the job search; formal and informal reports, with emphasis on the most used forms of technical writing and graphics; and oral reporting, with some emphasis on the use of audiovisual devices. **3 credits**

TCOM 204 Technical Writing — A continuation of TCOM 104 with emphasis on technical report writing and presentations. **3 credits**

BOMA — Building Owners and Managers Association

BOMI is the Building Owners and Managers Institute International, a non-profit organization whose purpose is to professionalize the industry by providing educational programs for BOMA members. The SMA (Systems Maintenance Administrator) program confers two levels of proficiency; SMT (Systems Maintenance Technician) after completion of the first five courses and SMA after completion of the remaining three. These courses are specifically designed for building operating employees. The SMA program has been fully endorsed by the employer members of BOMA B.C.

Students who have successfully completed courses 1, 3, 4 and 5 of the SMA Program are eligible to write the examination for the British Columbia Boiler Operators Certificate of Competency and receive four months credit toward the required period of employment.

How to get started

The first step is to enroll in BOMI. The second step is to choose one of the study options available.

Program Option

CLASSROOM: In the Vancouver area SMA classes are held at BCIT (British Columbia Institute of Technology). The date, timne and particular courses offered are shown in the calendar (prefix BOMA).

SELF-STUDY: Individuals in areas where it is not convenient to get to Vancouver on a regular basis can take the SMA program on a self-study basis.

All program information from: SMA Program, BOMI B.C. #601 - 325 Howe Street, Vancouver, B.C., V6C 1Z7, or telephone (604) 684-3916.

Course Descriptions

BOMA 901 BOMA — Heating Plumbing and Fire Protection Systems — Explains steam boilers, hot water heaters, burners, pumps and boiler accessory equipment. In addition, lessons on plumbing systems and fire protection systems are included. **non credit**

BOMA 902 Refrigeration Systems and Accessories — Explains the refrigeration cycle and discusses the various types of refrigeration equipment. In addition, the principles of operation and maintenance requirements of each of the component parts of a refrigeration machine will be discussed. **non credit**

BOMA 903 Air Handling Systems and Water Treatment — The first half of this course explains the various types of air handling systems and the component parts used in air handling systems. The second half of the course explains water chemistry, boiler water treatment, coding water treatment and chemical treatment equipment. **non credit**

BOMA 904 Electrical Systems and Illumination — Explains basic electricity , electrical systems and illumination. **non credit**

BOMA 905 Control Systems — Explains pneumatic and electric control systems and their application to heating, cooling and air conditioning systems. **non credit**

BOMA 906 Buildings and Grounds Design and Maintenance — Explains the need for a preventive maintenance program and the various types of programs available for use in buildings. The course will also discuss the components of a building which should be included in a preventive maintenance program. **non credit**

BOMA 907 Energy Management — Explains the purpose and procedures for managing energy use in a building. Discusses each of the systems within a building that consumes energy and suggests ways to manage energy use within each system. **non credit**

BOMA 908 Supervision — Trains building employees in the techniques and "human relations" of supervision. It concentrates on organizing, selecting, developing and motivating employees. **non credit**

School of Construction and Natural Resource Studies

Building Technology

Programs leading to the award of the Certificate of Technology, or Intermediate Certificate, in Building Technology consist of building technology courses plus mandatory core courses and other technology courses to the required total credits. All programs must be submitted to the program consultant for approval by the Technology Department.

Faculty and Staff

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Intermediate Certificate of Technology

		Credit
BLDG 151	Drafting and Design 1 — Introduction	6.0
BLDG 152	Construction 1	6.0
BLDG 251	Drafting and Design 2 — Architectural Presentation	6.0
BLDG 252	Construction 2	9.0
BLDG 351	Drafting and Design 3 — Architectual Design	6.0
CIVL 161	Statics	4.0
COMM 160	Introduction to Business and Technical Communication	3.0
MATH 101	Technical Mathematics 1 — Trigonometry	3.0
MATH 102	Technical Mathematics 2 — Logarithms and Analytic Geometry	3.0

Certificate of Technology

Prerequisite: completion of Intermediate Certificate of Technology or equivalent.

		Credit
BLDG 153	National Building Code	3.0
BLDG 154	Construction Industry Procedures — Introduction	3.0
BLDG 155	Construction Contracts	3.0
BLDG 256	Construction Estimating 1	3.0
BLDG 258	Computer Applications in Building Technology 1	3.0
BLDG 355	Construction Specifications	4.5
BLDG 356	Construction Estimating 2	3.0
CIVL 263	Strength of Materials	6.0
COMM 180	Technical Correspondence	3.0

Year 1 Equivalency

Prerequisite: Completion of Certificate of Technology or equivalent.

		Credit
COMM 183	Technical Reports	3.0
ELEC 150	Illumination	3.0
MATH 203	Technical Mathematics 3 — Calculus	6.0
MECH 223	Heating and Ventilation 1	3.0
MSYS 101	Plumbing	3.0
OPMT 187	Project Planning and Scheduling	3.0
PHYS 131/132	Physics 1	6.0

Advanced, Optional and Elective Courses

		Credit
BLDG 159	Architectural and Industrial Illustration	3.0
BLDG 170	Microcomputer Based 2D Architectural CADD	3.0
BLDG 173	Microcomputer Based 3D Architectural Modelling	3.0
BLDG 253	Building Code (Correspondence)	non credit
BLDG 254	Project Management — Introduction to Building Development	3.0
BLDG 352	Construction 3	3.0
BLDG 354	Project Management — Contract Management	3.0
BLDG 358	Computer Applications in Building Technology 2	3.0
BLDG 452	Construction 4	4.5
BLDG 454	Project Management — Construction Management	3.0
BLDG 456	Construction Estimating 3	3.0
BLDG 459	Building Acoustics	3.0
ELEC 250	Electrical Systems	3.0
MECH 313	Heating and Ventilating 2	3.0
MSYS 420	Air Conditioning Systems	9.0
SURV 108	Engineering Survey	7.0

Course Descriptions

BLDG 151 Drafting and Design 1 — Introduction to Architectural Drafting and Design — Elementary drafting techniques, lettering and symbols. Brief history of architecture with specific study of the development of building technology. Development of a technical vocabulary. Assignments concentrate on building element description rather than on geometrical objects. **6 credits**

BLDG 152 Construction 1 — Introduces the basic principles of building construction. Develops skills to produce a basic set of construction working drawings. Topics include site layout, foundation details, western wood frame detailing, preparation of a partial set of working drawings for a single family residence. A list of necessary drafting equipment will be issued on the first evening. **6 credits**

BLDG 153 National Building Code — Examines the purpose, scope and contents of the National Building Code of Canada, for persons in design, drafting, construction, inspection and financing of buildings. A history of the development of the code, with specific study of Part 3: Use and Occupancy and Part 9: Housing and Small Buildings. Prerequisite: some knowledge of building construction. **3 credits**

BLDG 154 Construction Industry Procedures — Introduction — Topics include the basis of building development; design, bidding and contracting procedures; types of construction contracts; principles of measurement; pricing and specification of construction work and the basis of construction costs. **3 credits**

BLDG 155 Construction Contracts — Fundamentals of contracts. Parties to construction contracts. Basic types of construction contracts. Relationship between information and risk. Standard forms of construction contracts used in Canada and elsewhere. Appropriate documentation and related issues. **3 credits**

BLDG 159 Architectural and Industrial Illustration — Provides grounding in architectural and industrial illustration and the scope, styles and techniques of contemporary presentation. Introduces illustration, elements of rendering form and space, entourage techniques, perspective, photographic techniques, black/white, color and mixed media. **3 credits**

BLDG 170 Microcomputer Based 2-D Architectural CADD — A one-week, intensive, hands-on, practical seminar/workshop for those with a background in architectural working drawings. This seminar is not intended for those who are not familiar with current industry practices. **3 credits**

BLDG 173 Microcomputer Based 3-D Architectural Modelling — A one-week, intensive, hands-on, practical seminar/workshop for those with a background in architectural design and/or rendering. No computer experience is required. Participants will learn to use IBM compatible computers and STYLE 3-D Architectural Software to quickly create wireframe models for massing studies, considering design alternatives, and providing blockouts for perspective renderings. **3 credits**

BLDG 251 Drafting and Design 2 — Architectural Presentation — A continuation of BLDG 151. Topics include descriptive geometry and its use in design presentation, description of building elements through isometric and axonometric projection, one and two point perspectives; application of regulations and other restrictions in design drafting and presentation; design and drafting services, drawing applications. Prerequisite: BLDG 151 or permission of the instructor. **6 credits**

BLDG 252 Construction 2 — A continuation of BLDG 152. Topics include western frame and modified post and beam construction; details for fireplaces, stairs, doors and windows; further development of working drawings to include the foregoing elements. Prerequisite: BLDG 152 or permission of the instructor. **9 credits**

BLDG 253 B.C. Building Code (Correspondence) — Flexible entry correspondence course that gives students a working knowledge of part 9 of the B.C. Building Code for housing. Of interest to practicing building officials, those in housing construction, and those working with inspectors and plan checkers. Successful completion fulfills the technical requirements for the Building Inspectors Association of British Columbia certificate, Level 1 (Housing) Inspector. Full certification requires two additional years of practical experience. Prerequisite are ability to read simple building plans and construction specifications and familiarity with metric system. **non-credit**

BLDG 254 Project Management — Introduction to Building Development — Introduces students to the considerations of the project process — the development of raw land from the recognition of the need for a building or facility through feasibility studies, financing, budget control and design evolution. Prerequisite: some knowledge of building construction. **3 credits**

BLDG 256 Construction Estimating 1 — Introduces general theories of measurement and pricing of construction work. Specific study of particular methods of measurement and techniques of pricing; application to elementary examples of work; introduction to bidding procedures and documentation; sources of cost data; preparation for CIQS exam 103. Prerequisite: some knowledge of building construction. **3 credits**

BLDG 258 Computer Applications in Building Technology 1 — Students learn the capabilities and limitations of digital computer hardware; sufficient programming to write and document simple BASIC programs and practical computer applications for architecture and construction. Lectures cover computer programming, program documentation, computer hardware technology, word processing, computer systems and CADD. Lab work covers writing, documenting and running building industry computer programs using BASIC language and commercial software packages that have direct applications for the building industry. **3 credits**

BLDG 351 Drafting and Design 3 — Fundamentals of Architectural Design — Studies specific aspects of design principles — simple design problems resolution, client statement of needs, basic design vocabulary and delegation of directions from a superior to a junior. Topics include site determinants: program planning; living, dining, sleeping, dressing, kitchen and utility facilities; planning multiple dwellings; student residences and other residential topics. Prerequisite: BLDG 251. **6 credits**

BLDG 352 Construction 3 — A continuation of BLDG 252. Principles of fire-resistive construction. Fundamentals of building science relative to weathering, deterioration and heat transfer. Industrial post and beam systems. Masonry, steel and concrete structures. Drawing applications. Prerequisite: BLDG 252 or permission of the instructor. **3 credits**

BLDG 354 Project Management — Contract Management — Examines controlling the project management process, types of contracts and the project manager's role. Tender documents and bid processes, bonds and insurance. Planning and scheduling the master plan and dimensions of the project. The job plan and off-site management. Prerequisite: some knowledge of building construction. **3 credits**

BLDG 355 Construction Specifications — Language as a means of communication; style in specifications. Organization and presentation of information in construction contract documentation. Filing and retrieval of information using masterformat. Preparation and reproduction procedures for production of project manuals. Study of construction materials and methods. Specification office organization. Prerequisite: good knowledge of building construction. **4.5 credits**

BLDG 356 Construction Estimating 2 — A continuation of BLDG 256. More detailed study and application of measurement and pricing of work for specific trades, with emphasis on wood framing, concrete work and masonry construction. Detailed examination of CIQS methods for measurement of construction work. Tendering procedures and budget estimating. Preparation for CIQS exam 203. Prerequisite: BLDG 256 or permission of instructor. **3 credits**

BLDG 358 Computer Applications in Building Technology 2 — An introduction to computers in construction, capabilities and limitations of digital computers for architectural and construction applications. Introduction to and discussion of suitable and available hardware and software program documentation, computer systems, word processing and computer-aided design and drafting (CADD). Sufficient instruction in BASIC programming to write simple programs. Prerequisite: BLDG 258. **3 credits**

BLDG 452 Construction 4 — A continuation of BLDG 352. Curtain walls, panel walls and partitions. Exterior and interior finishes, drawing applications. Preliminary freehand sketching of details. Prerequisite: BLDG 352 or permission of instructor. **4.5 credits**

BLDG 454 Project Management — Construction Management — Students prepare for the administrative and operations management demands of a construction company. Topics include forms of ownership, head office practices and contracts, cash flow, subtrade co-ordination, field supervision, cost control, equipment management, purchasing controls, warehousing and labor relations. Prerequisite: some knowledge of building construction. **3 credits**

BLDG 456 Construction Estimating 3 — A continuation of BLDG 356. Measurement and unit pricing of specific construction details. Preparation of estimate summaries and bids or proposals to owners or clients. Construction cost accounting. Documentation used in estimating and cost accounting processes. Bid strategies, bid depositories, bid procedures in general. Preparation for CIQS exam 303. Prerequisite: BLDG 356 or permission of instructor. **3 credits**

BLDG 459 Building Acoustics — Theory and principles of sound, including properties, propagation, sources and measurement techniques. Noise criteria and control of noise in buildings. Selection of materials having appropriate acoustical and aesthetic qualities for buildings. Calculations encountered in acoustical considerations. **3 credits**

CIVL 161 Statics — Examines historical development and relationship to structural design; vectors; force systems; graphical representation; results and components; moments and couples; conditions of equilibrium; force polygon; funicular polygon; coplanar sytems; dimensional systems; frames and trusses; stress diagrams and Bowe's notation; chains and cables; vertical shear force and bending moment diagrams, related problems and experiments with emphasis on bridge and building walls. Prerequisite: MATH 101. **4 credits**

CIVL 263 Strength of Materials — Examines simple stresses; stress, strain, elasticity; compound bars and columns; temperature stress; elastic limit; limit of proportionality; yield, ultimates; factor of safety; load factor, ductility; resilience, fatigue, shock; properties of sections, bending moments, shear forces, theory of flexure, slope and deflection of beams, restrained and continuous beams; strut theories, eccentric loading, lateral loading; compound stress and strain, ellipse of stress; Poilson's ratio; principal stresses and strains; Mohr's circle. Prerequisite: CIVL 161 or CIVL 165. **6 credits**

COMM 160 Introduction to Business and Technical Communication — Introduces students to the basics of communicating in business and industry. It offers practical techniques for planning communication according to the writer's purpose and the reader's needs. Organizing, selecting and presenting information and using effective business and technical style are covered. Students apply these skills to communications common to most office jobs — writing simple memos, instructions, procedures and summaries. Presenting information orally is also covered. Practical "case" assignments are used. Students are encouraged to work on communication problems from their jobs, if appropriate. **3 credits**

COMM 180 Technical Correspondence — Covers correspondence inside and outside the engineering office. The emphasis is on short, informal communications. Topics include memo and letter format, technical writing style, process descriptions, troubleshooting memos, procedures, routine requests and replies. It also covers trip, progress and incident reports. **3 credits**

COMM 183 Technical Reports — Gives writers from technical or industrial backgrounds practice in problem-solving reports. The emphasis is on the communication skills needed to solve engineering problems and to describe methods and products. Specific applications include comparison and feasibility reports, technical proposals, journal reviews, executive summaries and formal report format. Persuasive presentations, meetings, and effective use of graphics are also covered. **3 credits**

ELEC 150 Illumination — An introductory course in illumination which examines electrical systems pertaining to buildings. Deals with the language of lighting, design methods, characteristics and types of light sources and the economics of lighting. As the lighting system is generally designed by the electrical system designer, it is necessary to have a working knowledge of lighting systems when studying the electrical system. Prerequisite: MATH 101 and 102. **3 credits**

ELEC 250 Electrical Systems — Students learn how to plan the electrical system for a specific building, with the electrical designer. How to read and work with common electrical drawings and specifications, understand single and three-phase systems, and power factor correction for minimumal operations costs; recognize and avoid building designs that create costly electrical design problems. Prerequisite: ELEC 150. **3 credits**

MATH 101 Technical Mathematics 1 — Trigonometry — A course for students in Engineering Technologies on the application and theory of trigonometric functions including right angle trigonometry, vector and triangle problems, trigonometric identities and graphing, polar co-ordinates, transformations and radian measure. Prerequisite: C + or better in Algebra 12 or MATH 001. **3 credits**

MATH 102 Technical Mathematics 2 — Logarithms and Analytic Geometry — A study of the theory and applications of common and natural logarithms, and an introduction to analytic geometry. Topics emphasized are the plotting, interpretation and uses of logarithmic and semilogarithmic graphs and the geometrical and practical properties of conic sections. A brief consideration of quadratic surfaces is included. Prerequisite: C+ or better in Algebra 12 or MATH 001. **3 credits**

MATH 203 Technical Mathematics 3 — Calculus — An introductory course in calculus and its technical applications involving the differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions. The course emphasizes the application of calculus to engineering technology problems. Prerequisite: MATH 101 and 102. **6 credits**

MECH 223 Heating and Ventilating 1 — Introduces heat energy sources; building heat loss estimates; the properties of air using the psychrometric chart; ventilation air requirements; sizing and layout of piping systems for hot water space heating, centrifugal circulating pump performance characteristics. Prerequisite: MECH 222, MECH 221 preferred in addition to MECH 222. **3 credits**

MECH 313 Heating and Ventilating 2 — Examines hot water space heating equipment including boilers, heating units, expansion tanks, operating valves and trim; air handling equipment including filters, fans, heating coils, central heating and ventilating units; warm air heating systems; ducted air distribution; space air distribution entailing grille and diffuser selection procedures. Prerequisite: MECH 223. **3 credits**

MSYS 101 Plumbing — Topics include codes; basic engineering principles and graphic presentations related to plumbing systems design; load calculations; piping methods, sizing of system components for storm and sanitary drainage and water distribution. Some drafting skill will be required. Prerequisite: MECH 140 or BLDG 151. **3 credits**

MSYS 420 Air Conditioning Systems — Properties of air, extending use of psychrometric chart of air conditioning comfort criteria and examination of air conditioning processes; refrigeration for air conditioning, encompassing evaporator, compressor, condensor and expansion valve performance characteristics and selection; air conditioning systems, encompassing representative unitary, constant volume and variable volume systems. Prerequisite: MECH 313. **9 credits**

OPMT 187 Project Planning and Scheduling — For those who require basic information about the critical path method (CPM) and its application to project management. The course introduces the fundamentals of CPM as used in planning, scheduling, resource allocation and project management. The course includes an introduction to planning and scheduling techniques; Gantt charts, arrow diagrams; precedence diagrams; PERT; time-cost relationships; resource allocation; bid determination; project management and the role of the computer. **3 credits**

PHYS 131/132 Physics 1 — Topics include kinematics, statics, linear and rotational dynamics, properties of matter, heat and thermodynamics. Problem solving is emphasized and consistent effort is directed towards relating physics to its technological manifestations. Prerequisite: Algebra 12, (Physics 11 is desirable). **6 credits**

SURV 108 Engineering Survey — Covers the basic use of levels — open plate and optic transits, tape measurement methods of horizontal distance and direction determination. Computations — including slope reduction, open and closed traverse calculations, benchmark levelling, steel and tape correction techniques, electronic distance measurements, stadia work, tachometers, route surveys, earth work, site work, construction control. Upon completion, students can use a variety of survey instruments and office procedures, and make plans, profiles and maps to determine precise sizes, shapes and locations. **7 credits**

Chemical Sciences Technology

Intermediate Certificate Programs

Nondestructive Testing
Metallurgy
Paint Technician

The programs leading to the award of the Intermediate Certificate of Technology in the above areas of Chemical Sciences Technology, will consist of chemical sciences courses plus mandatory core courses and other technology courses to the required total credits. All programs must be submitted to the program consultant for approval by the Technology Department.

Faculty and Staff

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Intermediate Certificate of Technology in Nondestructive Testing

Mandatory Courses		Credit
CHSC 156	Metallurgy 1	6.0
CIVL 161	Statics	4.0
CIVL 263	Strength of Materials	6.0
COMM 160	Introduction to Business and Technical Communications	3.0
MATH 101	Technical Mathematics 1 — Trigonometry	3.0
MECH 304	Manufacturing Processes 3	4.0

PLUS at least FOUR NDT courses selected from list below:

		Credit
CHSC 169	NDT Radiography — Level 1	3.0
CHSC 170	NDT Ultrasonics — Level 1	3.0
CHSC 171	NDT Eddy Current	3.0
CHSC 172	NDT Magnetic Particle and Liquid Penetrant	3.0
CHSC 173	NDT Strain Gauge and Acoustic Emission	3.0

Optional, Elective and Advanced Courses		Credit
CHSC 269	NDT Radiography — Level 2	3.0
CHSC 270	NDT Ultrasonics — Level 2	3.0
CHSC 304	Physical Metallurgy	6.0
CHSC 404*	Physical Metallurgy	9.0
COMM 180	Technical Correspondence	3.0
COMM 183	Technical Reports	3.0
MATH 106	Probability and Statistics	6.0
MECH 140	Drafting Fundamentals	3.0
OPMT 193	Quality Control Methods 1	3.0
OPMT 194	Quality Control Methods 2	3.0

* This course is available through part-time day study only.

Intermediate Certificate of Technology in Paint Technology

Mandatory Courses		Credit
CHEM 101*	Applied Chemical Principles	6.0
CHEM 201*	Applied Chemical Principles	9.0
CHEM 317	Gas and Liquid Chromatography	3.0
CHSC 163	Paint Technology	4.5
CHSC 164	Paint Technology — Latex Paints	1.5
CHSC 165	Paint Technology — Modern Coating Resins	1.5
COMM 180	Technical Correspondence	3.0
COMM 183	Technical Reports	3.0
MATH 101	Technical Mathematics 1 — Trigonometry	3.0
MATH 102	Technical Mathematics 2 — Logarithms and Analytic Geometry	3.0

Elective Courses		Credit
CHEM 204*	Chemical Laboratory Techniques	4.5
CHEM 309*	Organic Chemistry	6.0
CHEM 314*	Analytical Chemistry	6.0
CHEM 409*	Organic Chemistry	9.0
CHEM 414*	Analytical Chemistry	9.0
CHSC 246*	Industrial Chemical Processes	5.0
MATH 106	Probability and Statistics	6.0

* These courses are available through part-time day study only.

Intermediate Certificate of Technology in Metallurgy

Mandatory Courses		Credit
CHSC 156	Metallurgy	6.0
CHSC 304	Physical Metallurgy	6.0
COMM 180	Technical Correspondence OR	
COMM 183	Technical Reports	3.0
MATH 101	Technical Mathematics 1 — Trigonometry	3.0
MATH 102	Technical Mathematics 2 — Logarithms and Analytic Geometry	3.0
PHYS 131/132	Physics 1	6.0

Optional/Elective Courses		Credit
CHSC 260	Mineral Analysis	12.0
CHSC 314	Mineral Processing	3.5
CHSC 404*	Physical Metallurgy	9.0
CHSC 414	Mineral Processing	3.5
CIVL 161	Statics	4.0
CIVL 263	Strength of Materials	6.0
COMM 160	Introduction to Business and Technical Communication	3.0
MECH 140	Drafting Fundamentals	3.0

Course Descriptions

CHEM 101 Applied Chemical Principles — Provides the necessary background for chemical calculations and analysis. Included are stoichiometry, atomic structure, bonding, solution preparation and acid base and oxidation-reduction reactions and titrations. Study of chemical equilibrium leads to a good working knowledge of pH, buffer solutions, solubility product, selective precipitation and industrial processes involving equilibria. Lab work consists of qualitative and quantitative analysis using good lab technique. **6 credits**

CHEM 201 Applied Chemical Principles — A continuation of CHEM 101 which includes theory of gravimetric and volumetric analysis, and qualitative analysis of cations and anions. Electrochemistry includes cells, electroplating and corrosion. Study of physical chemistry provides theory of solids, liquids and gases leading to fractional distillation and colligative properties. The Periodic Table is used to correlate many properties of elements and compounds. Names and properties of some organic compounds are taught and lab work covers qualitative and quantitative analysis and physio-chemical separations. Throughout CHEM 101/201 attention is given to industrial and every-day applications. **9 credits**

CHEM 204 Chemical Laboratory Techniques — Teaches basic techniques in sampling, weighing, moisture determination, ashing, extractions, filtration gravimetric methods and volumetric methods. Instrumental analysis and separation methods will be described, demonstrated and, whenever possible, practiced. **4.5 credits**

CHEM 309/409 Organic Chemistry — A general course covering properties, preparations and reactions of all major classes of organic compounds — aliphatic and aromatic hydrocarbons, halides, alcohols, ethers, carboxylic acids and derivatives of carboxylic acids, aldehydes, ketones, amines, amino acids, carbohydrates, heterocyclics, dyes, and polymers. Lab work emphasizes organic techniques of qualitative chemical analysis and instrumental methods, infra-red, ultra-violet and gas chromatography. **6 and 9 credits**

CHEM 314 Analytical Chemistry — Conventional inorganic methods of analysis for determining the common metals in ores and alloys. Basic methods of fire assaying for gold and silver are also covered. **6 credits**

CHEM 317 Gas and Liquid Chromatography — Introduces students to the uses of gas chromatography (GC) and high performance liquid chromatography (HPLC) in solving organic analysis problems. Applications of GC and HPLC are found in energy, chemical, food and forest industries as well as laboratories concerned with environmental and clinical work. Topics include separation theory, instrument operation and trouble shooting, quantitative and qualitative analysis, columns, detector application and sample preparation. **3 credits**

CHEM 414 Analytical Chemistry — Advanced analytical techniques using various instruments such as the polarograph, spectrophotometer, coloriometer, gas chromatograph, spectrograph, X-ray scintillometer and X-ray diffractometer. **9 credits**

CHSC 156 Metallurgy — Includes casting and forming of metals, heat treatment, physical testing, nondestructive testing and metallurgy of welding. Laboratory work involving metallography, heat treatment and corrosion constitutes approximately half of the course. **6 credits**

CHSC 163 Paint Technology — An introductory course for those actively engaged in paint and coatings manufacture (both technical and production sides) — raw material suppliers, architects, professional decorators and paint salesmen. Students study the raw materials used in the coating industry, the methods of coatings manufacture, application methods and formulating techniques. **4.5 credits**

CHSC 164 Paint Technology — Latex Paints — To complement CHSC 163 Paint Technology. Students study latex paints including aspects of polymer emulsion manufacture and the formulation and manufacture of latex paints. Prerequisite: CHSC 163. **1.5 credits**

CHSC 165 Paint Technology — Modern Coating Resins — To complement CHSC 163 Paint Technology, students study the production and end use of contemporary surface coating resins. Prerequisite: CHSC 163. **1.5 credits**

CHSC 169 NDT — Radiography — Level 1 — Covers the general principles of radiography — nature of penetrating radiation, the interaction between penetrating radiation and matter, radiation sources, detection and measurement of radiation, radiation safety and darkroom procedures. Students learn the proper selection of a radiation source for a given application, film type, screens, etc., and should be able to perform radiographic examinations according to prescribed techniques. The course meets the requirements for classroom training as stipulated in CGSB Standard 48-GP-4M, condition (b). **3 credits**

CHSC 170 NDT — Ultrasonics — Level 1 — Combines theory with practice, using a variety of ultrasonic testing equipment and test samples to cover generation of ultrasound. Instrumentation, frequency, velocity, wavelength, attenuation, calibration, reference standards, longitudinal, transverse and surface waves, reflection, Snell's Law, sensitivity and resolution. Meets the requirements of CGSB Standard 48-GP-7M, condition (b) for classroom training. **3 credits**

CHSC 171 NDT — Eddy Current — Covers basic concepts of induced current, characteristics of induced eddy current, factors affecting conductivity, permeability and hysteresis, coil characteristics, impedance method-balanced bridge, signal to noise ratio, readout mechanisms, phase analysis, modulation analysis, methods and applications of eddy current testing, relationship of indications to discontinuities, advantages and limitations of the method, probe arrangement, design and manufacture. Meets classroom training requirements as stipulated in CGSB Standard 48-CP-13M for levels 1 and 2. **3 credits**

CHSC 172 NDT — Magnetic Particle and Liquid Penetrant — Covers theory of magnetism and magnetic properties of materials; comparison with other NDT methods; current characteristics; direct and indirect induction; residual and continuous methods; black light — principles and requirements; dry vs. wet method; indicating the mediums; material controls and calibration; discontinuities — their causes and detectability; demagnetization; inspection, interpretation and evaluation of indications. Meets CGSB Standard 48-GP-8M and 9M condition (b) level 1 and 2. **3 credits**

CHSC 173 NDT — Strain Gauge and Acoustic Emission — Includes reviews of the theory and applications of electrical resistance strain gauges and acoustic emission techniques. **3 credits**

CHSC 246 Industrial Chemical Processes — A description of the chemical processes involved in major industrial chemical plants in B.C. Emphasis is placed on chemical operations associated with the pulp and paper industry including chemical pulping, water treatment. Lab sessions involve the testing and control procedures utilized in industrial applications. **5 credits**

CHSC 254 Pollution Control Equipment and Techniques — Familiarizes the student with engineering methods currently used for the control and/or treatment of major air and water pollutants. Methods include electrostatic precipitators, scrubbers, cyclone collectors, fabric filters, control of motor vehicle emissions, stack sampling, cooling towers, industrial and municipal wastewater treatment processes, oil spill recovery techniques, solid waste disposal methods and treatment of radioactive wastes. **3 credits**

CHSC 260 Mineral Analysis — Deals specifically with chemical methods of ore analysis. Presents basics in analytical chemistry ore assaying and an opportunity to develop laboratory skills. The course covers the general methods of ore analysis, principles and practice of fire assaying for gold and silver and gravimetric and volumetric analysis. **12 credits**

CHSC 269 NDT — Radiography — Level 2 — Meets the requirements of CGSB Standard 48-GP-4M, condition (b) for classroom training. The course includes a review of radiation theory, physical principles, radiation sources, detection and safety. Topics include the radiographic process, miscellaneous applications,

test result interpretation, material considerations, codes standards, specifications and procedures. Prerequisite: CHSC 169 or be a certified level 1 radiographer. **3 credits**

CHSC 270 NDT — Ultrasonics — Level 2 — Meets the requirements of CGSB Standard 48-GP-7M, condition (b) for classroom training. The course includes a review of the theory of ultrasonic testing and its practical applications. Emphasis will be on the operation of special equipment, applications requiring specific testing procedures and the consideration of variables affecting test results. Prerequisite: CHSC 170 or be a certified level 1 operator. **3 credits**

CHSC 304 Physical Metallurgy — Develops the subject areas covered in CHSC 156 Metallurgy — iron and steel-making processes, solidification of metals and alloys, operations, casting methods and defects, foundry technology, metal forming, review of phase diagrams for binary alloy systems, isothermal transformations in steels, heat-treating techniques, non-ferrous metals and alloys, welding metallurgy and principles of nondestructive testing. Lectures and field trips to industrial plants are supplemented by lab sessions which emphasize physical testing of materials, metallography, service failure investigation and nondestructive testing. Prerequisite: CHSC 156. **6 credits**

CHSC 314 Mineral Processing — Deals specifically with mineral processing as applied to the B.C. mining industry. Covers the essential operations of applied mineral processing ie: crushing, grinding, screening, gravity separation, cyclone classification; flotation, sedimentation, thickening, filtration. Emphasis on numerical solution of operating and design type problems. Course includes laboratory work. **3.5 credits**

CHSC 404 Physical Metallurgy — A continuation of CHSC 304. Prerequisite: CHSC 304. **9 credits**

CHSC 414 Mineral Processing — A continuation of CHSC 314. Prerequisite: CHSC 314. **5 credits**

CIVL 161 Statics — Examines historical development and relationship to structural design; vectors; force systems; graphical representation; results and components; moments and couples; conditions of equilibrium; force polygon; funicular polygon; coplanar sytems; dimensional systems; frames and trusses; stress diagrams and Bowe's notation; chains and cables; vertical shear force and bending moment diagrams, related problems and experiments with emphasis on bridge and building walls. Prerequisite: MATH 101. **4 credits**

CIVL 263 Strength of Materials — Examines simple stresses; stress, strain, elasticity; compound bars and columns; temperature stress; elastic limit; limit of proportionality; yield, ultimates; factor of safety; load factor, ductility; resilience, fatigue, shock; properties of sections, bending moments, shear forces, theory of flexure, slope and deflection of beams, restrained and continuous beams; strut theories, eccentric loading, lateral loading; compound stress and strain, ellipse of stress; Poilson's ratio; principal stresses and strains; Mohr's circle. Prerequisite: CIVL 161 or CIVL 165. **6 credits**

COMM 160 Introduction to Business and Technical Communication — Introduces students to the basics of communicating in business and industry. It offers practical techniques for planning communication according to the writer's purpose and the reader's needs. Organizing, selecting and presenting information and using effective business and technical style are covered. Students apply these skills to communications common to most office jobs — writing simple memos, instructions, procedures and summaries. Presenting information orally is also covered. Practical "case" assignments are used. Students are encouraged to work on communication problems from their jobs, if appropriate. **3 credits**

COMM 180 Technical Correspondence — Covers correspondence inside and outside the engineering office. The emphasis is on short, informal communications. Topics include memo and letter format, technical writing style, process descriptions, troubleshooting memos, procedures, routine requests and replies. It also covers trip, progress and incident reports. **3 credits**

COMM 183 Technical Reports — Gives writers from technical or industrial backgrounds practice in problem-solving reports. The emphasis is on the communication skills needed to solve engineering problems and to describe methods and products. Specific applications include comparison and feasibility reports, technical proposals, journal reviews, executive summaries and formal report format. Persuasive presentations, meetings, and effective use of graphics are also covered. **3 credits**

MATH 101 Technical Mathematics 1 — Trigonometry — A course for students in Engineering Technologies on the application and theory of trigonometric functions including right angle trigonometry, vector and triangle problems, trigonometric identities and graphing, polar co-ordinates, transformations and radian measure. Prerequisite: C+ or better in Algebra 12 or MATH 001. **3 credits**

MATH 102 Technical Mathematics 2 — Logarithms and Analytic Geometry — A study of the theory and applications of common and natural logarithms, and an introduction to analytic geometry. Topics emphasized are the plotting, interpretation and uses of logarithmic and semilogarithmic graphs and the geometrical and practical properties of conic sections. A brief consideration of quadratic surfaces is included. Prerequisite: C+ or better in Algebra 12 or MATH 001. **3 credits**

MATH 106 Probability and Statistics 1 — An introduction to statistical methods and their application to technological problems including the organization and graphical representation of data; frequency distributions; measures of central tendency — the arithmetical mean, the median, the mode; quartiles, deciles, percentiles; measures of variation — the mean deviation, the standard deviation, quartile deviation; introduction to probability; the rules of addition and multiplication; random variables; mathematical expectation; theoretical distributions — the binomial distribution, the Poisson distribution, the normal distribution curve and use of tables to obtain normal curve areas; populations and samples — sampling techniques, sampling distributions, problems of estimation, small samples and Student's t-distribution; confidence intervals; tests of hypotheses; types of error; operating characteristic curves; linear regression; method of least squares; correlation. Prerequisite: MATH 001 or recent Algebra 12. **6 credits**

MECH 140 Drafting Fundamentals — An introductory course for persons with little or no experience in graphics. **Students are required to purchase drafting equipment and supplies on the first night of class.** Students learn to produce and read simple drawings. Topics include scales, geometric constructions, basic orthographics, detail interpretation, line visibility, dimensioning, auxiliary views, true shape, inclined and skewed surfaces, sections, pictorials, working drawings and freehand sketches. **3 credits**

MECH 304 Manufacturing Processes 3 — Offers a detailed study of processes such as casting, hot and cold forming, extruding, forging, stamping, pressing and material joining, including machines and materials. Quantities/costs will be investigated. Recently introduced manufacturing processes will be discussed. **4 credits**

OPMT 193 Quality Control Methods 1 — Introduces the basic principles of modern quality control. Students develop insights into the problems and solutions of achieving product quality in industry. The course examines development, planning and organizing for quality; engineering a quality product; reliability and maintainability assurance; material control systems, inspection and non-destructive testing; metrology and quality costs. **3 credits**

OPMT 194 Quality Control Methods 2 — A continuation of Quality Control Methods 1, this course enables the student to handle advanced techniques for quality control and prepares them to write the American Society for Quality Control examinations for Quality Technician and/or Quality Engineer. Topics include management, engineering technology, statistical technology, motivational methods, and application of quality control. Prerequisite: OPMT 193. **3 credits**

PHYS 131/132 Physics 1 — Topics include kinematics, statics, linear and rotational dynamics, properties of matter, heat and thermodynamics. Problem solving is emphasized and consistent effort is directed towards relating physics to its technological manifestations. Prerequisite: Algebra 12, (Physics 11 is desirable). **6 credits**

Civil and Structural Technology

Civil and Structural part-time studies are designed to accommodate a variety of career oriented goals for part-time learners. Certificate of Technology is designed to satisfy the academic requirements for a certified technician with A.S.T.T.B.C. A student can elect to complete a diploma of Technology on a part-time basis. The flexibility of the program will allow the student to complete first year day school equivalency and directly enter into second year day school. In addition Civil and Structural offers intermediate certificates in Civil and Structural, as well as post diploma courses. All programs consist of technology courses and mandatory core subjects. Experienced students can apply for experiential learning credit for some courses. All programs must be submitted to the Program Consultant for approval by the Civil and Structural Department.

Faculty and Staff

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Intermediate Certificate of Technology in Structural Technology

		Credit ➧
CIVL 161	Statics	4.0
CIVL 167	Structural Design in Steel	3.0
CIVL 263	Strength of Materials	6.0
CIVL 264	Structural Detailing	3.0
CIVL 271	Structural Design in Timber	3.0
CIVL 382	Computer Applications for Civil Technology	4.5
COMM 160	Introduction to Business and Technical Communications	3.0
MATH 101	Technical Mathematics 1 — Trigonometry	3.0
MATH 102	Technical Mathematics 2 — Logarithms and Analytic Geometry	3.0
MECH 140	Drafting Fundamentals	3.0
MECH 214	Drafting — Structural	3.0
	Approved elective(s)	4.5

Intermediate Certificate of Technology in Civil Technology

		Credit ➧
CIVL 110	Asphalt Technology	3.0
CIVL 160	Hydrology	3.0
CIVL 161	Statics	4.0
CIVL 162	Concrete Technology	3.0
CIVL 169	Soil Mechanics 1	3.0
CIVL 175	Roads and Streets	3.0
CIVL 272	Hydraulics 1	4.5
COMM 160	Introduction to Business and Technical Communications	3.0
MATH 101	Technical Mathematics 1 — Trigonometry	3.0
MATH 102	Technical Mathematics 2 — Logarithms and Analytic Geometry	3.0
MECH 140	Drafting Fundamentals	3.0
MECH 216	Drafting — Civil/Survey	3.0
SURV 108	Engineering Survey	7.0

Certificate of Technology in Civil and Structural Technology

		Credit ➧
CIVL 110	Asphalt Technology	3.0
CIVL 160	Hydrology	3.0
CIVL 161	Statics	4.0
CIVL 162	Concrete Technology	3.0
CIVL 167	Structural Design in Steel	3.0
CIVL 169	Soil Mechanics 1	3.0
CIVL 173	Estimates and Contracts for Heavy Construction 1	2.5
CIVL 175	Roads and Streets	3.0
CIVL 263	Strength of Materials	6.0
CIVL 271	Structural Design in Timber OR	
CIVL 272	Hydraulics 1	4.5
CIVL 274	Estimates and Contracts for Heavy Construction 2	2.5
CIVL 382	Computer Applications in Civil Technology	4.5
COMM 160	Introduction to Business and Technical Communications	3.0
COMM 183	Technical Reports	3.0
MATH 101	Technical Mathematics 1 — Trigonometry	3.0
MATH 102	Technical Mathematics 2 — Logarithms and Analytic Geometry	3.0
MECH 140	Drafting Fundamentals	3.0
MECH 214	Drafting — Civil/Survey OR	
MECH 216	Drafting — Structural	3.0
PHYS 131/132	Physics 1	6.0
SURV 108	Engineering Survey	7.0
	Elective	2.0

Civil and Structural Part-time Studies — 1st Year Equivalency

		Credit ➧
CIVL 110	Asphalt Technology	3.0
CIVL 160	Hydrology	3.0
CIVL 161	Statics	4.0
CIVL 162	Concrete Technology	3.0
CIVL 167	Structural Design in Steel	3.0
CIVL 175	Roads and Streets	3.0
CIVL 263	Strength of Materials	6.0
CIVL 271	Structural Design in Timber OR	
CIVL 272	Hydraulics 1	4.5
CIVL 382	Computer Applications in Civil Technology	4.5
COMM 160	Introduction to Business and Technical Communications	3.0
COMM 180	Technical Correspondence	3.0
COMM 183	Technical Reports	3.0
MATH 101	Technical Mathematics 1 — Trigonometry	3.0
MATH 102	Technical Mathematics 2 — Logarithms and Analytic Geometry	3.0
MATH 203	Technical Mathematics 3 — Calculus	6.0
MECH 140	Drafting Fundamentals	3.0
MECH 214	Drafting — Structural OR	
MECH 216	Drafting — Civil/Survey	3.0
PHYS 131/132	Physics 1	6.0
PHYS 133/134	Physics 2	6.0
SURV 108	Engineering Survey	7.0

Diploma of Technology

Prerequisite: Year 1 equivalency

		Credit ➧
CIVL 166	Structural Analysis	3.0
CIVL 167	Structural Design in Steels	3.0
CIVL 169	Soil Mechanics 1	3.0

CIVL 173	Estimates and Contracts for Heavy Construction 1	2.5
CIVL 174	Estimates and Contracts for Heavy Construction 2	2.5
CIVL 180	Introduction to Urban Traffic Engineering	3.0
CIVL 268	Structural Design in Reinforced Concrete	4.5
CIVL 270	Soil Mechanics 2	3.0
CIVL 271	Structural Design in Timber OR	
CIVL 276	Highway Design	4.5
CIVL 277	Municipal Services	4.5
CIVL 279	Subdivision Planning and Street Design	4.5
CIVL 431	Soil Mechanics 3	3.0
MATH 204	Technical Mathematics 4 — Calculus	6.0
OPMT 187	Project Planning and Scheduling	3.0
PHOT 102	Photo Interpretation and Remote Sensing	7.0
SURV 313	Field Survey	7.0
SURV 320	Land Use Control	3.0
	Approved Electives	8.0

Advanced, Optional and Elective Courses

		Credit
CHEM 101*	Applied Chemical Principles	6.0
CIVL 166	Structural Analysis	3.0
CIVL 264	Steel Detailing	3.0
CIVL 268	Structural Design in Reinforced Concrete	4.5
CIVL 270	Soil Mechanics 2	3.0
CIVL 276	Highway Design and Construction	4.5
CIVL 277	Municipal Services	4.5
CIVL 279	Subdivision Planning and Street Design	4.5
CIVL 382	Computer Applications in Civil Technology	4.5
CIVL 431	Soil Mechanics 3	3.0
CIVL 443	Hydraulics 2	3.0
CIVL 501	Reinforced Masonry Design	3.0
CIVL 502	Concrete Technology (Advanced)	3.0
CIVL 503	Transportation Planning	3.0
LAND 501	Land Use Technology	3.0
MATH 204	Technical Mathematics 4 — Calculus	6.0
MINE 101	Geology	3.0
MINE 201	Geology 1	4.5
OPMT 187	Project Planning and Scheduling	3.0
PHOT 102	Photo Interpretation and Remote Sensing	7.0
SURV 313	Field Survey	7.0
SURV 320	Land Use Control	3.0

* This course is available as part-time day study only.

Course Descriptions

CHEM 101 Applied Chemical Principles 1 — Provides the necessary background for chemical calculations and analysis. Included are stoichiometry, atomic structure, bonding, solution preparation and acid-base and oxidation-reduction reactions and titrations. Simple chemical equilibrium leads to a good working knowledge of pH, buffer solutions, solubility product, selective precipitation and industrial processes involving equilibria. Lab work consists of simple qualitative and quantitative analysis and good lab technique is taught. **6 credits**

CIVL 102 Public Works Inspection — Has been specially designed by the public works inspection committee, a joint committee of the industry with BCIT, to provide training for those in public works inspection. The course is a highly practical one with instructors drawn from public works inspectors currently active in this area. It includes field sessions to complement classroom activities. Enrolment is limited, so if you are interested you are advised to act now, or to contact our program consultant for further information. **4 credits**

CIVL 110 Asphalt Technology — After successfully completing this introductory course, a student will have the knowledge to select suitable materials for asphaltic concrete design using the Marshall method. Topics include plant and paving quality control, asphaltic cement testing, calculation for asphaltic design. **3 credits**

CIVL 160 Hydrology — Presents the basic concepts and techniques of small watershed analysis including the design, supervision and construction of drainage facilities. Topics include concepts of hydrologic analysis, hydrologic cycle, weather, precipitation, snowmelt, runoff, stream flow and stream gauging, evaporation and transpiration, infiltration; storage; flood estimation, frequency analysis, ground water movement and wells; sediment transport and deposition and an introduction to open channel flow and culvert hydraulics. **3 credits**

CIVL 161 Statics — Examines historical development and relationship to structural design; vectors; force systems; graphical representation; results and components; moments and couples; conditions of equilibrium; force polygon; funicular polygon; coplanar sytems; dimensional systems; frames and trusses; stress diagrams and Bowe's notation; chains and cables; vertical shear force and bending moment diagrams, related problems and experiments with emphasis on bridge and building walls. Prerequisite: MATH 101. **4 credits**

CIVL 162 Concrete Technology — After successfully completing this course, a student will have the knowledge required to select suitable materials for making quality concrete; design a concrete mix for strength, workability and economy; sample and conduct quality control tests on concrete and aggregates and understand the theory and practices used in concrete manufacturing and construction. Topics include cements, water/cement ratio, admixtures, concrete properties manufacturing, transportation, placing, finishing, curing, CSA code A23. 1 and 2 Inspection Techniques. **3 credits**

CIVL 166 Structural Analysis — After a brief review of relevant portions of prerequisite courses, including statics and determination of internal stress and moments in statically determinate beams, the analysis of statically indeterminate structures will be considered. Two methods will be given the most attention: 1. Moment distribution including sidesway, 2. Computer (stiffness matrix) method, using the P FRAME program commonly used by consultants. Students will use an IBM PC or PC compatible computer. The remainder of the course will cover some of the following topics as time permits: deflection by area-moment theorems, effects of temperature, moving loads and influence lines, arch and cable structures. Prerequisite: CIVL 263. **3 credits**

CIVL 167 Structural Design in Steel — Provides a sound knowledge of the principles of steel design, and enables the graduate to perform elementary steel design. Topics covered include design of flexural members, columns and members subject to combined loadings; simple connections, moment connections; open web joists; base plates; CSA codes and standards; new developments. Prerequisite: CIVL 263. **3 credits**

CIVL 169 Soil Mechanics 1 — Introductory course in which the basic principles of soil mechanics and soil testing are taught. Topics are mass/volume relationships, soil testing, soil classification, compaction, geology, subsurface investigation, permeability and pressure diagrams, effective stress. **3 credits**

CIVL 173 Estimates and Contracts for Heavy Construction 1 — Presents the basic concepts and techniques for the preparation of estimates and tenders for the construction of civil engineering projects by contract. The course consists of lectures and the preparation of estimates for basic operations and components of

a typical job. Topics include an introduction to the heavy construction industry, contracts and specifications, preparation of estimates and estimates resources; estimates for various types of projects; overhead costs; estimate adjustments; cost accounting and job cost control. **2.5 credits**

CIVL 175 Roads and Streets — Introduces the fundamentals of road and street design to those who wish to become civil engineering technicians or technologists. On successful completion, the student will know the basic concepts of highway engineering including some geometric design theory. The course consists of lectures, problems and mini-projects. Topics include road classification, cross-section elements, horizontal and vertical alignment, pavement structure, quantity take-off, drainage, construction methods and some traffic theory. Prerequisite: COMM 160. **3 credits**

CIVL 180 Introduction to Urban Traffic Engineering — Designed to introduce basic traffic engineering concepts. In general, traffic engineering entails the study of the movement and storage of vehicles on road systems. The topics covered should be of particular interest to persons involved in municipal and highway engineering and/or land development. The course comprises lectures and assignments. Topics include driver and vehicle characteristics, traffic stream characteristics, highway and intersection capacity, intersection and parking layout, data collection techniques and traffic control. **3 credits**

CIVL 263 Strength of Materials — Examines simple stresses; stress, strain, elasticity; compound bars and columns; temperature stress; elastic limit; limit of proportionality; yield, ultimates; factor of safety; load factor, ductility; resilience, fatigue, shock; properties of sections, bending moments, shear forces, theory of flexure, slope and deflection of beams, restrained and continuous beams; strut theories, eccentric loading, lateral loading; compound stress and strain, ellipse of stress; Pollson's ratio; principal stresses and strains; Mohr's circle. Prerequisite: CIVL 161. **6 credits**

CIVL 264 Steel Detailing — On successful completion, students can solve most of the problems associated with designing and drafting of joints and assembly in steel structures. Students are required to design and draw solutions to detailing problems taken from actual structures in steel, including bill of materials. Prerequisite: MECH 214. **3 credits**

CIVL 268 Structural Design in Reinforced Concrete — Provides a good basic knowledge of structural design in reinforced concrete for individuals working in the design field. On successful completion, students can design any simple structure in reinforced concrete using the ultimate strength design method. The course covers bending and shear in reinforced concrete; simple beams and one-way slabs; compressive reinforcement, tee-beams; two-way slabs, columns; concentric loading; footings, retaining walls; introduction to simple prestressed concrete beams. Prerequisite: CIVL 263. **4.5 credits**

CIVL 270 Soil Mechanics 2 — Initially, basic soil mechanics theory is completed through lectures and laboratory work. Later, this theory is applied to geotechnical design problems. Topics covered are consolidation, shear strength, shallow and deep foundations and retaining walls. Prerequisite: CIVL 169. **3 credits**

CIVL 271 Structural Design in Timber — On successful completion of the course, students should have a good basic knowledge of timber design and be capable of simple structural timber design. Topics covered include NBC loadings and assumptions; flexure; shear; deflection; combined flexure and axial loads; beams; columns; trusses; frames; bolted and nailed connections; base plates and new developments. Prerequisite: CIVL 263. **3 credits**

CIVL 272 Hydraulics 1 — Introduces fundamental, practical concepts of hydraulics. Examples from civil and municipal engineering are applicable to plant or process hydraulics. Topics include fluid pressures, continuity and Bernoulli equations, energy/momentum; pipe flow, friction losses and flow formulas; series, parallel and branching pipes; use of nomograph; open channel flow, hydraulic elements, culvert flows, surges, hydraulic jump, energy dissipation, backwater curve; impact jet and function of storage in waterworks systems. Prerequisite: CIVL 160. **3 credits**

CIVL 274 Estimates and Contracts for Heavy Construction 2 — Allows students to gain further experience in the preparation of estimates, and to consider problems which arise in the administration of contracts for heavy construction jobs. The course consists of lectures and the preparation of an estimate for, typically, a highway construction job and possibly a small bridge using SI standards. Topics include labor agreements, equipment ownership/rental and operating costs, materials, subcontracts, use of cost reports in preparing estimates, financial and legal aspects and the administration of contracts. Prerequisite: CIVL 173. **2.5 credits**

CIVL 276 Highway Design and Construction — On successful completion, students will have the working knowledge to design highways in accordance with RTAC standards. In addition, students will be able to do the calculations for geometry, earthworks, drainage and pavement structure. The course consists of lectures and a design project. Topics include detailed considerations of vertical and horizontal alignment, cross-sections, intersection design, traffic control, drainage, earthwork, mass haul diagrams and various highway construction techniques. Students are expected to prepare preliminary design drawings. Prerequisite: CIVL 175, MECH 216 and SURV 108. **4.5 credits**

CIVL 277 Municipal Services — Provides an introduction to various community utilities. Topics include determination of flow and design of water supply distribution systems; sanitary and storm sewers; loads on buried conduits; locations of gas and electrical systems; construction practices; procedures for inspection and quality assurance of construction; testing of systems; organization for operation and maintenance; treatment of water and waste water. Prerequisite: CIVL 160, CIVL 272. **4.5 credits**

CIVL 279 Subdivision Planning and Street Design — Students learn to systematically subdivide a piece of land in accordance with recommended standards using imagination and creativity; design a major street to8recommended standards including geometrics, elevation tables, catch basin locations, crown rotation; design a minor street complete with intersection, curb returns and drainage. This course offers the opportunity to make decisions and to design a civil works project. Prerequisite: MECH 216. **4.5 credits**

CIVL 382 Computer Applications in Civil Technology — Designed as an introduction to Computer Applications in Civil Technology. Course covers introductory BASIC; development of flowcharts and programs for highway alignments, vertical and horizontal, parabolas and Euler spirals; earthworks, use of spreadsheets, word processing, data bases; use of large mainframe files and micros; use existing software to solve engineering problems. **4.5 credits**

CIVL 431 Soil Mechanics 3 — Soil mechanics theory learned in previous courses is used in geotechnical analysis and design. Topics covered include excavations and retaining structures, seepage analysis and flow nets, and slope stability. Prerequisite: CIVL 270. **3 credits**

CIVL 443 Hydraulics 2 — The course has three distinct sections. The first discusses more advanced topics in pressure conduit flow such as pipe strength requirements, water hammer, and pipe system design. The second looks at open channel flow and its applications including channel flow, controls, flow measurement, and culvert design. The final section introduces sewer design. The goal of the course is to have the students capable of solving any practical hydraulic problem normally encountered in civil practice. Prerequisite: CIVL 272. **3 credits**

CIVL 501 — Reinforced Masonry Design — A course on the structural design, specification and inspection of reinforced load bearing masonry. The design of reinforced concrete block and hollow clay brick for axial, bending and shear forces to comply with CSA standards. S304M84. Design of slender walls. Properties of local masonry materials, including grouts and mortar, and construction methods, inspection and testing of masonry, bricklaying workshop. Prerequisite: CIVL 263. **3 credits**

CIVL 502 Concrete Technology (Advanced) — Presents academic theory to technicians and technologists familiar with and working in concrete technology. Students learn to use statistical analysis to calculate strength trends; identify various behavioural characteristics of cement; analyze new trends in admixtures; design concrete mixes; use various nondestructive methods to determine concrete quality. New technology and the Canadian Standards are discussed. Class size limited to 20 students. Prerequisite: CIVL 162. **3 credits**

CIVL 503 Transportation Planning — Reviews in broad terms the field of transportation engineering. Various transportation modes are investigated and related to the overall transportation network. Environmental, economical and political aspects of transportation systems are considered through discussion and films. Students prepare a report suitable for presentation to a planning department on some aspect of transportation. Prerequisite: CIVL 175 and CIVL 180. **3 credits**

COMM 160 Introduction to Business and Technical Communication — Introduces students to the basics of communicating in business and industry. It offers practical techniques for planning communication according to the writer's purpose and the reader's needs. Organizing, selecting and presenting information and using effective business and technical style are covered. Students apply these skills to communications common to most office jobs — writing simple memos, instructions, procedures and summaries. Presenting information orally is also covered. Practical "case" assignments are used. Students are encouraged to work on communication problems from their jobs, if appropriate. **3 credits**

COMM 180 Technical Correspondence — Covers correspondence inside and outside the engineering office. The emphasis is on short, informal communications. Topics include memo and letter format, technical writing style, process descriptions, troubleshooting memos, procedures, routine requests and replies. It also covers trip, progress and incident reports. **3 credits**

COMM 183 Technical Reports — Gives writers from technical or industrial backgrounds practice in problem-solving reports. The emphasis is on the communication skills needed to solve engineering problems and to describe methods and products. Specific applications include comparison and feasibility reports, technical proposals, journal reviews, executive summaries and formal report format. Persuasive presentations, meetings, and effective use of graphics are also covered. **3 credits**

LAND 501 Land Use Technology — Introduction — An introductory course for those involved in land use management of public areas, private development, local and regional planning departments, federal and provincial agencies. This course includes historical, ecological, economic and legal perspectives of land use; the principles and application of use of land based resources with references to land capability, economic constraints, environmental issues and legislation. Also included are inventory, gathering, storing and presentation of information techniques within the framework of planning principles. **3 credits**

MATH 101 Technical Mathematics 1 — Trigonometry — A course for students in Engineering Technologies on the application and theory of trigonometric functions including right angle trigonometry, vector and triangle problems, trigonometric identities and graphing, polar co-ordinates, transformations and radian measure. Prerequisite: C+ or better in Algebra 12 or MATH 001. **3 credits**

MATH 102 Technical Mathematics 2 — Logarithms and Analytic Geometry — A study of the theory and applications of common and natural logarithms, and an introduction to analytic geometry. Topics emphasized are the plotting, interpretation and uses of logarithmic and semilogarithmic graphs and the geometrical and practical properties of conic sections. A brief consideration of quadratic surfaces is included. Prerequisite: C+ or better in Algebra 12 or MATH 001. **3 credits**

MATH 203 Technical Mathematics 3 — Calculus — An introductory course in calculus and its technical applications involving the differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions. The course emphasizes the application of calculus to engineering technology problems. Prerequisite: MATH 101 and 102. **6 credits**

MATH 204 Technical Mathematics 4 — Calculus — A continuation of MATH 203. This course continues the work on integration started in MATH 203. Other topics include partial differentiation, an overview of Maclaurin, Taylor and Fourier series and the solution of differential equations. Special consideration is given to the use of Laplace Transforms in the solution of differential equations. Prerequisite: MATH 203. **6 credits**

MECH 140 Drafting Fundamentals — An introductory course for persons with little or no experience in graphics. **Students are required to purchase drafting equipment and supplies on the first night of class.** Students learn to produce and read simple drawings. Topics include scales, geometric constructions, basic orthographics, detail interpretation, line visibility, dimensioning, auxiliary views, true shape, inclined and skewed surfaces, sections, pictorials, working drawings and freehand sketches. **3 credits**

MECH 214 Drafting — Structural — A general insight into graphical aspects of structural problems for managers, construction workers, foremen, planners and estimators. Students study the application of drawing skills and techniques to structural engineering. Drawing assignments relate to wood frame, reinforced concrete and steel structures. Prerequisite: MECH 140. **3 credits**

MECH 216 Drafting — Civil/Survey — A general insight into graphical aspects of civil problems for managers, construction workers, foremen, planners and estimators. Students study the application of drawing skills and techniques to civil engineering. Drawing assignments relate to topographical drafting plans and profiles, cuts and fills and municipal sewage systems or rights of way plans. Prerequisite: MECH 140. **3 credits**

MINE 101 Geology — Definition, basic concepts, earth's crust, geologic time, atomic structure of minerals, crystal forms and symmetry systems; properties of common minerals; sedimentary rock types; clastic and chemical sedimentaries; igneous rock types; classification, deformation of earth's crust: folds, faults,

metamorphic rocks; weathering erosion, and glaciation; economic geology, mineral fuels, non-metallics, ore deposits and their controls; geological history, pre-Cambrian, Paleozoic, Mesozioc, Tertiary, Pleistocene; geologic maps. **3 credits**

MINE 201 Geology 1 — Definition, basic concepts, earth's crust, geologic time, atomic structure of minerals, crystal forms and symmetry systems; properties of common minerals; sedimentary rock types; clastic and chemical sedimentaries; igneous rock types; classification, deformation of earth's crust: folds, faults, metamorphic rocks; weathering erosion, and glaciation; economic geology, mineral fuels, non-metallics, ore deposits and their controls; geological history, pre-Cambrian, Paleozoic, Mesozico, Tertiary, Pleistocene; geologic maps. A continuation of MINE 101. **4.5 credits**

OPMT 187 Project Planning and Scheduling — For those who require basic information about the critical path method (CPM) and its application to project management. The course introduces the fundamentals of CPM as used in planning, scheduling, resource allocation and project management. The course includes an introduction to planning and scheduling techniques; Gantt charts, arrow diagrams; precedence diagrams; PERT; time-cost relationships; resource allocation; bid determination; project management and the role of the computer. **3 credits**

PHOT 102 Photo Interpretation and Remote Sensing — Engineers, planners, foresters, geographers, hydrologists, geologists and agriculturists, learn the application and interpretation of aerial photographs and other remote sensor acquired data, as applied to their respective fields. Students develop a working ability in image interpretation from photographic (camera) imagery, near-infrared imagery, thermal infrared imagery and radar imagery. Course covers the application of photographic systems in remote sensing, imaging, non-imaging sensors; the technical elements of image interpretation, imagery interpretation equipment; mapping from remote sensor acquired data, terrain and mineral assessment and evaluation, forest land inventory and assessment, water resources evaluation, soils evaluation and assessment; urban environment inventory and analysis, analysis and application of aerial photos and other remote sensing data to engineering (route location, regional and site analysis). **7 credits**

PHYS 131/132 Physics 1 — Topics include kinematics, statics, linear and rotational dynamics, properties of matter, heat and thermodynamics. Problem solving is emphasized and consistent effort is directed towards relating physics to its technological manifestations. Prerequisite: Algebra 12, (Physics 11 is desirable). **6 credits**

PHYS 133/134 Physics 2 — Topics include waves, sound, light, basic electricity and magnetism, elementary description of semiconductor properties, atomic spectram and nuclear energy. Problem solving is emphasized and consistent effort is directed towards relating physics to its technological manifestations. Prerequisite: PHYS 131/132 Physics 1 or MECH 217. **6 credits**

SURV 108 Engineering Survey — Covers the basic use of levels — open plate and optic transits, tape measurement methods of horizontal distance and direction determination. Computations — including slope reduction, open and closed traverse calculations, benchmark levelling, steel and tape correction techniques, electronic distance measurements, stadia work, tachometers, route surveys, earth work, site work, construction control. Upon completion, students can use a variety of survey instruments and office procedures, and make plans, profiles and maps to determine precise sizes, shapes and locations. **7 credits**

SURV 313 Field Survey — Includes highway surveying; layout of centre line, circular, spiral and vertical curves; topographic surveys by ground survey methods; preparation of topographic plans; mining surveys; use of gyro theodolite. Horizontal control by triangulation, trilateration and traverse, direction measurement, use of precise instruments; vertical control — trigonometric levelling, precise differential levelling; electronic distance measurement; calibration of instruments; hydrographic surveying; horizontal and vertical shore control; tide measurements; sounding methods; preparation of charts. Prerequisite: SURV 108. **7 credits**

SURV 320 Land Use Control — Studies land use and regulation, for those interested in aspects of land control. Of particular interest to those involved in municipal engineering and planning departments, surveyors, appraisers, developers, real estate agents and construction departments of utility companies. This course describes how the development and subdivision of land is controlled in B.C. and how regulated use of the basic resource impacts on our jobs, lives and the environment. The approach is primarily technical, with emphasis on the means of control. Specific provincial statutes, including the Municipal Act and the Land Registry Act and Municipal Regulations, such as zoning and subdivision bylaws, are reviewed. Land values, factors affecting their change, and the part that they play in providing a base for municipal revenue, are considered. Practical aspects of land use control are illustrated by examples of specific subdivision and development schemes. **3 credits**

Landscape Technology

The program leading to the award of the Intermediate Certificate of Technology in Landscape Technology consists of landscaping courses plus mandatory core courses and other technology courses to the required total credits. All programs must be submitted to the program consultant for approval by the Technology Department.

Faculty and Staff

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Intermediate Certificate of Technology in Landscape

		Credit
COMM 160	Introduction to Business and Technical Communications	3.0
LAND 101	Structural Materials	3.0
LAND 102	Soil Improvement	4.5
LAND 103	Grading and Drainage Plan Production	3.0
LAND 104	Basic Horticulture	4.5
LAND 105	Plant Introduction	3.0
LAND 201	Landscape Structurals	3.0
LAND 202	Plant Material Study	3.0
LAND 203	Planting Plan	4.5
MATH 101	Technical Mathematics 1 — Trigonometry	3.0
MATH 102	Technical Mathematics 2 — Logarithms and Analytic Geometry	3.0
MECH 140	Drafting Fundamentals	3.0
MECH 214	Drafting — Structural	3.0
	Elective	1.5

Elective Courses

		Credit
LAND 106	Pesticides for Retailers and Landscape Applicators	1.5
LAND 204	Parks and Recreation	4.5
LAND 205	Management for Landscape	3.0
LAND 206	Cost Estimation	4.5
LAND 207	Landscape Irrigation	3.0
LAND 208	Sports Turfgrass Management	3.0
LAND 501	Land Use Technology — Introduction	3.0
SURV 108	Engineering Survey	7.0

Course Descriptions

COMM 160 Introduction to Business and Technical Communication — Introduces students to the basics of communicating in business and industry. It offers practical techniques for planning communication according to the writer's purpose and the reader's needs. Organizing, selecting and presenting information and using effective business and technical style are covered. Students apply these skills to communications common to most office jobs — writing simple memos, instructions, procedures and summaries. Presenting information orally is also covered. Practical "case" assignments are used. Students are encouraged to work on communication problems from their jobs, if appropriate. **3 credits**

LAND 101 Structural Material — An introductory course in structural material for students with little or no experience in Landscape Technology. The structural materials covered include rock, brick, wood, asphalt, concrete, glass and plastic. The student studies the origin, qualities and use of materials in landscape design and management; the appropriate materials for particular jobs, and a cross-section of these materials with specification exercises. Topics include selection and location of materials in the landscape. **3 credits**

LAND 102 Soil Improvement — For those concerned with landscape development, this course in soil technology forms the first part of the horticulture section within the Landscape Technology program. Discussion includes soil chemistry, biology and soil mechanics; the means and methods of soil improvement for plant development; drainage and irrigation; soil compaction, permeability, soil pressure and their effects in horticulture. Topics include subsoils, topsoils; organic and inorganic soil improvement mediums; erosion control; surface and subsurface drainage; irrigation; earth pressure of concern for retaining walls and foundation structures in landscape projects. **4.5 credits**

LAND 103 Grading and Drainage Plan Production — For persons with some previous training in technical drafting and knowledge of soil technology in landscaping. Students learn to produce detailed plans showing grading of areas for landscape projects, and study government regulations covering grading and drainage of land. Students practice drafting exercises in detailed plan production. A home assignment is presented on the last night of the course. Prerequisite: MECH 214. **3 credits**

LAND 104 Basic Horticulture — The second part of the horticulture section of the Landscape Technology program, this introductory course in horticulture and plant protection for landscape use provides the novice with a working knowledge of plants and their value in landscape developments. The student studies botany — plant classification and identification, plant propagation, plant food requirements, hardiness, the handling and protection of plants from nursery to future site. Ways of preparing plants for herbariums are discussed and a herbarium is started. Prerequisite: LAND 102. **4.5 credits**

LAND 105 Plant Introduction — The third part of the horticulture section of the Landscape Technology program, this introduction to plant material for landscape development consists mainly of field trips. The student learns suitability, size, form, color and growing habits of trees, shrubs, vines and climbers, perennials, annuals and other herbaceous plants in this climatic zone. Topics include native trees, street trees, older park shrubs, herbaceous plants and turf. Students collect specimens for the preparation of an herbarium for the subsequent course LAND 202 Plant Material Study. Prerequisite: LAND 104. **3 credits**

LAND 106 Pesticides for Retailers and Landscape Applicators — For persons engaged in retailing, commercial landscape maintenance or nursery crop production, who intend to write examinations under the Pesticides Act to become certified as dispensers or applicators. Students study pesticides used in B.C. and have the opportunity to write the Pesticides Act examination under the direction of the B.C. Ministry of the Environment in the sixth week of the course. Topics include legislation, pesticide safety, pesticide formulation, prescribed uses, data interpretation in the various bulletins and the responsibilities of pesticide applicators or dispensers. **1.5 credits**

LAND 201 Landscape Structurals — Introduces the production of detailed plans for use in the landscape industry to persons with basic knowledge of landscape materials and fundamental drafting techniques. Students learn to prepare landscape design drawings and detail plans for structural items commonly used in landscape projects. The course includes lectures, field trips and

drafting practice covering access — driveways, walks, etc.; retention — walls, cribbing, piling, bulkheads, fencing; water — ponds, streams, waterfalls; miscellaneous — seats, fireplaces, landscape lighting; presentation drawings — preparation, method of presentation, sketches; site work. Prerequisite: LAND 101 and MECH 214. **3 credits**

LAND 202 Plant Material Study — The fourth part of the horticulture section of the Landscape Technology program discusses plant materials and their suitability for use in particular types of landscape projects. Students study types and varieties of indigenous and exotic trees, shrubs, herbaceous and evergreen ground covers and vines, and the characteristics and values which aid in the selection of these materials for use in landscape. The course includes descriptions and characteristics, varieties, landscape use and value, cultural conditions, seven to ten year growth patterns, hardiness zones, availability and available sizes. Each student researches specific varieties and species and includes these, with course material, in a handbook for future reference. Prerequisite: LAND 105. **3 credits**

LAND 203 Planting Plan — The fifth part of the horticulture section within the Landscape Technology program, this course in planting plan production drafting allows persons with some knowledge of horticulture, soil and plants, and with experience in technical drafting, further study of plant material for use in landscape projects and detailed planting area layouts. Students learn climate, soil tolerances and to produce detailed planting plans for a given land development master plan in B.C. Topics include climate and soil condition; solitary, group and mass planting; plant size and quality; plant spacing; specification of material and planting procedure. Prerequisite: LAND 103 and LAND 201 and LAND 202. **4.5 credits**

LAND 204 Parks and Recreation — An introductory course in the design of parks and recreational facilities and/or their maintenance. Students study the basic facilities required for public parks and recreation areas; the layout of areas for indoor or outdoor sports and other recreation facilities and maintenance requirements for recreation facilities. Course content includes planning principles, space requirements for sports, art education, etc; facilities, swimming pools, ice arenas, lawn bowling, curling, golf, marinas, resorts, beaches, children's playgrounds; general features, fences, walls, lights, parking, and general maintenance. Students design and make drawings for a major community park. **4.5 credits**

LAND 205 Management For Landscape — Introduces landscape technicians to management skills required in landscape development, including the legal requirements affecting land use, contract documentation, ethics and professional liability. The student studies professional responsibilities in respect to the consultant's relationship to client and contractor; contractor/client relationship; production of contract documents; legal liability; contract supervision. **3 credits**

LAND 206 Cost Estimation — For persons with limited or no experience in cost estimation for landscape projects. An introduction to methods of area and volume survey from landscape plans; study of work capacity; administration and maintenance costs including quantity and capacity as bases for cost estimation; methods of journal keeping and accounting. Topics include mathematics, surface, area, volume; weights and measures; cuts and fills; work capacity, man-hours, equipment; overhead expenses; journals; bookkeeping and an introduction to the metric system. **4.5 credits**

LAND 207 Landscape Irrigation — Provides technical information and basic training for persons associated with or interested in turf and landscape irrigation. Topics include basic hydraulic theory, system design and construction fundamentals; scientific and practical aspects of water application; installation, operating and maintenance procedures for major types of irrigation systems. **3 credits**

LAND 208 Sports Turfgrass Management — An introductory course in turfgrass management for persons associated with maintenance of golf courses, municipal parks and outdoor recreational facilities. Topics include turfgrass botany (classification, nomenclature, identification and utilization); weed, disease and insect problems and control strategies; soils (introduction and classification); soil amendments and fertilizers; tillage and cultivation systems; irrigation principles, equipment design and construction. **3 credits**

LAND 501 Land Use Technology — Introduction — An introductory course for those involved in land use management of public areas, private development, local and regional planning departments, federal and provincial agencies. This course includes historical, ecological, economic and legal perspectives of land use; the principles and application of use of land based resources with references to land capability, economic constraints, environmental issues and legislation. Also included are inventory, gathering, storing and presentation of information techniques within the framework of planning principles. **3 credits**

MATH 101 Technical Mathematics 1 — Trigonometry — A course for students in Engineering Technologies on the application and theory of trigonometric functions including right angle trigonometry, vector and triangle problems, trigonometric identities and graphing, polar co-ordinates, transformations and radian measure. Prerequisite: C+ or better in Algebra 12 or MATH 001. **3 credits**

MATH 102 Technical Mathematics 2 — Logarithms and Analytic Geometry — A study of the theory and applications of common and natural logarithms, and an introduction to analytic geometry. Topics emphasized are the plotting, interpretation and uses of logarithmic and semilogarithmic graphs and the geometrical and practical properties of conic sections. A brief consideration of quadratic surfaces is included. Prerequisite: C+ or better in Algebra 12 or MATH 001. **3 credits**

MECH 140 Drafting Fundamentals — An introductory course for persons with little or no experience in graphics. **Students are required to purchase drafting equipment and supplies on the first night of class.** Students learn to produce and read simple drawings. Topics include scales, geometric constructions, basic orthographics, detail interpretation, line visibility, dimensioning, auxiliary views, true shape, inclined and skewed surfaces, sections, pictorials, working drawings and freehand sketches. **3 credits**

MECH 214 Drafting — Structural — A general insight into graphical aspects of structural problems for managers, construction workers, foremen, planners and estimators. Students study the application of drawing skills and techniques to structural engineering. Drawing assignments relate to wood frame, reinforced concrete and steel structures. Prerequisite: MECH 140. **3 credits**

SURV 108 Engineering Survey — Covers the basic use of levels — open plate and optic transits, tape measurement methods of horizontal distance and direction determination. Computations — including slope reduction, open and closed traverse calculations, benchmark levelling, steel and tape correction techniques, electronic distance measurements, stadia work, tachometers, route surveys, earth work, site work, construction control. Upon completion, students can use a variety of survey instruments and office procedures, and make plans, profiles and maps to determine precise sizes, shapes and locations. **7 credits**

Surveying Technology

The programs leading to the award of the Certificate of Technology, or Intermediate Certificate, in Surveying will consist of survey courses plus mandatory core courses and other technology courses to the required total credits. All programs must be submitted to the program consultant for approval by the Technology Department.

Faculty and Staff

R.I. McNeil, B. Surv., B.C.L.S., D.L.S., Dipl. Adult Ed., P. Eng., Department Head. Telephone: 432-8340
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Intermediate Certificate of Technology in Surveying Technology

Mandatory Courses

		Credit
COMM 160	Business and Technical Communication	3.0
MATH 101	Technical Mathematics 1 — Trigonometry	3.0
MATH 102	Technical Mathematics 2 — Logarithms and Analytic Geometry	3.0
MECH 140	Drafting Fundamentals	3.0
PHYS 131/132	Physics 1	6.0
SURV 108	Engineering Survey	7.0
SURV 112	Survey Computations 1	7.0
SURV 118	Programmable Calculators	3.0
	Electives from list below	10.0

Electives

		Credit
COMM 180	Technical Correspondence	3.0
COMM 183*	Technical Reports	3.0
MATH 203+	Technical Mathematics 3 — Calculus	6.0
MATH 204+	Technical Mathematics 4 — Calculus	6.0
MECH 216*	Drafting — Civil/Survey	3.0
PHOT 217+	Photogrammetry 1	7.0
PHYS 133/134+	Physics 2	6.0
SURV 311*	Survey Computations 2	3.0
SURV 313*	Field Survey	7.0

Certificate of Technology in Surveying

Completion of all of the above mandatory and elective courses would fulfill the requirements for the Certificate of Technology. However courses marked * are mandatory and may not be replaced by options; only those marked + may be replaced by options.

Year 1 Equivalency

Completion of all the above courses are necessary for Year 1 Full-time Equivalancy.

Advanced, Optional and Elective Courses

		Credit
MATH 125	BASIC 1 — Introduction to Microcomputers IBM PC's	3.0
MINE 151	General Interest Geology	3.0
MINE 154	The Mining Industry	3.0
PHOT 102	PhotoInterpretation and Remote Sensing	7.0
PHOT 317	Photogrammetry 2	9.0
SURV 320	Land Use Control	3.0
SURV 362	Geodetic Surveying 1	3.0
SURV 363	Adjustment of Survey Measurements	3.0
SURV 365	Drafting sand Survey CAD	2.0
SURV 410	Survey Computations 3	3.0
SURV 411	Survey Computations 4	7.0
SURV 426	Astronomy	7.0
SURV 463	Mathematical Cartography	5.0
SURV 465	Survey CAD 2	4.0

Course Descriptions

COMM 160 Introduction to Business and Technical Communication — Introduces students to the basics of communicating in business and industry. It offers practical techniques for planning communication according to the writer's purpose and the reader's needs. Organizing, selecting and presenting information and using effective business and technical style are covered. Students apply these skills to communications common to most office jobs — writing simple memos, instructions, procedures and summaries. Presenting information orally is also covered. Practical "case" assignments are used. Students are encouraged to work on communication problems from their jobs, if appropriate. **3 credits**

COMM 180 Technical Correspondence — Covers correspondence inside and outside the engineering office. The emphasis is on short, informal communications. Topics include memo and letter format, technical writing style, process descriptions, troubleshooting memos, procedures, routine requests and replies. It also covers trip, progress and incident reports. **3 credits**

COMM 183 Technical Reports — Gives writers from technical or industrial backgrounds practice in problem-solving reports. The emphasis is on the communication skills needed to solve engineering problems and to describe methods and products. Specific applications include comparison and feasibility reports, technical proposals, journal reviews, executive summaries and formal report format. Persuasive presentations, meetings, and effective use of graphics are also covered. **3 credits**

MATH 101 Technical Mathematics 1 — Trigonometry — A course for students in Engineering Technologies on the application and theory of trigonometric functions including right angle trigonometry, vector and triangle problems, trigonometric identities and graphing, polar co-ordinates, transformations and radian measure. Prerequisite: C + or better in Algebra 12 or MATH 001. **3 credits**

MATH 102 Technical Mathematics 2 — Logarithms and Analytic Geometry — A study of the theory and applications of common and natural logarithms, and an introduction to analytic geometry. Topics emphasized are the plotting, interpretation and uses of logarithmic and semilogarithmic graphs and the geometrical and practical properties of conic sections. A brief consideration of quadratic surfaces is included. Prerequisite: C+ or better in Algebra 12 or MATH 001. **3 credits**

MATH 125 BASIC 1 — An Introduction to Microcomputers — IBM PCs — Designed for engineering technology students with no previous BASIC programming or microcomputer experience. Students become familiar with computer terminology and write BASIC programs. Topics include computers, system commands and disk operating systems, BASIC language concepts including input/output; relational operators, subroutines and graphics statements. **3 credits**

MATH 203 Technical Mathematics 3 — Calculus — An introductory course in calculus and its technical applications involving the differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions. The course emphasizes the application of calculus to engineering technology problems. Prerequisite: MATH 101 and 102. **6 credits**

MATH 204 Technical Mathematics 4 — Calculus — A continuation of MATH 203. This course continues the work on integration started in MATH 203. Other topics include partial differentiation, an overview of Maclaurin, Taylor and Fourier series and the solution of differential equations. Special consideration is given to the use of Laplace Transforms in the solution of differential equations. Prerequisite: MATH 203. **6 credits**

MECH 140 Drafting Fundamentals — An introductory course for persons with little or no experience in graphics. **Students are required to purchase drafting equipment and supplies on the first night of class.** Students learn to produce and read simple drawings. Topics include scales, geometric constructions, basic orthographics, detail interpretation, line visibility, dimensioning, auxiliary views, true shape, inclined and skewed surfaces, sections, pictorials, working drawings and freehand sketches. **3 credits**

MECH 216 Drafting — Civil/Survey — A general insight into graphical aspects of civil problems for managers, construction workers, foremen, planners and estimators. Students study the application of drawing skills and techniques to civil engineering. Drawing assignments relate to topographical drafting plans and profiles, cuts and fills and municipal sewage systems or rights of way plans. Prerequisite: MECH 140. **3 credits**

MINE 151 General Interest Geology — Designed for part-time and full-time prospectors, the course studies the common rock-forming minerals, rocks and ore minerals; geological structures and what constitutes an ore deposit; topographic and geological maps and the procedure for staking claims; the use of the magnetic compass, dip needle, scintillometer, mineral lamp, gold pan, and geochemical soil sampling kit and the application of diamond drilling. The topics are studied in a very practical "hands-on" approach. A full day field trip is included during the term. **3 credits**

MINE 154 The Mining Industry — Provides a background for those unfamiliar with the mining industry. Introduces the importance, nature, sub-divisions and economic framework of the mining industry; exploration techniques — brief descriptions of geology, geophysics and geochemical principles; mining methods — surface and underground, particularly those common in B.C., reclamation; treatment methods — ore values are concentrated with crushing, grinding, flotation, gravity separation, leaching and other operations. Smelter contracts and mine evaluations can be covered. **3 credits**

PHOT 102 Photo Interpretation and Remote Sensing — Engineers, planners, foresters, geographers, hydrologists, geologists and agriculturists, learn the application and interpretation of aerial photographs and other remote sensor acquired data, as applied to their respective fields. Students develop a working ability in image interpretation from photographic (camera) imagery, near-infrared imagery, thermal infrared imagery and radar imagery. Course covers the application of photographic systems in remote sensing, imaging, non-imaging sensors; the technical elements of image interpretation, imagery interpretation equipment; mapping from remote sensor acquired data, terrain and mineral assessment and evaluation, forest land inventory and assessment, water resources evaluation, soils evaluation and assessment; urban environment inventory and analysis, analysis and application of aerial photos and other remote sensing data to engineering (route location, regional and site analysis). **7 credits**

PHOT 217 Photogrammetry 1 — Introduces students to the mechanics of photogrammetry through a combination of theory and practical work. Topics include: introduction to photogrammetry; photo-interpretation; mapping from photographs; cameras; flight-planning for vertical photography; mosaics, principle of stereovision; determination of height from aerial photos; radial line-plotting; oblique photogrammetry, plotting instruments, stereoscopes, photographic laboratory procedures, analytical photogrammetry; tilted photogrammetry; determination of ground co-ordinates from measurements on photos; supplementing ground survey control; card punching for computer; running a program for co-ordinates; adjusting and trouble-shooting program elements and an introduction to aerial triangulation. **7 credits**

PHOT 317 Photogrammetry 2 — Presents the theory and practical skills needed to produce topographical mapping from aerial photography for those who seek employment in the mapping industry or for those wanting a fundamental understanding of the mapping process using photogrammetric methods. Covers: geometric projections, perspective projection, inner, relative and absolute orientation, stereovision; model deformations, theory and uses of stereo restitution instruments, co-ordinate transformations; aerial triangulation, affine restitution, special products. Note: because of limited lab facilities, enrolment is limited to eight students. Prerequisite: PHOT 217. **9 credits**

PHYS 131/132 Physics 1 — Topics include kinematics, statics, linear and rotational dynamics, properties of matter, heat and thermodynamics. Problem solving is emphasized and consistent effort is directed towards relating physics to its technological manifestations. Prerequisite: Algebra 12, (Physics 11 is desirable). **6 credits**

PHYS 133/134 Physics 2 — Topics include waves, sound, light, basic electricity and magnetism, elementary description of semiconductor properties, atomic spectram and nuclear energy. Problem solving is emphasized and consistent effort is directed towards relating physics to its technological manifestations. Prerequisite: PHYS 131/132 Physics 1 or MECH 217. **6 credits**

SURV 108 Engineering Survey — Covers the basic use of levels — open plate and optic transits, tape measurement methods of horizontal distance and direction determination. Computations — including slope reduction, open and closed traverse calculations, benchmark levelling, steel and tape correction techniques, electronic distance measurements, stadia work, tachometers, route surveys, earth work, site work, construction control. Upon completion, students can use a variety of survey instruments and office procedures, and make plans, profiles and maps to determine precise sizes, shapes and locations. **7 credits**

SURV 112 Survey Computations 1 — Topics include basic trigonometric functions, algebra and geometry; operation of an electronic calculator; field measurement calculations of chained distances and levelling notes; solution of right and oblique triangles, bearings — magnetic quadrantal and full circle traverse calculations, polar and rectangular co-ordinates, omitted measurements; adjustments of traverses; area by co-ordinates and DMDs; subdivision of areas; simple circular curves; areas of irregular areas, volumes of regular and irregular solids; stadia calculations; setting out and design calculations; basic UTM integrated traverse calculations. **7 credits**

SURV 118 Programmable Calculators — Covers two aspects of the programmable calculator. Manual use — the use of built-in functions, storage registers, the stack, stack manipulation and register manipulation. Programming — using the memory of the machine to "remember" algorithms to solve a particular problem.

Also covered are flowcharts, programming techniques, subroutines, looping, controlled looping, conditional tests and indirect operations. Appropriate models of calculators for course will be confirmed by instructor. **3 credits**

SURV 311 Survey Computations 2 — Deals with curves in engineering surveying and covers the following topics: rectangular and polar co-ordinates, transformation of co-ordinates, omitted parts in closed traverses; circular, reverse, and compound curves, special problems of circular curves. Prerequisite: SURV 112. **3 credits**

SURV 313 Field Survey — Includes highway surveying; layout of centre line, circular, spiral and vertical curves; topographic surveys by ground survey methods; preparation of topographic plans; mining surveys; use of gyro theodolite. Horizontal control by triangulation, trilateration and traverse, direction measurement, use of precise instruments; vertical control — trigonometric levelling, precise differential levelling: electronic distance measurement; calibration of instruments; hydrographic surveying; horizontal and vertical shore control; tide measurements; sounding methods; preparation of charts. Prerequisite: SURV 108. **7 credits**

SURV 320 Land Use Control — Studies land use and regulation, for those interested in aspects of land control. Of particular interest to those involved in municipal engineering and planning departments, surveyors, appraisers, developers, real estate agents and construction departments of utility companies. This course describes how the development and subdivision of land is controlled in B.C. and how regulated use of the basic resource impacts on our jobs, lives and the environment. The approach is primarily technical, with emphasis on the means of control. Specific provincial statutes, including the Municipal Act and the Land Registry Act and Municipal Regulations, such as zoning and subdivision bylaws, are reviewed. Land values, factors affecting their change, and the part that they play in providing a base for municipal revenue, are considered. Practical aspects of land use control are illustrated by examples of specific subdivision and development schemes. **3 credits**

SURV 362 Geodetic Surveying 1 — Properties of the ellipse and the ellipsoid of revolution; calculation of radii of curvature; spherical excess; Legendre's theorem, method of addends. Field tests; triangle closures, side equations, sine consistency computation of geodetic position, foreward and inverse. Trigonometric levelling; reciprocal, non-reciprocal, refraction, intervisibility problems. Prerequisite: MATH 204 recommended. **3 credits**

SURV 363 Adjustment of Survey Measurements — An introduction to the appreciation of least squares in surveying. Topics include matrix algebra, theory of probability and statistics, errors of measurements, covariance matrix, parametric adjustment (levelling net, transformation of co-ordinates, control survey net), conditional observations (levelling net, traversing, control survey net), combined method (traversing nets). Prerequisite: SURV 311, and a course in linear algebra and BASIC for microcomputers is desirable. **3 credits**

SURV 365 Drafting and Survey CAD — Topics covered include sequential files, string manipulation, microcomputer graphics, role of CAD in surveying, BASIC and FORTRAN programming for plotters and digitizers, data collector transfers, reduction of field data, coordinate geometry programs, creation of plot files. Surveyor general requirements for survey plans, inking. Prerequisite: MECH 216 and must have some knowledge of a programming language or permission of instructor. **2 credits**

SURV 410 Survey Computations 3 — Covers vertical and transition curves in engineering surveying and computations for local control surveys. Other topics include concept of geometric space (simple and conformal plane), UTM coordinates, triangulation and trilateration, reduction of field observations (eccentric measurements, mean-sea-level reduction), field consistence checks, intersection, resection (Snellius and D'Alamber solutions), inaccessible base, traversing in control survey, adjustments by semi-rigorous methods and least squares. Prerequisite: SURV 311. **3 credits**

SURV 411 Survey Computations 4 — Covers numerical methods in surveying computations; Newton's method and the solution of non-linear equations; partitioning of land with curved boundaries; systems of heights; computations with differential levelling; orthometric correction; consistency checks and simple adjustments; trigonometric levelling; barometric levelling; three dimensional surveying systems; spacial traverses; deformation measurements and statistical assessments; computation of areas and volumes. Prerequisite: SURV 410. **3 credits**

SURV 426 Astronomy — An introduction to astronomy as used by surveyors. Of particular interest to persons intending to write the Professional Land Surveyor examinations. Through the use of the BCIT planetarium facilities, students gain a good grounding in star identification. The course includes an introduction to practical astronomy, the celestial sphere, the astronomical triangle; universal time, mean solar time, sidereal time and star almanacs; instruments used in solar and stellar observations; star identification, observations for latitude; observations for time and longitude; observations for azimuth; observations for position. Prerequisite: MATH 204 recommended. **7 credits**

SURV 463 Mathematical Cartography — Theory of map projections and distortions, classification of projections; conic, cylindric and azimuthal systems. Universal Transverse Mercator projection and all involved computations. Stereographic projection for the maritime provinces. Polyconic projection of British Columbia. Prerequisite: SURV 362. **5 credits**

SURV 465 Survey CAD 2 — Continuation of SURV 365. **4 credits**

Transportation Systems (Highways) Program

A full Diploma program has been developed by BCIT in conjunction with the Ministry of Transportation and Highways. It has two unique features:

1. Students can study through correspondence courses at their own pace with tutored assistance;
2. Students can receive credits towards their Diploma for previous academic or on-the-job experiential learning.

Courses now being developed cover the fields of Engineering Sciences, Construction Materials and Methods, Highway Design, Construction, and Maintenance, and Operations Management. Many of these are also credit granting in other Technologies.

Faculty and Staff

R.B. Robins, M.Sc., M.I.C.E., C.Eng., P.Eng., Department Head. Telephone: 432-8234.

Biological Sciences Technology

Faculty and Staff

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W. Hooge, B.S.A., P. Ag., Program Co-ordinator. Telephone: 432-8269
M. Woolley, Dipl. T., A.Sc.T., Program Consultant. Telephone: 432-8467

Course Descriptions

BISC 152 Food Analysis Techniques — This course is designed to offer students practical laboratory work with modern instrumentation in a well equipped laboratory. Selected analyses will be offered to cover a range of techniques. Students are encouraged to bring their own samples. The laboratory work will be supported by the necessary lecture material. **3 credits**

BISC 901 Basic Food Processing — An introduction to the processing of foods by canning, freezing, pasteurizing, fermenting, concentrating and dehydrating. Importance of sanitation in food processing operations. Testing of food containers. Examination of processed food products. **non credit**

BISC 903 Thermal Processing and Container Evaluation — Designed to provide certification for supervisors of heat processing and container evaluation operations in food canning plants. Topics covered include: the microbiology of canning, food container handling, food plant sanitation, records for product protection, principles of heat processing, heat processing systems, container closure evaluation for metal and glass containers. **non credit**

BISC 904 Sanitation Workshop for Food Processing Industry — The major emphasis of the program will be on the basic fundamentals of food plant sanitation. The workshop will offer a broad range of information with specific technology incorporated. Some general topics are: the microbiology of sanitation; insect and rodent control, cleaning and sanitizing, plant storage control, handling toxic materials, waste material handling, plant inspections. Open to persons employed and associated with the food processing industry. There are no special educational requirements for admission. **non credit**

BISC 905 Technology of Baking — Surveys the technology that forms the basis of the commercial bakery industry. Emphasis is on major industry products and processes. Topics covered include: wheat selection, flour specifications, flour quality testing using the Farinograph, other ingredients of baking, commercial bread making procedures and other baking processes. **non credit**

BISC 907 Dairy Processing (Correspondence Course) — A flexible-entry correspondence course developed in co-operation with the B.C. Dairy Council. The course is the prerequisite for the one-week, in-class session held at BCIT (BISC 908). The course introduces the technical aspects of dairy processing to those employed in the dairy industry. **non credit**

BISC 908 Dairy Processing 1 — A one-week technical course for dairy processing personnel covering general dairy processing requirements for the Dairy Plant Process Worker License issued by the B.C. Ministry of Agriculture and Food. Prerequisite: BISC 907. **non credit**

BISC 909 Dairy Processing 2 — Emphasizes pasteurization techniques, standardization of milk, and organoleptic testing. Designed to meet the requirements of the dairy industry and given upon request, the course offers specialization in pasteurization, ice cream manufacture and cultured dairy products. Prerequisite: BISC 908. **non credit**

Chemical Sciences Technology

Faculty and Staff

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W.J. Bogyo, B.C.L. Ass., Senior Instructor, Program Co-ordinator. Telephone: 434-5734, local 5756
M. Woolley, Dipl. T., A.Sc.T., Program Consultant. Telephone: 432-8467

Course Descriptions

CHSC 166 Glassblowing — Recommended for persons working in a chemical laboratory setting to develop skills in the natural gas and oxygen flame working of glass tubing and rods. Topics include identification of glasses; preparation and cutting of glass; procedure for working with tubing; pulling points, seals, straight tubes, round and flat bottom tubes; sealing, bands, blowing bulbs, ring seals; side arms, small condensers, flask joints, columns and coil wings. Students learn to perform minor repairs to laboratory glassware. **3 credits**

CHSC 267 Air Pollution: Chemistry and Sampling Techniques — Examines the chemistry of the major air pollutants and their interactions in the atmosphere — the oxides of sulphur and nitrogen, carbon monoxide, carbon dioxide, hydrocarbons, particulates (including heavy metals) chlorocarbons and fluorocarbons; the effects of air pollutants on human health and on the environment; the collection and analysis of air pollutant samples by various methods — infra-red, gas chromatography and atomic absorption. **3 credits**

CHSC 268 Water Pollution: Chemistry and Sampling Techniques — Discusses the processes that take place in water systems when pollutants are present, and the various techniques used for detection and control of these pollutants. The course examines the chemistry and microbiology of the major water pollutants; the major sources of pollutants, their interactions in the environment and methods of control and/or treatment; laboratory analysis of water samples. **4.5 credits**

CHSC 274 Pulp and Paper Manufacture — Presents a detailed background to the pulp and paper industry of British Columbia for those presently employed in manufacturing, service functions and allied industries. The course discusses the processes employed and the mechanical equipment utilized, in the manufacture of pulp and paper. It examines wood structure and chemistry, water treatment, mechanical and chemical pulp manufacture, pulp bleaching, kraft recovery systems, chemical preparation and handling, pollution abatement, paper and paperboard manufacture, future developments. Guest lecturers discuss specific areas. **7.5 credits**

Directed Study/Correspondence Courses

Some credit courses in engineering technology subjects are available in correspondence format. Many others are presently being prepared specifically to meet the requirements of a Transportation Systems (Highways) Diploma program. However, several of these are acceptable for credit in other Technology programs.

General courses are available in Technical Communications, Technical Mathematics and Introduction to Data Processing.

Specialized courses will be available in Engineering Science, Graphical Communications, Engineering Materials, Survey, Construction, Highway and Structural Design, Maintenance, and Operations Management.

A wide range of courses in Forest Technology is presently undergoing review and updating.

For further details of any engineering technology correspondence type courses please contact:
Ray Robins
Directed Study Section
Telephone: 432-8234

For details of correspondence courses in Math, Physics and Chemistry contact:
Eva Longman
School of Academic and Vocational Studies
Telephone: 432-8475

Forest Resource Technology

Faculty and Staff

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A.G. Jakoy, B.S.F., M.F., R.P.F., Program Co-ordinator. Telephone: 434-5734, local 5275
M. Woolley, Dipl. T., A.Sc.T., Program Consultant. Telephone: 432-8467

Course Descriptions

FSTR 120 Ecology of Southern B.C. — Introduction — This course is a field trip through Southern B.C. focusing on the geology, ecology and wildlife of the region. Preceded by an introductory series of lectures, the field trip will cover the Fraser Valley, Fraser Canyon and Southern Interior areas. **2.5 credits**

FSTR 151 Forest Measurement 1 — Want to work in the woods next spring? This forestry field training course teaches the basics of mapping, note taking and use of most field instruments used in logging engineering layout, plus cruising and other renewable resource inventory. Includes measurement of distance, direction and elevations, plotting topographic detail and the care and maintenance of equipment. Further studies familiarize the student with advanced methods of forest timber volume measurement and calculation, sampling and report compilation. Subjects include measurement of standing and felled timber, tree diameter, height and age; use of volume tables; construction of local volume tables; sampling types and design; aerial sampling, point sampling with elementary statistical analysis; compilation methods for sample data and report writing. **5 credits**

FSTR 153 Plant Identification — An introduction to plant identification using identification keys. Covers all major plant groups, evergreen and broad leaf trees, shrubs, herbs, grasses, ferns and mosses. There are two field trips scheduled for Saturdays and Sundays for those students who seek day school credit. Students must be prepared to provide their own transportation (car pools). The economic and aesthetic values of plants are pointed out and students become familiar with natural surroundings, forests, marshes and rangelands. **3 credits**

FSTR 154 Principles and Practices in Wildlife Management — An introduction to wildlife management covering the basic ecological principles upon which practices are based, and exploring the biology and habitat requirements of common native wildlife species. Some basic wildlife techniques are explained, including techniques for habitat improvement. At the end of the course, a day is spent in the field examining local wildlife areas. Suitable for lay persons, such as naturalists or hunters who want a better understanding of wildlife management, and useful to technical and professional graduates in such fields as agriculture and forestry whose work involves wildlife. **3 credits**

FSTR 155 Wildland Recreation and Park Management — Examines the importance of recreation and wildland recreation management to the proper planning and administration of Canada's wildlands. The course provides a working knowledge of recreational pursuits on public and private wildlands within B.C., and presents the specific criteria involved in the assessment and management of recreational wildland. The course includes an introduction to recreation, wilderness management, winter-oriented recreation, water-oriented recreation, campsite design, wildlife in parks, interpretation, visual management, public input in decision-making and trail design. **3 credits**

FSTR 156 B.C. Fish and Fisheries — Provides basic information and technical data relating to B.C. fish and their management for naturalists, sportsmen, foresters, agriculturists and others in the resources field. Students learn about the biology and characteristics of numerous species of B.C. fish, and develop an insight into the parameters of fisheries management. The course examines population dynamics, fish physiology, survey techniques, pollution sampling, resource problems, and the effects of B.C. fishing regulations. Examination and discussion of preserved specimens supplemented with presentations related to the biology of the species under discussion. The remaining sessions deal with management aspects of the fisheries resource. **3 credits**

FSTR 157 Log Scaling — Prepares candidates for the B.C. Forest Service Licensed Scalers Examination (Coastal). Students learn the skills involved in accurate measurement, volume estimations and grading of coastal logs, through classroom sessions and practical scaling in various locations along the north arm of the Fraser River. Scale sticks and life vest supplied; students must supply suitable caulk boots. Emphasis is on the new B.C. Government metric scale and current (1981) coastal log grades. **7 credits**

FSTR 202 Forest Soils — Introduces students to soil formation, soil as foundation and soil as a medium for plant growth. Covers the properties of soils, texture, structure and water retention. Introduces students to the soils and landscapes of British Columbia. Those students studying for credit must be prepared to take one day field trip during the term and a weekend field trip at the end of the term. Students must be prepared to provide their own transportation (car pools). **6 credits**

FSTR 250 Ecology — Introduces students to the basic concepts and terminology of ecology. Develops an appreciation for the components of ecosystems including man and his activities; outlines the energy flow in and introduces management aspects of numerous eco-systems. Students learn to identify numerous eco-systems of terrestrial and aquatic environments, describe energy fixation transfer in them and recognize approaches to

proper management. The material is presented in the form of lectures and tutorials. Approximately four field trips are held on Saturdays and Sundays in lieu of classroom sessions. Students should be prepared to provide their own transportation (car pools). **4.5 credits**

FSTR 306 Forest Administration — Many of the functions once performed by government agencies and industry in the natural resource field are now being contracted out. This course is designed for people interested in embarking on a career in service contracting to the natural resource industry. Upon successful completion of this course, the student will have a basic knowledge of small business planning, be able to read and understand financial statements, understand simple double-entry accounting principles, be able to project a business plan for entrepreneurial activities and develop estimates for contract work. **3 credits**

FSTR 921 B.C. Log Scale fbm Course — This course is for licensed log scalers who require endorsement in imperial measurements. Prerequisite: FSTR 157 or equivalent or log scaling ticket. **non credit**

Lumber and Plywood Technology

Faculty and Staff

J.T. Neilson, B.A. Sc., P. Eng., Acting Department Head. Telephone: 432-8319

M. Woolley, Dipl. T., A.Sc.T., Program Consultant. Telephone: 432-8467

Course Description

LUPL 110 Lumber and Plywood Manufacture — Persons interested in the manufacture of lumber and plywood will enlarge their knowledge of the equipment and methods used. Correct manufacturing techniques are examined to give an understanding of sawing, drying and planing of lumber, peeling and drying of veneer, and plywood construction. Management principles studied include guidelines for supervisors, control of quality and recovery, equipment and saw maintenance, safe plant environment, cost controls and pollution abatement. Field trips will be arranged to examine a lumber mill and plywood plant. **7.5 credits**

Mining Technology

Faculty and Staff

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G. Headley, Acting Program Co-ordinator. Telephone: 432-8823

M. Woolley, Dipl. T., A.Sc.T., Program Consultant. Telephone: 432-8467

Course Descriptions

MINE 101 Geology — Definition, basic concepts, earth's crust, geologic time, atomic structure of minerals, crystal forms and symmetry systems; properties of common minerals; sedimentary rock types; clastic and chemical sedimentaries; igneous rock types; classification, deformation of earth's crust: folds, faults, metamorphic rocks; weathering erosion, and glaciation. **3 credits**

MINE 151 General Interest Geology — Designed for part-time and full-time prospectors, the course studies the common rock-forming minerals, rocks and ore minerals; geological structures and what constitutes an ore deposit; topographic and geological maps and the procedure for staking claims; the use of the magnetic compass, dip needle, scintillometer, mineral lamp, gold pan, and geochemical soil sampling kit and the application of diamond drilling. The topics are studied in a very practical "hands-on" approach. A full day field trip is included during the term. **3 credits**

MINE 154 The Mining Industry — Provides a background for those unfamiliar with the mining industry. Introduces the importance, nature, sub-divisions and economic framework of the mining industry; exploration techniques — brief descriptions of geology, geophysics and geochemical principles; mining methods — surface and underground, particularly those common in B.C., reclamation; treatment methods — ore values are concentrated with crushing, grinding, flotation, gravity separation, leaching and other operations. Smelter contracts and mine evaluations can be covered. **3 credits**

MINE 201 Geology 1 — Economic geology, mineral fuels, non-metallics, ore deposits and their controls; geological history — pre-Cambrian, Paleozoic, Mesozoic, Tertiary, Pleistocene; geologic maps. Prerequisite: MINE 101. **4.5 credits**

Natural Gas and Petroleum Technology

Faculty and Staff

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D.A. Campbell, B.A. (Hons.), M. Ed., Program Co-ordinator. Telephone: 434-5734, local 5325

M. Woolley, Dipl. T., A.Sc.T., Program Consultant. Telephone: 432-8467

Course Descriptions

NGAS 152 Gas and Oil Production and Transmission — Examines petroleum geology, reservoirs, exploration well-drilling, field production and treatment, conservation, gathering and transmission systems, pipeline construction and maintenance, corrosion protection, compressor and pumping stations, flow computations, economics of design, measurements, laws and regulations. **6 credits**

NGAS 154 Distribution and Utilization — Gas — Examines city gas stations; regulations and colorization; high, medium and low-pressure distribution systems; network analysis; service regulations; meters; combustion stoichiometry; furnaces, boilers; installation codes; industrial and power utilization; corrosion control; peak shaving; storage. **6 credits**

Refresher Courses for B.C. Land Surveyors

A series of one-day, non credit, refresher courses for Articled Students to B.C. Land Surveyors, who are writing their Western Board of Examiners exams.

PHOT 917 Photogrammetry
SURV 919 Map Projections
SURV 926 Astronomy
SURV 962 Geodesy
SURV 963 Methods of Least Squares
SURV 968 Description for Deeds
SURV 969 Planning
SURV 970 Land Title Acts

Faculty and Staff

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Course Descriptions

PHOT 917 Photogrammetry — A refresher course for Articled Students to B.C. Land Surveyors, who are writing their Western Board of Examiners exams. Projections, photo scale, inner orientation, co-ordinate transformations, collinearity equations, coplanarity equations, tilt and relief displacement, stereo plotting instruments, photogrammetric accuracy and various systematic errors. **non credit**

SURV 919 Map Projections — A refresher course for Articled Students to B.C. Land Surveyors, who are writing their Western Board of Examiners exams. Problems of cartographic mappings, theory of distortions, classification of map projection, conformal mappings (Mercator, Lambert conformal conic, polyconic), UTM projections and computations associated with the projection. **non credit**

SURV 926 Astronomy — A refresher course for Articled Students to B.C. Land Surveyors, who are writing their Western Board of Examiners exams. A review of material tested on previous B.C.L.S. exams with emphasis on the last 3 years including: spherical trig; celestial sphere and astronomical triangle; solar and sidereal time; star identification; determination of latitude, longitude and azimuth by calculations from various types of solar and sidereal observations. **non credit**

SURV 962 Geodesy — A refresher course for Articled Students to B.C. Land Surveyors, who are writing their Western Board Examiners exams. Review of the following topics: concepts of geometric and physical geodesy; spherical and ellipsoidal computations; reduction and evaluation of field observations; gravity and potential; application to geodetic measurements; satellite and inertial positioning; co-ordinate systems and transformations. **non credit**

SURV 963 Methods of Least Squares — A refresher course for Articled Students to B.C. Land Surveyors, who are writing their Western Board of Examiners exams. Introduction to probability and statistics, various probability distributions (normal, Student-t, chi-square, Fisher, tau), statistical testing of hypotheses, propagation of covariances, method of least squares, parametric adjustment, conditional adjustment, combined adjustment. **non credit**

SURV 968 Description for Deeds — A refresher course for Articled Students to B.C. Land Surveyors, who are writing their Final exams. **non credit**

SURV 969 Planning — A refresher course for Articled Students to B.C. Land Surveyors, who are writing their Final exams. It is recommended that the participants have a copy of "Guide to Planning and Land Development" by J. Connelly. **non credit**

SURV 970 Land Title Acts — A refresher course for Articled Students to B.C. Land Surveyors, who are writing their Final exams. **non credit**

Industry Services

Industry Services is that part of BCIT responsible for the provision of in-house training. If your company is looking for support in the development of training programs, or if your company has a particular training need, pick up your phone and call us now.

In its seventeen years of existence, Industry Services has developed a large and satisfied client group, whose members return year after year for training for their staff. For many companies, this is by far the most cost effective way of training staff.

In addition to in-house training, Industry Services organizes seminars and conferences.

Our major programs for 1986/87 are:

* Customized training programs for client companies
* Consultation and development services
* Industrial Maintenance guided study program
* Industrial Maintenance intensive program
* Industrial Maintenance in-house program
* Computerized Maintenance Management program
* Avalanche Safety program
* CAD/CAM Awareness Campaign
* Annual Pulping Summer Institute
* Salmonid Enhancement Training program
* State-of-the-Art technology seminars and workshops

More information from:

Eric Morse, Program Head, Industry Services. Telephone: (604) 432-8638.

Customized Programs, Consulting and Development Services

BCIT's Industry Services staff will work with your company to help determine your training requirements and to design and present courses for your staff. The full resources of BCIT are available to provide a comprehensive range of training, at the supervisory, senior or middle management levels.

All of the courses described in this calendar contain material which can be adapted for your company for presentation at the required level. With the rapid growth in the implementation of new technology, it is more important than ever that companies use local resources to train personnel.

If your company has a training project, or if you wish to draw on the resources of BCIT for support in any new venture, contact Industry Services to find out how we can help you.

Faculty and Staff

Eric Morse, Program Head, Industry Services. Telephone: (604) 432-8638.
Paddy O'Reilly, Department Head, Part-time Programs. Telephone: (604) 432-8582.

Industrial Maintenance Programs

These programs offer a series of practical courses on electronic circuitry and its function in current industrial equipment, designed for anyone who services electronic equipment or who requires a practical course in electronics and microprocessor troubleshooting; also suitable for engineers and technicians who have a wide range of responsibilities and who require a working knowledge of microprocessor hardware and software. Emphasis is on hands-on practice in operating and troubleshooting.

The courses are presented in several different ways including:

Guided Learning

Nine courses are offered simultaneously each term at the Downtown Education Centre, 549 Howe Street, Vancouver. Where you start depends on your experience. You may be able to skip the beginning courses and start at a more advanced level. Work at your own pace in these practical sessions. There are 21 hours of supervised lab time and 20 hours of home study.

Intensive Program — Block Format

Eight courses are offered in a week-long, seminar format at the Downtown Education Centre, 549 Howe Street, Vancouver. You may take the courses on an individual basis or as a block of training at a reduced price. These courses will be particularly attractive for unemployed students who require a concentrated period of retraining.

Intensive Program — Once-a-month Format

Eight courses are also offered in a week-long, seminar format at the Downtown Education Centre, 549 Howe Street, Vancouver, once monthly.

In-house Programs

All Industry Services Industrial Maintenance courses can be run in-house. In the last sixteen years, over a hundred companies have benefitted from this efficient way of staff training. In addition, we can provide support in the development of new programs or courses tailor-made to your company's needs.

For more information about this service call:

Eric Morse, Program Head, Industry Services. Telephone: (604) 432-8638.
Paddy O'Reilly, Department Head, Part-time Programs. Telephone: (604) 432-8582.

Course Descriptions

MTCE 900 Electronics — This is not a taught course. It is a "catch-all" for students enrolling in any of the Guided Electronics courses run at the Downtown Education Centre, 549 Howe Street, Vancouver. If you are interested in these courses (MTCE 901 — 907 and MTCE 928) please refer to the individual course descriptions below, but register into MTCE 900. Your registration in any of the other courses will be determined on the first night of classes. **non credit**

MTCE 901 Electronics 1 — Solid State Devices — Requires little or no experience with solid state components. Learn theory and application of junction diodes, transistors, zener diodes, TRIAC, JFET, DIAC, LED, MOSFET, UJT, SCR, PUT. First lab experiments show how to use oscilloscope, signal generator, etc. Build and test circuits — half and full-wave rectifiers, filters, constant current voltage regulators, simple and 2-state feedback amplifiers, oscillators, simple UJT triggering and magnetic isolation phase controls. Hours: 20 home study/21 supervised lab time. Emphasis is on hands-on practice in operation and trouble shooting. **non credit**

MTCE 902 Electronics 2 — Digital Techniques 2 — Introduction to integrated circuits; Boolean algebra, number systems and conversion codes included. Learn operation/application of op amps; inverters; AND, NAND, OR, NOR, exclusive OR, exclusive NOR gates; flip flops. Lab experiments consist of simple gates testing and completing truth tables. Build/test circuits: op amp

adders, multipliers, AND gates; logic equivalents of magnetic starters, decimal to binary encoders, binary to decimal decoders, contact bounce eliminators, flip flops using simple gates, binary/decode counters; shift registers. Prerequisite: MTCE 901. **non credit**

MTCE 903 Electronics 3 — Digital Techniques 3 — Covers logic circuit applications and additional specialized chips. Includes internal circuitry of typical gates; current sourcing and sinking; logic threshholds; fan cut, noise immunity; propagation delay; switching speed vs. power consumption; tri-state logic, binary, arithmetic; RAM, ROM, PROM, EPROM memory chips. Lab experiments: TTL NAND gates using discrete comp; logic threshholds for TTL and CMOS; open inputs — TTL/CMOS; tri-state bus system; binary adder/subtract; BCD adder with decimal adjust circuit; ALU; single chip serial/parallel shift register; random access memory circuit. Prerequisite: MTCE 902. **non credit**

MTCE 904 Electronics 4 — Introduction to Microprocessors — Will remove some of the mystery surrounding the operation and application of microprocessors. Topics include terms and conventions; executing programs; addressing modes; branching; architecture and instruction set for 6800 MPU: extended and indexed addressing; stack operations; sub routines. Heathkit model ET 3400 trainer will be used in lab. Experiments will allow you to practice machine language programming and debugging. Prerequisite: MTCE 903. **non credit**

MTCE 905 Electronics 5 — Microprocessors 2 — The second half of electronics 4. Topics include: address decoding; input/output (I/O) operations; interrupts; interfacing fundamentals, interfacing direct and interfacing using the peripheral interface adapter (PIA). You will be required to wire additional logic circuits to work in conjunction with MPU during labs. This will give you additional practice in logic circuit trouble-shooting and program debugging. Prerequisite: MTCE 904. **non credit**

MTCE 906 Electronics 6 — Micro Interfacing 1 — Interfacing is a part of all microprocessor applications and is the area where most problems occur. Topics: digital to analog converters; analog to digital converters; serial data communications; parallel/serial conversions; asynchronous/synchronous transmissions; asynchronous communication interface adaptors; TTL, RS23SC, 2OMA current loop inter facing; modems; teletypewriters, line printers, CRT terminals; cassette recorders, floppy disks; static vs dynamic RAM, ROM, PROM, EPROM: bubble/charge coupled memory. Prerequisite: MTCE 905. **non credit**

MTCE 907 Electronics 7 — Micro Interfacing 2 — In electronics 6, you become familiar with interfacing circuits. In this course we look at the whole 6800 family of processors including the new, sophisticated 16 bit 68000 MPU. Topics include: programmable timer modules (PTM); 6800, 6801, 6802, 6803, 6805, 6808, 6809, 68000; 6821 PIA interface; 6840 PTM interface; 6850 ACIA interface. Lab experiments will again give you hands-on practice, wherever possible. Prerequisite: MTCE 906. **non credit**

MTCE 908 Electronics 8 — Introduction to Computers — Designed to lead you from microprocessors to microcomputers. Topics: computer terms and conventions; comparison of 6800 and 8080 microprocessors; typical computer (Heathkit H8); typical terminal (Heathkit H19); use of front panel monitor; escape routines; use of console debug programs; single stepping program; use of break points; computer languages (machine-assembly-high level); intro to BASIC programming. You will use Heathkit H8 computers and H19 terminals with cassette interface in lab experiments. Prerequisite: MTCE 907. **non credit**

MTCE 909 Programmable Controllers — PLC components and configuration; BASIC programming; programming of timer, counter and other BASIC circuits; range extension and data modification; programs with cascaded instructions. Participants will get hands-on experience with an Allen-Bradley PLC 4. The PLC is now part of almost every electrical control system. In replacing arrays of electromechanical control relays, timers, counters, shift registers and sequencers, the PLC provides impressive savings in space and costs. **non credit**

MTCE 928 Operational Amplifiers — Terminology and parameters; voltage follower; inverting amp, noninverting amp, summing junction, differential, comparitor; sine wave generator, square wave generator; staircase wave generator, instrumentation amps, triangle wave generator. **non credit**

Computerized Maintenance Program

A series of three practical workshops for those who are directly responsible for equipment maintenance, in particular, maintenance managers, superintendents, foremen and planners. The workshps are offered at the Downtown Education Centre, 549 Howe Street, Vancouver. Enrolment is restricted to 10 per workshop to allow each participant to work alone on a computer terminal. Hardware: IBM PCs or compatibles. Software: COMAC Computerized Preventive Maintenance System.

Course Descriptions

MTCE 921 Preventive Maintenance — A step by step guide to designing an integrated Preventive Maintenance program for your organization. **non credit**

MTCE 932 Computerized Maintenance Management 1 — Allows each participant to use a microcomputer with a brand name software package to develop a Preventive Maintenance program. Participants will work with software modules in plant assets, forward planning, plant resources, work in progress and plant history. **non credit**

MTCE 933 Computerized Maintenance Management 2 — A continuation of course MTCE 932. Participants will work with software modules in plant conditions, defect analysis and report retrieval systems. **non credit**

Avalanche Safety Program

A series of non credit training courses for professionals in the field, designed to meet the needs of operations concerned with Avalanche Safety: Ski Areas, Ski Guiding, Highway Operations, Railways, Mining, Logging, etc.

Avalanche training in British Columbia is a joint venture between the NATIONAL RESEARCH COUNCIL CANADA and BRITISH COLUMBIA INSTITITE OF TECHNOLOGY.

Support and assistance to this program is provided by:

Association of Canadian Mountain Guides
Blackcomb Skiing Enterprises
Canada West Ski Areas Association
Canadian Avalanche Association
Canadian Mountain Holidays
Ministry of Education, Province of British Columbia

Ministry of Lands, Parks and Housing, Province of British Columbia
Ministry of Transportation and Highways, Province of British Columbia
Parks Canada
Skiing Louise Ltd.
Whistler Mountain Ski Corporation

Technical Enquiries about these courses to: NRC Avalanche Centre, Peter Schaerer, (604) 666-6741
Registration enquiries to: Karen Fraik, BCIT, (604) 432-8521

Course Descriptions

AVAL 951 Avalanche Safety for Ski Operations Level 1 — For advanced/intermediate skiers with some touring experience. At the end of the course participants will be able to identify avalanche terrain, the character and hazards involved and the formation of avalanches, apply personal safety measures, participate in avalanche search and rescue, and assist with the collection of weather, snow pack and avalanche activity data. **non credit**

AVAL 952 Avalanche Safety for Ski Operations Level 2 — Designed for professional mountain guides, back-country ski guides and ski area personnel, this course offers a more technical treatment of the subject matter. At the end of this course participants will be able to identify hazardous terrain and choose safe routes; collect accurate weather, snow pack and avalanche occurrence data; determine snow stability; implement personal and public safety measures; direct search and rescue operations and assist with avalanche hazard forecasting. Prerequisite: AVAL 951, or equivalent, and NRC approval of background. **non credit**

AVAL 953 Avalanche Safety for Transportation and Industry — An introductory course for supervisors and technicians whose work involves the construction or maintenance of transportation and utility corridors, and those who make decisions directly affecting the safety of their employees and the public. This training in avalanche safety is directed towards the skills and knowledge necessary to monitor potentially hazardous areas, take adequate safety precautions, conduct search and rescue activities and other associated tasks. **non credit**

AVAL 954 Avalanche Terrain — For engineers and technicians who are responsible for the design and location of recreational, industrial, transportation and utility facilities in areas subject to avalanche activity. In order to make adjustments for real or potential hazards, designers must be able to recognize and evaluate terrain, know where expert advice is available and be able to apply appropriate safety and preventative measures. **non credit**

AVAL 955 Avalanche Control — Specially designed for operational avalanche control. At the end of the course, participants will be able to describe options and priorize avalanche control methods; describe operational safety measures; define the protective methods required to apply control; define local, provincial, and federal regulations re avalanche control; state appropriate methods for explosives and application; participate as a team in use of hand charges, case charges, cornice removal and use of avalancher; dispose of explosive duds; evaluate effect of control methods. Prerequisite: AVAL 951, or equivalent, and NRCC approval of background. **non credit**

AVAL 956 Avalanche Awareness — Specially designed for members of the skiing community who wish to have a high quality avalanche awareness course but do not require accreditation. This is a shortened version of AVAL 951 with less emphasis on avalanche control and collection of data and more on hazard recognition and data interpretation. Suitable for those who are advanced/intermediate skiers with some touring experience, backcountry skiers and mountaineers. **non credit**

CAD/CAM Awareness Campaign

During 1986/87 BCIT will be mounting a CAD/CAM awareness campaign to assist small and medium industry in the understanding and implementation of CAD/CAM and other advanced manufacturing technologies.

A series of workshops for senior managers will be presented during the Summer of 1986, followed by more intensive sessions in the Fall of 1986 and Spring of 1987.

The objective is to provide companies with the opportunity to explore the possibilities of implementing these productivity-enhancing technologies in their businesses without the commercial sales pressure normally encountered at trade shows and equipment demonstrations.

The first part of the campaign will consist of management workshops for one-and-a-half days, focusing on providing broad familiarization with the technology, and providing initial data to encourage serious evaluation of the suitability of the technology for each company. Attendance at these workshops will be limited to about 10 people and will be by invitation. Hands-on access to BCIT's CAD/CAM and Robot systems will be available.

The second stage of the campaign will be for management and engineering staff and will focus on developing an understanding of the process of justifying, selecting, evaluating, and installing CAD/CAM systems, robots and any other advanced technology. These sessions will last two-and-a-half days, and hands-on access to BCIT's facilities will be available.

The third stage of the campaign will be the provision of back-up support to companies involved in the acquisition of a CAD/CAM system or robot. This support may take the form of assistance with preparation of specifications, project evaluation, benchmark testing, training of staff, etc.

Orientation Workshops:

CDCM 901	NC/CNC Applications Workshop
CDCM 902	Automated Drafting Workshop
CDCM 903	Robot Applications Workshop
CDCM 904	Process Control Workshop
CDCM 905	Computer Integrated Manufacturing Workshop

Management Workshops:

CDCM 906	How to Select the Right CAD/CAM System or Robot for your Company

Further information about this campaign from:

E. Morse, Industry Services, School of Engineering Technology. Telephone: (604) 432-8638

C. Goodbrand, CAD/CAM Technology, School of Engineering Technology. Telephone: (604) 432-8488.

Annual Pulp and Paper Summer Institute

The Pulp and Paper Summer Institute is a well-established technology program in the field of pulp and paper manufacture and has been presented at various locations in British Columbia each year since 1979. The technical programs are designed to draw upon the practical expertise of speakers recruited from pulp and paper and related industries. The technical program of Pulp and Paper Technology Summer Institute presents an overview of the pulp and paper industry together with current innovations in technology. The discussions are directed primarily to the principles and methods of manufacture. However emphasis is given to product qualities within the various unit processes and their potential effects on end-use applications.

Further information from:

E. Morse, Program Head, Industry Services, School of Engineering Technology. Telephone: (604) 432-8638

S. Berghold, Program Co-ordinator, Pulp and Paper Technology. Telephone: (604) 432-8267.

Salmonid Enhancement Training Program

A series of seven courses designed as part of the Federal/Provincial Salmonid Enhancement Training Program. The courses are offered by special request only.

FSTR 931 SETP — Introduction to Salmonid Enhancement
FSTR 932 SETP — Fish Health Level 1
FSTR 933 SETP — Environmental Awareness Level 1
FSTR 934 SETP — Bio-reconnaisance
FSTR 935 SETP — Ponding and Feeding
FSTR 936 SETP — Project Management 1
FSTR 937 SETP — Project Management 2

Further information from:

Eric Morse, Program Head, Industry Services. Telephone: (604) 432-8638.

School of Health Sciences Studies

Certificate programs and individual courses are available through the Health Sciences Part-time Studies Department and include update, advanced and qualifying courses in the Health Science field.

Courses are delivered in a variety of formats:

(a) Classroom delivery — one night per week, week long or weekends at BCIT Burnaby campus, the Downtown Education Centre or other locations in B.C. by arrangement;
(b) Guided Learning — home study supplemented by tele-tutoring, teleconferences or seminars;
(c) Classroom delivery — short intensive periods of full-time study and clinical practice;

Program Approval

Some courses are grouped in Certificate Programs. It is recommended that students consult with program coordinator prior to registering, to have their program of studies approved.

Health Care Management

Level 1 Certificate Program
Long Term Care
Level 2 Certificate Program
Professional Development Courses

Health Technologies

Medical Laboratory
Medical Radiography
Diagnostic Medical Sonography
Nuclear Medicine Technology
Biomedical Electronics
Health Information
Prosthetics and Orthotics
Environmental Health
Basic Health Sciences
Occupational Health and Safety

Nursing

Advanced Courses
Certificate of Credit in Nursing
Refresher Courses
Qualifying Courses
Professional Development
Advanced Diploma in Health Sciences

Interdisciplinary Courses

Health Care Management

There are two levels of Health Care Management Programs (Level 1 and Level 2) leading to two separate certificates. These are supplemented by additional professional development courses in the Health Care Management field. The programs are designed to help managers, and would-be managers, sharpen their management skills and acquire new skills appropriate to their particular needs, while broadening their general perspectives on the health care field. Applicants should be employed in health care agencies or be graduates of a health paraprofessional, professional or technological program.

Applicants for either of the Health Care Certificate Programs must have their proposed programs of courses, and any revisions to existing programs of courses, approved by the program co-ordinator. These requests may be made in person or in written form. Contact Health Part-time studies at the BCIT Burnaby Campus for an interview appointment and/or the necessary forms.

Transfer credits may be awarded for academic work completed at other recognized institutions according to the policy established for Health Part-time studies. For further information see page in this calendar or contact the Health Care Management Program Co-ordinator at BCIT, Burnaby.

Applicants not wishing to complete the entire program may enroll in any of the mandatory or elective courses.

Health Care Management Certificate Program Level 1

This program, offered in cooperation with the British Columbia Health Association (B.C.H.A.), is designed for first level managers. It provides information and practise in the application of management principles to health care and long term care management situations. It is appropriate for department heads, administrators, head nurses and anyone anticipating a management position. The courses are offered in a variety of time frames as outlined in the part-time studies tabloids published quarterly.

Those students who have completed HMGT 600 Health Care Supervisory Skills will receive credit towards their elective course work. Preferably, this course will be completed before entering the Level 1 program.

Mandatory Courses

		Credit	Hours
HCSY 610	Health Care Systems	1.5	18
HMGT 601	Health Care Organizational Behavior	3.0	36
HMGT 602	Health Care Principles of Management	3.0	36
HMGT 603	Health Care Operations Management	1.5	18
HMGT 604	Budgeting in Health Care	1.5	18
HMGT 605	Human Resource Management	3.0	36
HMGT 606	Health Labor Relations 1	1.5	18
or			
HMGT 607	Long Term Care Labor Relations	1.5	18

Recommended Electives

108 hours of elective course work from:

Administrative (General) Management

		Credit	Hours
ADMN 145	Managing Change	2.0	18
ADMN 301	Managerial Styles	3.0	36
ADMN 302	Problem Solving and Decision Making	3.0	36
COMP 101	Data Processing Introduction	3.0	36
HMGT 600	Health Care Supervisory Skills	3.0	36

(should be completed before HMGT 601 and 602)

Education (Training)

		Credit	Hours
ADMN 127	Training Techniques	3.0	36
ADMN 202	Course Design	3.0	36
ADMN 203	Instruction/Facilitation — Training	3.0	36
EDUC 601	Human Learning	2.0	18
EDUC 625	Using Audio Visuals in Education	2.0	18

Financial Management

		Credit	Hours
ADMN 100	Micro Economics	4.0	36
ADMN 302	Problem Solving and Decision Making	3.0	36
COMP 101	Data Processing Introduction	3.0	36
FMGT 101	Accounting 1	4.0	36
FMGT 109	Accounting for the Manager	3.0	36
FMGT 201	Accounting 2	6.0	36

Personnel

		Credit	Hours
ADMN 204	Personnel Management	4.0	36
ADMN 205	Selection Interviewing	4.0	36
ADMN 304	Manpower Planning	4.0	36
ADMN 305	Salary Administration	4.0	36

Systems

		Credit	Hours
COMP 101	Data Processing Introduction	3.0	36
COMP 160	Computer Systems — Introduction 1	3.0	36
or			
OPMT 188	Management Information Systems	3.0	36
OPMT 191	Purchasing	3.0	36
OPMT 192	Inventory Planning and Control	3.0	36

Recommended Pre-entry Courses

It is assumed that participants have well developed written and verbal communication skills. For those wishing to upgrade these skills, the following courses are recommended.

		Credit	Hours
COMM 192	Writing Reports	1.5	18
MKTG 323	Public Speaking and Oral Communication 1	3.0	36

Long Term Care

Long Term Care Management is an integral part of the Health Care Management Program. Compulsory courses present management principles, then apply these principles to both health care and long term care situations. The course HMGT 607 Long Term Care Labor Relations is compulsory for all those selecting the Long Term Care stream.

Recommended Electives

		Credit	Hours
ADMN 145	Managing Change	2.0	18
ADMN 201	Counselling 1	3.0	36
ADMN 301	Managerial Styles	3.0	36
ADMN 302	Problem Solving and Decision Making	3.0	36
BSMT 100	Maintenance and Control	3.0	36
BSMT 101	Safety and Sanitation	3.0	36
OHCE 301	Fire Protection 1: Fire Prevention	3.0	36
OPMT 191	Purchasing	3.0	36
OPMT 192	Inventory Planning and Control	3.0	36

Health Care Management Certificate Program Level 2

This program is designed for middle managers in health care agencies and in long term care agencies. The program builds upon the Health Care Management Certificate Program (Level 1) by requiring participants to complete an additional 252 hours (21 credits) of course work.

Level 2 program objectives include increasing the breadth and depth of knowledge by studying new subject material as well as advanced subjects, and solving problems using theory and skills gained in previous mandatory courses.

To qualify for the Level 2 Certificate, participants must complete additional mandatory core courses and electives. Electives are chosen in consultation with the program co-ordinator and are selected from the same elective streams as listed for the Level 1 program.

Mandatory Courses

		Credit/Hours	
HMGT 701	Information Systems in Health Care 1	1.5	18
HMGT 702	Health Care Law	2.0	18
HMGT 703	Financial Administration for Health Care Managers	1.5	18
HMGT 751	Information Systems in Health Care 2	1.5	18
HMGT 752	Health Labor Relations 2	1.5	18
HMGT 753	Application of Theory to Selected Health Problems	1.5	18

Health Care Management Professional Development

Throughout the year, courses are featured for graduates from the Health Care Management Certificate Program, the Canadian Hospital Association's correspondence courses in management, other management courses, and for those people who simply wish more information about a particular health care topic. Included in these are:

		Credit/Hours	
HMGT 909	Selection Interviewing for Health Care Supervisors	1.5	18
HMGT 914	Performance Appraisal for Health Care Supervisors	1.5	18
HMGT 915	Power in Health Care Organizations	0.0	—
HMGT 918	Management Information Systems for Long Term Care Administrators	1.0	12
HMGT 919	Layoff and Dismissal in Health Care Organizations	0.0	—
HMGT 920	Employment Interviewing for Health Care Organizations	0.0	—
HMGT 921	Quality Circles: a Change of Perspective for Health Care Managers	0.0	—
HMGT 922	Administrative Cost Control for Long Term Care Administrators	0.5	6
HMGT 923	Food Cost Control	0.0	—

These courses may be offered in any community in B.C. Fees will vary depending on the local arrangements and the location. For further information contact Health Part-time Studies at the Burnaby Campus.

Health Technologies

There are two levels of health technology courses, update and advanced. The update courses enable technologists to keep up with the latest developments in their fields; the advanced courses examine specific subjects in depth.

For Medical Laboratory, advanced courses can be used as preparation for the Advanced Registered Technologist's examination of the Canadian Society of Laboratory Technologists. For Medical Radiography and Nuclear Medicine Technology, the advanced courses have been awarded credit toward Advanced Certification.

Medical Laboratory

Medical Laboratory offers courses at many levels. The refresher courses prepare students for re-entering the work force, while the advanced ones prepare them for the Advanced Registered Technologist examination and/or the Advanced Diploma in Health Sciences.

		Credit
MLCE 602	Normal Histology and Microanatomy for Medical Laboratory Technologists — Part 1	3.0
MLCE 603	Normal Histology and Microanatomy — Part 2	4.0
MLCE 604	Clinical Chemistry	1.5
MLCE 605	Hematology	1.5
MLCE 606	Histopathology	1.5
MLCE 607	Immunohematology	1.5
MLCE 608	Clinical Microbiology	1.5
MLCE 609	Teleconference for Medical Laboratory Technologists	1.0
MLCE 610	Advanced Hematology (Red Cell)	1.5
MLCE 611	Advanced Hematology — Part 2	1.5
MLCE 901	Clinical Microbiology Refresher Program	0.0

Medical Radiography

Medical Radiography offers advanced level courses in a variety of technical subjects. While most of the courses are designed for Advanced Certification, they can be used to update knowledge.

		Credit
BHCE 601	Cross Sectional Anatomy (approved by CAMRT for Advanced Certificate 0.5 credit)	3.0
MRCE 611	Computed Tomography (Advanced Certification Credit 1.0)	3.0
MRCE 902	Refresher Program for Medical Radiography Technologists	0.0
MRCE 912	Radiation Biology for Medical Radiography Technologists (Advanced Certification Credit)	3.0

Nuclear Medicine Technology

Nuclear Medicine Technology offers advanced courses which have been awarded credit toward Advanced Certification.

		Credit
NMCE 903	Advanced Physiology for Nuclear Medicine Technology (under development)	—

Biomedical Electronics

Biomedical Electronics technologists maintain and repair electronic equipment used in medicine and biology. There is a need for individuals who have an understanding of this rapidly changing field. Courses are designed to provide specific skills for immediate job application. Advanced Diploma courses are being prepared in this area.

		Credit
ADNU 670	Patient Care Technology	3.0
BMCE 914	Principles of Electrical Machinery for Occupational Health and Safety	3.0

Medical Electronics Modules

These three modules are designed for Electronic and Biomedical Electronic Technologists employed in the medical field. They provide both upgrading and continuing education to the technologist who whould like more experience with advanced digital electronic devices and microprocessors. The three modules are designed to be taken consecutively, but the preliminary modules may be omitted with proper prerequisites or work experience.

		Credit
BMCE 904	Advanced Electronic Devices (Module 1)	3.0
BMCE 905	Introduction to Microprocessors for Medical Applications (Module 2)	3.0
BMCE 906	Microprocessor Based Medical and Clinical Equipment (Module 3)	3.0

Health Information

This program offers courses for both upgrading and advancement. Evening courses allow people to begin their health record technician studies while remaining employed. It is anticipated that courses for the completion of the second year of the health records administration program will be available shortly, through Part-time Studies. Advanced Diploma courses are also being planned.

		Credit
HICE 903	Quality Assurance for Health Records Departments	3.0
HICE 904	Medical Terminology 1	3.0
HICE 905	Medical Terminology 2	1.5

Prosthetics and Orthotics

Short courses and workshops in Prosthetics and Orthotics are currently under development. To be placed on the mailing list contact Health Part-time Studies.

		Credit
POCE 901	Lower Limb Orthotics	TBA
POCE 902	Upper Limb Orthotics	TBA
POCE 903	IPOS Trans Femoral Prosthetic Systems	1.5
POCE 904	Prosthetics, Orthotics and the Amputee Part 1: The Lower Limb	TBA
POCE 905	Rehabilitation of the Amputee	—
POCE 906	Prosthetic Feet	—

Environmental Health

Environmental Health Technologists often face new challenges. Part-time Studies courses are designed to assist these professionals to become familiar with key issues in these new areas. Advanced Diploma courses are being planned in this technology.

		Credit
EHCE 901	Basic Sound Measurement	1.5
EHCE 902	Basic Pest Control Within Buildings	3.0

Basic Health Sciences

Courses are offered in the basic health sciences to help health professionals upgrade and advance their knowledge in the biological and behavioral sciences.

		Credit
BHCE 601	Cross Sectional Anatomy	3.0
BHCE 914	Anatomy and Physiology Review	3.0
BHCE 915	Pathophysiology	3.0

Certificate Program in Occupational Health and Safety

This program is designed for people employed in, or interested in, safety of persons and property in industry. Credits accrued in this certificate program may be applied to the Diploma program. Persons not wishing to take the entire program may register for individual courses.

Course selections must be approved in writing by the Program Head in Occupational Health and Safety.

Mandatory Courses

		Credit
OHCE 101	Accident Prevention 1: Job Safety Analysis	3.0
OHCE 102	Accident Prevention 2: Employee Motivation	3.0
OHCE 103	Accident Prevention 3: Safety Design and Equipment	3.0
OHCE 104	Accident Prevention 4: Industrial Applications	3.0
OHCE 201	Industrial Health and Safety 1: Legislation	3.0
OHCE 202	Industrial Health and Safety 2: Policy Application	3.0
OHCE 203	Industrial Health and Safety 3: Loss Control and Auditing	3.0
OHCE 301	Fire Protection 1: Fire Prevention	3.0
OHCE 302	Fire Protection 2: Gases and Flammable Materials	3.0
OHCE 401	Industrial Hygiene 1: Toxicology	3.0
OHCE 402	Industrial Hygiene 2: Noise	3.0
OHCE 403	Industrial Hygiene 3: Radiation Protection	3.0

Suggested Electives

		Credit
ADMN 124	Supervisory Skills	3.0
ADMN 128	Occupational Safety and Health (B.C.S.C.)	3.0
ADMN 222	Organizational Behavior 1	3.0
ADMN 332	Labor Relations 1	4.0
BLDG 153	National Building Code	3.0
BSMT 101	Safety and Sanitation	3.0
COMM 183	Technical Report Writing	3.0
MECH 140	Drafting Fundamentals	3.0
MECH 432	Automatic Sprinkler Design 1	3.0
MECH 433	Automatic Sprinkler Design 2	4.5
OPMT 294	Physical Material Handling: (Control and Use of Pesticides)	1.5

Professional Development Courses

		Credit
OHCE 902	Basic Anatomy and Physiology for Occupational Health	3.0
OHCE 903	Controlling Loss Through Interpersonal Skills	0.0

Nursing

Courses are offered for graduates in General Nursing to update knowledge and skills. Advanced level (post basic) courses are available in Critical Care Nursing, Operating Room Nursing, emergency nursing, occupational health nursing, advanced medical/surgical nursing and obstetrical nursing. Others, such as advanced pediatric, neonatal, rehabilitation and home care nursing are being developed. Clinical application courses may be full-time study practicums or preceptorships.

Advanced Courses

Advanced courses are designed to provide post diploma qualifications in specialty areas for registered nurses. Some of these courses are available in a guided learning mode, ie. via modules supported with teletutoring and teleconferencing which enable participants to study part-time and complete these courses mainly in their own communities. These courses lead to an Advanced Diploma in Health Sciences. More detailed information is provided in the Advanced Diploma section and in the Advanced Diploma calendar.

Certificate of Credit in Nursing

This is a program of guided learning courses offering tutorial assistance in english, behavioral sciences and biological sciences to meet the requirements of the BCIT General Nursing curricula. More information is available in the Certificate of Credit in Nursing brochure.

		Credit
CTCR 101	Anatomy and Physiology	4.0
CTCR 102	Writing for Nurses	3.0
CTCR 103	Personal Fitness Management	3.0
CTCR 104	Physiology	4.0
CTCR 105	Human Development 1	4.0
CTCR 106	Human Development 2	2.0
CTCR 107	Sociology	2.0
CTCR 108	Microbiology	1.5
CTCR 109	Immunology	1.5

Refresher Courses

Nurses who have not practised in recent years who wish to upgrade their knowledge and skills may undertake the intensive refresher program with supervised practicums.

		Credit
NUCE 901	Refresher Course for Graduate Nurses**	27.0

Qualifying Courses

These courses are offered to assist graduate nurses to complete their educational qualifications for eligibility to become registered nurses in British Columbia.

		Credit
NUCE 902	Basic Mental Health Nursing	25.0
NUCE 903	Obstetrical Nursing Qualifying**	non

** These courses require approval by the department before registration. Application forms are available by contacting Health Part-time Studies BCIT, Burnaby.

Professional Development Courses

As the need for continuing education of Registered Nurses and Registered Psychiatric Nurses is identified, BCIT will design and conduct appropriate courses. Check your hospital notice boards for postings about new courses or contact Health Part-time Studies at the Burnaby Campus to have your name placed on our mailing list.

		Credit
NUCE 909	Enterostomal Therapy: the Role of the Nurse	0.0
NUCE 911	Gerontology Concepts	0.0
NUCE 919	Obstetrical Nursing Update	0.0
NUCE 930	Diabetes Update	0.0
NUCE 931	Cancer Update	0.0
NUCE 960/962	Pharmacology in Nursing Practice	0.0

Advanced Diploma in Health Sciences

The Advanced Diploma in Health Sciences is designed to provide practicing technologists and nurses with the advanced knowledge, skills and attitudes necessary for further professional competence, advanced technological or clinical roles, management roles and/or for individual growth.

The Advanced Diploma has six components. The student will be required to successfully complete a minimum number of credits in each component, plus elective credits. For more detailed information, request a copy of the Advanced Diploma calendar.

Some examples of courses available are listed below.

Nursing Specialties

		Credit
ADNU 601	Physiological Aspects of Patient Care — Part 1	4.0
ADNU 602	Physiological Aspects of Patient Care — Part 2	2.0
ADNU 603	Physiological Aspects: Critical Care Nursing Part 1	4.0
ADNU 604	Physiological Aspects: Critical Care Nursing Part 2	2.0
ADNU 605	Physiological Aspects: Obstetrics/Emergency	3.0
ADNU 606	Physiological Aspects: Home Nursing Care	3.0
ADNU 620	Psychological Aspects of Patient Care — Part 1	3.0
ADNU 621	Psychological Aspects of Patient Care — Part 2	3.0
ADNU 630	Interpersonal Skills	3.0
ADNU 640	Physical Status Assessment	3.0
ADNU 641	Mental Status Assessment	2.0
ADNU 650	Ethics in Health Sciences	2.0
ADNU 670	Patient Care Technology	
ADNS 600	Advanced Medical/Surgical Nursing — Part 1	6.0
ADNS 601	Advanced Medical/Surgical Nursing — Part 2	6.0
ADNS 620	Operating Room Nursing — Part 1	7.5
ADNS 621	Operating Room Nursing — Part 2	20.0
ADNS 626	Operating Room Specialty: Vascular Surgery	—
ADNS 630	Critical Care Nursing — 1	4.0
ADNS 631	Critical Care Nursing — 1A	1.0
ADNS 632	Critical Care Nursing — 2	5.0
ADNS 633	Critical Care Nursing — 3	6.0
ADNS 634	Critical Care Nursing — 4	6.0
ADNS 635	Critical Care Nursing — 4A	TBA
ADNS 636	Critical Care Nursing — 5	7.0
ADNS 640	Concepts in Nursing the Childbearing Family — Part 1	3.0
ADNS 641	Concepts in Nursing the Childbearing Family — Part 2	3.0

Health Technologies Specializations

		Credit
MLCE 610	Advanced Hematology (Red Cell) — Part 1	1.5
MLCE 611	Advanced Hematology (Red Cell) — Part 2	1.5
MLCE 602	Normal Histology and Microanatomy for Medical Laboratory Technologists — Part 1	3.0
MRCE 611	Computed Tomography	3.0

Health Care Systems

		Credit
HCSY 610	Health Care Systems	1.5

Educational Skills

		Credit
EDUC 601	Human Learning	2.0
EDUC 625	Using Audio Visuals in Education	2.0

Research

		Credit
RESH 601	Understanding Research in the Health Sciences	3.0
RESH 602	Preparing Health Science Research	3.0

Management

		Credit
HMGT 600	Health Care Supervisory Skills	3.0

(See Health Care Management section for other listings)

Interdisciplinary Courses

These workshops and courses are developed on a variety of general interest topics for health care professionals. They are offered at various times as indicated by specific need. Agencies and interested groups of individuals may request the development of courses and workshops on topics not listed by contacting Health Part-time Studies, BCIT, Burnaby.

		Credit
IHCE 901	Career Change: Career Exploration	0.0
IHCE 905	Infection Control	3.0
IHCE 907	Designing Fitness Programs for Mature Adults	0.0
IHCE 909	Motivating Without Money	0.0
IHCE 910	Fund Raising Grant Proposals	0.0
IHCE 911	Update on Nutrition, Physical Fitness and Weight Control	0.0
IHCE 912	Current Perspectives on Weight Management	0.0
IHCE 913	Can You Eat to Win?	0.0
IHCE 920	Computer Literacy	0.0

Course Descriptions

ADMN 100 Micro Economics — The major areas studied are the product and resource market. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored. **4 credits**

ADMN 124 Supervisory Skills — Designed for new supervisors or aspirants for leadership responsibilities in large or small companies, institutions, government departments, municipalities and associations. Students increase their confidence and abilities as leaders and establish a foundation for further training in supervision and management. Persons taking the first step into supervision study delegation, grievances, work planning, and roles and relationships within an organization. **3 credits**

ADMN 127 Training Techniques — Useful to people responsible for personnel training in business, industry, government and institutions. Members of personnel departments contemplating a training program, and supervisors involved with on-the-job training will be particularly interested. The student develops a good grounding in current training methodology, techniques and aids. Topics include learning theory, determining training needs, writing objectives, designing training programs using outside resources and evaluation. **3 credits**

ADMN 128 Occupational Safety and Health — A practical course conducted by the B.C. Safety Council for those responsible for occupational safety and health in an industrial settings including managers, supervisors, shop stewards, safety committee members and members of the industrial relations or personnel department. Topics include: Workers' Compensation Act; Factories Act; rules and regulations; types of organizational structure; the role of the committee; creating a "thinking" state of mind; pros and cons of reward systems; union/management co-operation; other ways and means of getting this important job done. **3 credits**

ADMN 145 Managing Change — Using experiential techniques, the course deals with the challenges of managing in the contemporary environment. Concerned with conflict, planned change and organization development, content covers each of these processes and offers an opportunity to facilitate organizational adaptability. **2 credits**

ADMN 201 Counselling 1 — Demonstrates that communication skills can be learned, and that through training, everyone can learn to become a more effective communicator. The instructional method focuses on learning to discriminate various levels of communication through lectures, listening, observing and actual practicing. The discrimination training focuses on empathy, respect, genuineness, concreteness, self-disclosure and confrontation. Live interaction and observer feedback are essential aspects of this developmental training. **3 credits**

ADMN 202 Course Design — Advanced Training Techniques — This sequel to ADMN 127 develops skills to effectively plan, design, construct and evaluate training programs and courses. The course is intensive and requires considerable commitment from participants to actively demonstrate and assess their developing skills. **3 credits**

ADMN 203 Instruction and Facilitation — Advanced Training Techniques — As a sequel to ADMN 127, this course develops skills necessary to lead and assess training sessions, workshops, simulation exercises and group sessions. This course is intensive and requires considerable commitment from participants to actively demonstrate and assess their developing skills. **3 credits**

ADMN 204 Personnel Management — An introductory course for those who have recently joined a personnel or industrial relations department or who plan to enter the field. It is also valuable to supervisors or managers who must implement, or are accountable for administering, personnel policies. The student develops an understanding of the personnel function, relationship to management and responsibility to employees. Topics cover: major functions emphasizing the practical application of personnel policies and procedures; salary administration, benefits administration; employee relations. **4 credits**

ADMN 205 Selection Interviewing — This course is presented for people in the fields of personnel, management, supervision, or anyone involved in interviewing applicants for employment, identifies techniques, styles, stages, uses, pitfalls and key points in interviewing with particular emphasis on questioning techniques and selective listening. Classes limited to 20 students. **4 credits**

ADMN 222 Organizational Behavior 1 — For persons with no formal training in Organizational Behavior, a study of basic behavioral concepts and their applications to management situations. These include operational definitions or terminology common to psychology and other social sciences, allowing the student to easily understand the information conveyed in reading in all areas of organizational behavior studies. The beginning concentrates on the individual, focusing on the determinants of behavior — heredity, culture, motivation, perception, attitudes, learning and leadership. The conclusion focuses on understanding group interactions in an organizational environment. The succeeding course is ADMN 322 Organizational Behavior 2. **3 credits**

ADMN 301 Managerial Styles — A practical course for the supervisor, manager or student wishing to learn more about the "people aspect" and psychology of management, with emphasis on how and why people interact as they do. Students develop a productive management style and study how accepted theories successfully deal with managerial problem situations as they arise. **3 credits**

ADMN 302 Problem Solving and Decision Making — Participants learn to apply various techniques to problem solving and decision making; the emphasis is on problem analysis. Group dynamics, demonstrations, lectures and practice sessions relating to real applications prevail. Rational and creative methods, using the principle of learning through interpersonal workshops group involvement, establish a high level of confidence in the student's ability to deal with problems effectively. **3 credits**

ADMN 304 Manpower Planning — Designed for anyone in a planning organization involving "people resources". Presents the philosophy of some techniques used in utilizing people potential within organizations. Topics include manpower planning, methods of evaluating present resources, future projections, sources of supply, identifying training needs, related personnel policies, budgeting, costing and program evaluation. **4 credits**

ADMN 305 Salary Administration — Students learn the 'whys' and 'hows' of salary administration and develop a basic knowledge of techniques in this field. Topics include alternative methods of job evaluation, job description; establishing and maintaining salary schedules; administering a salary plan; general and specific adjustments for promotions and demotions, how to set up a simple plan. **4 credits**

ADMN 332 Labor Relations 1 — For those involved in or associated with labor relations as members of management or of a union. People in the personnel field, shop stewards, supervisors and managers will find the coverage of the collective bargaining process and day-to-day contract administration extremely useful, and learn to approach their responsibilities for matters covered by

collective agreements with more confidence and expertise. Topics include related laws, typical contract clauses, grievance procedures, responsibilities of the supervisor and the shop steward and current activities in the labor relations field. **4 credits**

ADNS 600 Advanced Medical Surgical Nursing Part 1 — Focuses on patients with multiple system failures using case studies with concurrent clinical experience, whenever possible. A guided learning course. Prerequisite: ADNU 601, ADNU 602. **6 credits**

ADNS 601 Advanced Medical Surgical Nursing Part 2 — A continuation of ADNS 600. A guided learning course. Prerequisite: ADNS 600. **6 credits**

ADNS 620 Operating Room Nursing Part 1 — Units of guided learning material present the theory related to O.R. nursing. Prepares students for participation in the skills laboratory. A guided learning course. On-site tutorials, exams, labs. Prerequisite: Registered Nurse.7. **5 credits**

ADNS 621 Operating Room Nursing Part 2 — Ten weeks full-time attendance in supervised clinical practice in a hospital operating room. Prerequisite: ADNS 620. **20 credits**

ADNS 626 Operating Room Specialty: Vascular Surgery — under development.

ADNS 630 Critical Care Nursing 1 — A guided learning course which presents knowledge, skills and attitudes required by nurses who are employed in critical care practice settings. A framework is provided for the application of knowledge to the care of adult patients who require rapid assessment and immediate nursing intervention. **4 credits**

ADNS 631 Critical Care Nursing 1A — A guided learning course adapted from ADNS 630 for graduates of the UBC/VCC Level 1 Critical Care Nursing Program. **1 credit**

ADNS 632 Critical Care Nursing 2 — Three weeks full-time study. Includes independent practice in a critical care setting of a community hospital. Emphasis is on integration and application of previous learning, with particular attention to refining physical assessment skills. **5 credits**

ADNS 633 Critical Care Nursing 3 — A guided learning course plus four day laboratory sessions provides knowledge and skills required by nurses for critical care practice in tertiary care hospitals. Emphasis is on independent nursing functions and advanced nursing skills. **6 credits**

ADNS 634 Critical Care Nursing 4 — Five weeks full-time study. Supervised clinical practice in critical care setting of tertiary care hospital. Provides the opportunity to integrate and apply advanced knowledge and skills. Emphasis is on providing complete nursing care to critically ill adults. **6 credits**

ADNS 635 Critical Care Nursing 4A — Two weeks full-time supervised clinical practice modification of ADNS 634 for graduates of UBC/VCC Critical Care Nursing Program. **tba credit**

ADNS 636 Critical Care Nursing 5 — Four weeks clinical preceptorship including some independent study. Emphasis is on the transition from general nursing practice to critical care nursing practice. **7 credits**

ADNS 640 Concepts in Nursing the Childbearing Family Part 1 — Current concepts in Obstetrical Nursing designed for nurses who are employed in non-departmentalized hospitals and have obstetric patients as part of their practice. A guided learning course. Prerequisite: ADNU 605. **3 credits**

ADNS 641 Concepts in Nursing the Childbearing Family Part 2 — A continuation of ADNS 640. **3 credits**

ADNU 601 Physiological Aspects of Patient Care — Part 1 — Builds on basic physiology and assists students to understand the mechanisms the body uses to adapt to stressors and to predict common problems resulting from alterations in body functions. A guided learning course. **4 credits**

ADNU 602 Physiological Aspects of Patient Care — Part 2 — A continuation of ADNU 601. A guided learning course. Prerequisite: ADNU 601. **2 credits**

ADNU 603 Physiological Aspects: Critical Care Nursing Part 1 — Selected modules from ADNU 601/602 modified to meet the requirements of nurses in Critical Care areas. A guided learning course. **4 credits**

ADNU 604 Physiological Aspects: Critical Care Nursing — Part 2 — A continuation of ADNU 603. A guided learning course. **2 credits**

ADNU 605 Physiological Aspects: Obstetrics and Emergency — Selected modules from ADNU 601/602 modified to meet the requirements of nurses working in non departmentalized hospitals caring for obstetrical or emergency patients. A guided learning course. **3 credits**

ADNU 606 Physiological Aspects: Home Nursing Care — Selected modules from ADNU 601/602 modified to meet the requirements of nurses working in Home Care. **3 credits**

ADNU 620 Psychological Aspects of Patient Care — Part 1 — An eight module independent study course through which nurses will learn to assess dysfunctional behavior using a case study approach. Precedes the nursing interventions course in this area. A guided learning course.3 **credits**

ADNU 621 Psychological Aspects of Patient Care — Part 2 — A continuation of ADNU 620. A guided learning course. Prerequisite: ADNU 620. **3 credits**

ADNU 622 Psychological Aspects 3 — Selected modules from ADNU 620/621 modified to meet the needs of RN's, RPN's and graduate nurses employed in acute care agencies. **3 credits**

ADNU 630 Interpersonal Skills — Provides training which will enable you to respond with empathy, warmth and respect to patients. The course is based on a systematic human relations training model. A guided learning course. **3 credits**

ADNU 640 Physical Status Assessment — This course is designed to provide the knowledge and skills necessary to perform a physical assessment. It includes the expected findings resulting from the assessment but not the rationale for normal or abnormal findings. A guided learning course. **3 credits**

ADNU 641 Mental Status Assessment — under development.

ADNU 650 Ethics in Health Sciences — Designed to provide the practicing health care professional with an introduction to the study of ethics in health sciences. It will not provide answers to specific ethical dilemmas but will help the student to acquire the tools needed for ethical deliberation and action. **2 credits**

ADNU 670 Patient Care Technology — Overview of medical instrumentation for nurses and paramedical personnel. This course teaches effective and safe use of equipment referring to "state of the art" technology and features of that equipment. **3 credits**

BHCE 601 Cross Sectional Anatomy — For technologists who require knowledge of cross sectional anatomy of the chest, abdomen and pelvis. Content includes body planes, cavities and their divisions, sectional geometry and three dimensional anatomy. Anatomic features and relationships of functional and pathological significance will be emphasized. **3 credits**

BHCE 914 Anatomy and Physiology Review — For health professionals who have had a course in anatomy and physiology, but want to review and update their knowledge. Covers all body systems and includes genetics. A guided learning course. **3 credits**

BHCE 915 Pathophysiology — For health professionals already familiar with normal physiology, this course emphasizes those principles of pathophysiology which are common to a class of diseases. **3 credits**

BHSC 001 Biology — An upgrading and refresher course for those whose background in biology is weak or for those who have not studied biology for some time. This course meets the Biology 11 entrance requirement for BCIT. **non credit**

BHSC 002 Biology — An upgrading and refresher course for those whose background in biology is weak or for those who have not studied biology for some time. This course meets the Biology 12 entrance requirement for BCIT. **non credit**

BLDG 153 National Building Code — Examines the purpose, scope and contents of the National Building Code of Canada, for persons in design, drafting, construction, inspection and financing of buildings. A brief history of the development of the code, with specific study of Part 3: Use and Occupancy and Part 9: Housing and Small Buildings. Prerequisite: some knowledge of building construction. **3 credits**

BMCE 350 Basic Instrumentation for EEC Technologists — Intended for the practicing EEC Technologist, this course will provide systematic instruction in the Technical and instrumentation aspects of electroencephalography. **3 credits**

BMCE 351 Basic Instrumentation for Paramedics in Nursing Health Care — A general introduction to electronics and instrumentation for people working with electronic equipment in health care. Provides an overview of electronics, basic measurement instruments, electrical safety, and the operation of medical devices. **2 credits**

BMCE 601 Patient Care Technology — A review of medical instrumentation for nurses and paramedical personnel. This course teaches effective and safe use of equipment referring to "state of the art" technology and features of that equipment. **3 credits**

BMCE 904 Advanced Electronic Devices (Module 1) — Builds on a basic knowledge of analog and digital electronics. Topics include low level biomedical preamplifier circuits, isolated amplifiers, universal timer devices, basic digital circuit theory review, interfacing discrete components, frequency sources, etc. **3 credits**

BMCE 905 Introduction to Microprocessors for Medical Applications (Module 2) — This lecture/laboratory course is designed for the graduate technologist with a solid knowledge of SSI, MSI and LSI digital and analog circuit applications. Topics to be examined include review of Data Bus and Memory System fundamentals, Intel 8080/8085 microprocessor systems hardware and machine language instruction set, program development tools, high level computer languages, etc. **3 credits**

BMCE 906 Microprocessor Based Medical and Clinical Equipment (Module 3) — This lecture/laboratory course is designed for the graduate technologist with a solid knowledge of microprocessor fundamentals and applications. Topics include an overview of popular microprocessors e.g. Intel 8048, 8086, and 8088, Motorola 6800, etc. video display of characters and graphical information, microprocessor-based medical and clinical equipment, design and construction of simple microprocessor-based medical devices, single board computers, digital communications, etc. **3 credits**

BMCE 911 Basic Electronics in Medicine and Biology — Introductory electronics for people working in medicine and biology. Overview of electronics including basic circuit components, use of basic measurement instruments and electrical safety pertaining to electronic equipment. **3 credits**

BMCE 913 Basic Instrumentation for Health Science Technologists — Examines electronic instrumentation in general terms for health science technologists. Prerequisite: Diploma of Technology in Health Science plus work experience. **3 credits**

BMCE 914 Principles of Electrical Machinery for Occupational Health and Safety — Examines basic electrical equipment and its operation. Prerequisite: enrolment in Occupational Health and Safety Program or work experience. Evening lectures plus Saturday field trips. **3 credits**

BSMT 100 Maintenance and Control — Prepares candidates for supervisory roles in the building management field. Students study maintenance from a supervisory viewpoint, in particular, the chemicals involved in various types of maintenance. Lectures, demonstrations, visual aids and viewing equipment provide information on chemicals, disinfectants, equipment and techniques for maintaining floors, carpets, windows, blinds, etc., with particular attention to hotel, hospital and institutional maintenance. **3 credits**

BSMT 101 Safety and Sanitation — Hospital executive housekeepers, maintenance employees, hotel and residence building managers and those striving for such positions, study the causative factors of diseases and the methods available to control their incidence. Students learn to identify and evaluate biological, physical and chemical safety hazards. Established methods are utilized so that adequate controls can be used for protection and prevention. Topics include sanitation terminology, related bacteriology, behavior control using physical and chemical agents, cleaning techniques, waste material handling, insect and rodent control, plumbing, safety ergonomics, chemical hazards, ventilation, protective equipment, dangerous liquids, tools and machinery, accident prevention, safety training, radioactive materials, disaster planning, evacuation and case studies. **3 credits**

COMM 192 Writing Reports — This 18-hour course covers selecting and organizing information, using effective formats and layout, analysing audience needs, reporting factual information and making recommendations. It is offered in weekend and 3-day formats at the Burnaby and Downtown campuses or at the request of individual companies. **1.5 credits**

COMP 101 Data Processing — Introduction — Introduces the principles and concepts of business data processing to people with little or no programming experience. It may be useful to those who need a better understanding of computer operations in their firms. A prerequisite for most systems and programming courses. Lectures and laboratory sessions with "hands-on" computer practice include an introduction to the computer: input/output, hardware, computer use; background, data representation, applied systems, files, magnetic tape and disk, master and transaction files, data entry and control, batch processing, on-line data entry, computer programming, flowcharting, input/output, processing, decision, arithmetic and branching. Students will write and test five programs in BASIC programming language. **3 credits**

COMP 160 Computer Systems — Introduction 1 — Introduces the basic definition and design of computer systems. Emphasis is on the fundamentals of systems analysis including development of system objectives, problem definition, information gathering, effective written and verbal communication (particularly with user

department personnel) about their systems problems and possible computer solutions. The course presents the systems development process and covers basic systems theory, the systems development cycle, information gathering, flowcharting, report writing, forms design and presentation techniques. Additional techniques and their applications to common business systems are presented in COMP 260 Computer Systems — Intro 2. Prerequisite: COMP 101 or COMP 102 or COMP 103 or COMP 105. **3 credits**

CTCR 101 Anatomy and Physiology — A survey of the basic structure and function of human body systems. An introduction to the basic principles of genetics is also included. This is a guided learning course and is equivalent to BHSC 105 in BCIT General Nursing program. **4 credits**

CTCR 102 Writing for Nurses — Teaches general writing skills and their specific application to professional writing tasks in the clinical area. This is a guided learning course and is equivalent to HCOM 107 Writing for Nurses in the BCIT General Nursing program. A guided learning course. **3 credits**

CTCR 103 Personal Fitness Management — A combined theory and practice course designed to emphasize the relationship of physical fitness to lifestyle patterns. Focuses on the student's own activity pattern. A guided learning course equivalent to BHSC 118 in the BCIT General Nursing program. **3 credits**

CTCR 104 Physiology — A study of physiological regulation and control in the normal individual based on the fundamentals established in CTCR 101 Anatomy and Physiology, (same text as CTCR 101). A guided learning course equivalent to BHSC 205 in the BCIT General Nursing program. **4 credits**

CTCR 105 Human Development 1 — Provides students with an introduction to the theories, methods, concepts and research findings relevant to normal human development from prenatal, through late adulthood, to death. Particular attention is given to the social and familial context in which development occurs. The importance of individual differences, the effects of heredity and environment, and the ethical issues involved in research and treatment are discussed. Applications to clinical situations are explored. A guided learning course equivalent to BHSC 140 in the BCIT General Nursing program. **4 credits**

CTCR 106 Human Development 2 — Focuses on the growth and development from middle childhood to death. Physical, congintive, affective and social development are surveyed. Emphasis is placed on relating developmental concepts to health care. A guided learning course equivalent to BHSC 240 in the BCIT General Nursing program. Prerequisite: CTCR 105. **2 credits**

CTCR 107 Sociology — An introduction to those concepts and methods of sociology which are most pertinent to the nurse's observation and understanding of human behavior in a social context. The internal and external components of man's environment are investigated. Social and epidemiological factors related to health and illness will be reviewed. A guided learning course equivalent to BHSC 239 in the BCIT General Nursing program. **2 credits**

CTCR 108 Microbiology — An introduction to basic microbiological concepts including the distinguishing characteristics of micro-organisms, methods of controlling infectious disease and host-parasite relationships. A guided learning course equivalent to BHSC 225 in the BCIT General Nursing program. Prerequisite: CTCR 101. **1.5 credits**

CTCR 109 Immunology — Provides an understanding of the immune response as it is applied to immunity, surveillance, homeostasis, hypersensitivity, autoimmunity and immunohematology. The course progresses from discussions on the components and biological activities of the immune response to the immune response role in protective as well as disease conditions. A guided learning course. Prerequisite: CTCR 101. **1.5 credits**

EDUC 601 Human Learning — For nurses and technologists where patient education is a component of the clinical program. the course focuses on the processes of learning and strategies to help oneself, patients and peers learn more effectively. A guided learning course. **2 credits**

EDUC 625 Using Audio Visuals in Education — Introduces a variety of audio visual media, their utilization and evaluation in educational programs. Topics introduced include simulation exercises, computer-based training, teleconferencing. Opportunities to create A/V software are included in the health oriented practice exercises. A guided learning course. **2 credits**

EHCE 901 Basic Sound Measurement — An examination of the principles of noise reduction and control of sound producing equipment. Prepares those working in the field of environmental or public health to operate equipment used in enforcing municipal noise bylaws. **non credit**

EHCE 902 Basic Pest Control Within Buildings — Identification of household pests and demonstration of safe application of pesticides using equipment currently used in the structural pest control industry. Of interest to members and employees of the B.C. Structural Pest Control Association and public health inspectors. **non credit**

FMGT 101 Accounting 1 — Permits persons with little or no accounting background to become familiar with the techniques of working through the full accounting cycle. It provides theoretical and practical training in basic accounting as preparation for FMGT 201. Topics include accounting as an information system, introduction to accounting theory, income measurement, traditional record-keeping procedures, the accounting cycle, special journals, cash investments and receivables. **4 credits**

FMGT 109 Accounting for the Manager — For the manager who wants to understand basic accounting principles without taking a formal accounting course. The student studies the accounting function and the services it provides the manager, and learns to interpret statements, reports, budgets, etc., in managerial decision making. Topics include the accounting cycle, inventory valuation and control, depreciation methods, credit control, budgeting and analysis of financial statements. **3 credits**

FMGT 201 Accounting 2 — The follow-up to FMGT 101, topics include inventory, long-lived assets, liabilities, forms of business organizations, cash flow and working capital analysis, manufacturing accounting, management accounting, consolidated statements, analysis of financial statements and price level changes. Prerequisite: FMGT 101. **6 credits**

HCSY 610 Health Care Systems — Examines issues related to the development of health care systems in Canada including the roles of various levels of government, health care finance, manpower planning, impact of new health technology. **1.5 credits**

HICE 903 Quality Assurance for Health Record Departments — Covers the development, implementation and maintenance of quality assurance programs for all aspects of health record services. **3 credits**

HICE 904 Medical Terminology — Introduces language of medicine by an analysis of stems, prefixes and suffixes used in anatomical and clinical descriptions. **3 credits**

HICE 905 Medical Terminology — Continues HICE 904. Builds on the introduction by using a word-building technique, instead of memorization, to add to the knowledge of medical terminology. Relates terminology to anatomy and physiology. Prerequisite: HICE 904. **1.5 credits**

HICE 906 Coding Review Workshop — Workshop designed to review basic coding principles, and current coding practices. Interrelates disease processes and coding. **non credit**

HMGT 600 Health Care Supervisory Skills — Introduces the basics of supervision: problem solving and decision making, selecting and motivating people, performance appraisal, leadership and communication. A guided learning course. **3 credits**

HMGT 601 Health Care Organizational Behavior — Examines components influencing individual behavior in organizational settings including attitudes, values and theories of leadership. Text: Robbins: Organizational Behavior. Also offered in guided learning mode. Pre-reading required. **3 credits**

HMGT 602 Health Care Principles of Management — Reviews the roles and functions of management. Identifies and practices skills required for planning, organization and control in health care agencies. Text: Stoner: Management. Also offered at sites throughout the province. Pre-reading required. **3 credits**

HMGT 603 Health Care Operations Management — Identifies practical skills necessary for systems analysis, method study and productivity improvement. Also offered as circuit course at other sites. **1.5 credits**

HMGT 604 Budgeting in Health Care — Introduces the principles of budgeting and the role of budgeting as part of the financial and health care objectives of the organization. Priority setting in several areas of budgeting will be reviewed. Also offered as circuit course at other sites. **1.5 credits**

HMGT 605 Human Resource Management — Examines total staffing process including job analysis and description, interviewing, training and performance appraisal. Also offered as circuit course at other sites. **3 credits**

HMGT 606 Health Labor Relations 1 — Explores the development of labor relations in health care. Emphasizes the interpretation and application of negotiated contracts and reviews grievance and arbitration procedures. Also offered as circuit course at other sites. **1.5 credits**

HMGT 607 Long Term Care Labor Relations — For long term care personnel. Examines labor relations in the long term care setting. Emphasizes negotiation, interpretation, application of negotiated contracts, grievances and arbitration. **1.5 credits**

HMGT 701 Information Systems in Health Care 1 — Reviews manual and computer information systems and their terminology. Examines information systems in health care. Also offered as circuit course at other sites. **1.5 credits**

HMGT 702 Health Care Law — Introduces origins and principles of law, legal role of health paraprofessionals and significant legal themes. Pre-reading required. **2 credits**

HMGT 703 Financial Administration for Health Care Managers — Introduces accounting tools and concepts of health care systems. Examines cost accounting and program accounting, and management reporting. **1.5 credits**

HMGT 751 Information Systems in Health Care 2 — Continues MIS/HIS project management, needs assessment and specifications, cost benefit analysis, implementation. Prerequisite: HMGT 701 or equivalent. **1.5 credits**

HMGT 752 Health Labor Relations 2 — In-depth examination of grievance handling. Introduces arbitration process. Prerequisite: HMGT 606 or equivalent. **1.5 credits**

HMGT 753 Application of Theory to Selected Health Care Problems — Applies theory presented in earlier courses. Concentrates on real life problems encountered in health care systems. Prerequisite: All of compulsory courses in Levels 1 and 2 HMGT program. **1.5 credits**

HMGT 909 Selection Interviewing for Health Care Supervisors — Develops skills necessary for the recruitment and selection of health care personnel and examines job orientation of new personnel. **1.5 credits**

HMGT 914 Performance Appraisal for Health Care Supervisors — Designed to provide both newly appointed and experienced supervisors with skills necessary for objective performance appraisal including methods, standards, implementation, and follow-up of appraisals. **1.5 credits**

HMGT 915 Power in Health Care Organizations — Explores the nature and bases of organizational power, self-confidence, personal power, power plays in health care organizations, and strategies for enhancing power effectively and ethically. **non credit**

HMGT 918 Management Information Systems for Long Term Care Administrators — Designed to show long term care administrators how to put information support systems to work in their organizations. Day 1 — Introduction to computer systems. Day 2 — Project management and applications. **1 credit**

HMGT 919 Layoff and Dismissal in Health Care Organizations — Practical introduction to understanding the ramifications of layoff and summary dismissal. Focuses on concerns about dismissal and its legal implications. **non credit**

HMGT 920 Employment Interviewing for Health Care Managers — Presents a variety of proven techniques to reduce costly hiring mistakes. Focuses on acquisition of skills to improve interviewer confidence. **non credit**

HMGT 921 Quality Circles: A Change of Perspective for Health Care Managers — Introduces Quality Circles, an innovative and pragmatic managerial style which emphasizes quality and productivity. **non credit**

HMGT 922 Administrative Cost Control for Long Term Care Administrators — Through a direct approach, Long Term Care Administrators learn how to maximize their administrative resources in a cost effective manner. **0.5 credits**

HMGT 923 Food Cost Control — Examines purchasing, receiving, storing, issuing and preparing food to achieve effective cost control. **non credit**

HMGT 924 Public Speaking For Health Care Managers — Designed for managers who wish to improve their communication skills. Through active participation in a non-critical atmosphere, participants practise the situational analysis and basic presentation skills which will meet their managerial communication needs. **1 credit**

IHCE 901 Career Change: Career Exploration — A workshop for people seeking a change in carreer or employment. The workshop is designed to help you identify different or hidden career opportunities. **non credit**

IHCE 905 Infection Control — Topics include clinical microbiology review, common infections, use of antibiotics and laboratory control practices. **3 credits**

IHCE 907 Designing Fitness Programs for Mature Adults — Examines the unique needs of mature adults in fitness programs by identifying common blocks to exercise and demonstrating movement systems for active to institutionalized older adults. **non credit**

IHCE 909 Motivating Without Money — Will assist those supervising others to identify non-monetary tools available to them to increase productivity. **non credit**

IHCE 910 Fund Raising Grant Proposals **non credit**

IHCE 911 Update on Nutrition, Fitness and Weight Control — Designed for nurses and dietitians who counsel clients in these areas, this one day workshop reviews current advances in research. Aerobic fitness participation is part of the workshop. The role of exercise in weight control is reviewed. **non credit**

IHCE 912 Current Perspectives on Weight Management — This series of workshops and classes offers an in-depth review of new perspectives and research on weight management including attitudinal change, evaluation of diet and exercise plans, set point theory of weight control, binge eating and brown fat theory. Includes active participation. **non credit**

IHCE 913 Can You Eat To Win? — This workshop for athletes and fitness instructors is designed to analyze the effect of nutrition on physical performance. The design of food plans suitable for fitness enthusiasts, marathon runners, body-builders and other athletes during training, preactivity and activity will be reviewed. **non credit**

IHCE 920 Computer Literacy — An introduction to the basic elements of the computer: input/output, hardware, computer use, data entry, programming, flowcharting. Laboratory sessions include "hands-on" computer practice. **non credit**

MECH 140 Drafting Fundamentals — An introductory course *for persons with little or no experience in graphics.* **Students are required to purchase drafting equipment and supplies on the first night of class.** Students learn to produce and read simple drawings. Topics include scales, geometric constructions, basic orthographics, detail interpretation, line visibility, dimensioning, auxiliary views, true shape, inclined and skewed surfaces, sections, pictorials, working drawings and freehand sketches. **3 credits**

MECH 432 Automatic Sprinkler Systems Design 1 — For persons involved in engineering, design, supervision or inspection of commercial and industrial automatic sprinkler systems to gain an understanding of pipe schedule systems and water supply system analysis. The course examines the basics of wet and dry pipe systems; NFPA Standard #13; system components and applications; basic hydraulics of piping systems; water supply system analysis and tests with various examples; quick opening devices. Classroom lectures may be augmented by a Saturday field trip to take water flow tests. Students require an electronic calculator with XY function. Prerequisite: MECH 222. **3 credits**

MECH 433 Automatic Sprinkler Systems Design 2 — Advanced detailed instruction for persons involved in fire service, engineering design, supervision or inspection of automatic sprinkler systems in commercial and industrial buildings. The course examines deluge systems; pre-action systems; combined dry pipe and pre-action systems; water spray systems; special systems; hydraulics of sprinkler systems including tree, looped and gridded systems; computerized calculations; economical design considerations; water tanks; fire pumps, booster pumps, jockey pumps; maintenance of systems. Prerequisite: MECH 432. **4.5 credits**

MKTG 323 Public Speaking and Oral Communication 1 — Emphasizes the development of public speaking skills and the *principles of effective oral communication. Topics include* communication as it applies to public speaking and the rudiments of improving the speaking voice. Films, buzz groups and closed circuit TV are utilized. Each person is expected to prepare and deliver an oral assignment weekly. **3 credits**

MLCE 602 Normal Histology and Microanatomy for Medical Laboratory Technologists Part 1 — Introduces registered technologists (RT's) to the fundamentals of embryology, cell structure and ultrastructure and the composition of the four primary tissues. No previous experience in histology or microanatomy is necessary, however, a knowledge of gross anatomy and physiology may be beneficial. **3 credits**

MLCE 603 Normal Histology and Microanatomy for Medical Laboratory Technologists Part 2 — continuation of MLCE 602. **4 credits**

MLCE 604 Clinical Chemistry — A series of lectures on advanced clinical chemistry. Topics include pharmacology and toxicology as well as a wet lab on isoenzymes. BCSMT in co-operation with BCIT. This course will be submitted to CSLT for credits. **1.5 credits**

MLCE 605 Hematology — Lectures and group discussion to pursue advanced topics in hematology including coagulation, quality control and instrumentation in the hematology laboratory. BCSMT in co-operation with BCIT. This course will be submitted to CSLT for credits. **1.5 credits**

MLCE 606 Histopathology — Introduces the concepts of pathology, through an evening lecture series, including clinical disorders, general pathology and related technical procedures, eg: for diseases of the G.I. tract. BCSMT in co-operation with BCIT. This course will be submitted to CSLT for credits. **1.5 credits**

MLCE 607 Immunohematology — A lecture series by recognized experts in advanced immunohematology. BCSMT in co-operation with BCIT. This course will be submitted to CSLT for credits. **1.5 credits**

MLCE 608 Clinical Microbiology — Advanced course in microbiology for medical laboratory technologists through an evening lecture series. May include a wet workshop. BCSMT in co-operation with BCIT. This course will be submitted to CSLT for credits. **1.5 credits**

MLCE 609 Teleconference for Medical Laboratory Technologists — Sessions on various topics will be delivered at several sites on the teleconference network. BCSMT in co-operation with BCIT. This course will be submitted to CSLT for credits. **1 credit**

MLCE 610 Advanced Hematology Part 1 — A correspondence course to prepare registered technologists for the advanced registered technologists examination. Acquaints students with new and advanced theories of hematology. The Canadian Society of Laboratory Technologists (CSLT) grants 15.8 credits for this course. **1.5 credits**

MLCE 611 Advanced Hematology — Part 2 — Introductory course provides broad theoretical framework for understanding the principles of computed tomography (CT). Lays the basic foundations for the practical aspects of CT scanning. (1.0 A.C. credit). **1.5 credits**

MLCE 901 Clinical Microbiology Refresher Program — Designed for inactive Registered Technologists. Theory and clinical practice in microbiology. This course has **23.4 CSLT credits.**

MLCE 906 Medical Laboratory Technology Teleconference — Series of post graduate lectures delivered by teleconference to 6-8 sites in B.C., offer a variety of current topics in hematology, clinical chemistry and microbiology. **1 credit**

MRCE 611 Computed Tomography — Introductory course provides a broad theoretical framework for understanding the principles of Computed Tomography (CT). Lays the basic foundations for practical aspects of Computer Tomography scanning. **3 credits**

MRCE 902 Medical Radiography Refresher — Designed to upgrade radiation technologists who have been out of the field for 5 years or more. Pre-reading required. **non credit**

MRCE 912 Radiation Biology for Medical Radiation Technologists — Designed for the technologist who wishes to have a greater understanding of the effects of radiation on the cells. This course commences with a review of cellular biology and the basic interactions of radiation with matter, and continues with an examination of the specific types of intracellular responses to radiation and the factors which influence these responses. The course concludes with radiation pathology and human experience with radiation injury. **3 BCIT credits. 0.5 AC credit**

NMCE Advanced Physiology for Nuclear Medicine Technology — (under development)

*** NUCE 901 Refresher Course for Graduate Nurses** — Designed for graduates of approved schools of nursing. Theory and clinical practice are combined to assist nurses to meet clinical competency objectives in Medical/Surgical nursing. **27 credits**

*** NUCE 902 Basic Mental Health Nursing** — Designed for graduate nurses trained outside Canada to prepare them for the B.C. Registered Nurse examinations. Includes theory and clinical practice. **25 credits**

*** NUCE 903 Obstetrical Nursing Qualifying** — A qualifying course for nurses who require to update their obstetrical nursing skills preparatory to writing B.C. registration examinations. **non credit**

*** NUCE 909 Enterostomal Therapy** — This two-day course acquaints the nurse with the knowledge and skills required for the care of patients with stomas and non-stomal skin problems. **non credit**

NUCE 911 Gerontology Concepts — Topics covered relating to long term care include personal care, activation, medical problems and implications of drug therapy. **non credit**

*** Approval of application by Health C.E. co-ordinator is required before registering in these courses as seats are limited. Fee refunds will not be granted to students cancelling in the two weeks prior to class start unless a substitute can be found.**

NUCE 918 Nursing Management of Behavioral Patterns — A two-day workshop for RN's and RPN's who which to become familiar with selected behavior patterns and related nursing interventions. **non credit**

NUCE 919 Obstetrical Nursing Update — Information on current theories and practice in selected obstetrical topics for hospital and public health nurses. Includes neonatal assessment and infant attachment. **non credit**

NUCE 930 Diabetes Update — Workshop on recent advances and current practice in the management of the diabetic patient. Of interest to health care personnel, patients and families. **non credit**

NUCE 931 Cancer Update — Workshop on current research findings and nursing management of the patient with cancer. **non credit**

NUCE 933 Nursing Management of Respiratory Problems — One-day workshop discusses manifestations of acute and chronic respiratory failure and the approaches used in treatment, including rehabilitation. **non credit**

NUCE 934 Medical Nursing — A series of topics of interest to hospital and homes care nurses including respiratory, cardiac, diabetic nursing. **non credit**

NUCE 935 Surgical Nursing — Topic will include pre and post operative care of patients undergoing surgery of G.I. systems, vascular, orthopaedic, and E.E.N.T. **non credit**

NUCE 960 Pharmacology in Nursing Practicum — A series of three seminars focusing on selected drug therapies in pediatric, adult and psychiatric patient care. **non credit**

NUCE 961 — *see* NUCE 960 **non credit**

NUCE 962 — *see* NUCE 960 **non credit**

NUCE 963 Nursing Diagnosis **non credit**

Note: Curriculum subject to revision

OHCE 101 Accident Prevention 1: Job Safety Analysis — Reviews the history of the safety movement, accidents investigation, job safety analysis, inspections and observations. Prerequisite: Math 12, Chemistry 11, Physics 11, or permission of instructor. **3 credits**

OHCE 102 Accident Prevention 2: Employee Motivation — Deals with how to maintain interest in safety, safety talks, how to deal with problem employees, off-the-job safety, incident recall techniques, and job pride development. Prerequisite: OHCE 101. **3 credits**

OHCE 103 Accident Prevention 3: Safety Design and Equipment — Examines accident prevention for industrial operations, the engineering and technology involved in the various operations, safety standards for buildings, equipment and operations. **3 credits**

OHCE 104 Accident Prevention 4: Industrial Applications — Includes accident prevention for industrial operations — the engineering and technology involved in the various operations, safety standards for buildings, equipment and operations personal protective equipment and machine guarding. Prerequisite: OHCE 103. **3 credits**

OHCE 201 Industrial Health and Safety 1: Legislation — Examines legislation relevant to safety and the agencies enforcing this legislation. **3 credits**

OHCE 202 Industrial Health and Safety 2: Policy Application — Examines various types of safety programs, risk management, emergency planning, transportation and storage of hazardous materials. **3 credits**

OHCE 203 Industrial Health and Safety 3: Loss Control and Auditing — Deals with the total loss control concept. Covers audits and measurement of safety performance. Also looks at office safety and safety in B.C. industries such as the forest industry, transportation, food processing and general manufacturing. Prerequisite: OHCE 101, 102, 103, 104, 201 and 202. **3 credits**

OHCE 301 Fire Protection 1 — Examines heating hazards, electrical hazards, chemistry of fire, flammable liquids, fire detection, portable fire extinguishers and sprinkler systems. **3 credits**

OHCE 302 Fire Protection 2 — Includes fire causes, statistics, flammable gases, storage, combustible gases, chemical hazards, fumigants, plastics, fire alarms. Note: Mandatory for OH&S certificate. Prerequisite: OHCE 301. **3 credits**

OHCE 401 Industrial Hygiene 1 — Examines health concerns related to the use of chemicals in the work place. Permissible levels of toxicity and hazard assessment reviewed. Prerequisite: Math 12, Chemistry 11, Physics 11. **3 credits**

OHCE 402 Industrial Hygiene 2 — Includes acoustics and noise control, use of sound level meters and noise dosimeters. Prerequisite: Math 12, Chemistry 11, Physics 11. **3 credits**

OHCE 403 Industrial Hygiene 3 — Examines radiation and includes detection, evaluation and control of radiation, and extremes of temperature and pressure. **3 credits**

OHCE 902 Basic Anatomy and Physiology for Occupational Health — Develops basic knowledge of human anatomy and physiology with reference to effects of certain environmental factors on the major organs. **3 credits**

OHCE 903 Controlling Loss Through Interpersonal Skills — This one-day workshop is for people concerned with Occupational Health and Safety. It examines image building and the use of techniques to improve the stature of safety within the organization. **non credit**

OPMT 188 Management Information Systems — Students learn to use a managerial systems approach to the management information area; review, assess and evaluate information processing hardware and software; evaluate management needs for information and integrate those needs into the management system; design and implement a simple management information system. The course is not intended to produce highly skilled MIS practitioners, but to provide an understanding of basic MIS concepts. Students learn how to relate to MIS specialists and managers in large organizations and how to approach a MIS problem in a small organization that would not normally have MIS specialists on staff. **3 credits**

OPMT 191 Purchasing — Designed for those entering or related to the purchasing field, the course examines the fundamentals, principles and practices of purchasing. Topics include the functions of a purchasing department and its relationship and responsibilities to management; centralized purchasing; negotiating; buying for quality, quantity and price; timing and sources of supply; receiving and warehousing; inventory control. See OPMT 192 for a supporting course in Inventory Planning and Control. **3 credits**

OPMT 192 Inventory Planning and Control — Presents the fundamentals of inventory planning for those preparing to enter the inventory planning field, and for those in related areas that interact with an inventory system including purchasing agents, buyers, maintenance planners, production schedulers, sales managers, warehouse managers, mill storekeepers and parts people. Examines the basic techniques used in the design and control of inventory systems. Topics include forecasting inventory requirements, the ABC classification, material requirements planning, the role of the computer, inventory information flow and inventory control design. Prerequisite: understanding of basic algebra. **3 credits**

OPMT 294 Physical Material Handling and Inventory Space Planning — An introduction to sensitivity analysis as it pertains to purchasing, inventory planning and control. The student is introduced to the concepts and techniques required to design and analyze physical space requirements for the storage and handling of products in warehouses, retail and manufacturing facilities. Prerequisite: OPMT 198. **1.5 credits**

POCE 903 IPOS Trans-Femoral Prosthetic System — Provides theoretical basis for and practical experience in the newly developed I.P.O.S. casting and socket fabrication procedures. **1.5 credits**

POCE 905 Rehabilitation of the Amputee — The course is intended for all health care professionals concerned with the rehabilitation of the amputee. Understanding current prosthetic practice should aid them in setting realistic goals for their amputee patients or clients and in integrating their services with that of the prosthetist. Topics include preprosthetic care, immediate post operative prosthetic management, normal human locomotion, prosthetic components and designs and gait training for the various amputation levels. **non credit**

POCE 906 Prosthetic Feet — A two day workshop for prosthetists. **non credit**

RESH 601 Understanding Research in Health Sciences — The first of three courses which constitute the practical research component of the Advanced Diploma in Health Sciences program. Focusing on practical research skills, this course examines the components of the research process, the terminology commonly used in research reports and criteria for evaluating research. Students will learn how to critically evaluate research performed and reported by others in their field. A guided learning course. **3 credits**

RESH 602 Preparing Health Science Research — Builds on the knowledge and skills of understanding research in health science. Students will be expected to select an appropriate research question or problem, plan a research project, write a research proposal and evaluate that proposal. **3 credits**

School of Management Studies

This Certificate Program section is made up of course groupings representing the suggested basic Certificate Programs within the School of Management Studies. The basic certificate is attainable over three years. This three year period is flexible and these suggested programs can, in most cases, be amended to suit the individual career goals of the student.

Prior to embarking on a part-time studies Management Certificate Program it is advisable to consult a program consultant. It is **essential** to submit any planned revision to a program consultant for approval by the appropriate department. Programs for Senior Certificates, Diplomas of Technology, and Special Certificates in Business must be approved in advance.

Administrative Management Systems

Business Certificate in Administrative Management
Business Certificate in Personnel Management
Business Certificate in Public Administration

Broadcast Communications

Business Certificate in Broadcast Communications

Financial Management

Business Certificate in Accounting
Business Certificate in Finance

Hospitality and Tourism Administration

Business Certificate in Hospitality and Tourism Management
- Hotel Option
- Food and Beverage Option
- Travel and Tourism Option

Marketing Management

Business Certificate in Marketing
Business Certificate in Advertising and Public Relations
Business Certificate in Technical Sales Representative
Business Certificate in Retail Merchandising

Operations Management

Business Certificate in Operations Management
- Industrial Engineering
- Management Engineering
- Materials Management
- Transportation and Distribution

CAPIC Production and Inventory Management

Specialized Business Certificates

Business Certificate in Building Services Management
Business Certificate in Interior Design

Program Consultation

Program Consultants are available to assist students in course selection and program planning appropriate to their individual career needs. Students are advised to confer with a program consultant prior to entering a program of studies at BCIT. Although many of the suggested Certificate Programs are preapproved, it is recommended that proposed programs be submitted to a program consultant for approval.

At the Burnaby Campus call 434-1610 for program consultation. At the Downtown Education Centre, 549 Howe Street, Vancouver assistance for Business Courses and Certificate Programs is available. For information call 687-4666.

Certificate Program Approval

Suggested Certificate Programs are presented within the Certificate Program section of this calendar beginning on page ??. These Certificate Programs are made up of courses representing the basic certificate. These certificates are attainable over a three year period. The three year period is flexible.

Although these suggested programs are preapproved it is advisable and often essential to have them approved by a program consultant or the appropriate department head. Students may amend recommended programs to suit their individual career needs; amendments must be submitted to a program consultant for approval by the appropriate Technology.

Administrative Management Systems

Business Certificate in Administrative Management

The number of courses required to obtain the Business Certificate in Administrative Management must generate a minimum of 50 credits.

The balance of credits should be selected from the list of electives and substitutes.

A. Complete the following:	Credit
ADMN 110 Management 1	4.0
ADMN 211 Management 2	4.0
ADMN 222 Organizational Behavior 1	3.0
FMGT 109* Accounting for the Manager	3.0

B. Complete at least 1 of the following:	Credit
ADMN 100 Micro Economics	4.0
ADMN 200 Macro Economics	6.0

C. Complete at least 4 of the following:	Credit
ADMN 204 Personnel Management	4.0
ADMN 332 Labor Relations 1	4.0
ADMN 380 Business Law 1	3.0
ADMN 432 Labor Relations 2	6.0
ADMN 480 Business Law 2	6.0

D. Complete 1 of the following:Credit	Credit
COMP 101 Data Processing Introduction	3.0
COMP 103 Data Processing Micro/Apple	3.0
COMP 105 Data Processing Micro/IBM PC	3.0

E. Balance of 50 credits to be electives.
Course selection should reflect the student's career objectives.

* Those considering CGA, RIA or other professional programs are referred to the Professional Agencies section of this catalog. This is especially true for courses in Group A where we suggest both FMGT 101 and 201 be taken in **lieu of** FMGT 109.

Students involved in, or considering, the Diploma Program must consult with the Program Head. This is especially important since day school requirements in the various areas often exceed certificate requirements (e.g. both ADMN 380 and 480 are required for day school law credit).

Business Certificate in Personnel Management

The number of courses required to obtain the Business Certificate in Personnel Management must generate a minimum of 50 credits.

The balance of courses should be selected from the list of electives and substitutions.

A. Complete the following:	Credit
ADMN 110 Management 1	4.0
ADMN 204 Personnel Management	4.0
ADMN 211 Management 2	4.0
ADMN 222 Organizational Behavior 1	3.0
ADMN 322 Organizational Behavior 2	3.0
FMGT 109 Accounting for the Manager	3.0

B. Complete at least 1 of the following:	Credit
ADMN 100 Micro Economics	4.0
ADMN 200 Macro Economics	6.0

C. Complete at least 4 of the following:	Credit
ADMN 127 Training Techniques	3.0
ADMN 205 Selection Interviewing	4.0
ADMN 304 Manpower Planning	4.0
ADMN 305 Salary Administration	4.0
ADMN 332 Labor Relations 1	3.0
ADMN 432 Labor Relations 2	6.0

D. Balance of 50 credits to be electives.
Course selection should reflect the student's career objectives.

Students involved in the Diploma Program must consult with the Program Head.

Business Certificate in Public Administration

The number of courses required to obtain the Business Certificate in Public Administration must generate a minimum of 50 credits.

Balance of courses should be selected from the list of electives and substitutions.

A. Complete the following:	Credit
ADMN 110 Management 1	4.0
ADMN 211 Management 2	4.0
ADMN 222 Organizational Behavior 1	3.0
ADMN 322 Organizational Behavior 2	3.0
FMGT 109 Accounting for the Manager	3.0

B. Complete 3 of the following:	Credit
ADMN 100 Micro Economics	4.0
ADMN 200 Macro Economics	6.0
ADMN 332 Labor Relations 1	4.0
FMGT 112 Finance for the Manager	3.0

C. Complete each of the following:	Credit
ADMN 170 Government and Business	3.0
ADMN 208 Municipal Law	3.0

D. Balance of 50 credits to be electives.
Course selection should reflect the student's career objectives.

Suggested Electives

Electives should be chosen to complement career goals. The following electives are suggested as a guide for a standard path of studies. Variations must be approved by a program consultant.

	Credit
ADMN 127 Training Techniques	3.0
ADMN 145 Managing Change	2.0
ADMN 150 Business Behavioral Research	3.0
ADMN 201 Counselling 1	3.0
ADMN 204 Personnel Management	4.0
ADMN 205 Selection Interviewing	4.0
ADMN 222 Organizational Behavior 1	3.0
ADMN 302 Problem Solving and Decision Making	3.0
ADMN 303 Counselling 3	3.0
ADMN 304 Manpower Planning	4.0
ADMN 322 Organizational Behavior 2	3.0
ADMN 332 Labor Relations 1	4.0
ADMN 380 Business Law 1	3.0
ADMN 428 Management Simulations 1	4.0
ADMN 432 Labor Relations 2	6.0
ADMN 480 Business Law 2	6.0
COMP 101 Data Processing Introduction **or**	3.0
COMP 103 Data Processing Micro/Apple **or**	3.0
COMP 104 Computers in Business	3.0
COMP 105 Data Processing Micro/IBM PC	3.0
MKTG 101 Marketing 1	3.0
MKTG 323 Public Speaking and Oral Communication 1	3.0
MKTG 324 Small Business Development	3.0
OPMT 102 Basic Mathematics of Finance	3.0
OPMT 197 Statistics for Business and Industry	4.5

Broadcast Communications

Prospective applicants are advised to attend a counselling session prior to enrolling in any Broadcast Communications part-time course. These sessions are held at 1730 in Room 1A-129 (just off the main lobby) on the following days: the last Monday in August, and the first Monday of every month thereafter through June. (Where a first Monday is a Statutory Holiday, the seminar will be held on the **second** Monday.) Confirmation of dates can be obtained by contacting the School of Management part-time studies office at 432-8645.

The following courses are available through part-time offerings from the Broadcast Communications Department. These courses are normally twelve weeks in length, running one night per week, three hours per night.

First Level Courses

		Credit
BCST 101	Technical Basics	2.0
BCST 140	Broadcast Industry Organization	3.0
BCST 141	Broadcast Sales and Management	3.0
BCST 142	The History and Development of Contemporary Music	3.0
BCST 143	The Music Business and the Broadcast Industry	3.0
BCST 144	Writing for the Media	3.0
BCST 145	Copywriting for Radio and TV	3.0
BCST 146	Broadcast Advertising and Promotion	3.0
BCST 147	Broadcast Engineering for Production Personnel	3.0
BCST 150	Radio Broadcasting Introduction	3.0
BCST 151	Radio and TV Announcing	3.0
BCST 160	Television Broadcasting Introduction	3.0
BCST 161	Film for Beginners	3.0
BCST 162	Dramatic Writing for Film and TV	3.0
BCST 163	Acting for Television	3.0
BCST 167	Production Assisting for Television	3.0
BCST 170	Broadcast Journalism Introduction	3.0
BCST 171	Broadcast News Writing	3.0
BCST 172	Investigative Reporting	3.0
BCST 173	Sportscasting	3.0

Second Level Courses (requiring one or more prerequisites)

		Credit
BCST 252	Radio Commercial and Audio Production (requires BCST 150)	3.0
BCST 253	Radio Operations Lab (requires BCST 150)	3.0
BCST 260	Television Production Techniques (requires BCST 160/BCST 323)	3.0
BCST 261	Television Commercial Production (requires BCST 160/BCST 323)	3.0
BCST 270	Radio Newsroom Operations (requires BCST 170)	3.0
BCST 323	Television Production Planning (requires BCST 160)	1.0

Business Certificate in Broadcast Communications

The courses required to obtain the Business Certificate in Broadcast Communications, and additional courses from either Broadcast or other business programs are listed below.

Students intending to pursue a Certificate in Broadcast Communications should choose a program corresponding to a specific Option(Radio, Television or Broadcast Journalism). Each Option program requires EIGHT specific Broadcast Communications courses, TWO elective Broadcast Communications courses, and SEVEN additional business courses selected from ELEVEN offerings.

Option and course selection should only be done with the guidance and advice of a program consultant. The program must be reviewed and approved by the Broadcast Communications Department Head and Part-time Studies Coordinator.

Option Programs

Radio

		Credit
BCST 101	Technical Basics	2.0
BCST 140	Broadcast Industry Organization	3.0
BCST 145	Copywriting for Radio and TV	3.0
BCST 150	Radio Broadcasting Introduction	3.0
BCST 151	Radio Announcing	3.0
BCST 170	Broadcast Journalism Introduction	3.0
BCST 252	Radio Commercial and Audio Production	3.0
BCST 253	Radio Operations Lab	3.0
BCST	*** Elective	
BCST	*** Elective	

Television

		Credit
BCST 101	Technical Basics	2.0
BCST 140	Broadcast Industry Organization	3.0
BCST 145	Copywriting for Radio and TV	3.0
BCST 160	Television Broadcasting Introduction	3.0
BCST 170	Broadcast Journalism Introduction	3.0
BCST 260	Television Production	3.0
BCST 261	Television Commercial Production	3.0
BCST 323	Television Production Planning	3.0
BCST	*** Elective	
BCST	*** Elective	

Broadcast Journalism

		Credit
BCST 144	Writing for the Media	3.0
BCST 150	Radio Broadcasting Introduction	3.0
BCST 151	Radio and TV Announcing	3.0
BCST 160	Television Broadcasting Introduction	3.0
BCST 170	Broadcast Journalism Introduction	3.0
BCST 171	Broadcast News Writing	3.0
BCST 172	Investigative Reporting	3.0
BCST 270	Radio Newsroom Operations	3.0
BCST	*** Elective	
BCST	*** Elective	

Broadcast (BCST) electives may be chosen from the list of First and Second level Broadcast Communications courses.

Business electives may be chosen from the following list:

		Credit
ADMN 110	Management 1	4.5
ADMN 181	Word Processing	1.5
ADMN 200	Macro Economics	6.0
ADMN 211	Management 2	4.0
ADMN 222	Organizational Behavior	3.0
ADMN 380	Business Law	3.0
COMM 160	Business and Technical Communication	3.0
COMM 171	Business Reports	3.0
COMP 101	Data Processing	3.0
MKTG 101	Marketing 1	3.0
OPMT 197	Statistics for Business and Industry	4.5

Entry into the Second Year Day School Program

Students who wish to enter the second year of the full-time day school program may be able to qualify to do so by successfully completing the Broadcast Communications Certificate program and by subsequently attending an "intersessional" — an intensive full-time practical program operated five days a week for four weeks, commencing in the middle of April every year, operated in conjunction with the day school "first year practicum" session.

Students meeting these requirements may then be able to enter the second year program if positions are available and a selection committee deems them qualified for entry based upon normal selection procedures and guidelines.

Approval for day school second year entry must be obtained from the Department Head of Broadcast Communications. An interview will be required. It is recommended that Certificate program students intending to enter a second year program upon completion of their Certificate, should contact the Department Head for an interview early in their program of studies. This interview will determine **initial** suitability for second year entry.

Financial Management

Business Certificate in Accounting

This program establishes a firm grounding in financial management with an emphasis on the generation and understanding of financial reports. There is ample opportunity for specialization to suit individual needs and preferences. The courses required to obtain the Business Certificate in Accounting are as follows.

First Level Courses		Credit
ADMN 100	Micro Economics	4.0
ADMN 110	Management 1	4.5
ADMN 200	Macro Economics	6.0
ADMN 211	Management 2	4.0
COMP 101	Data Processing Introduction **or**	3.0
COMP 103	Data Processing Intro Micro/Apple **or**	3.0
COMP 105	Data Processing Intro Micro/IBM PC	3.0
FMGT 101	Accounting 1	4.0
FMGT 201	Accounting 2	6.0

Second Level Courses		Credit
FMGT 301/	Cost and Managerial Accounting 1 **and**	
FMGT 401	Cost and Managerial Accounting 2 **or**	10.0
FMGT 302/	Financial Accounting 1 **and**	
FMGT 402	Financial Accounting 2	10.0
FMGT 316	Taxation 1	3.0
FMGT 408	Taxation 2	3.0
	Electives	

Business Certificate in Finance

A program designed for those working or aspiring to work in the financial administration area of a firm. The program is also appropriate for those who have progressed to a position in an organization where they must add financial skills to their repertoires. The courses required at each level to obtain the Business Certificate in Finance are as follows. The balance of courses may be selected from the list of electives.

First Level Courses		Credit
ADMN 100	Micro Economics	4.0
ADMN 110	Management 1	6.0
ADMN 200	Macro Economics	6.0
ADMN 211	Management 2	4.0
COMP 101	Data Processing Introduction or	3.0
COMP 103	Data Processing Micro/Apple or	3.0
COMP 105	Data Processing Micro/IBM PC	3.0
FMGT 101	Accounting 1	4.0
FMGT 106	Credit and Collections	4.0
FMGT 201	Accounting 2	6.0

Second Level Courses		Credit
FMGT 302	Financial Accounting 1 **and**	
FMGT 307	Finance 1	4.0
FMGT 315	Security Analysis 1	4.0
FMGT 402	Financial Accounting 2	10.0
FMGT 404	Finance 2	6.0
OPMT 102	Basic Mathematics of Finance	3.0
OPMT 132	Statistics for Financial Management	7.0
	Electives	

Suggested Electives

Electives should be chosen to complement career goals. The following electives are suggested as a guide for a standard path of studies. Variations must be approved by a program consultant.

		Credit
ADMN 145	Managing Change	2.0
ADMN 302	Problem Solving and Decision Making	3.0
ADMN 305	Salary Administration	4.0
ADMN 322	Organizational Behavior 2	3.0
ADMN 332	Labor Relations 1	4.0
ADMN 380	Business Law	4.0
ADMN 428	Management Simulations 1	4.0
ADMN 432	Labor Relations 2	6.0
ADMN 480	Business Law 2	6.0
COMM 160	Business and Technical Communication	3.0
COMP 104	Computers in Business	3.0
COMP 160	Computer Systems — Introduction 1	4.0
FMGT 301	Cost and Managerial Accounting 1	4.0
FMGT 302	Financial Accounting 1	4.0
FMGT 307	Finance 1	4.0
FMGT 308	Security Analysis 1	4.0
FMGT 310	Auditing 1	4.0
FMGT 316	Taxation 1	3.0
FMGT 401	Cost and Managerial Accounting 2	6.0
FMGT 402	Financial Accounting 2	6.0
FMGT 404	Finance 2	6.0
FMGT 406	Auditing 2	6.0
FMGT 408	Taxation 2	3.0
MKTG 102	Introduction to Marketing	3.0
MKTG 301	Marketing Planning	4.5
MKTG 309	Marketing Research 1	3.0
MKTG 323	Public Speaking and Oral Communication 1	3.0
MKTG 324	Small Business Development	3.0
MKTG 424	Advertising for the Small Firm	3.0
OPMT 102	Basic Mathematics of Finance	3.0
OPMT 132	Statistics for Financial Management	7.0
OPMT 186	Systems and Procedures — Manual	3.0
OPMT 188	Management Information Systems	3.0
OPMT 199	Method Study Office	3.0
TDMT 409	Exporting and Importing	4.5

Hospitality and Tourism Administration

Business Certificate in Hospitality and Tourism Management — Hotel Option

The program is designed to give students a solid understanding of the Hotel, Motel and Accommodations industry. Courses will provide entry level skills leading to employment as hotel reception clerks, front office supervisors, marketing and sales representatives, housekeeping department supervisors as well as food and beverage positions. The courses required at each level to obtain the Business Certificate in the Hospitality and Tourism certificate are as follows. The balance of courses may be selected from the list of electives.

First Level Courses		Credit
BSMT 102	Orientation and Techniques for the Executive Housekeeper	
BSMT 103	Housekeeping Department Organization and Records	
HOSP 112	Customer Relations and Communications	3.0
HOSP 132	Career Explorations for Hospitality	1.5
HOSP 205	Front Office Procedures	3.0
HOSP 207	Front Office Equipment Practicum	1.5

Second Level Courses		Credit
BSMT 202	Housekeeping Department Budgeting, Purchasing and Equipment	
COMP 101	Data Processing — Introduction	3.0
FMGT 101	Accounting 1	4.0
HOSP 306	Bar Management: Lounges and Pubs	3.0
HOSP 313	Food and Beverage Control	5.0
HOSP 357	Marketing and Sales — Accommodation and Food Service	3.0
HOSP 412	Hospitality Management Accounting	3.0
	Electives	

Business Certificate in Hospitality and Tourism Management — Food and Beverage Option

This option is designed to give students a broad understanding of the food and beverage industry. Career opportunities exist as food and beverage managers, catering supervisors, food production supervisors, sales representatives, bartenders and food service personnel. Many courses will appeal to those planning to open their own restaurants. The courses required at each level to obtain the Business Certificate in Hospitality and Tourism are as follows. The balance of courses may be selected from the list of electives.

First Level Courses		Credit
HOSP 112	Customer Relations and Communications	3.0
HOSP 132	Career Explorations for Hospitality	1.5
HOSP 203	Introduction to Food and Beverage Management	3.0
HOSP 204	Introduction to Bartending	1.5
HOSP 255	How to Start Your own Restaurant	3.0

Second Level Courses		Credit
COMP 101	Data Processing — Introduction	3.0
FMGT 101	Accounting 1	4.0
HOSP 306	Bar Management: Lounges and Pubs	3.0
HOSP 307	Understanding Wines 1	3.0
HOSP 313	Food and Beverage Control	5.0
HOSP 357	Marketing and Sales — Accommodation and Food Service	3.0
HOSP 358	Analyzing Costs and Planning for Restaurants	3.0
HOSP 412	Hospitality Management Accounting	3.0
	Electives	

Business Certificate in Hospitality and Tourism Management — Travel and Tourism Option

This option gives participants a broad general understanding of the opportunities available in a variety of tourism and travel related industries. Several of the courses offer specialized skill building modules which are beneficial when seeking employment or advancement. The courses required at each level to obtain the Business Certificate in the Travel and Tourism Option are as follows. The balance of courses may be selected from the list of electives.

First Level Courses		Credit
COMP 101	Data Processing — Introduction	3.0
FMGT 109	Accounting for the Manager	3.0
HOSP 112	Customer Relations and Communication Skills	3.0
HOSP 240	Tourism Geography	3.0
HOSP 250	Travel Agency and Tour Operations, an Introduction	4.5
HOSP 350	Domestic Air	3.0

Two of the courses from List B

Second Level Courses		Credit
ADMN 110	Management 1	4.5
ADMN 211	Management 2	4.0
HOSP 251	Tour Managing	1.5
HOSP 351	International Air 1	3.0
HOSP 353	Automated Reservations	3.0
HOSP 356	Travel Industry Marketing and Sales or	3.0
MKTG 102	Introduction to Marketing	3.0
	One of the courses from List A	
	Electives	

List A		Credit
HOSP 212	Basic Communication in Japanese	3.0
HOSP 213	Basic Communication in French	3.0
HOSP 214	Basic Communication in Spanish	3.0
HOSP 215	Basic Communication in German	3.0

List B		Credit
HOSP 241	Tourism: Europe	1.5
HOSP 242	Tourism: Africa	1.5
HOSP 243	Tourism: Pacific Rim	1.5
HOSP 244	Tourism: South Pacific	1.5

Suggested Electives

Electives should be chosen to complement career goals. The following electives are suggested as a guide for a standard path of studies. Variations must be approved by a program consultant.

		Credit
ADMN 110	Management 1	4.5
ADMN 211	Management 2	4.0
ADMN 222	Organizational Behavior 1	3.0

ADMN 322	Organizational Behavior 2	3.0
BSMT 102	Orientation and Techniques for the Executive Housekeeper	
BSMT 103	Housekeeping Department, Organization and Records	
COMM 171	Business Reports	3.0
COMP 104	Computers in Business	3.0
FMGT 201	Accounting 2	6.0
HOSP 317	Understanding Wines 2	1.5
HOSP 352	International Air 2	3.0
HOSP 355	Automated Ticketing	1.5
HOSP 414	Financial Management — Hospitality	3.0
MKTG 101	Marketing 1	3.0
MKTG 306	Principles of Small Business Management	5.0
MKTG 323	Public Speaking and Oral Communication 1	3.0

Marketing Management

Business Certificate in Marketing

A program designed for those requiring a broad understanding of the various marketing related activities, rather than a highly specialized set of skills. Graduates are qualified to work as general responsibility managers in retail, wholesale, manufacturing or service organizations. Courses are designed to develop planning, scheduling, and control techniques over general demand development and sales operations. The courses required at each level to obtain the Business Certificate in Marketing are as follows. The balance of courses may be selected from the list of electives.

First Level Courses		Credit
ADMN 110	Management 1	4.5
ADMN 211	Management 2	4.0
MKTG 101	Marketing 1	3.0
MKTG 201	Marketing 2	4.0

Second Level Courses		Credit
COMM 171	Business Reports	3.0
FMGT 109	Accounting for the Manager	3.0
MKTG 203	Sales Management	4.0
MKTG 219	Professional Sales 1	3.0
MKTG 301	Marketing Planning	4.5
MKTG 309	Marketing Research	4.5
MKTG 323	Public Speaking and Oral Communication 1	3.0
	Electives	4.0

Business Certificate in Advertising and Public Relations

A program detailing specific campaign development and design requirements. Courses are designed to provide students with the capability of setting realistic advertising objectives, selecting appropriate message design, adopting suitable media, establishing campaign timing and expenditure, and overall budgetary control. The courses required at each level to obtain this certificate are as follows. The balance may be selected from the list of electives.

First Level Courses		Credit
MKTG 101	Marketing 1	3.0
MKTG 201	Marketing 2	4.0
MKTG 322	Advertising 1	3.0
MKTG 422	Advertising 2	3.0

Second Level Courses		Credit
ADMN 110	Management 1	4.5
BCST 145	Copywriting for Radio and TV	3.0
FMGT 109	Accounting for the Manager	3.0
MKTG 302	Industrial Marketing	3.0
MKTG 309	Marketing Research 1	4.5
MKTG 318	Media Planning	5.0
MKTG 321	Public Relations	3.0
MKTG 323	Public Speaking and Oral Communication 1	3.0
MKTG 421	Advertising Creative Print	3.0
MKTG 423	Public Speaking and Oral Communication 2	3.0
	Electives	

Business Certificate in Technical Sales

A program for those who must prepare and make sales presentations to professional buyers. The student will be capable of analyzing buyer needs, planning detailed presentations, and executing oral and written skills. The courses required at each level to obtain this certificate are as follows. The balance of courses may be selected from the list of electives.

First Level Courses		Credit
MKTG 101	Marketing 1	3.0
MKTG 201	Marketing 2	4.0
MKTG 219	Professional Sales 1	3.0
MKTG 319	Professional Sales 2	3.0

Second Level Courses		Credit
ADMN 110	Management 1	4.5
COMM 171	Business Reports	3.0
MKTG 203	Sales Management	4.0
MKTG 301	Marketing Planning	4.5
MKTG 302	Industrial Marketing	3.0
MKTG 309	Marketing Research	4.5
MKTG 323	Public Speaking and Oral Communication 1	3.0
	Electives	3.0

Business Certificate in Retail Merchandising

A program designed for individuals with retailing experience seeking advancement into merchandising management positions. The curriculum develops a basis for sound buying decisions, capable sales forecasting and planning effective merchandise presentations. There is an emphasis on sound budgeting and profit planning techniques. The courses required at each level to obtain this certificate are as follows. The balance of courses may be selected from the list of electives.

First Level Courses		Credit
ADMN 110	Management 1	3.0
MKTG 101	Marketing 1 or	3.0
MKTG 108	Retail Marketing	3.0
MKTG 109	Retail Selling or	1.5
MKTG 110	Leadership Retailing	3.0
MKTG 201	Marketing 2	3.0
MKTG 219	Professional Sales 1	3.0

Second Level Courses		Credit
FMGT 109	Accounting for the Manager	3.0
MKTG 111	Retail Promotion	3.0
MKTG 112	Research for Retailers	3.0
MKTG 113	Computer Applications in Retailing	3.0
MKTG 309	Marketing Research or	4.5
MKTG 322	Advertising 1 or	3.0
MKTG 422	Advertising 2	3.0
MKTG 428	Marketing Management Simulations 1	4.0
	Electives	4.0

Suggested Electives

Electives should be chosen to complement career goals. The following list of electives is not exhaustive but is suggested as a guide for a standard path of studies. Variations are acceptable but must be approved by a program consultant.

		Credit
ADMN 222	Organizational Behavior 1	3.0
COMP 101	Intro to Data Processing	3.0
COMP 103	Data Processing Intro Micro/Apple or	3.0
COMP 105	Data Processing Intro Micro/IBM PC or	3.0
MKTG 108	Retail Marketing	4.0
MKTG 219	Professional Sales 1	3.0
MKTG 306	Principles of Small Business Management	5.0
MKTG 318	Media Planning	5.0
MKTG 319	Professional Sales 2	3.0
MKTG 324	Small Business Development	3.0
MKTG 326	Export/Import Development	3.0
MKTG 424	Advertising for the Small Firm	3.0
MKTG 427	Creative Advertising Design	3.0
MKTG 428	Marketing Simulations 1	4.0
TDMT 305	International Trade	4.0
TDMT 409	Exporting and Importing	4.5

Operations Management

The Key to Your Future!

Action and Results — The needs of today's dynamic business environment.

Operations Management puts you in the position to help business meet its productivity improvement goals while enhancing your quality of work life. Operations Management offers several options each oriented to specific operating sectors — each bringing its own rewards and advancements.

This program will assist entrepreneurs, divisional managers, line supervisors as well as first level employees attain both their personal and corporate goals. The program is very results oriented in that course content can be used for productivity improvement at the student's place of employment.

The Options include:

1. Industrial Engineering
2. Management Engineering
3. Materials Management
4. Transportation and Distribution

Business Certificates in Operations Management

Industrial Engineering

This program is designed for people who work, or wish to work, in the manufacturing and/or warehousing functions of an organization. It is suited to those who are or will be production foremen, analysts or supervisors in such areas as inventory control, product cost estimating, standard setting, production planning and control, project administration and technical sales.

Management Engineering

This program is designed for people who work in the private and public sectors of service industries — health care, education, justice services. Special attention is paid to ways in which management engineering tools may be applied in organizations whose results are intangible.

Materials Management

This program is designed to provide working adults with the training and education necessary to pursue a career in materials management.

The program is of interest to anyone involved in production and inventory control, buying, or related professions. Others benefitting from this program include: production and inventory control professionals who want to increase their knowledge of the field; newcomers to the profession who want to acquire a solid foundation on which to build a career and those choosing careers in such areas as purchasing, accounting, production supervisor, traffic or warehousing.

This certificate uses the Canadian Association for Production and Inventory Control PIM courses.

Transportation and Distribution

This program is designed for those in both the buying and selling of transportation and distribution of goods.

The course OPMT 198. Productivity Engineering 1, is the core course for all options. It is a basic course in productivity improvement utilizing proven industrial engineering techniques.

Course Listings

Industrial Engineering Option

		Credit
ADMN 124	Supervisory Skills	3.0
COMM 183	Report Writing	3.0
FMGT 109	*Accounting for the Manager*	3.0
OPMT 102	Basic Mathematics of Finance	3.0
OPMT 163	Engineering Economics	3.0
OPMT 187	Project Planning and Scheduling	3.0
OPMT 188	Management Information Systems	3.0
OPMT 191	Purchasing	3.0
OPMT 192	Inventory Planning and Control	3.0
OPMT 193	Quality Control Methods 1	3.0
OPMT 194	Quality Control Methods 2	3.0
OPMT 198	Productivity Engineering 1	3.0
OPMT 290	Work Analysis and Design	3.0
OPMT 292	Facilities Design Layout and Materials Planning	3.0
OPMT 298	Productivity Engineering 2	

Management Engineering Option

		Credit
ADMN 124	Supervisory Skills	3.0
ADMN 145	Managing Change	2.0
ADMN 170	Government and Business	3.0
ADMN 222	Organizational Behavior 1	3.0
COMP 105	Introduction to Data Processing/Micro IBM PC	3.0
COMM 183	Report Writing	3.0
FMGT 109	Accounting for the Manager	3.0
OPMT 102	Basic Mathematics of Finance	3.0
OPMT 187	Project Planning and Scheduling	3.0
OPMT 188	Management Information Systems	3.0
OPMT 191	Purchasing	3.0
OPMT 198	Productivity Engineering 1	3.0
OPMT 290	Work Analysis and Design	3.0
OPMT 298	Productivity Engineering 2	

Materials Management Option

		Credit
ADMN 124	Supervisory Skills	3.0
COMM 183	Report Writing	3.0
COMP 105	Introduction to Data Processing/Micro IBM PC	3.0
CPIC 100	CAPIC — Planning	3.0
CPIC 200	CAPIC — Inventory Management	3.0
CPIC 300	CAPIC — Material Requirements Planning	4.0
CPIC 400	CAPIC — Capacity and Priority Planning	4.0
OPMT 175	Warehouse Management	
OPMT 191	Purchasing	3.0
OPMT 193	Quality Control Method	3.0
OPMT 198	Productivity Engineering 1	3.0
OPMT 293	Facility Layout and Material Handling — Office	3.0
OPMT 298	Productivity Engineering 2	
TDMT 409	Exporting and Importing	4.5
TDMT 413	Traffic and Transportation Management	4.5

Transportation and Distribution Option

		Credit
ADMN 124	Supervisory Skills	3.0
COMP 101	Data Processing — Introduction or	3.0
COMP 103	Introduction to Data Processing Micro/Apple or	3.0
COMP 105	Introduction to Data Processing Micro/IBM PC	3.0
OPMT 191	Purchasing	3.0

OPMT 192	Inventory Planning and Control	3.0
OPMT 198	Productivity Engineering 1	3.0
OPMT 298	Productivity Engineering 2	3.0
TDMT 101	Geography of Trading 1	2.0
TDMT 201	Geography of Trading 2	2.5
TDMT 202	Transportation Regulations	5.0
TDMT 203	Transportation Economics	5.0
TDMT 305	International Trade	4.0
TDMT 409	Exporting and Importing	4.5
TDMT 410	Strategic Distribution Management	6.0
TDMT 412	Principles of Logistics	3.0
TDMT 413	Traffic and Transportation Management	4.5
	Electives	4.5

For Further information contact:

B.R.M. Morrow, Department Head. Telephone — 434-5734, local 5232.

J. Ribic, Continuing Education Co-ordinator. Telephone — 434-5734, local 5746.

S. Dudra, Program Head, Operations Management. Telephone — 434-5734, local 5746.

H. Pevecz, Program Head, Traffic and Distribution. Telephone — 434-5734, local 5849.

CAPIC Production and Inventory Management Program

BCIT, in cooperation with CAPIC (Canadian Association for Production and Inventory Management (PIM). This practical "how-to" program was developed specifically to serve both supervisory and non-supervisory P & IM practitioners as well as students preparing themselves for a career in the P & IM field. In keeping with the needs of the population it serves, this program teaches the most practical topics in depth, and includes case studies and exams which test integration of the complex concepts applied to real life situations. Topics will be presented in four courses:

CPIC 100	Planning
CPIC 200	Inventory Management
CPIC 300	Materials Requirements Planning
CPIC 400	Capacity and Priority Management

These courses provide the basis for the Business Certificate in Operations Management — Materials Management and in addition, are excellent preparation for the American Production and Inventory Control Society (APICS) certification exams.

Specialized Business Certificates

Business Certificate in Building Services Management

BCIT, in co-operation with the Canadian Building Servicing Association of British Columbia, is pleased to present the following certificate program.

First Level Courses		Credit
ADMN 110	Management 1	4.5
ADMN 211	Management 2	4.0
ADMN 124	Supervisory Skills	3.0
BSMT 100	Maintenance and Control	3.0
BSMT 101	Safety and Sanitation	3.0

Second Level Courses		Credit
ADMN 222	Organizational Behavior 1	3.0
ADMN 332	Labor Relations 1	4.0
FMGT 109	Accounting for the Manager	3.0
OPMT 191	Purchasing	3.0
	Electives	

Suggested Electives

Electives should be chosen to complement career goals. The following electives are suggested as a guide for a standard path of studies. Variations from the School of Management courses are allowed if prior approval is obtained from a program consultant.

First Level Courses		Credit
ADMN 100	Micro Economics	4.0
ADMN 127	Training Techniques	3.0
ADMN 128	Occupational Safety and Health	3.0
ADMN 141	Business Computer Fluency/Apple 2 — Word Processing	2.0
ADMN 145	Managing Change	2.0
ADMN 201	Counselling 1	3.0
ADMN 205	Selection Interviewing	4.0
COMP 103	Data Processing Intro Micro/Apples	3.0
INTD 100	Interior Design — Basic	3.0
MKTG 102	Introduction to Marketing	3.0
OPMT 192	Inventory Planning and Control	3.0

Business Certificate in Interior Design

A program designed for those working in or seeking employment in areas such as kitchen outlets, furniture or drapery centres, wallpaper outlets or retail sales. Graduates may also be suited to be employed as assistants in a design office. The courses required to obtain the Business Certificate in Interior Design are listed below.

Suggested path of study		Credit
INTD 100	Interior Design — Basic	3.0
INTD 101	History of Furniture	3.0
INTD 102	Interior Design — Drafting 1	6.0
INTD 200	Color	3.0
INTD 202	Interior Design Drafting 2	6.0
INTD 301	Graphic Presentation	3.0
INTD 302	Interior Design Drafting 3	3.0
INTD 303	Materials	1.5
INTD 304	Space Planning 1	3.0
INTD 305	Detailing and Materials	3.0
INTD 400	Directed Study Project	1.5
INTD 404	Space Planning 2	3.0
MKTG 323	Public Speaking and Oral Communication 1	3.0
MKTG 423	Public Speaking and Oral Communication 2	3.0
	Electives	

Suggested Electives

Electives should be chosen to complement career goals. The following electives are suggested as a guide for a standard path of studies. Variations must be approved by a Program Consultant.

		Credit
ADMN 110	Management 1	4.5
ADMN 141	Business Computer Fluency/Apple 2 — Word Processing	2.0
ADMN 145	Managing Change	2.0
ADMN 204	Personnel Management	4.0
ADMN 205	Selection Interviewing	4.0
ADMN 211	Management 2	4.0
ADMN 222	Organizational Behavior 1	3.0
COMP 103	Data Processing Intro Micro/Apple **or**	3.0
COMP 105	Data Processing Intro Micro/IBM PC	3.0
MKTG 309	Marketing Research 1	4.5

Combined Management and Engineering Technology Certificate Programs

Operations Management

Operations Management offers students the opportunity to acquire the techniques needed to solve complex business problems that have applications to both the business and engineering fields.

The British Columbia Institute of Technology will award combined Management and Engineering Technology Certificates to students who successfully complete 15 units of study drawn from both schools. The object of these certificates is to provide a course of studies with a general business base and the flexibility to include engineering courses to suit the interest of each individual.

Industrial Management Certificate

		Credit
ADMN 124	Supervisory Skills	3.0
BCOM 180	Business and Technical Report Writing	3.0
COMM 181	Business and Technical Correspondence **or**	
FMGT 109	Accounting for the Manager	3.0
OPMT 198	Productivity Engineering 1	3.0
OPMT 298	Productivity Engineering 2 (choice of option)	3.0
TCOM 180		3.0
	(6) Pre-Approved Engineering Electives	
	(3) Pre-Approved Business Electives	

Technical Marketing Certificate

		Credit
COMM 170	Business Correspondence	3.0
COMM 171	Business Reports	3.0
COMM 183	Technical Report Writing	3.0
MKTG 101/201	Marketing 1 and 2	7.0
MKTG 219	Professional Sales	3.0
	Pre-Approved Business Electives	7.5
	Pre-Approved Engineering Electives	21.0

The Electives will be drawn from a Management or Engineering Technology and must form an acceptable program. In some cases it may be necessary to devote two or three units to technical mathematics. Students must have a complete program approved in advance.

COMM 160 Basic Introduction to Business and Technical Communication plus one additional Business elective can, upon request, be substituted for COMM 180 Technical Communication.

Course Descriptions

ADMN 100 Micro Economics — The major areas studied are the product and resource markets. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored. **4 credits**

ADMN 110 Management Fundamentals — An insight into the basic nature of business problems and the administrative process involved in handling them with emphasis on the personnel management function. Study and discussion is undertaken of actual business situations illustrating problems frequently met in industry requiring managerial analysis, decision and action. **4.5 credits**

ADMN 122 Managerial Skills for Administrative Assistants — For persons preparing for career advancement to positions such as administrative assistant or executive secretary. Students completing this course are comfortable in broadening the scope of their work, increasing their responsibilities and taking initiative in their administrative functions. Topics include: role of the secretary; time management principles; expressing ideas; listening skills; handling criticism; group discussion skills. Student participation is stressed to develop communication skills, learn from the experience of others. **3 credits**

ADMN 123 Office of the Future Management and Supervision — Assists the progressive manager to cope with the impact of technological change experienced within the present and future office environment. Lectures, discussions, case studies, and role playing describe and explain the influence that developments in word processing, data procssing and communication technology have on the manager's role. Topics include activities of the office manager; systems in the office of the future; human factors and behavioral implications; analysis; design and implementation of the office of the future. **3 credits**

ADMN 124 Supervisory Skills — Designed for new supervisors or aspirants for leadership responsibilities in large or small companies, institutions, government departments, municipalities, or associations. Students increase their confidence and abilities as leaders and establish a foundation for further training in supervision and management. Persons taking the first step into supervision study delegation, grievances, work planning, and roles and relationships within an organization. **3 credits**

ADMN 127 Training Techniques — Useful to people responsible for personnel training in business, industry government and institutions. Members of personnel departments contemplating a training program, and supervisors involved with on the job training, will be particularly interested. The student develops a good grounding in current training methodology, techniques and aids. Topics include learning theory, determining training needs; writing objectives, designing training programs using outside resources, and evaluation. **3 credits**

ADMN 128 Occupational Safety and Health — A practical course conducted by the B.C. Safety Council for those responsible for occupational safety and health in an industrial setting including managers, supervisors, shop stewards, safety committee members or members of the industrial relations or personnel department. Topics include: Worker's Compensation Act; Factories Act; rules and regulations; types of organization structure; the role of the committee; creating a 'thinking' state of mind; pros and cons of reward systems; union/management cooperation; other ways and means of getting this important job done. **3 credits**

ADMN 129 Records and Information Management 1000 — An overview of records management and the basic principles, techniques and operations in the creation, use and maintenance of records for people involved with records and information mangement. This course will provide an "ideal program" as a standard to apply to a current work environment. **3 credits**

ADMN 130 Records and Information Management 2000 — This course for people involved with records and information management as a resource covers the effects of technology on records management, such as data processing and micrographics, advanced records management concepts to improve the records and information systems through the management of forms, vital or archival records, security of records laws and regulations affecting records management. **3 credits**

ADMN 140 Business Computer Fluency/Apple 2+ Spreadsheets — This introductory level course is designed for individuals with little or no prior exposure to computers. The content covers spreadsheet applications, design and manipulation. A Visicalc One computer is reserved for the personal use of each student. A comprehensive instructional manual is included as part of the course fee. **2 credits**

ADMN 141 Business Computer Fluency/Apple 2+ Word Processing — This introductory level course is designed for individuals with little or no prior exposure to computers. The content covers document creation, editing, storage and printing, spelling checker, mailing lists and procedures. Uses Magic Window II, Magic Words and Magic Mailer. One computer is reserved for the personal use of each student. A comprehensive instructional manual is included as part of the course fee. **2 credits**

ADMN 145 Managing Change — Using experiential techniques, the course deals with the challenges of managing in the contemporary environment. Concerned with conflict, planned change and organization development, content covers each of these processes and offers an opportunity to facilitate organizational adaptability. **2 credits**

ADMN 170 Government and Business — A basic course helpful to persons seeking a career in Federal, Provincial or Municipal Government and to business people needing to understand the nature, extent and rationale of government involvement in business. Lectures, group discussions and selected readings explore government regulation and support of business enterprises in Canada; government monopoly and combines control policy; legislation and regulation in banking, broadcasting, transportation, labor consumer protection; support programs for various types of economic development; taxation; licensing; marketing boards. **3 credits**

ADMN 180 Computer and Technology Law — An introductory computer law course of interest to students in the financial management and administrative management areas. Students study the practical application of current law relative to technological change and the use and development of computers with an emphasis on product liability and professional negligence, electronic transfer, computer fraud, criminal law, privacy and the confidentiality of data bank resources, patent and copywrite and special types of contracts in computers and technology. **3 credits**

ADMN 181 Basic Word Processing — Offers the basic principles of microcomputers and covers all the functions normally associated with word processing. Students will become familiar with the processes of creating, editing, filing and printing all types of business correspondence. **1.5 credits**

ADMN 200 Macro Economics — Develops and understanding of the organization and operation of the Canadian Economy in an International setting. The theoretical tools of the economist are used to expand the concepts of national income, employment,

inflation, money and banking, international trade and growth. An appreciation of the relationship between economic theory and economic policy is provided. **6 credits**

ADMN 201 Counselling 1 — Demonstrates that communication skills can be learned, and that through training, everyone can learn to become a more effective communicator. The instructional method focuses on learning to discriminate various levels of communication through lectures, listening, observing and practising. The discrimination training focuses on empathy, respect, genuineness, concreteness, self-disclosure and confrontation. Live interaction and observer feedback are essential aspects of this developmental training. **3 credits**

ADMN 202 Course Design — Advanced Training Techniques — This sequel to ADMN 127 develops skills to effectively plan, design, construct and evaluate training programs and courses. This course is intensive and requires considerable commitment from participants to actively demonstrate and assess their developing skills. **3 credits**

ADMN 203 Instruction and Facilitation — Advanced Training Techniques — As a sequel to ADMN 127, this course develops skills necessary to lead and assess training sessions, workshops, simulation exercises, and group sessions. This course is intensive and requires considerable commitment from participants to actively demonstrate and assess their developing skills. **3 credits**

ADMN 204 Personnel Management — An introductory course for those who have recently joined a personnel or industrial relations department or who plan to enter the field. It is also valuable to supervisors or managers who must implement or are held accountable for administering personnel policies. The student develops an understanding of the personnel function, relationship to management and responsibility to employees. Topics cover major functions emphasizing the practical application of personnel policies and procedures, salary administration, benefits administration and employee relations. **4 credits**

ADMN 205 Selection Interviewing — This course is presented for people in the fields of personnel, management, supervision, or anyone involved in interviewing applicants for employment. It identifies techniques, styles, stages, uses, pitfalls and key points in interviewing, with particular emphasis on questioning techniques and selective listening. Classes limited to 20 students. **4 credits**

ADMN 206 Psychological Testing — Introduces various tests such as aptitude, personality, and interest measures. Administration scoring and the design of 'in-house' testing programs are covered along with uses of tests in selection, promotion, training and individual career planning, including relocation counselling, testing and human rights, discrimination and manpower planning. **3 credits**

ADMN 207 Paralegal Aspects of Personnel Practice — Participants study current para-legal issues in human resources. This course supplements other personnel courses and enables the personnel practitioner to interpret corporate goals and positions in sources of help, appeal/adjudication channels and when to retain professional assistance. **3 credits**

ADMN 208 Municipal Law — In addition to an overview of the B.C. Municipal Act and other provincial statutes governing local government activities, this course covers areas of administrative practice. Additional topics include: municipal powers and duties; municipal councils; elections; by-laws; acquisition and disposal of land; contracts and franchises, revenues, assessment and taxation; B.C. statutes and case law relating to the principal services provided by municipal authorities. **3 credits**

ADMN 211 Management 2 — A continuation of the study of functions of management begun in ADMN 110. Prequisite: ADMN 110. **4 credits**

ADMN 222 Organizational Behavior 1 — For persons with no formal training in organizational behavior, a study of basic behavioral concepts and their applications to management situations. These include operational definitions or terminology common to psychology and other social sciences, allowing the student to easily understand the information conveyed in reading in all areas of organizational behavior studies. The beginning concentrates on the individual, focusing on the determinants of behavior — heredity, culture, motivation, perception, attitudes, learning and leadership. The conclusion focuses on understanding. **3 credits**

ADMN 300 Management Policy — Lectures, case studies and business exercises, simulated through a comprehensive computer exercise, provide a comprehensive view of the general management role and provide practice in making decisions in such areas as sales, price and production. Case studies examine the relationship between the business opportunity and the definition of business purpose, product and general policy and strategy for the guidance of business activities. **3 credits**

ADMN 301 Managerial Styles — A practical course for the supervisor, manager or student wishing to learn more about the 'people aspect' and psychology of management, with emphasis on how and why people interface as they do. Students develop a productive management style and learn how accepted theories successfully deal with managerial problem situations as they arise. **3 credits**

ADMN 302 Problem Solving and Decision Making — Participants learn to apply various techniques to problem solving and decision making with emphasis on problem analysis. Group dynamics, demonstrations, lectures and practice sessions relating to real applications prevail. Rational and creative methods, using the principle of learning through interpersonal workshops or group involvement, establish a high level of confidence in the student's ability to deal with problems effectively. **3 credits**

ADMN 303 Counselling 3 — This second phase of interpersonal communications skill development is an opportunity to practice communication skills in supervised training sessions. Focuses on the application, integration and refinement of the core dimensions: empathy, respect, genuineness, concreteness; self-disclosure and confrontation. Dyads and double dyads comprised of counsellor, client and peer-group observers combine with audio and video tapes as ongoing feedback. **3 credits**

ADMN 304 Manpower Planning — Designed for anyone in a planning organization involving "people resources". Presents the philosophy of techniques used in utilizing people potential within organizations. Topics include manpower planning; methods of evaluating present resources; future projections; sources of supply; identifying training needs; related personnel policies, budgeting and costing, and program evaluation. **4 credits**

ADMN 305 Salary Administration — Students learn the 'whys' and 'hows' of salary administration and develop a basic knowledge of techniques in this field. Topics include alternative methods of job evaluation; job description; establishing and maintaining salary schedules; administering a salary plan; general and specific adjustments for promotions and demotions; how to set up a simple plan. **4 credits**

ADMN 322 Organizational Behavior 2 — Persons in counselling situations or with leadership responsibilities who, having completed part 1, will benefit from a deeper appreciation of motivation theory and its application. Students study theories of people and management and come to better understand and cope with

human behavior in the world of work. Topics include organization culture attitudes and their importance in change, leadership styles and conflict in goals and objectives. **3 credits**

ADMN 332 Labor Relations 1 — For those involved in or associated with labor relations as members of management or of a union. People in the personnel field, shop stewards, supervisors and managers will find the coverage of the collective bargaining process and day-to-day contract administration extremely useful, and learn to approach their responsibilities for matters covered by collective agreements with more confidence and expertise. Topics include related laws, typical contract clauses, grievance procedures, responsibilities of the supervisor and the shop steward, and current activities in the labor relations field. **4 credits**

ADMN 380 Business Law — A study of legal rules and principles which guide decisions involving the law of contracts, including the sale of goods and negotiable instruments, as well as the business associations of agency, partnership and the company. **3 credits**

ADMN 400 Special Project — An opportunity for advanced level students to do an independent, in-depth study in the business management field under the guidance of an instructor. Students take a real 'live' problem or situation that they face in their work, and tackle it with the guidance of an 'expert' in the field. The specific objective is set by the student. Students interested in pursuing this should approach a program consultant for assistance in developing proposals for the project. **3 credits**

ADMN 428 Management Simulations 1 — A basic introduction to decision making in a simulated organization. The student has the opportunity of running one of several companies in an industry. Decisions range through product development, price, selling strategies, production strategies and financial control. **4 credits**

ADMN 432 Labor Relations 2 — A thorough explanation of collective administration, agreements, wage issues, economic supplements, arbitration, mediation, preparation for collective bargaining and collective bargaining techniques. Prerequisite: ADMN 332. **6 credits**

ADMN 480 Business Law 2 — The second part of Business Law delves further into commercial law. Students become more competent in dealing with lawyers and in handling their own affairs, including knowing when to call a lawyer. Reading assignments, lectures and case studies cover Canadian mercantile law, the law of contracts and subjects involved with guarantee; agency employment; mechanics' and wage earners' liens; sale of goods; bailment; corporations; partnerships; bankruptcy; real property; mortgages; landlord and tenant; negotiable instruments; insurance; banks and banking torts; criminal, marriage and constitutional law. Prerequisite: ADMN 380. **6 credits**

BCST 101 Technical Basics — Students are introduced to the basics of electricity, magnetism, batteries and other principles which are then applied to the equipment they will be working with. The origin of sound is traced through the entire processing and transmission system to its ultimate reception in the listener's home. The same is done with the sending and receiving of television pictures. This is an elementary introduction to explain "how things work." **2 credits**

BCST 140 Broadcast Industry Organization — For people interested in finding out how the broadcast industry operates from an organizational point of view, who want more information about the operation of our Canadian Broadcasting System and its relationship with the rest of the world. Discussions centre on individual station hierarchies, the Canadian Radio-Television and Telecommunications Commission, the Canadian Association of Broadcasters and Provincial and Regional Associations, international affiliations and associations, regulatory agencies and broadcast-related industries, and the CBC. **3 credits**

BCST 141 Broadcast Sales and Management — Through a combination of informal lectures, guest speakers and tours of local broadcasting stations, students obtain a unique insight into the complexities involved in the operation of a broadcast outlet as a business. Lectures cover sales, sales management, advertising (theory and practice), sales and station promotion, advertising agencies, programming, an overview of economics in broadcasting, market measurement, contemporary management styles, computers in broadcasting, etc. **3 credits**

BCST 142 History and Development of Contemporary Music — Examines changes that have taken place in our music over the past few decades. Topics are approached through informal lectures and guest speakers. Considerable time is spent auditioning, analyzing and discussing recordings of the major contributors to the development of today's contemporary music. **3 credits**

BCST 143 The Music Business and The Broadcast Industry — Course topics include the roles, responsibilities and operation of talent agencies and management; concert promotion and merchandising; song writing and publishing, copyright; record companies and manufacturing, recording studios; getting "air-play" on radio stations, contracts, etc. **3 credits**

BCST 144 Writing For The Media — A practical guide to freelance writing for radio and television in preparation for writing opportunities with CBC Information Radio, CBC Television, The National Film Board and other markets. Emphasizes proper formats, writing styles, use of equipment and professional business practice, as well as assisting writers to package material for sale. **3 credits**

BCST 145 Copywriting For Radio and TV — The "how" and "why" of writing radio and TV commercials. Ideal for non-production or writing employees in broadcasting looking for a move into this area and for anyone wishing to explore copywriting as a career. **3 credits**

BCST 146 Broadcast Advertising and Promotion — Discusses various aspects of advertising and promotion for broadcast stations, including developing promotional concepts, marketing of broadcast stations and market studies. **3 credits**

BCST 147 Broadcast Engineering for Production Personnel — Designed to teach a production people the technical basics of equipment used in daily operations. **3 credits**

BCST 150 Radio Broadcasting Introduction — For people contemplating a career in radio broadcasting or currently employed in non-broadcast positions in the industry who wish to move into the operations area of a radio station. Introduces broadcast equipment, station operation and hierarchies, regulations, commercial production, broadcast procedures and jargon. **3 credits**

BCST 151 Radio and TV Announcing — An introduction to basic announcing skills. This course will improve students' presentation and articulation by employing several styles and techniques of announcing practice followed by critiques and evaluation. A voice audition may be required. **3 credits**

BCST 160 Television Broadcasting Introduction — Designed for persons interested in television broadcasting as a career, and those working in non-production areas. Introduces the theory and procedures of television equipment necessary to the operation of a TV station. Participants operate equipment in production exercises to produce full-length programs. **3 credits**

BCST 161 Film For Beginners — Introduces the basics of professional film making including scripting, equipment operation and filming techniques to people who are interested in cinematography. Additional topics are optical and magnetic sound, special effects, animation, lighting and editing. Note: A laboratory fee will be assessed to cover cost of processing film. **3 credits**

BCST 162 Dramatic Writing For Film and TV — Provides a solid base for people interested in pursuing opportunities in the expanding areas of film and television dramatic script writing. As the satellite age develops, programmers are seeking more and more material to supply new programming to the dozens of available channels. This course addresses that demand and prepares students for these opportunities by discussing the many different approaches to dramatic writing, the special techniques involved, different types of scripts, marketing of material, etc. **3 credits**

BCST 163 Acting For Television — The student studies the workings of television as it affects the actor and becomes better equipped to audition for professional productions in the local market. **3 credits**

BCST 166 Broadcast Newsroom Operations — Provides students with the opportunity to acquire practical skills in the preparation and delivery of radio newscasts. The student recives training in newsroom equipment and intruction in news writing, newscast lineup and announcing. **3 credits**

BCST 167 Production Assistant — Techniques for Film and TV — This course is designed to provide a basic understanding of broadcast engineering for current employees of broadcast stations or those interested in a broadcasting career. **3 credits**

BCST 170 Broadcast Journalism Introduction — An introduction to all aspects of news operation in the broadcast industry covering basic reporting, writing and presentation of radio and TV news; newsroom operations, methods and practices; editing, line-up and content of news stories. **3 credits**

BCST 171 Broadcast News Writing — Writing techniques used in radio and TV newswriting for those in the field who wish to develop additional skills, and for employees in the industry who wish to add news writing to their present skills, and for general interest. **3 credits**

BCST 172 Investigative Reporting — Anyone interested in the motives and processes of investigative reporting will find this course interesting. Although the course should not be regarded as sufficient preparation for employment as an investigative reporter, content is detailed enough to be useful to anyone contemplating a reporting career with the addition of a broader journalism course. **3 credits**

BCST 173 Sportscasting — Designed for those contemplating a career in radio or television sports broadcasting. Topics include sports reporting, sportscast organization and presentation, interviewing techniques, play-by-play and industry background information. **3 credits**

BCST 180 Copywriting For Radio and TV — This is a correspondence course designed for beginning copywriters with little or no experience. The course provides basic copywriting training while the student is working, without requiring the student to attend classes. **3 credits**

BCST 252 Radio: Commercial and Audio Production — Learn how to produce commercials and other audio features using modern radio commercial production and recording theories and techniques. For those who have completed BCST 150 or who have industry experience. **3 credits**

BCST 253 Radio Operations Lab — Most students find upon completion of BCST 150 that they are just becoming familiar with equipment and operations when the course ends. This course provides 36 hours of advanced practice in simulated station operations. Group and individual critiques are made after simulation to evaluate performance. **3 credits**

BCST 260 Television Production Techniques — Offers practical application opportunities for students who have completed BCST 160 and BCST 323. Each session consists of a lecture followed by setup and shooting of interviews, demonstrations, commercials and promos including the introduction of special techniques which allow students to add more professional polish to their work. **3 credits**

BCST 261 Commercial Production — This is an advanced studio course that includes basic information on how to structure a television commercial. This course will involve the production and critique of commercials. The student will also use the equipment needed to produce commercials. Prerequisite: BCST 160 and BCST 323. **3 credits**

BCST 270 Radio Newsroom Operations — See BCST 166. **3 credits**

BCST 323 Television Production Planning — Enables students to plan the elements necessary to guarantee a TV production which meets the professional standards of the television production industry, and organize and conduct pre and post production meetings as the producer/director of a proposed series pilot. Prerequisite: BCST 220. **1 credit**

BSMT 100 Maintenance and Control — Prepares candidates for supervisory roles in the building management field. Students study maintenance from a supervisory viewpoint, in particular, the chemicals involved in various types of maintenance. Lectures, demonstrations, visual aids and viewing equipment provide information on chemicals, disinfectants, equipment and techniques for maintaining floors, carpets, windows, blinds, etc., with particular attention to hotel, hospital and institutional maintenance. **3 credits**

BSMT 101 Safety and Sanitation — Hospital executive housekeepers, maintenance employees, hotel and residence building managers and those striving for such positions, study the causative factors of diseases and the methods available to control their incidence. Students learn to identify and evaluate biological, physical and chemical safety hazards. Established methods are utilized so that adequate controls can be used for protection and prevention. Topics include sanitation terminology, related bacteriology, behavior control using physical and chemical agents, cleaning techniques, waste material handling, insect and rodent control, plumbing, safety ergonomics, chemical hazards, ventilation, protective equipment, dangerous liquids, tools and machinery, accident prevention, safety training, radioactive materials, disaster planning, evacuation and case studies. **3 credits**

BSMT 400 Excellence in Business — Presents the basic rules of the business of management. America's best run companies are used as examples. **3 credits**

COMM 160 Introduction to Business and Technical Communication — Introduces students to the basics of communicating in business and industry. It offers practical techniques for planning, organizing, selecting and presenting information. Using effective business and technical style is also covered. Students apply these skills to communications common to most office jobs — writing routine memos, instructions, procedures and summaries. Presenting information orally is also covered. Practical "case" assignments are used. The combination of COMM 160, 170 and 171 taken in sequence is equivalent to first year Business Communication in day school. COMM 160, 180 and 183 are equivalent to first year technical communication. **3 credits**

COMM 170 Business Correspondence — Covers communicating inside and outside the office. Internal correspondence includes routine requests and replies and short, informal memos. External correspondence includes request, reply, sales and collection letters. Job applications are also covered. **3 credits**

COMM 171 Business Reports — Gives business writers practice in problem-solving reports and proposals. The emphasis is on the persuasive skills needed to sell ideas, methods and products. Specific applications include comparison and recommendation reports, proposals, feasibility studies, executive summaries and formal report format. It also covers persuasive presentations, meetings and the effective use of graphics. **3 credits**

COMM 183 Technical Report Writing — Gives writers from technical or industrial backgrounds practice in problem-solving reports. The emphasis is on the communication skills needed when solving engineering problems and describing methods and products. Specific applications include comparison and feasibility reports, technical proposals, journal reviews, executive summaries and formal report format. Persuasive presentations, meetings, and effective use of graphics are also covered. **3 credits**

COMM 196 Writing User Friendly Manuals — This 18-hour course is for anyone who writes user manuals. It covers planning, researching, organizing, formatting and writing the manual and testing and packaging the finished product. It emphasizes techniques for translating technical material for the non-technical reader. The course is offered in weekend and 3-day formats at the Burnaby and Downtown campuses. **1.5 credits**

COMP 101 Data Processing — Introduction — Introduces the principles and concepts of business data processing to people with little or no programming experience. It may be useful to those who need a better understanding of computer operations in their firms. A prerequisite for most systems and programming courses. Lectures and laboratory sessions with "hands-on" computer practice include an introduction to the computer: input/output, hardware, computer use; background, data representation, applied systems, files, magnetic tape and disk, master and transaction files, data entry and control, batch processing, on-line data entry, computer programming, flowcharting, input/output, processing, decision, arithmetic and branching. Students will write and test five programs in BASIC programming language. **3 credits**

COMP 102 Data Processing — Introduction — A one-week intensive course covering material presented in COMP 101. Full days (0900-1700) plus some evening work required. See COMP 101 for course content. **3 credits**

COMP 103 Introduction to Data Processing — Microcomputers Apple — Introduces the principles and concepts of business data processing to people with little or no programming experience and those needing a better understanding of computer operations in their firms. As a prerequisite for most of our systems and programming courses, this course includes lectures and laboratory sessions with "hands-on" microcomputer experience as an introduction to the computer; input/output, hardware, uses of computers, data representation, applied systems; files, magnetic tape and disk, master and transaction files, data entry and control, batch processing, on-line data entry; computer programming, flowcharting, input/output, processing, decisions, arithmetic and branching. Students write and test five programs in BASIC language. **3 credits**

COMP 104 Computers in Business — For those with a basic understanding of programming and computer systems who are not directly involved in data processing but require familiarity with current terminology and concepts used in the computer industry. Students learn to communicate effectively with data processing personnel, recognize the potential use of computers in a business environment and understand the implications of installing an in-house computer or data centre system. Topics include "state of the art" computer equipment and programming; data entry techniques; batch on-line and distributed processing; telecommunications; control and security; criteria for evaluating and selecting computer systems for a medium-sized company and the simplifications computers have on the financial and staff resources of companies. Prerequisite: COMP 101/102/103/105. **3 credits**

COMP 105 Introduction to Data Processing — Microcomputer — IBM PC — Introduces the principles and concepts of business data processing to people with little or no programming experience. See COMP 101 and COMP 103 for a detailed description. Students receive "hands-on" microcomputer experience using the IBM PC. **3 credits**

COMP 160 Computer Systems — Introduction 1 — Introduces the basic definition and design of computer systems. Emphasis is on the fundamentals of systems analysis including development of system objectives, problem definition, information gathering, effective written and verbal communication (particularly with user department personnel) about systems problems and possible computer solutions. The course presents the systems development process and covers basic systems theory, the systems development cycle, information gathering, flowcharting, report writing, forms design and presentation techniques. Additional techniques and their applications to common business systems are presented in COMP 260. Prerequisite: COMP 101/102/103/105. **3 credits**

CPIC 100 Planning — A company, like an airliner, needs a flight plan to know where it is going. For a manufacturing facility, the production plan is that flight plan since it expresses the desired rate of production in aggregate terms for each month. The course includes manufacturing functions, types of industries, lead time considerations, general planning concepts, production planning details, demand management and statistical forecasting. This course forms part of the CAPIC developed Production and Inventory Management Program to provide a comprehensive program covering current principles and techniques which are essential to the effective management of the Integrated Materials System. Other modules in this program are OPMT 310, OPMT 315 and OPMT 320. **3 credits**

CPIC 200 Inventory Management — Encompasses the principles, concepts and techniques for deciding what items to order, how much to order, when they are needed, when to order, and how and when to store them. Topics include inventory functions, inventory costs, independent versus dependent demand, stores management, inventory segregation, lot sizing (independent), replenishment rules (independent), safety stock (independent), distribution inventories and aggregate measures. This course forms part of the CAPIC developed Production and Inventory Management Program. Other courses in this program are OPMT 305, OPMT 315 and OPMT 320. **3 credits**

CPIC 300 Material Requirements Planning (MRP) — MRP or time-phased material requirements planning is a set of techniques that evolved from an approach to inventory management which combines calculating dependent demand items in a time-phased format. Topics include bills of material, MRP concepts, lot sizing and safety stock, closing and loop, master production schedule concepts and master production schedule types. This course forms part of the CAPIC developed Production and Inventory Management Program. Other courses in this program are OPMT 305, OPMT 310 and OPMT 320. **4 credits**

CPIC 400 Capacity and Priority Management — Capacity Management is the function of establishing, measuring, monitoring and adjusting limits or levels of capacity in order to execute all manufacturing schedules. Priority management encompasses the principles, concepts and techniques for deciding which jobs should be worked on and when. The course examines scheduling, long range capacity planning, medium range capacity planning, managing the capacity plan; controlling capacity, the system data and paper needs, controlling priorities and planning and controlling the outside factory. This course forms part of the CAPIC developed Production and Inventory Management Program. Other courses in this program are OPMT 305, OPMT 310 and OPMT 315. **4 credits**

FMGT 101 Accounting 1 — Permits persons with little or no accounting background to become familiar with the techniques of working through the full accounting cycle. It provides theoretical and practical training in basic accounting as preparation for FMGT 201. Topics include accounting as an information system; introduction to accounting theory; income measurement; traditional record-keeping procedures; the accounting cycle; special journals; cash; investments and receivables. **4 credits**

FMGT 106 Credit and Collections — A detailed examination of credit granting, collection techniques and credit philosophy in all levels of business prepares the student to assist the credit manager of a large or small business in any area of the subject. Topics include determining credit risk; credit instruments and collateral security; types of consumer credit and credit cards; sources of consumer credit information; collections; credit department management. **4 credits**

FMGT 109 Accounting for the Manager — For the manager who wants to understand basic accounting principles without taking a formal accounting course. The student studies the accounting function and the services it provides the manager and learns to interpret statements, reports, budgets, etc. in managerial decision making. Topics include the accounting cycle, inventory valuation and control depreciation methods, credit control, budgeting and analysis of financial statements. **3 credits**

FMGT 110 Principles of Accounting (Accelerated) — This course, equivalent to FMGT 101/201, presents a full introduction to accounting in 14 weeks. Prospective students are cautioned against enrolling in this course without a strong background in accounting. Students must be prepared to spend a minimum of 10 hours per week out of class working on the course material. See FMGT 101/201 for details. **6 credits**

FMGT 112 Finance for the Manager — For the manager or entrepreneur who wants to understand the basic principles of business finance without formal study in finance or the usual preparatory courses for formal study. The student develops a working understanding of business finance, cash flow management and financial planning in large and small businesses. **3 credits**

FMGT 113 Introduction to Accounting 1 — A flexible entry correspondence course that permits individuals with little or no accounting background to become familiar with the techniques of working through the accounting cycle. It provides theoretical and practical training in basic accounting and serves as preparation for accounting 2. On successful completion of the course, students can expect to have an understanding of basic accounting functions and to have gained an appreciation of accounting history which is the foundation for accounting procedures. **3 credits**

FMGT 114 Introduction to Accounting 2 — A flexible entry correspondence course which follows Introduction to Accounting 1. It permits those with a basic course in accounting to expand their knowledge of financial and management accounting techniques through theoretical and practical training in these areas. Students who complete the practice set of books are awarded an extra half credit. The practice set is a separate purchase with an additional marking fee. **3 credits**

FMGT 115 Accounting 1L — Enables students to start the basic course in accounting in January. It is the equivalent of FMGT 101 and the first six weeks of FMGT 201 for a total of 18 weeks of the 30 week presentation. The balance of the course may be taken in either May or September FMGT 201. For a description of the course content see FMGT 101/201. **6 credits**

FMGT 201 Accounting 2 — The follow-up to FMGT 101, topics include inventory, long-lived assets, liabilities, forms of business organizations, cash-flow and working capital analysis, manufacturing accounting, management accounting, consolidated statements, analysis of financial statements and price level changes. Prerequisite: FMGT 101. **6 credits**

FMGT 215 Accounting 2S — Follow-up course to FMGT 101, enabling students to complete the last 12 weeks of the basic accounting course. See FMGT 201 for details. Prerequisite: FMGT 115. **4 credits**

FMGT 301 Cost and Managerial Accounting 1 — Emphasizes the role of the management accountant, cost terms and purposes, cost-volume-profit relationships, job order accounting, budgeting, responsibility accounting and standard costs. Prerequisite: FMGT 201. **4 credits**

FMGT 302 Financial Accounting 1 — For students with basic accounting knowledge to broaden their understanding of the accounting process and its underlying theory. This course and FMGT 402 prepare them for career advancement and advanced study in accounting. Topics cover development of financial information for external circulation; the accounting process from a more analytical standpoint; the income statement and balance sheet; cost, valuation, presentation and income measurement problems associated with current assets and current liabilities. Prerequisite: FMGT 201. **4 credits**

FMGT 305 Cost Accounting — Computer Systems — Direct costing and the contribution approach; cost-volume-profit analysis; cost analysis for managerial planning and decisions; inventory planning, control and valuation; budgeting and profit planning; standard costs; cost and price variance analysis; capital budgeting. Applications on HP 3000 will be studied during late term labs. Prerequisite: FMGT 201. **4 credits**

FMGT 307 Finance 1 — Those with little or no knowledge of financial management will study the various methods of optimizing the economic position of a firm. Middle management people in business finance will learn to make the best decisions on the financing of a firm. Topics include control and financial management of the business firm, profit planning, cash and capital budgeting and inventory control. Prerequisite: FMGT 201. **4 credits**

FMGT 310 Auditing 1 — Discusses auditing principles, specific techniques in analytical auditing and some asset classifications. Students study the meaning and purpose of the audit function and are introduced to techniques and procedures. Topics include history, professional ethics, internal control, auditing EDP systems, gathering evidence, audit work papers. Prerequisite: FMGT 201. **4 credits**

FMGT 314 Financial Accounting 1 and 2 Accelerated — This course is equivalent to FMGT 302/402 and offers both financial accounting courses in 15 weeks. Prospective students are cautioned against enrolling in the course unless they have a reasonable background in financial accounting and are prepared to

spend a minimum of 12 hours per week out of class working on the course material. See FMGT 302/402 for details. Prerequisite: FMGT 201. **12 credits**

FMGT 316 Taxation 1 — Introduces individuals with little or no income tax knowledge to the basics of Canadian income tax. The course constitutes the first half of taxation with FMGT 408 completing it. Topics include tax information sources, residency, classes of taxpayers, employment income, business income, investment income, capital cost allowance and capital gain rules. Prerequisite: FMGT 201. **3 credits**

FMGT 319 Cost and Managerial Accounting 1L — Designed to permit students to start cost accounting in January, this is equivalent to FMGT 301 and the first 6 weeks of FMGT 401 for a total of 18 weeks of the 30 week presentation. The remaining 12 weeks can then be completed either by taking FMGT 401 over 6 weeks, 2 nights per week commencing in May, or over 12 weeks commencing in September. See FMGT 301/401 for details. Prerequisite: FMGT 215. **6 credits**

FMGT 320 Financial Accounting 1L — Permits students to start financial accounting in January. It covers the equivalent of FMGT 302 and the first 6 weeks of FMGT 402 for a total of l8 weeks of the 30 week presentation. The remaining 12 weeks can be completed either by taking FMGT 402 over 6 weeks, on a 2 nights per week basis commencing in May, or over 12 weeks commencing in September. See FMGT 302/402 for details. Prerequisite: FMGT 215. **7 credits**

FMGT 401 Cost and Managerial Accounting 2 — Enables the student who has completed FMGT 301 to understand cost accounting techniques which will assist management in planning, control, income determination and decision making. The course emphasizes direct costing, relevant costs, cost allocation, capital budgeting, inventory planning and valuation, joint and by-product costs, process costing, payroll; factory ledgers and decentralization and transfer pricing. Prerequisite: FMGT 301. **6 credits**

FMGT 402 Financial Accounting 2 — Completes the study of intermediate accounting necessary for employment in more responsible accounting positions. Topics include cost, valuation, presentation, income measurement problems associated with long term assets and liabilities (where appropriate), shareholders' equity accounts, income tax allocation, statement of charts in financial position, statements from incomplete data, accounting changes and price-level and fair-value accounting. Prerequisite: FMGT 302. **6 credits**

FMGT 404 Finance 2 — Instructs students in raising capital to finance a firm. Topics include the cost of capital; short, medium and long term financing leasing; refinancing; security analysis; the Canadian capital and money markets and pension portfolios as they affect business decisions of the Canadian firm. Prerequisite: FMGT 307. **6 credits**

FMGT 406 Auditing 2 — Follow-up to FMGT 310. The student studies general auditing principles and specific audit procedures and learns to critically assess accounting procedures. Topics include auditing assets, liabilities, owner's equity, revenues, cost, expenses, financial statements and audit reports. A short audit case will be undertaken. Prerequisite: FMGT 310. **6 credits**

FMGT 408 Taxation 2 — Students expand on their study of Canadian income tax begun in FMGT 316 and become aware of the complexities and problem areas involved in tax planning. Topics include tax on individuals (including proprietors and partners), corporations and trusts, corporate surplus distributions, international income, appeal procedures, tax planning and tax avoidance versus tax evasion. Prerequisite: FMGT 316. **3 credits**

FMGT 419 Cost and Managerial Accounting 2S — As a follow-up course to FMGT 319, FMGT 419 completes the last portion of the cost accounting courses. See FMGT 401 for details. Prerequisite: FMGT 319. **4 credits**

FMGT 420 Financial Accounting 2S — The follow-up course to FMGT 320, enables students to complete the last portion of the financial accounting course. See FMGT 402 for details. Prerequisite: FMGT 320. **5 credits**

FMGT 441 Financing International Trade — Covers the various financing methods in both import and export situations. Documentation requirements are thoroughly covered. Students become familiar with the operations of foreign exchange markets and methods of financing foreign investments. **6 credits**

HOSP 103 Hospitality Accounting — Flexible entry correspondence course that presents accounting basics with an emphasis on variations specific to the hospitality industry to give an appreciation of fundamental accounting techniques and terminology. Mechanics of accounting, maintenance of accounting records, and preparation of financial statements are stressed to solve the problems of small hospitality enterprise. **3 credits**

HOSP 106 Rooms Management — Front Office Procedures — Flexible entry correspondence course that provides theory and practice for the facilities, equipment, forms, and specific techniques used by desk clerks to complete their clerical and interpersonal duties. The course is designed for those intereted in the hospitality field or those in other areas of the industry who wish to improve their opportunities for advancememt. **3 credits**

HOSP 109 How to Start a Restaurant — This course teaches the student the essentials of becoming a food service entrepreneur. Topics covered include site selection, construction and lease considerations, marketing znd financial plans, and franchising. Employee selection, training and evaluation techniques are also covered. **3 credits**

HOSP 112 Customer Relations and Communications Skills — For those in contact with the public including travel clerks, ticket agents, restaurant staff, desk clerks and others serving or anticipating serving the travelling public. Students learn to speak confidently and clearly to customers; use good telephone techniques; deal effectively with a variety of unusual situations; demonstrate and practice good communication skills (attending, listening, responding); and analyze their personal grooming and professional appearance. **3 credits**

HOSP 132 Career Exploration for the Hospitality Industry — Discusses career opportunities in hotels, motels, food service operations, resorts and related industries. Training opportunities in B.C. (full-time and part-time), entry requirements into the job market, specific job functions and working conditions, employment and advancement opportunities, preparation of a systematic plan for career decision making. **1.5 credits**

HOSP 135 Bed and Breakfast Business — This is a "how to" course for potential entrepreneurs wishing to use their private homes as accommodations facilities for fun and profit.

HOSP 203 Introduction to Food and Beverage Management — Persons intending to enter the food service industry with management/ownership as a goal are challenged to consider the many facets and multiple pitfalls of this industry. The student studies basic organization of a food enterprise or department; theory and classification of foods; equipment and supplies needed and purveyors available; basic elements of aesthetics and design; the importance of menu, location, plant layout; basic cost controls; setting of objectives; sanitation and storage principles. **3 credits**

HOSP 204 Introduction to Bartending — For those wishing to work in the restaurant industry or to upgrade their bartending skills. The student studies the mixing of drinks and their recipes. Coupled with waiter/waitress training or practical experience, the student may then work in an operation selling alcoholic beverages. The course includes practical experience behind a cocktail lounge bar with emphasis on mixing, glassware, service and knowledge of wines, spirits, beers and liqueurs. A variety of dates and weekday formats are available. Class size is limited to 10 students. **1.5 credits**

HOSP 205 Front Office Procedures — For persons with little or no hotel/motel experience or those employed in hotels/motels, to broaden their employment opportunities. The course offers theoretical and simulated practical training in most aspects of front office operations. Students study the specific functions of the front office department and learn to perform the duties of a front desk clerk in a hotel or motel after a brief period of on-the-job training. Topics include who does what in a hotel or motel, personal requirements of a front desk clerk, reservation systems, dealing with guests, management and fellow employees, effective sales techniques, cash and credit handling, handling emergencies, career opportunities and steps to gaining employment as a desk clerk, communication skills. **3 credits**

HOSP 207 Front Office Equipment Practicum — Enables students to operate a variety of machines and systems used in hotels to develop guest accounts and balance daily night audits. The course demonstrates and allows practise in procedures and transactions relating to posting of credits and debits to accounts, handling city ledger, cash reporting, correcting guest folio errors, dealing with memory capacity machines and hand transcripts. Systems include hand transcript method, NCR 4200 posting machine, microelectronic machines, and VISI-CALC auditing. Approximately 27 hours of instructor monitored learning is supplemented by nine hours of self instruction and small group instruction. Prerequisite: HOSP 205, hotel front desk course, or hotel front office experience. **1.5 credits**

HOSP 211 Orientation and Techniques for the Executive Housekeeper — An introduction to opportunities in industrial, institutional and hotel housekeeping. Persons employed in related fields wanting career advancement are encouraed to participate. The course is under consideration by the National Executive Housekeepers Association, Inc. for credit toward the NEHA Certificate. Please contact your program consultant for more information. Topics include the definition of housekeeping as applied to hotels, motels, clubs and schools; housekeeping as applied to health-related institutions such as hospitals, nursing homes and places of incarceration; housekeeping as related to office complexes, factories; chemical, pharmaceutical and food organizations, etc.; basic procedures and surfaces to be cleaned; selection of appropriate equipment and supplies; selective and unusual cleaning procedures; cleaning standards and inspection; work measurement and simplification; time/motion study, etc. NEHA examinations and in-class demonstrations may be required for NEHA accreditation. **3 credits**

HOSP 212 Basic Communication in Japanese — English speaking persons will develop basic Japanese conversational skills. Persons employed in restaurants, hotels and motels, travel offices, information, customs and government offices and persons intending to travel to Japan, will greatly benefit from the course. Topics include cultural differences; geographical and historical background; language technique; Hirigana in Roman lettering; food, clothes, souvenirs and items of general interest for Japanese travellers; currency and exchange; dealing with tour guides and limited English translators; the importance of this language group to tourism in Canada and British Columbia. Practical subjects include basic vocabulary and pronunciation skills; sentence structuring; making initial approaches conversationally and basic reading, spelling and pronunciation. **3 credits**

HOSP 213 Basic Communication in French — English speaking persons will develop basic French conversational skills. Persons employed in restaurants, information, government and customs offices, will greatly benefit from the course. Topics include cultural differences, geographical and historical background; techniques of speaking the language; how to deal with tour guides and limited English translators; importance of this language group to tourism in Canada and British Columbia. Topics include basic vocabulary and pronunciation; sentence structuring; basic reading, spelling and pronunciation and making initial conversational approaches. **3 credits**

HOSP 214 Basic Communication in Spanish — English speaking persons will develop basic Spanish conversational skills. Persons employed in restaurants, hotels and motels, travel offices, information, customs and government offices intending to travel to Spanish speaking areas, will benefit greatly from the course. Topics include cultural differences; geographical and historical background; techniques of speaking; how to deal with tour guides and limited English translators; importance of this language group to tourism in Canada and British Columbia; food; souvenirs and currency differences related to Spanish speaking tourists. Practical subjects include basic vocabulary and pronunciation; sentence structuring; making initial approaches conversationally; basic reading, spelling and pronunciation. **3 credits**

HOSP 215 Basic Communication in German — English speaking persons will develop German conversational skills. Persons employed in restaurants, hotels and motels, travel offices, information, customs and government offices who intend to travel to German speaking areas, will benefit greatly from this course. Topics include cultural differences, geographical and historical background; techniques of speaking; how to deal with tour guides and limited English translators, importance of this language group to tourism in Canada and British Columbia; food, souvenirs and currency differences related to German speaking tourists. Practical subjects include basic vocabulary and pronunciation, sentence structuring, making initial approaches conversationally, basic reading, spelling and pronunciation. **3 credits**

HOSP 216 Housekeeping Department Budgeting, Purchasing and Equipment — The course is under consideration by the National Executive Housekeeping Association, Inc. for credit toward the NEHA Certificate. Please contact your program consultant for more information. Topics include using the budget as a management tool; the mechanics of the budget process; elements of a housekeeping department budget; budget control; purchasing; process, problems and evaluation; product research techniques; storage and selection on the basis of effectiveness; determination of supplies; equipment, textiles, etc. Classroom time features demonstrations and lectures by the instructor. Student demonstrations are encouraged and reports, budgets and tests are required. NEHA examinations for NEHA accreditation may also be required. Prerequisite: BSMT 102 or current employment in a housekeeping function in industry. **3 credits**

HOSP 217 Housekeeping Department Organization and Records — This course is under consideration by the National Executive Housekeepers Association, Inc. for credit toward the NEHA Certificate. Please contact your program consultant for more information. Topics include setting up a housekeeping department in a large operation; housekeeping management as a co-ordinative function of methods, manpower, machines, materials, controls, etc.; manpower structuring, description of task and

job specifications of manpower in housekeeping; lines of responsibility and co-ordination with other departments; staff recruitment and interviewing techniques; departmental policies regarding employees; employee motivation; personnel recordkeeping; records used in housekeeping; use of records as a planning function, etc; Classroom time is augmented by applied practicums and home study. Students who wish accreditation from NEHA examinations may be required to write NEHA accreditation. **3 credits**

HOSP 230 Travel and Tourism — Introduction — For persons who are engaged in, or who anticipate employment in this industry. Students study components of the industry, the major organizational relationships and jobs and careers available within them emphasizing entry-level positions; travel agent, tour wholesaler, passenger agent, sales and reservations areas; Tourism British Columbia's role and organization. Includes discussion of the social and economic effects of tourism, marketing and the role of tour operators and travel agents. **4.5 credits**

HOSP 240 Tourism Geography — Designed for persons wishing to enter the travel and tourism industry as travel counsellors or travel agents and those who are interested in travel destinations. Students study the countries of the world where tourism is a significant part of the economy, and develop a good knowledge of tourism geography. Topics include geographic location, tourism regions, climate, population, culture, language, natural and man-made tourist resources, currency and transportation. Major tourism destinations studied are selected from North, Central and South America, Europe, Asia, the South Pacific and the Far East. **3 credits**

HOSP 241 Tourism: Europe — Discusses historical and practical tourist related aspects of Continental Europe and Great Britain including practical hints for the travel counsellor. The course covers England, Germany, France, the Netherlands, Italy, Spain, Ireland, Scotland, Austria and Switzerland, including historical and geographical knowledge of the areas and cultural climate, economic, and educational standards. Research and home study is required. **1.5 credits**

HOSP 242 Tourism: Africa — Acquaints students with historical and practical tourist related aspects of the African continent. Practical hints for the travel counsellor and traveller familiarize students with the sights, sounds and living styles in these countries. Countries studied include Kenya, Nigeria, Zaire, South Africa, Zambia, Zimbabwe, Tanzania, the Sudan, Algeria, Saudi Arabia and others. Covers historical and geographical knowledge of the area; dress, culture and language of the people; social and economic conditions; climate; industry; educational standards, etc., as well as places of particular interest to the visitor. Research and home study is required. **1.5 credits**

HOSP 243 Tourism: Pacific Rim — Acquaints students with historical and practical aspects of Pacific Rim countries as seen through the eyes of a tourist. Practical hints will help both the traveller and travel counsellor. The course examines the background and current conditions in Japan, Thailand, Malaysia, Hong Kong, Indonesia and the Phillipines including historical and geographical knowledge of the areas: cultural and economic conditions, climate, industry, educational standards, etc., as well as places of particular interest to the visitor. Research and home study is required. **1.5 credits**

HOSP 244 Tourism: South Pacific — Acquaints students with the historical and practical tourist related aspects of the South Pacific now well frequented by Western Canadians. Practical hints for the travel counsellor and traveller familiarize students with the sights, sounds and living conditions in these lands. The course covers the countries and/or areas of Hawaii, Fiji, Tahiti, the Samoan Islands, New Zealand and Australia including historical and geographical knowledge of the areas; cultural, social and economic conditions; industry; educational standards; etc., as well as places of particular interest to the visitor. Research is required. Slides, 16 mm film, mini-lectures and class discussion illustrate the course. **1.5 credits**

HOSP 250 Travel Agency and Tour Operations — An Introduction — A framework for students considering working in the travel counselling and tour arranging field, to be completed before or in conjunction with HOSP 350 Domestic Air. Topics include hotel terminology, classifications and bookings; cruise and tour bookings, marketing of tours and product comparisons. Basic functions of travel agencies are covered. **1.5 credits**

HOSP 251 Tour Managing, Escorting and Guiding — For those who enjoy dealing with tourists, and who want to become professional tour managers or local "sightseeing" guides, this very practical course concentrates on how to supervise and conduct an escorted tour (domestic/international) and on the roles and responsibilities of the tour manager and local guide. Topics include meeting, escorting and looking after tour participants; dealing with emergencies and tourist complaints; sightseeing procedures; care of baggage, airport/hotel procedure; personal demeanor and dress. **1.5 credits**

HOSP 303 Dining Room Service — Introduces persons with limited experience in restaurants to fundamental techniques and prerequisites for successful operation of a quality dining room. Focus is on the supervisory role. With some practical experience, students can assume relevant responsibilities at the junior management level. Topics include staff and other supervisory responsibilities; hiring of personnel, menu terminology, salesmanship, equipment knowledge, table settings and arrangement, proper service techniques, staff scheduling and safety, fundamentals of table-side cooking. A nominal lab fee may be required. **3 credits**

HOSP 306 Bar Management — Lounges and Pubs — Designed for prospective managers and owners of lounge and pub operations, this course discusses techniques for successful and profitable beverage sales operations. Develops and enhances managerial skills for neighbourhood pubs, cocktail lounges in hotels, restaurants and clubs. The course focuses on principles of management, internal controls, supervision of employees and their functions as related to drink production and service, inventory control procedures, liquor costing and sales controls, determining guidelines for purchasing of accessories, equipment and supplies, cocktail lists and in-house merchandising ideas. Prerequisite: HOSP 201 or practical experience. **3 credits**

HOSP 307 Understanding Wines 1 — Presents the origins, production, marketing, sensory evaluation and service of domestic and imported wines focusing on wine in restaurants. The student learns to describe the characteristics of popular wines and spirits, their growing and processing; the requirements for storing and handling wines; how to distinguish basic types of wine using acceptable tasting procedures; how to conduct staff training sessions on the merchandising aspects of wines in restaurants and how to identify elements of spirits and liqueurs. Lectures, film and slide presentations, discussions, field trips, guest presentations, samplings and student projects cover the wine growing process — wine making, geographical and grape differences, government regulations, label terminology, storage and selling techniques, serving procedure and staff training. **3 credits**

HOSP 313 Food and Beverage Control — Discover the fundamentals of food service industry internal control procedures and information systems for food and beverage operations of all types. The course deals particularly with interpretation of the information obtained, and the making of appropriate management decisions. Participants should have an aptitude for basic

arithmetical calculations. Major control points studied include sales, ordering, purchasing and receiving, storeroom, inventory and production (costing). **5 credits**

HOSP 317 Understanding Wines 2 — This continuation of HOSP 307 covers recent developments in grape growing and commercial wine making and examines major growing regions in greater depth. Students study grape growing and wine making at the technical level, the wine classification systems in France, Australia and California and the taste characteristics of varietals from major regions. **1.5 credits**

HOSP 350 Domestic Air — Working with the official North American Passenger Tariff and the Official Airline Guide, students study the fundamentals of domestic (within Canada and the U.S.A.) passenger air travel. The course includes the construction of normal and special fares, terminology, schedules, ticketing procedures, etc., related to today's world of travel. Approximately 3-5 hours per week of home study is required. Note: a deposit is required on the second night of class for tariff and schedule books. 50% is refundable upon return of the materials to the course instructor. On no account can the tariff materials be retained by the student. **3 credits**

HOSP 351 International Air 1 — Provides instruction in Transatlantic and Transpacific passenger rules, regulations and fares. Familiarizes students with the terminology and fundamentals of Transatlantic and Transpacific fare construction and enables them, under supervision, to handle all facets of these air travel sales for travel agencies and carriers ticket offices. Topics include the Air Tariff Book 1 general rules; fare construction rules (fare construction units, the mileage system, HIPs, backhauls, etc.); normal and special fare rules for fare types which are generally saleable from Canada. Lectures and prescribed itineraries will be used. Approximately 2-6 hours per week of home study is required. Ticketing is limited to discussions of specific ticket entries. Note: a deposit will be required on the first night of classes for tariff and schedule books. 50% is refundable upon return of the materials to the course instructor. On no account may the tariff materials be retained by the student. Prerequisite: previous direct sales experience in the industry, or completion of HOSP 350. **3 credits**

HOSP 352 International Air 2 — Detailed instruction in passenger rules, regulations and fares on a world-wide basis for persons who have completed HOSP 351 International Air 1 and who are involved in direct passenger sales. Topics include the terminology and fundamentals of fare construction and worldwide currency regulations as related to PTA's (fare and equivalent fare paid procedures); rerouting (fares, additional collections/refunds); air tariffs; fare construction and rerouting for fare types which are generally saleable to, from or via Canada and also wholly within TC1. Approximately 3-6 hours per week of home study is required. The applicant must have a sound knowledge of the basic fare construction principles for journeys originating in TC1. Note: a deposit is required on the first night of classes for tariff and schedule books. 50% is refundable upon return of the materials to the course instructor. On no account may the tariff materials be retained by the student. Prerequisite: completion of HOSP 351 or related work experience. **3 credits**

HOSP 353 Automated Reservations — Persons who have completed the Domestic or International Air courses or have one year of experience in the air travel industry and are familiar with city codes, terminology, etc., will learn to activate a reservations computer terminal as installed in many travel agency offices and to perform all functions relative to booking airline reservations, tours, hotels and/or car rentals. Although not mandatory, basic typing skills are beneficial. A precourse booklet is supplied to each student to provide some basic knowledge of the computer system. The course consists of "hands-on" training in the use of a CRT terminal. The building, queueing, changing and cancelling of PNR's (Passenger Name Records), automated hotel bookings, car rental and tour reservations and the relevant transactions are explained and practised. Enrolment is limited to 8 students. **3 credits**

HOSP 355 Automated Ticketing — A two-weekend course for persons fully conversant with the operation of reservation computer terminals as installed in many travel agency offices, and those who have successfully completed HOSP 353 Automated Reservations. Students learn to activate a ticket printer linked to a reservations computer terminal and to perform all functions relative to producing a computer generated ticket. The course consists of "hands-on" training in producing computer generated tickets, both computer and manually priced. All relevant transactions are explained and instruction in loading, changing and minor trouble-shooting of a ticket printer is given. Prerequisite: students should be fully conversant with IATA ticketing procedures (Domestic Air and International Air), and have at least two years in the industry working international itineraries. **1.5 credits**

HOSP 356 Travel Industry Marketing and Sales — For students employed in the travel industry who wish to improve their marketing and sales techniques. Topics include general marketing concepts and techniques as applied to government marketing agencies, air and surface carriers, tour operators and travel agencies; how and where they inter-relate; consumer demand and competition; consumer awareness of travel and marketing, use of audiovisual aids. Promotions, personal selling techniques and salesmanship are discussed relative to making client presentations, itinerary planning, dealing with media and advertising agencies, developing advertising pieces for creative promotion, communication of the printed word and pictures, understanding client behavior and the implications of budget on the selling function. **3 credits**

HOSP 357 Marketing and Sales — Accommodation and Food Service — An introduction to techniques and principles of basic marketing and sales, emphasizing the Hospitality Industry. Students evaluate case studies and develop realistic sales program strategies. The course content includes marketing theory; principles of marketing, product cycle, the gathering and application of research, interpretation of trends; forecasting; positioning your package for consumer acceptance; applying marketing objectives in the production of sales material, advertising copy and layout; evaluation of media productions, developing an annual promotional budget. Consideration of personal selling and practice in making sales calls are all covered in this course. **3 credits**

HOSP 358 Analyzing Costs and Planning for Restaurants — For owners and managers in the restaurant field who wish to analyze particular cost problems, reduce operating costs and develop effective menus. Class discussions and lectures cover proven cost reduction techniques and areas such as advertising, energy and utilities, product cost and labor service. Students learn the factors that influence the make-up of a menu, such as types of market served, price structure, staffing, physical plant limitations, storage availability of foods and costing; how to analyze these data and compose suitable menus, and to understand layout, colour, print-type and manufacture of menus. **3 credits**

HOSP 412 Hospitality Management Accounting — Persons with accounting experience study the specific accounting principles and procedures of hotel and restaurant operations. Students study hotel and restaurant departmental income statements and balance sheets enabling them to interpret and analyze the results. Management tools such as the break-even technique, budgeting and investing are discussed. The course is problem oriented and an understanding of general accounting principles is beneficial. Prerequisite: HOSP 104 would be helpful. **3 credits**

HOSP 414 Financial Management — Hospitality — Presents practical illustrations for financial decision making. This is the senior course in the finance/accounting area that has direct application to the hotel food service industry. Students learn how to develop financial goals for a company and obtain financing to meet objectives; prepare cash budgets; determine rates of financial return; calculate costs of stock; develop a plan for a feasibility study. The course is problem solving in nature, with the instructor available for consultation and practical assistance. Prerequisite: HOSP 412 or FMGT 101 or previous accounting experience. **3 credits**

INTD 100 Interior Design — Basic — Examines the difference between interior design and interior decoration. Topics include the elements and principles of design as they relate to the interior environment, space planning, color, materials, furniture, lighting, accessories, and the relationship between interior and exterior design. **3 credits**

INTD 101 History of Furniture — Covers the history of furniture from ancient Egyptian to contemporary including ancient and European furniture to 1500; Renaissance, Baroque, Rococo, Neoclassical, Victorian and modern periods and furniture are discussed including construction and quality. Some sketching and design is included to encourage individual expression. **3 credits**

INTD 102 Interior Design Drafting 1 — Presents aspects of architectural drafting beginning with lettering, equipment awareness and technical vocabulary. Enables students to present plans, elevations, site and plot plans, being aware of correctness of architectural symbols in presentation. **6 credits**

INTD 200 Color — Color theory and application as it relates to interior design. Topics include color in architecture, psychology of color; color in commercial, industrial and residential spaces and the development and presentation of various color schemes. Prerequisite: INTD 100 (65% minimum). **3 credits**

INTD 202 Interior Design Drafting 2 — Presents isometric views, shadow and light. Provides training in the presentation of sections through walls, windows, doors and other architectural components. Focuses on the presentation of one and two point perspective. Prerequisite: INTD 102. **6 credits**

INTD 301 Graphic Presentation — Develops the student's ability to present design plans, elevations and perspectives. Subjects include the importance of presentation in the design process, seeing texture graphically, presentation methods in rendering plans, elevations and perspective sketches. Prerequisite: INTD 302 (65% minimum). **3 credits**

INTD 302 Interior Design Drafting 3 — Students study the reflected ceiling plan, organization of its legend and specification, types and characteristics of lighting. Students complete one major assignment combining plans, elevations, sections, perspectives, lighting plans and specifications. Prerequisite: INTD 102 and 202. **3 credits**

INTD 303 Materials — Examines interior finishing materials for floors, walls, ceilings and windows, and the characteristics of fabrics. **1.5 credits**

INTD 304 Space Planning 1 — Introduces factors in space planning including zoning and circulation considerations. Topics include social and private areas in the home, kitchens and types of plans and renovations. Prerequisite: INTD 100, 302 (65% minimum). **3 credits**

INTD 305 Detailing and Materials — Acquaints students with the properties, characteristics and uses of materials used for interior construction, custom furnishing and decor. Introduces the methods and techniques involved in the preparation of working drawings for interior construction elements, building components, millwork, custom furniture and built-in cabinets. Prerequisite: INTD 100, 302 (65% minimum). Students are to bring drafting samples to first class. **3 credits**

INTD 400 Directed Study Project — Students incorporate all material from previous courses in a major project representing a 450 square metre residential and commercial space including planning, color scheme selection, furniture selection, lighting and electrical planning, developing drawings of custom millwork. Graphic presentation is of major importance. Classroom time will be available for advice from various instructors. Prerequisite: all other courses in the Interior Design Certificate Program (65% minimum). **1.5 credits**

INTD 404 Space Planning 2 — Introduces factors in commercial space planning and problem solving using recognized factors. Topics include offices, restaurants and retail stores. Prerequisite: INTD 100 and 304 (65% minimum). **3 credits**

MKTG 101 Marketing 1 — An introduction to the marketing environment and marketing institutions. Detailed study of the basic marketing functions, marketing research, product planning, selection of trade channels, merchandising, advertising, sales promotion and salesmanship. Embraces marketing of consumer goods as well as industrial goods. **3 credits**

MKTG 102 Introduction to Marketing — This introduction to the marketing environment and marketing institutions includes a detailed study of the basic marketing functions, marketing research, product planning, selection of trade channels, merchandising, advertising, sales promotion and salesmanship. Marketing of consumer goods as well as industrial goods will also be covered. **3 credits**

MKTG 104 Starting a Business — Registration restricted, contact R. Vandermark. A telecourse containing twelve modules of independent study using a studies guide, a textbook, and a television series shown on the Knowledge Network. Covers the main issues in becoming an entrepreneur and starting a new venture. Different ways to get into business are examined. The management skills needed to run a small business are explained. **3 credits**

MKTG 108 Retail Marketing — An introductory course that discusses the role of the marketing function in the retail environment. Relates the specific activities of merchandising to the marketing field. For those students taking a concentration of retailing courses in their programs, MKTG 108 will be granted credit equivalency for MKTG 101. **4 credits**

MKTG 109 Retail Selling — Covers the fundamentals involved in retail sales of all types with emphasis on developing sales skills designed to satisfy the customer. **4 credits**

MKTG 110 Principles of Leadership in a Retail Environment — Designed to train the retail supervisor in management skills required to manage a retail operation and lead and train sales and operations personnel. **3 credits**

MKTG 111 Retail Promotion — A course designed to show retail operators how to use the promotional mix to market a broad range of products and service. **3 credits**

MKTG 112 Research for Retailers — A fundamental course on how and when to use market research effectively, with a special emphasis on designing and interpreting customer questionnaires. **3 credits**

MKTG 113 Using Computers in Retailing — An overview of software programs available for retailers, and their usage, with emphasis on inventory management and sales analysis. **3 credits**

MKTG 201 Marketing 2 — A continuation of MKTG 101. An introduction to the marketing environment and marketing institutions. Detailed study of the basic marketing functions, marketing research, product planning, selection of trade channels, merchandising, advertising, sales promotion and salesmanship. Embraces marketing of consumer goods, as well as industrial goods. Prerequisite: MKTG 101. **4 credits**

MKTG 203 Sales Management — General principles of sales management. Emphasis is given to the human resource, with stress placed on selection, assimilation, training and supervision. Examination of sales research, planning, organization and analysis is made. Computer applications in sales management are also covered. **4 credits**

MKTG 219 Professional Sales 1 — Provides basic training for the sales aspirant or person with no formal sales training. Students will develop selling skills through practical applications in role playing and video tape recording for critique and analysis. **3 credits**

MKTG 302 Industrial Marketing — An examination of the complex purchase process faced by companies selling to industry, government and institutions. Alternative distribution and pricing strategies are considered. Emphasis is on understanding the growing British Columbia industrial base. Prerequisite: MKTG 100 and 200. **5 credits**

MKTG 306 Principles of Small Business Management — Examination of the planning stages involved in starting a new business including market, financial and legal feasibility requirements. Prerequisite: MKTG 101, and 201. **5 credits**

MKTG 307 Financing New Ventures — Introduces various legal forms, tax matters and sources of financing essential for independent business operators to understand. Prerequisite: MKTG 101, 201 and 306. **3 credits**

MKTG 309 Marketing Research 1 — Examines the basic approaches to marketing research. It discusses the techniques and tools of this research and relates these tools to the decision-making process. Emphasis is placed on the use of marketing research in the total marketing decision concept. Special applications of marketing research to simulated real-life situations are examined. Prerequisite: MKTG 101 and 201. **5 credits**

MKTG 318 Media Planning — Emphasis is placed on development and execution of the media plan. Close contact is maintained by students with agency media buyers and other industry factors to ensure a practical direction to the course. Quantitative media planning techniques are evaluated in light of most recent computer applications. The main objective of this course is to provide marketable skills in media planning and buying to qualify students for career entry consideration in advertising agencies. Prerequisite: MKTG 101 and 201. **5 credits**

MKTG 319 Professional Sales 2 — Students will study power selling. They will learn about power phrases, buying signals, buying motives, getting attention, arousing interest, sales interview process, selling more, selling the end result, art of persuasion, benefits and values versus price. The course will also cover how to deal with no's, prospecting for sales, selling yourself and your company, generating sales through telephone and follow-up techniques, goal setting and personal motivation. Prerequisite: MKTG 101; MKTG 201/102. **3 credits**

MKTG 321 Public Relations — For anyone in business, government, municipalities, associations and organizations responsible for internal and external communication. Students learn to fulfil their information and communication assignments with increased confidence and competence. Topics include planning and executing a public relations program; communication techniques, principles of news writing and preparation of news photographs; utilizing the media; press and community relations; external and internal communications and meetings. Prerequisite: MKTG 101; MKTG 201/102. **3 credits**

MKTG 322 Advertising 1 — Advertising philosophy and purpose; organization of the advertising function; relationship of advertising to other business divisions; advertising planning; the business management of advertising. The creative process, research, media — newspaper, radio, TV, magazines, direct mail, outdoor, public relations. Copy, layout, art, strategies and campaigns, production and communications, controls, evaluating results. The course is designed to make the student a competent advertising critic. Prerequisite: MKTG 101; MKTG 201/102. **3 credits**

MKTG 323 Public Speaking and Oral Communication 1 — Emphasizes the development of public speaking skills and the principles of effective oral communication. Topics include communication as it applies to public speaking and the rudiments of improving the speaking voice. Films, buzz groups and closed circuit TV are utilized. Each person is expected to prepare and deliver an oral assignment weekly. **3 credits**

MKTG 324 Small Business Development — Discusses the planning stages involved in starting a new business including market, financial and legal feasibility requirements. Major emphasis is on the preparation of a business plan. **3 credits**

MKTG 326 Export/Import Development — Designed to give practical experience in different aspects of exporting, the course discusses exporting/importing functions and how to start an exporting/importing business. **3 credits**

MKTG 328 Principles of Property Management — Lays the foundation for a sound education in property management by presenting the basic theories and techniques of long range and day-to-day investment in real estate management. **3 credits**

MKTG 331 Marketing Management — Selling Computers — This course is designed for students who have basic sales training and/or sales experience. The course introduces the student to the elements required to achieve competence in computer selling. **4 credits**

MKTG 332 Marketing Management — Major Account Selling — This course is designed for intermediate and senior sales persons. It will focus on technical products and services to large organizational buyers. The course will provide and develop an indepth professional approach. **4 credits**

MKTG 401 Marketing Planning — Examines how to develop a formal marketing plan including situation analysis, market and competitive conditions research, objective setting and action scheduling using computer based management systems. Prerequisite: MKTG 100 and 200. **4.0 credits**

MKTG 421 Advertising Creative Print — Students with a basic knowledge of advertising and print media planning learn the creative development of graphic art concepts and printed publications. Design layout, typography, printing and their applications to both advertising and general publishing; the fundamentals of effective copywriting and the criteria used to determine effective design and production processes necessary for transforming rough art concepts into the published form are studied. Topics are covered through a combination of lectures, demonstrations, workshops and field trips. Prerequisite: MKTG 322 and 422. **3 credits**

MKTG 422 Advertising 2 — Clarifies the material covered in MKTG 322 permitting persons holding advertising positions to advance to more responsible areas and explains the interrelationship between marketing and advertising. The student studies

measuring advertising effectiveness; differences between advertising and sales promotion; media planning and budgets; the makeup of advertising campaigns; how an advertising agency operates; implementing marketing plans and coordination, controls and measurement. Prerequisite: MKTG 322. **3 credits**

MKTG 423 Public Speaking and Oral Communication 2 — Discusses various types of communication breakdown, one-to-one communication and techniques used in briefing business groups. Opportunity is given for improving public speaking skills in the areas of speaking on abstract subjects, the persuasive speech and the dinner speech. Films, buzz groups and closed circuit TV are utilized. Students prepare and deliver an oral assignment most nights. The course concludes with a dinner banquet when the class and invited guests hear each class member speak. (Banquet costs extra.) Prerequisite: MKTG 323. **3 credits**

MKTG 424 Advertising for the Small Firm — Designed for the manager or owner of a small business, this course demonstrates how to make the most of a limited advertising budget. Students gain an understanding of the relationship between marketing and advertising; types, media planning; budgeting; measuring advertising effectiveness; coordination and controls, and advertising agencies. **3 credits**

MKTG 425 Appraising Real Property — An introductory course for beginning appraisers, real estate brokers, lenders, builders and assessors. Assumes no background other than an interest in appraising and the ability to learn. May serve as a refresher for experienced appraisers to update their knowledge and skills. Students do not become appraisers but do learn how to apply appraising principles and techniques to residential appraisal problems. To become a professional appraiser, practical experience and further advanced training is necessary. This course is recognized for credit on most formal appraisal programs. **4.5 credits**

MKTG 426 Sales Management Computer Applications — Focuses on the use of microcomputers as planning tools to increase productivity. Two software packages, data base management and spreadsheets will be used for this course. Designed to complement the sales management courses, the course will focus on sales forecasting, budgeting, territorial design and sales evaluation. **3 credits**

MKTG 427 Creative Advertising Design — Moves the student from the development of creative strategy through the concept stage to the details of creative execution. Both print and broadcast advertising techniques will be explored with the guidance of professionals who are currently working in a variety of creative advertising areas. The primary objective of the course is to have each student produce high quality creative projects to enhance their portfolios. **3 credits**

MKTG 428 Marketing Management Simulations 1 — Students will practice analytical and decision making techniques in a simulated consumer product market. The instructional method will alternate interactive workshops and discussion sessions. Skills will be developed in market analysis, competition analysis, strategy evaluation, forecasting, budgeting and interpersonal effectiveness. **4 credits**

MKTG 600 Marketing and Sales in High Technology — For marketing and sales professionals involved in the high technology sector, this course discusses the unique problems associated with marketing and selling computers, communications systems and equipment, microelectronics and sophisticated office systems. Topics: defining markets for new products, penetrating the high technology market, developing appropriate marketing tools, advertising techniques to enhance visibility and customer acceptance, developing marketing and sales strategies. **3 credits**

MKTG 601 Marketing — Designed to give students a good understanding of the role of marketing in a company. Marketing plays a critical role in any company dealing in a product or service, and the decisions made by the marketing manager are reflected in the company's administrative and financial functions. Lab sessions will deal with typical marketing problems and students are exposed to the decision making process in marketing management. **4.5 credits**

MKTG 941 Applied Real Estate Salesmanship — An in-service training course for new real estate sales licensees in British Columbia. **3 credits**

OPMT 099 Mathematics for Business — Course to upgrade and refresh the mathematical skills of students who intend to enter the School of Management Studies at BCIT. A suitable prerequisite for the mathematics courses in the School of Management Studies as it meets the Algebra 11 entrance requirement. The course includes arithmetic, elementary algebra, graphical techniques, ratios and percentages, and the elementary business applications of these concepts. **non credit**

OPMT 102 Basic Mathematics of Finance — Discusses interest and its effects upon business and industry. The student learns to discriminate between common situations, apply necessary analysis and perform appropriate calculations. Topics include simple compound interest, present values and discounts, annuities, evaluation methods and basic replacement analysis. Prerequisite: basic algebraic skills to at least the Grade 11 level. Others should consider OPMT 099. **3 credits**

OPMT 175 Warehouse Management — The overall objective of this course is to provide a basic understanding of the major factors in managing a warehouse. The key subjects covered are: receiving, stock location planning, order picking, shipping, time space management, data processing and loss control. The course also introduces the participant to specific procedures such as inventory accuracy, cycle counts, inventory adjustments and inventory turnover. **3 credits**

OPMT 186 Systems and Procedures — Manual — For people in office environments who require an understanding of information flow and its analysis. Students document office systems and analyze those systems. The broad areas of business funding, purpose, goals and strategy are examined. Conventional systems analysis techniques are introduced to examine these areas in detail. In addition, selected topics in current developments in the economic and human elements of the work structure are examined. **3 credits**

OPMT 187 Project Planning and Scheduling — For those who require basic information about the critical path method (CPM) and its application to project management. The course introduces the fundamentals of CPM as used in planning, scheduling, resource allocation and project management. The course includes an introduction to planning and scheduling techniques; Gantt charts, arrow diagrams; precedence diagrams; PERT: time-cost relationships; resource allocation; bid determination; project management and the role of the computer. **3 credits**

OPMT 188 Management Information Systems — Students learn to use a managerial systems approach to the management information area; review, assess and evaluate information processing hardware and software; evaluate management needs for information and integrate those needs into the management system; design and implement a simple management information system. The course is not intended to produce highly skilled MIS

practitioners, but to provide an understanding of basic MIS concepts. Students learn how to relate to MIS specialists and managers in large organizations and how to approach a MIS problem in a small organization that would not normally have MIS specialists on staff. **3 credits**

OPMT 189 Operations Management — Presents broad interpretation of operations management and details some of the problems faced by different types of enterprises (private and public) in the management of their production systems. The student studies the nature, purpose and processes associated with operations management, the relevance to systems design, resource allocation, operations planning and control to the individual firm, how to identify and solve operational problems using quantitative methods. **4.5 credits**

OPMT 191 Purchasing — Designed for those entering or related to the purchasing field, the course examines the fundamentals, principles and practices of purchasing. Topics include the functions of a purchasing department and its relationship and responsibilities to management; centralized purchasing; negotiating; buying for quality, quantity and price; timing and sources of supply; receiving and warehousing; inventory control. See OPMT 192 for a supporting course in Inventory Planning and Control. **3 credits**

OPMT 192 Inventory Planning and Control — Presents the fundamentals of inventory planning for those preparing to enter the inventory planning field, and for those in related areas that interact with an inventory system including purchasing agents, buyers, maintenance planners, productions schedulers, sales managers, warehouse managers, mill storekeepers and parts people. Examines the basic techniques used in the design and control of inventory systems. Topics include forecasting inventory requirements, the ABC classification, material requirements planning, the role of the computer, inventory information flow and inventory control design. Prerequisite: understanding of basic algebra. **3 credits**

OPMT 193 Quality Control Methods 1 — An introductory level course which surveys basic principles of modern quality control and demonstrates their industrial applications. Topics include: quality program planning, supplier quality control, production processes and quality, quality cost analysis, inspection operations, corrective action techniques, total quality control and Canadian national standards for quality management programs. **3 credits**

OPMT 194 Quality Control Methods 2 — As a continuation of Quality Control Methods 1, this course covers the concept of statistical methods in quality control. This is a practical course which includes manufacturing and performance variation; data collection, analysis and display; process capability studies; control charts for variables and attributes; benefits and risks of acceptance sampling; sampling plan construction and characteristics; choice and application of standard inspection sampling plans. **3 credits**

OPMT 195 Advanced Purchasing — This course builds on OPMT 191 by detailing the principles and practices of sales taxes, negotiation and law. This 12 week course examines importing goods, federal and provincial sales and excise taxes, negotiating contracts, and law as it pertains to the purchasing function. **3 credits**

OPMT 196 Supervisory Training for Operations Management — Prepares new or aspiring supervisors for leadership and refreshes supervisors leadership skills. Self analysis, simulated meetings, group work, case studies, research and lectures teach students the implications of an early assignment to first line supervision, the application of management to organizational problems at the supervisory level and skill in planning, decision making, interpersonal and intergroup relations and communications. **3 credits**

OPMT 197 Statistics for Business and Industry — A comprehensive study of elementary statistical methods as applied to objective decision making, suitable for persons requiring statistics to initiate market research, audit sampling, quality control, inventory control and business forecasting. The course includes an introduction to the use of statistics in business and industry; descriptive statistical techniques — collection and treatment of data; a review of elementary set theory and probability; inferential statistical topics — sampling, estimation, hypothesis testing, goodness of fit, regression analysis, correlation and timeseries analysis. **4.5 credits**

OPMT 198 Productivity Engineering 1 — A fundamental course in productivity improvement, the course is based on a systematic, scientific approach to problem solving and/or methods improvement. Selection of study areas involves; economic feasibility, recording techniques, assembly and analysis of data, critical examination and the development and selection of alternative solutions. While the emphasis is on productivity improvement, case materials will explore various applications areas; manufacturing, warehouse, office, materials management and general management engineering. **3 credits**

OPMT 290 Work Analysis and Design — This is an introductory and applications style course to the subject area of work measurement. Using the principles of work study, methods study, motion study and various time analysis techniques, the student is well equipped to solve work study problems. Time measurement techniques such as stop watch, M.T.M. (Methods Time Measurement), M.O.S.T. (Maynard Operating Sequence Technique) will be discussed. This course will not license students as work study practitioners but will give them a basic understanding of the priciples of work study, work methods and work measurement techniques. **3 credits**

OPMT 291 Project Study — Manufacturing — Allows the student to do a complete study through to the final report by applying the knowledge obtained in OPMT 198 and OPMT 290 to an industrial problem. Prerequisite: OPMT 198 and 290. **1.5 credits**

OPMT 292 Facilities Design, Layout and Materials Handling — Presents a systematic procedure for designing layouts and determining alternative material handling systems for production, warehouse and storage settings. Topics covered through case studies and applications include materials handling equipment selection, introduction to material handling time measurement, production scheduling, facilities design and plant layout. Prerequisite: OPMT 290 and 198. **3 credits**

OPMT 293 Facility Layout and Material Handling — Office — Presents a systematic procedure for designing layouts and determining alternative material handling systems. Teaches students to do layout planning (both over-all and detailed) for office environments, in conjuntion with physical handling of paper equipment selection and how to solve layout and material handling functional design problems. Prerequisite: OPMT 199, 186, 295 and 192. **3 credits**

OPMT 294 Physical Material Handling and Inventory Space Planning — An introduction to sensitivity analysis as it pertains to purchasing, inventory planning and control. The student is introduced to the concepts and techniques required to design and analyze physical space requirements for the storage and handling of products in warehouses, retail and manufacturing facilities. Prerequisite: OPMT 198. **1.5 credits**

OPMT 295 Project Study — Office — Students apply the skill learned in OPMT 199 and OPMT 186 to an office problem and make a complete study through to the final report. Prerequisite: OPMT 186 and 199. **1.5 credits**

OPMT 296 Mathematics for Management — Covers the mathematics fundamental to many of the quantitatively oriented business subjects, techniques or formal programs of study. Students learn the fundamentals of the common quantitative methods used in business and industry by recognizing where these methods are appropriate and formulating solutions to elementary problems. Based upon the scientific method, techniques utilize mathematics, statistics and model building as aids in the decision-making process for organizational operators. These techniques include cost-volume-profit analysis, linear programming, inventory control, queuing theory, simulation and scheduling networks (CPM). Extensive assigned practice problems assist learning. Prerequisite: OPMT 197 and preferably OPMT 102. **4.5 credits**

OPMT 298 Productivity Engineering 2 — For students with the basics of Productivity Engineering 1. Productivity Engineering 2 will allow the student to complete a more detailed and complex study to final report and presentation in the areas of manufacturing, warehousing and storage. The course will stress and expand upon productivity improvement through systematic scientific problem solving. Prerequisite: OPMT 198. **3 credits**

OPMT 333 Operations Management — Product and Cost Control — This new course is designed to encourage students to utilize microcomputers for current situational analysis. It will offer state of the art cost control and cost reduction techniques to facilitate effective management in business. **3 credits**

OPMT 334 Operations Management — Computer Inventory Control — This new introductory course is designed for the small business operator requiring the basic principles of inventory planning and control using a microcomputer. **1 credit**

OPMT 411 Production Engineering Management — The course is designed to survey the general background to Production Management in terms of planning, organization and operations. Major topics include mass, batch and job shop production, economic factors, process planning and control, shop layout, make or buy decisions, purchasing activities, sub-contracting, production control, managing product quality, and human factors in production. Course material will be covered through lecture, labs, assignments and a student teamwork project. **3 credits**

PMAC 100 Principles of Buying — A comprehensive introduction to the basics of purchasing offered throughout Canada as an essential part of the Professional Development Program of the Purchasing Management Association of Canada. Designed for those seriously interested in pursuing a career in materials management it represents a minimal theoretical background for buyers. Topics include purchasing and materials management for the 1980's, organization and objectives, negotiation, quality and inspection procedures, quantity and inventories, supplier selection, price determination, transportation, value analysis and make or buy, public purchasing, legal aspects, equipment purchasing and disposal. **4.5 credits**

PMAC 200 Principles of Traffic and Transportation — Traffic and transportation are key areas utilized by purchasing personnel and the ability to control transportation costs is increasingly important. The course is designed by the Purchasing Management Association of Canada for buyers, inventory control clerks and people with little or no major exposure to the field. Topics include an appreciation of transportation, organization for transportation, role of the modes of transportation, regulation of transportation, railway industry, railway rates, trucking industry, customs, small shipment services, bills of lading, Canadian freight class, 6000 packaging considerations, materials handling, claims, transportation by water and air and safety in distribution. **4.5 credits**

PMAC 300 Principles of Production and Operations Control — The course covers applications in a wide range of organizations including public and non-profit, services, distributors and end-users, processors and manufacturers. Topics include management of inventories, inventory functions and classification, replenishment strategies, order quantities, order points, safety stocks, demand forecasting and strategies to reduce inventories (MRP and Just-in-time), capacity management, scheduling and project management. **4.5 credits**

TDMT 202 Transportation Regulations — Familiarizes the student with transportation regulations at federal, provincial, and regional levels. The Acts governing intra and inter-provincial transportation, and regulation of common, contract and private carriers, including their rights and responsibilities, and the deregulated U.S. transportation industry. **5 credits**

TDMT 203 Transport Economics — Covers a variety of transportation services and their cost factors including carrying capacity, load factors, fuel cost, etc., concluding with profit oriented rate making. Costing methods relating to various modes of transportation are discussed considering distance, flow of goods and backhaul. **5 credits**

TDMT 409 Exporting and Importing — Practical application of previously learned theories acquaints students with the terminology and interpretation of the Customs Act, customs tariff, excise tax, and Antidumping Act. Gives the student thorough understanding of fair market value, dumping, countervailing duty, the GATT, tariffs and the increasing use of non-tariff barriers including present new devices. Documentation for importing and exporting, entries, drawbacks, refunds, appeals and classification is covered. **4.5 credits**

TDMT 410 Logistics — An overview of the total distribution concept. Adding to previously learned information, the course examines distribution facility location analysis, information systems, control systems and distribution economics and profitability. With heavy emphasis on customer services and profitability, the course prepares the student to conduct a transportation audit, customer service audit and a complete distribution audit. **6 credits**

TDMT 413 Traffic and Transportation Management — Details the complexities of the industrial traffic department and the operations departments of a transportation company. The course provides comprehensive practical knowledge required by the shipper and receiver of goods in an industrial setting. Topics include: traffic management, decision making, freight tariffs, provisions used in determining the applicable rate, special services and ancillary services, marine cargo insurance, transportation. **4.5 credits**

Professional Agencies of Interest to Part-time Students

Canadian Association for Production and Inventory Control (CAPIC)

The Canadian Association for Production and Inventory Contol (CAPIC) is a professional group of men and women who practice the art and science of production and inventory management.

CAPIC is Region 8 of APICS, one of the fastest growing professional societies in the world. Organized in 1957, the society has grown from a handful of practitioners to over 38,000 members in over 170 chapters in Canada, the United States and 12 other international affiliates.

The primary objectives of CAPIC are to provide exposure to the increasingly important roles of production and inventory control practitioners, supervisors and managers, and educational means for both career exposure and advanced learning.

A course of studies leading to a materials control certificate issued by CAPICS is offered by BCIT through the Operations Management Technology. See the Operations Management Technology section of *Certificate Programs* for details.

For further information on CAPICS contact: Keith Hartley — CAPIC Director of Education, Operations Management Technology, BCIT, 3700 Willingdon Avenue, Burnaby, B.C., V5G 3H2 Telephone: 434-5734, local 857.

Canadian Credit Union Institute Fellows' Program

The Canadian Credit Union Institute Fellows' Program was developed under the sponsorship of the Canadian Co-operative Credit Society with the support of its member leagues and centrals. The program is managed and administered by the Co-operative College of Canada.

The need for developing people within the credit union system has been recognized as a high priority. The CCUI program provides an opportunity for credit union personnel to undertake a formal program designed to upgrade their knowledge and skills.

The CCUI program is a post-secondary level course of studies selected to provide students with a broad education in the theories, concepts and practices of all aspects of financial and business management.

Major commitment of time and energy, and a measure of self-discipline, will be required of those people who select the CCUI program as their program of professional development.

Further information can be obtained by contacting the CCUI Co-ordinator, Education Department, B.C. Central Credit Union, 1441 Creekside Drive, Vancouver, B.C. V6J 4S7. Telephone: 734-2511.

The following courses have been accepted for transfer credit:

CCUI Courses	BCIT Part-time Studies
Accounting	FMGT 101 Accounting 1 ADMN 110 Management 1
Business Administration	ADMN 211 Management 2
Marketing	MKTG 101 Marketing 1 or MKTG 201 Marketing 2
Economics	ADMN 100 Micro Economics ADMN 200 Macro Economics
Financial Accounting	FMGT 302 Financial Accounting 1
Business Finance	FMGT 307 Business Finance 1 or FMGT 404 Business Finance 2
Management Accounting	FMGT 109 Accounting for the Manager
Management Information Systems	COMP 241 Data Communications Concepts
Taxation	FMGT 316 Taxation 1 or FMGT 408 Taxation 2
Organizational Behavior	ADMN 222 Organizational Behavior 1 or ADMN 322 Organizational Behavior 2
Employee Relations	ADMN 332 Labor Relations 1 or ADMN 432 Labor Relations 2
Personnel Management	ADMN 204 Personnel Management
Business Law	ADMN 380 Business Law 1 or ADMN 480 Business Law 2
Business and Government	ADMN 170 Government and Business
Promotion Management	MKTG 322 Advertising 1
Computer Concepts	COMP 104 Computers in Business or COMP 160 Computer Systems — Introduction 1

The Certified General Accountants Association of British Columbia

The Certified General Accountants Association of British Columbia is the largest professional accounting association in B.C. with over 6,000 members and students. The association offers a program of studies leading to the professional designation: "Certified General Accountant" (CGA).

The association recognizes BCIT day and evening courses having a content substantially similar to courses in the CGA program. Students who obtain a grade of 65% or better will be granted credit for such courses towards the completion of the CGA program.

The following courses have been accepted for transfer credit:

CGA Courses	BCIT Part-time Studies
Accounting 101 (Accelerated)	FMGT 101/201 or FMGT 110
Economics 104	ADMN 100/200
Law 108	ADMN 380/480
Statistics 203	OPMT 197
Accounting 211/222 (Accelerated)	FMGT 302/402 or FMGT 314
Accounting 311	FMGT 301/401
Finance 316	FMGT 307/404
I.C.S. 325	COMP 100/104
Public Speaking	MKTG 323
Business Writing	COMM 160 or COMM 170

Students are advised to obtain a copy of the CGA exemption policy annually to ensure they complete the correct courses and do not overlook revisions.

Students who wish to present courses other than those listed above should consult the Association. Applications for registration must meet all association requirements to be accepted in the CGA program.

Students attending BCIT full-time or part-time may register with the Association as an "Associate Student" to receive the National CGA Magazine, provincial newsletter and details about professional development seminars.

For further information about exemptions, the association, or "Associate Student" membership, please contact: The Director of Admissions, The Certified General Accountants Association of B.C., 1555 West 8th Avenue, Vancouver, B.C., V6J 1T5.

The Institute of Chartered Accountants of British Columbia

The Institute of Chartered Accountants of British Columbia has advised the British Columbia Institute of Technology that it will accept certain courses as meeting its course requirements, providing a student meets its prerequisites and is acceptable to the Institute of Chartered Accountants of B.C.

The following table details suitable courses, subject to change without notice.

Introductory Financial Accounting	FMGT 110
Intermediate Financial Accounting	FMGT 314
Introductory Management Accounting	FMGT 301
Cost Accounting	FMGT 401
Business Finance	FMGT 307/404
Business Computers	COMP 104
Information Systems	COMP 160/260
	OPMT 186
Commercial Law	ADMN 380/480
Mathematics	OPMT 296
Probability and Statistics	OPMT 197
Economics	ADMN 100/200
Organizational Behavior/Policy	ADMN 222
Introductory Taxation	FMGT 316
(under review)	FMGT 408

BCIT does not offer an Advanced Financial Accounting Course.

Students who are interested in the Institute of Chartered Accountants of British Columbia should contact: The Registrar, 1133 Melville Street, Vancouver, B.C. V6E 4E5. Telephone 681-3264.

The Institute of Chartered Secretaries and Administrators

The Institute of Chartered Secretaries and Administrators (ICSA) is the leading professional body of administration executives recognized in the English speaking world, with a global membership of over 50,000.

Members hold positions such as Chief Administrative Officer, Provincial Deputy Minister, Chief Executive Officer or Secretary of corporations/companies and other major public or private bodies.

BCIT is pleased to co-operate with this successful management oriented organization by enrolling students to follow a program leading to BCIT certification and, subsequently, through completion of further CSA directed studies, to attain a worthwhile professional designation.

There are two levels of membership. Associate and Fellow Members are entitled to describe themselves as Chartered Secretaries and to use the designation ACIS or FCIS. To qualify as a member, it is mandatory to pass prescribed examinations, to have appropriate practical experience and to be acceptable to ICSA.

Suitable courses for the ICSA Business/Federal/Provincial/Municipal Programs are as follows:

Management Concepts (All Programs)

1. Principles of Economics	ADMN 100
2. Principles of Law	ADMN 380
3. Principles of Administration	ADMN 110/211
4. Principles of Accounting	FMGT 101/201
5. Communication	COMM 160
6. Statistics	OPMT 197

Business Administration Program

Module A (both subjects to be passed)	
7. Financial Management Accounting	FMGT 302/402
8. Corporation Law	ICSA
Module B (two subjects to be passed)	
9. Taxation	FMGT 316/408
10. Business Finance	FMGT 307/404
11. Law for the Administrator	ADMN 480
Module C (two subjects to be passed)	
12. Management of Human Resources	ADMN 222/322
13. Economic Policies and Problems	ADMN 200
14. Management Techniques and Services	ADMN 302
Module D (both subjects to be passed)	
15. Meetings — Law and Procedure	ICSA
16. Corporate Secretarial Practice	ICSA

Federal/Provincial Government Program

Module A (both subjects to be passed)	
7. Financial Management and Accounting	FMGT 302/402
8. Public Finance	—
Module B (two subjects to be passed)	
9. Canadian Government	—
10. Canadian Public Administration	ICSA
11. Law for the Administrator	ADMN 480
Module C (two subjects to be passed)	
12. Management of Human Resources	ADMN 222/322
13. Economic Policies and Problems	ADMN 200
14. Management Techniques and Services	ADMN 302
Module D (both subjects to be passed)	
15. Meetings — Law and Procedure	ICSA
16. Corporate Secretarial Practice	ICSA

Municipal and Other Local Government Programs

Module A (both subjects to be passed)	
7. Local Government Finance Accounting	ICSA
8. Law of Local Government	ADMN 208
Module B (two subjects to be passed)	
9. Canadian Government	—
10. Canadian Public Administration	ICSA
11. Law of Local Government 2	ADMN 208
Module C (two subjects to be passed)	
12. Management of Human Resources	ADMN 222/322
13. Economic Policies and Problems	ADMN 200
14. Management Techniques and Services	ADMN 302

Module D (both subjects to be passed)

15. Municipal Government Meetings	ICSA
16. Municipal Secretarial Practice	ICSA

Note for Mature Students with Appropriate Qualifications: ICSA will be offering a "Professional Administrator" designation, subject to individual requirements.

ICSA: these programs are presently only directly available through ICSA National Head Office.

Students who want additional information on the ICSA program should contact: The Institute of Chartered Secretaries and Administrators, Suite #1 — 650 Clyde Avenue, West Vancouver, B.C. V7T 1E2. Telephone: 922-0535.

The Municipal Administration Education Council of B.C.

The Municipal Administration Education Council is authorized by resolution of the Municipal Officers' Association of British Columbia and its membership to include six representatives from the Municipal Officers' Association, one representative from the Union of British Columbia Municipalities, one representative from the Board of Examiners and one representative from the Ministry of Municipal Affairs.

The members of the Municipal Administration Education Council also form an Advisory Council to the Board of Examiners to advise on the qualifications requisite to the granting of certificates; the sufficiency of courses of instruction provided by professional and other organizations; equivalencies between existing courses of instruction; the adequacy of various seminars, workshops and orientation courses, and the dissemination of public information formulated for the purpose of encouraging suitable persons to train for careers in municipal service.

The Board of Examiners is established under the Municipal Act and its main function is the granting of certificates of proficiency in the areas of administration and finance to persons in municipal employment. Requirements for certification are the attainment of a recognized level of academic qualification together with the appropriate amount of work experience in the local government field.

BCIT is recognized by the Board of Examiners as one of the educational institutions offering courses and certificates which meet the academic qualifications required for certification.

Course requirements for a Business Certificate in Public Administration, are detailed in the Certificate Program section of this calendar.

For further information contact Sandra M. Allen, Administration/Education Officer, Municipal Officers' Association of B.C., Suite 100-800 Douglas Street, Victoria, B.C. V8W 2B7 or telephone 383-7032.

Purchasing Management Association of Canada

The Purchasing Management Association of Canada offers a variety of activities and services to purchasing personnel, those interested in entering this challenging profession and those in associated areas.

One activity is the widely recognized professional development program designed to meet the changing demands of the business world and to expand knowledge and career development opportunities within the materials management field. Its focus is on purchasing management, but it encompasses both the fundamentals of the supply field and general management.

BCIT co-operates with PMAC in presenting the Principles courses and offering the following approved courses. A bursary will be given to the top student in each of the three "Principles Courses" in the Lower Mainland area. The bursary is the value of the next continuing education course or one-day seminar, it is conditional upon being used in the following year and students must be continuing their studies in the PMAC — Professional Development Program.

The following steps are required to achieve the Professional Purchaser Diploma.

PMS Courses Registration with PMAC	**BCIT Part-time Studies**
Principles of Buying	PMAC 100
Principles of Production and Operations Control	PMAC 300
Principles of Traffic and Transportation	PMAC 200
Core Management Courses	MKTG 101
Marketing	MKTG 201
Organizational Behavior 1	ADMN 222
Organizational Behavior 2	ADMN 322
Accounting	FMGT 101
or Accounting 2	FMGT 103
Elective Management Courses (Choose 3 from 9 courses listed)	
Business Finance	FMGT 307 and FMGT 404
Operations Management	OPMT 189
Managerial Styles	ADMN 301
or Discussion Leadership	ADMN 125
or Problem Solving and Decision Making	ADMN 302
Economics 2 — Macro	ADMN 200
Accounting 2	FMGT 201
or Accounting 2S	FMGT 213
Business Law 1	ADMN 380
Data Processing — Introduction	COMP 100
Introduction to Data Processing — Microcomputers (Apple)	COMP 103
or Introduction to Data Processing — Microcomputers (IBM)	COMP 105

Students are advised to obtain a copy of the current Purchasing Management Association of Canada — Professional Development Program annually to ensure they complete the correct courses and do not overlook any course revisions.

Students enrolled in previous programs must follow the course requirements of the program in which they are registered. Contact the P.M.A.C. — Professional Development Committee for any clarification to ensure enrolment in the correct courses.

For information on Purchasing Management Association of Canada — Telephone (604) 879-7325 or write to: Chairman, Professional Development, Purchasing Management Association of Canada, 206-640 West Broadway, Vancouver, B.C., V5Z 1G4.

Purchasing Management Association of Canada information is also available from Brenda Ng — 731-1131, Dennis Bidin — 663-2570, Teresa Cahill — 687-4833, Ken Lonquist — 421-2311, Brian McStay — 826-6251, Jim Matterson — 985-3827.

American Society for Quality Control Certification Program

The Certification Program offered by the American Society for Quality Control (ASQC) provides a means of obtaining specialized qualifications for those who work in the field of Quality Control.

Since there is no equivalent Canadian Society, the ASQC qualifications are continually gaining recognition among Canadian quality program managers, and many people across Canada have written the ASCQ certification examinations since 1970. The program, revised in 1985, now covers the following:

Quality Engineer Certification
Quality Engineer-in-Training Certification
Reliability Engineer Certification
Quality Technician Certification
Mechanical Inspector Certification

Courses currently at BCIT through the Operations Management Technology are:

OPMT 193 Quality Control Methods 1
OPMT 194 Quality Control Methods 2

These courses are endorsed by the local section of the ASQC and will help applicants prepare for the Quality Engineer/Technician/Inspector certification examinations.

For further information contact:

John Lloyd, Vancouver ASQC Education Chairman,
Operations Management Technology, BCIT,
3700 Willingdon Avenue, Burnaby, B.C. V5G 3H2

Telephone: 434-5734, local 5225

The Society of Management Accountants of British Columbia

The Society of Management Accountants of British Columbia has advised the British Columbia Institute of Technology that it will accept certain BCIT courses as meeting its course requirements, providing a student meets the other prerequisites and requirements and is acceptable to the Society of Management Accountants.

Students interested in the Registered Industrial Accountant (RIA) program should contact the Society at (604) 687-5091, or write to them at 1575 — 650 West Georgia Street, Vancouver, B.C. V6B 4W7.

EXEMPTION POLICY FOR BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

In order to be eligible for a complete course and exam exemption in any RIA subject listed below, STUDENTS MUST HAVE OBTAINED A MINIMUM MARK OF 60, or equivalent, in the required subject(s) identified.

The following courses have been accepted for tranfer credit:

RIA Courses	BCIT Part-time Studies
LEVEL 1	
111 Introductory Accounting	FMGT 101/201 or FMGT 115/215
122 Commercial Law	ADMN 380/480
123 Organizational Behavior	ADMN 222 (Term 1 course only)
LEVEL 2	
212 Economics	ADMN 100/200
213 Communications	COMM 160 + COMM 170 or COMM 171
229 Intermediate Accounting 1	FMGT 314 (Financial Accounting 1 and 2 Accelerated) or FMGT 302 or FMGT 320
232 Quantitative Methods 1	OPMT 197
LEVEL 3	
314 Data Processing	COMP 101 or COMP 102 and COMP 104
331 Cost and Management Accounting	FMGT 301/401 or FMGT 319/419
333 Quantitative Methods 2	OPMT 400
339 Intermediate Accounting 2	FMGT 402 orFMGT 314 or FMGT 420
LEVEL 4	
424 Taxation	FMGT 316/408
442 Financial Management	FMGT 307/404
451 Accounting Information Systems	no equivalent
452 Internal Auditing	(FMGT 310/406 Day School courses only)

The Trust Companies Institute

The Institute is concerned with upgrading and updating professional competence in all areas of activities carried on within the trust industry.

Comprehensive descriptions of educational programs leading to accreditation in various specialities within the industry are available in the calendar of the Trust Companies Institute of Canada.

The Institute will recognize Part-time Studies courses offered at BCIT but candidates are encouraged to work with an institute representative in selecting an appropriate program of courses.

A Business Education Certificate is available through the Trust Companies Institute. Candidates may begin by registering their intent to participate in the program with the Institute. The registration form must be accompanied by a $25.00 processing fee.

Candidates who have completed post-secondary education may be eligible for advanced standing in the program.

Candidates may enrol in courses that are recognized by the Institute and offered by an approved community college or university.

Candidates who have completed the program requirements may make a formal application for accreditation. The application form must be accompanied by a $25.00 processing fee for registered candidates.

The following courses have been accepted for transfer credit:

Trust Companies Institute Subjects — Compulsory Subjects	BCIT Equivalents
Principles of Accounting	FMGT 109 FMGT 101
Business Communications	COMM 160 COMM 170 COMM 181 COMM 183
Interpersonal Communication	MKTG 323/423
Business Law	ADMN 380/480
Principles of Economics	ADMN 100/200
Optional Subjects	
Money and Banking	Not presently available

Canadian Institute of Management Certificate Program in Management and Administration

The Canadian Institute of Management is a non-profit association dedicated to professional development and the enhancement of managerial skills in Canada. Effective September 1983, the Vancouver Branch of the Institute accepts the following BCIT courses for credit in the C.I.M. Four Year Certificate Program of Studies.

CIM Courses	BCIT Part-time Studies
Year 1	
Management Principles and Practises	ADMN 110/211
Managerial Accounting	FMGT 101/201 or FMGT 110
Year 2	
Canadian Business Law	ADMN 380
Managerial Process and Organizational Behaviour	ADMN 222
Year 3	
Marketing Management	MKTG 102
Applied Management	OPMT 188, OPMT 189, ADMN 124
Year 4	
Managerial Finance	offered through CIM only
Policy and Administration	offered through CIM only

For information on the Certificate Program, write to the Canadian Institute of Management, 600-890 West Pender Street, Vancouver, B.C. V6C 1J9 or call 669-2977.

Canadian Administrative Housekeepers Association (C.A.H.A.)

C.A.H.A. is an accredited Canadian professional association of persons employed in the field of Housekeeing Management. Students who are interested in the C.A.H.A., may contact Lea Buburuz, the Education Director of C.A.H.A., at 430-1261.

C.A.H.A. will accept BCIT Part-time Studies courses for transfer credit to their educational program. The following courses have been accepted.

Safety/Accident Prevention C.A.H.A. Requirement	BCIT Part-time Studies
Psychology/Sociology	ADMN 222 Organizational Behavior 1
Economics	ADMN 100 Micro Economics
Labor Relations	ADMN 332 Labor Relations 1
Personnel Management	ADMN 204 Personnel Management
Interior Planning/Design	INTD 100 Interior Design Basic or INTD 200 Color or INTD 304 Space Planning 1
Microbiology/Sanitation	BSMT 101 Safety and Sanitation
Safety/Accident Prevention	ADMN 128 Occupational Safety and Health
Supervisory Skills	ADMN 124 Supervisory Skills
Organization and Planning	ADMN 110 Management
Teaching Techniques	ADMN 127 Training Techniques
Business Law	ADMN 380 Business Law 1
Purchasing	OPMT 191 Purchasing
Accounting	FMGT 109 Accounting for the Manager
Small Business Management	MKTG 306 Small Business Management
Pest Control	EHCE 902 Basic Pest Control within Buildings
Communications	COMM 160 Business and Technical Communication and one of the following: COMM 180 Technical Correspondence COMM 183 Technical Reports COMM 171 Business Report Writing
Counselling Skills	ADMN 201 Counselling 1
Materials Management	OPMT 292 Facility Layout and Materials Handling — Manufacturing

School of Academic and Vocational Studies

The School of Academic and Vocational Studies offers Communication, Chemistry, Mathematics and Physics course components for full-time and part-time programs.

Pre-entry courses are offered throughout the year to students needing entrance requirements for BCIT. These courses will be of interest to mature students who need the courses as refresher, or to students who do not have the necessary prerequisites for entrance into BCIT programs.

Academic support courses are offered throughout the year in many forms:

- — as individual part-time evening classes
- — as individual part-time day-time classes (usually in the summer term)
- — as concentrated 15 week packages (through Technology Fundamentals, in both September and January)
- — as part of full-time program requirements.

Interested students are encouraged to call 432-8842 for further information.

Special In-house Communication Courses

All Communication courses can be delivered in-house for interested groups in 3-day, week-long, or other flexible formats. Special courses can also be designed to meet company communication requirements. Instructors will conduct needs assessments in the company and design relevant course materials. Please call the Communication Department at 432-8387 for more information.

English Language Proficiency Requirement

Students enrolling in Part-time Communication courses who have severe language difficulties may be referred to other, more appropriate courses.

Technology Fundamentals Program

Technology Fundamentals is an upgrading program to assist day school applicants who lack some or all of the prerequisites for admission into BCIT programs.

Technology Fundamentals is a full-time, day school program (Monday through Friday) beginning in September and January, and running for 15 weeks.

Applicants for admission into Technology Fundamentals must indicate which BCIT Technology program they are applying for and which session (September or January) of the Technology Fundamentals program they wish to enroll in. Technology Fundamentals application forms must also have all necessary documents attached.

Technology Fundamentals students may be guaranteed entry to their full-time technology programs, subject to successful completion of the Technology Fundamentals program. The participating technologies include:

Biological Sciences
Building
Civil and Structural
Forest Resources
Mechanical/Mechanical Systems
Mining
Natural Gas and Petroleum
Chemical Sciences
Lumber and Plywood
Survey
Electrical/Electronics

For further information contact 432-8842.

Pre-entry Courses

Pre-entry courses are individual day or night courses available for students who lack the necessary prerequisites to apply for their chosen technology programs, or for those who wish to prepare for their full-time workload.

Pre-entry courses are available in each of the BCIT terms: September, January, April and throughout the summer months (check the Part-time Studies flyer for dates, or phone 432-8842).

The following Pre-entry courses are available for those who need prerequisites or who wish to up-grade their existing grades:

Technical Mathematics — Introduction
(For School of Health Sciences Studies and the Schools of Engineering Studies)

Mathematics for Business
(For School of Management Studies)

Introductory Computer Programming for Engineering Technologies
(For the Schools of Engineering Studies

Effective Writing Independent Learnings Skills
(Preparation courses for every Technology)

Comprehensive Reading, Writing and Learning Skills
(English 12 for every Technology)

Technical English as a Second Language
(English 12 for English as a Second Language students)

Chemistry 1
(Chemistry 11)

Chemistry 2
(Chemistry 12)

Physics
(Physics 11)

Course Descriptions

BIOLOGY

BHSC 001 Biology 1 — An upgrading and refresher course for those whose background in biology is weak or those who have not studied biology for some time. The course meets the Biology 11 entrance requirement for BCIT. **non credit**

BHSC 002 Biology 2 — An upgrading and refresher course for those whose background in biology is weak or those who have not studied biology for some time. This course meets the Biology 12 entrance requirement for BCIT. **non credit**

CHEMISTRY

CHEM 001 Pre-entry Chemistry 1 — An upgrading course for people whose background in chemistry is weak, and a refresher course for those who have not studied chemistry for several years. Meets the Chemistry 11 program entrance requirements for BCIT. **non credit**

CHEM 002 Pre-entry Chemistry 2 — A further upgrading course for those whose background in chemistry is weak or a refresher course for those who have not studied chemistry for some time. The course meets the Chemistry 12 entrance requirement for BCIT. **non credit**

COMMUNICATION

COMM 001 Effective Writing — Develops the basic skills needed for the business and technical writing at BCIT. This 24-hour course prepares you for the heavy writing requirements in the Communication and Technology courses offered through full-time day school programs. You will find this course especially useful if you are uncertain of your skills in business and technical writing. The course addresses organization of written material, paragraph development and effective sentences in letter and memo writing. **non credit**

COMM 002 Independent Learning Skills — This course teaches you how to study on your own, manage your time, cope with heavy work loads and get the most from new instructional techniques. It includes textbook reading, learning from objectives, using computer managed learning packages, reading efficiently, completing assignments, taking exams successfully and managing your time. A must for students entering BCIT — especially for Electrical options. **non credit**

COMM 003 Comprehensive Reading, Writing and Learning Skills — An integrated couse which emphasizes the reading, writing and study skills needed for entering a full-time program of studies at BCIT. This course covers all the topics outlined in COMM 001 and COMM 002 as well as speed reading, reading comprehension , library research and short report format. NOTE: if your mark in B.C. high school English 12 does not meet BCIT admission requirements, a mark requirement of 65% or better in this course will meet the C + English 12 entrance requirement for BCIT full-time day school programs. **non credit**

COMM 004 Technical English as a Second Language — This 80-hour course is for students whose first language is not English, who have studied English, but need practice in applying their language skills to technical studies or need to upgrade their English to meet the Institute's English language requirement. This integrated language course focuses on the reading, writing, listening and speaking skills required for technical communication and will include reading efficiency, vocabulary expansion, sentence and paragraph development. A mark of 65% or better in this course will meet the C + in English 12 entrance requirement for BCIT full-time day school. **non credit**

MATHEMATICS

MATH 001 Technical Mathematics — An upgrading and/or refresher course for students who have not completed high school math, or have completed it more than three years previously, or whose math background is otherwise weak. This course meets Algebra 12 entrance requirements at BCIT. Students intending to enter a technology which requires an Algebra 12 grade of C + or better, must achieve a final mark of 65% or higher in MATH 001. Prerequisite: C or better in Algebra 11 or approved equivalent math course. **non credit**

MATH 002 Technical Mathematics — Correspondence — Flexible entry correspondence course that satisifies the Algebra 12 entrance requirements for BCIT. Students intending to enter a BCIT technology which requires an Algebra 12, grade of C + or better must achieve a final mark of 65% or higher in MATH 002. Students who have difficulty with mathematics or those who have been away from school more than three years are advised to take the classroom course (see P/T offering — MATH 001). Prerequisite: a pass in Algebra 11 or an approved equivalent mathematics course. **non credit**

PHYSICS

PHYS 009 Pre-entry Physics — This course is designed for those students who lack the physics prerequisite to enter their chosen technologies or those who anticipate difficulty in passing the physics course associated with their technology. The course offers an introduction to physics, its basic principles and common applications. Approximately two-thirds of the course deals with mechanics, the remainder with heat and geometric optics. Problem solving techniques are emphasized. Prerequisite: you are advised to have completed any necessary mathematics upgrading courses BEFORE taking PHYS 009. **non credit**

CHEMISTRY

CHEM 317 Gas and Liquid Chromatography — Introduces students to the use of gas chromatography (GC) and high performance liquid chromatography (HPLC) for solving organic analysis problems related to the energy, chemical, food and forest industries as well as clinical and environmental laboratories. The course lectures will cover such topics as separation, theory, instrument operation, trouble shooting, detectors, quality and quantity analysis applications and sample preparation. Laboratory experiments will demonstrate the principles covered in the lectures. **3 credits**

Special In-house Communication Courses

All Communication courses can be delivered in-house for interested groups in 3-day, week-long, or other flexible formats. Special courses can also be designed to meet company communication requirements. Instructors will conduct needs assessments in the company and design relevant course materials. Please call the Communication Department at 432-8387 for more information.

COMM 160 Introduction to Business and Technical Communication — Introduces students to the basics of communicating in business and industry. It offers practical techniques for planning, organizing, selecting and presenting information. Using effective business and technical style is also covered. Students apply these skills to communications common to most office jobs — writing routine memos, instructions, procedures and summaries. Presenting information orally is also covered. Practical "case" assignments are used. The combination of COMM 160, 170 and 171 taken in sequence, is equivalent to first year Business Communication in day school. COMM 160, 180 and 183 are equivalent to first year Technical Communication. **3 credits**

COMM 170 Business Correspondence — Covers communicating inside and outside the office. Internal correspondence includes routine requests and replies and short, informal memos. External correspondence includes request, reply, sales and collection letters. Job applications are also covered. **3 credits**

COMM 171 Business Report Writing — Gives business writers practice in writing problem-solving reports and proposals. The emphasis is on the persuasive skills needed to sell ideas, methods and products. Specific applications include comparison and recommendation reports, proposals, feasibility studies, executive

summaries and formal report format. It also covers persuasive presentations, meetings and the effective use of graphics. **3 credits**

COMM 180 Internal and External Correspondence — Covers internal and external correspondence common to engineering and industrial offices including routine requests, replies, specification and continuation letters and short memo reports such as trip, program and inspections. **3 credits**

COMM 183 Technical Report Writing — Gives writers from technical or industrial backgrounds practice in writing problem-solving reports. The emphasis is on the communication skills needed when solving engineering problems and describing methods and products. Specific applications include comparison and feasibility reports, technical proposals, journal reviews, executive summaries and formal report format. Persuasive presentations, meetings, and effective use of graphics are also covered. **3 credits**

COMM 190 Writing for Results — This 18-hour course is for people who want an overview and to upgrade their writing skills in short, intensive workshops. Participants learn simple techniques to make their writing clearer, better organized and more effective in getting the job done. The course covers techniques for memos, letters, reports and other major forms of written communication. It is offered in weekend and 3-day sessions. Participants are encouraged to work on writing from their workplace and are requested to bring samples of their writing to the first class. Companies may request this course in-house by calling 432-8387. **1.5 credits**

COMM 191 Writing Effective Letters — This 18-hour course covers the principles of letter style and organization and applies them to sales, collection, inquiries, claim, adjustment and application letters. Participants are encouraged to work on letters from their workplace. The course is offered in weekend and 3-day formats at the Burnaby and Downtown campuses or at the request of individual companies. **1.5 credits**

COMM 192 Writing Reports — This 18-hour course covers selecting and organizing information, using effective formats and layout, analysing audience needs, reporting factual information and making recommendations. It is offered in weekend and 3-day formats at the Burnaby and Downtown campuses or at the request of individual companies. **1.5 credits**

COMM 194 Effective Meetings — This 8-hour weekend course will make business meetings more productive. It covers how to prepare agendas, structure and control discussion, make decisions and write minutes. The course is offered in the 3-day format at the Downtown campus or at the request of individual companies. **non credit**

COMM 195 Practical Writing — This 18-hour course introduces secondary and post secondary teachers to teaching practical writing. It covers planning a course, designing assignments and evaluating student work. **non credit**

COMM 196 Writing User Friendly Manuals — This 18-hour course is for anyone who writes user manuals. It covers planning, researching, organizing, formatting and writing the manual and testing and packaging the finished product. It emphasizes techniques for translating technical material for the non-technical reader. The course is offered in weekend and 3-day formats at the Burnaby and Downtown campuses. **1.5 credits**

COMM 197 Telephone Techniques — This one-day course offers a refresher on business telephone techniques. Through classroom discussion, pre-recorded sample calls and role playing, participants will learn how to represent the company by making a positive first impression with customers and to handle calls efficiently. It is offered at the Downtown and Burnaby campuses or at the request of individual companies. **non credit**

COMM 198 Managing Large Writing Projects — This 18-hour course is for managers who supervise and edit other people's writing. It covers techniques for plotting a critical path, building a project team, specifying requirements, designing report segments, making revisions and packaging the finished product. It also reviews the meeting and interpersonal skills needed to manage the project. This course is offered at the Downtown campus or at the request of individual companies. **non credit**

COMM 900 English Fundamentals — This 36-hour practical, refresher course focuses on writing clear sentences and paragraphs. The course covers sentence structure, word choice, common grammatical problems, techniques for listing, traditional and alternate paragraph structure, and simple presentation strategies that help writers communicate clear messages. This course will give you confidence in your ability to focus your ideas and use the conventions and mechanics of the language. Who should take this course? People unsure of their English language skills. **non credit**

COMM 903 Writing Proposals — This two-day course covers the language, organization, presentation and packaging of effective sales and technical proposals. Participants are encouraged to write proposals from their work. The course includes a follow-up session. **non credit**

MATHEMATICS

MATH 101 Technical Mathematics 1 — Trigonometry — A course for engineering technology students in the application and theory of trigonometric functions including right angle trigonometry, radian measure, vector and triangle problems, trigonometric identities and graphing, polar co-ordinates, compound and double angle formulas, trigonometric equations and inverse functions. Prerequisite: C + or better in Algebra 12 or 65% or higher in MATH 001. **3 credits**

MATH 102 Technical Mathematics 2 — Logarithms and Analytic Geometry — A study of the theory and applications of common and natural logarithms, and an introduction to analytic geometry. Topics emphasized are the plotting, interpretation and uses of logarithmic/semilogarithmic graphs, the geometrical and practical properties of conic sections and polar/rectangular transformations. A brief consideration of quadratic surfaces is included. Prerequisite: C + or better in Algebra 12 or 65% or higher in MATH 001. **3 credits**

MATH 106 Probability and Statistics 1 — An introduction to statistical methods and their application to technological problems. This course includes the organization and graphical representation of data, frequency distributions, measures of central tendency and variation, probability theory, random variables, mathematical expectation, theoretical distributions, sampling, estimation, hypothesis testing, analysis of variance, and curve fitting (regression and correlation). Prerequisite: recent Algebra 12 or MATH 001. **6 credits**

MATH 108 BASIC 1 — An Introduction to Microcomputers — APPLE II — Designed for engineering technology students with no previous BASIC programming or microcomputer experience. Topics include computer terminology, hardware, disk operating system, commands, BASIC language concepts (input/output, BASIC arithmetic and functions, relational operators, branching statements, subroutines and graphics statements). **3 credits**

MATH 109 BASIC 2 — Microcomputers — APPLE II — A sequel to MATH 108 presenting further concepts and features of the BASIC language for engineering technology students. Topics

include further input/output, arrays, machine language statements, additional computer graphics and file operations. Prerequisite: MATH 108 or previous programming experience. **3 credits**

MATH 113 Mathematics for Electrical Technology — An accelerated course based on the material covered in MATH 143. Open only to students currently registered in ELEC 208 and MATH 143 and by invitation. **6 credits**

MATH 122 Logarithms (Correspondence) — Flexible entry correspondence course that presents a study of the theory applications of common and natural logarithms including plotting of logarithmic/semilogarithmic graphs and their interpretation. Equivalent to the Logarithms portion of the P/T offering MATH 102. ASTT accredited when taken with MATH 124. **1.5 credits**

MATH 123 Trigonometry (Correspondence) — Flexible entry correspondence course that describes the theory and outlines the application of trigonometric functions of any angle, vectors and solution of triangles, graphs of function, identities, compound and double angle formulas, trigonometric equations and inverse functions. Equivalent to the P/T offering MATH 101. ASTT accredited. **3 credits**

MATH 124 Analytic Geometry (Correspondence) — Flexible entry correspondence course that emphasizes geometrical and practical properties of conic sections and includes polar coordinates and transformations. Equivalent to the Analytic Geometry portion of the P/T offering MATH 102. ASTT accredited when taken with MATH 122. **1.5 credits**

MATH 125 BASIC 1 — An Introduction to Microcomputers — IBM PC — Covers the same topics as MATH 108 but uses the IBM PC. **3 credits**

MATH 126 BASIC 2 — An Introduction to Microcomputers — IBM PC — Covers the same topics as MATH 109 but uses the IBM PC. **3 credits**

MATH 143 Basic Technical Mathematics for Electrical — Common and natural logarithms, logarithmic/semilogarithmic graphs, decibels, exponential growth and decay. Systems of linear equations, determinants, application to electrical networks. Trigonometric functions, identities, solution of triangles, graphing and addition of sinusoidal functions. Complex numbers, rectangular/polar transformations, phasor representation of sinusoidal waveforms.

MATH 203 Technical Mathematics 3 — Calculus — An introductory course in calculus and its technical applications involving the differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions. The course emphasizes the application of calculus to engineering technology problems. Prerequisite: MATH 102. **6 credits**

MATH 204 Technical Mathematics 4 — Calculus — A continuation of MATH 203. Topics include further work on integration, partial differentiation, an overview of Maclaurin, Taylor and Fourier series, and the solution of differential equations with special consideration given to the use of Laplace transforms. Prerequisite: MATH 203. **6 credits**

MATH 206 Probability and Statistics 2 — This course covers further hypothesis testing, chi-square distribution, analysis of variance and experimental design, non-linear and multiple regression and introduction to quality control. Prerequisite: MATH 106. **6 credits**

MATH 208 Interactive Computer Graphics 1 — APPLE II — The course includes an introduction to the concepts of computer graphics, graphics output hardware, interactive graphics input devices, and BASIC computer programming projects and demonstrations illustrating some of the elementary aspects of graphics and CAD programming. Prerequisite: Algebra 12 and MATH 108. **3 credits**

MATH 209 Interactive Computer Graphics 2 — APPLE II — A continuation of MATH 208. Topics covered are matrix methods with emphasis on 2-D and 3-D transformations, an introduction to algorithms of computer graphics such as line clipping and hidden line detection, and an overview of CAD/CAM and its reliance on interactive computer graphics. Prerequisite: MATH 208. **3 credits**

MATH 221 Calculus Module 1 (Correspondence) — Flexible entry correspondence course that introduces differential calculus. Delta-process, the derivative, differentiation rules for algebraic functions, implicit differentiation, instantaneous rates of change, curve sketching, applied maxima/minima, the differential. Prerequisite: MATH 122, 123, 124 or equivalent(s). **3 credits**

MATH 222 Calculus Module 2 (Correspondence) — Flexible entry correspondence course that introduces integral calculus. Antidifferentiation, the indefinite integral, the trapezoidal rule and the definite integral with application to areas, volumes and centroids. Prerequisite: MATH 221 or equivalent. **3 credits**

MATH 225 Interactive Computer Graphics 1 — IBM PC — Covers the same material as MATH 208 but uses the IBM PC. **3 credits**

MATH 226 Interactive Computer Graphics 2 — IBM PC — Covers the same topics as MATH 209 but uses the IBM PC. **3 credits**

MATH 227 Calculus Module 3 (Correspondence) — Flexible entry correspondence course that furthers the study of differential and integral calculus. Differentiation and integration of trigonometric, logarithmic and exponential functions. Prerequisite: MATH 222 or equivalent. **3 credits**

MATH 228 Calculus Module 4 (Correspondence) — Flexible entry correspondence course that concludes the study of calculus. Expansion of functions in Maclaurin, Taylor and Fourier series, and solution of differential equations including separation of variables. Prerequisite: MATH 227 or equivalent. **3 credits**

MATH 243 Calculus for Electrical — The derivative, differentiation rules, applied maxima/minima and implicit differentiation with applications to electrical technology. Antidifferentiation, the indefinite integral and the definite integral including area, mean value and RMS value. Differentiation and integration of trigonometric, logarithmic and exponential functions. **7 credits**

MATH 306 Statistical Quality Control with Industrial Applications — Covers the application of statistical methods to quality control of industrial products, quality control charts and acceptance sampling. Prerequisite: MATH 106. **3 credits**

MATH 314 Math Make-up for Math 243 — A new "make-up" course is needed as the Math for E and E courses are going online with day-school courses. This new course will be for students who have completed Math 313 and would be going into 414 (which will now disappear) who will be required to do this math make-up as the next course will be much more advanced (one last offering September 1986). **1 credit**

MATH 320 Matrix Algebra — A course in matrix algebra and its applications. Topics include matrix operations, solution of systems of linear equations, translations and rotations, eigenvalues and eigenvectors. Students are expected to have some computer programming experience. Prerequisite: Algebra 12 or MATH 001. **3 credits**

MATH 343 Transform Calculus for Electrical — First and second order differential equations. The Laplace Transform as an integral function. Transform pairs for functions and operations, inverse transforms from tables, techniques of partial fraction expansion for inverse transformation. Poles, zeroes, s-plot, s-domain circuit diagram and applications. Transients in multi-mesh circuits, transfer functions and frequency responses to sinusoidal inputs. Fourier series, trigonometric Fourier coefficients and frequency spectrum. **4 credits**

MATH 443 Laplace Transform Methods for Electrical Technologies — Covers development of a table of Laplace transform pairs for functions and operations; finding inverse transforms, tables of transforms, partial fractions, simple order, double order and complex poles, poles and zeros; circuit problems; single loops with DC inputs; R-L, R-C and R-L-C; initial condition voltage generators; d-domain circuit diagrams; analysis of circuits in the s-domain (AC and DC); review of determinants and Cramer's Rules; self and mutual impedances; driving point and transfer impedances, transients in multimesh circuits; transfer functions and frequency responses, as well as selected topics from control engineering. Prerequisite: MATH 413. **6 credits**

MATH 495 Introduction to the FORTH Programming Language — Provides a complete introduction to the fascinating "high tech" FORTH language used in programming applications from database managers through robotics control and artificial intelligence. The course will be based on the IBM PC and compatible computers. Students who bring a blank diskette to the first session will be provided with a copy of the public domain F83 FORTH system. Topics include FORTH characteristics and history, structured programming concepts, usage of FORTH programming editors and utilities, data structures, virtual memory and block 1/0, extension of the FORTH compiler and construction of custom databases and editors. Overview will be given of FORTH internals, optimization with machine code and building new systems with a meta-compiler. **3 credits**

MATH 496 FORTH Internals — A continuation of MATH 495, the course will concentrate on the internal construction and operation of the FORTH programming environment. A thorough understanding of FORTH internals is required for those students wishing to build new stand-alone systems with the metacompiler. The course will include presentation and discussion of the pertinent section of FORTH83 source files. Topics include the outer interpreter and compilers, terminal and mass storage 1/0, word parsing and programming structures including case statements. **3 credits**

MATH 497 Optimizing FORTH — A continuation of MATH 495 and MATH 496, this course will concentrate on using the FORTH 8086 machine code assembler to write program segments that are optimized for speed of execution. Machine code is used for interfacing to external devices and is required when FORTH is used in areas such as process control and robotics. An understanding of machine code is also required when using the metacompiler to build a new system. Topics include 8086 programming model and registers, 8086 addressing modes, 8086 instruction set, structure of FORTH code definitions, the FORTH machine code assembler, assembler control structures, assembler macros, study of the FORTH nucleus code definitions, optimization examples, using BIOS system calls and using machine code to interface to external devices. **3 credits**

PHYSICS

PHYS 106 Physics for Electrical Technology — A general level course about physical quantities, their properties, relationships, how they affect each other and their connecting principles. Motion, force, mechanical energy and power are studied concerning translational and rotational motion. Then follows basic electricity, atomic physics and the band theory of solids and its application to semiconductor devices. The lab program emphasizes measurements, data analysis and experimental techniques while confirming and expanding the lecture concepts. **6 credits**

PHYS 131 Physics 1 — Part 1 — Topics include kinematics, statics, linear and rotational dynamics, properties of matter, heat and thermodynamics. Problem solving is emphasized and consistent effort is directed towards relating physics to its technological manifestations. Prerequisite: Algebra 12, (Physics 11 is desirable). **3 credits**

PHYS 132 Physics 1 — Part 2 — Topics include kinematics, statics, linear and rotational dynamics, properties of matter, heat and thermodynamics. Problem solving is emphasized and consistent effort is directed towards relating physics to its technological manifestations. Prerequisite: Algebra 12, (Physics 11 is desirable) and PHYS 131. **3 credits**

PHYS 133 Physics 2 — Part 1 — This course, with Physics 1, satisfies the knowledge required in various engineering and related technologies. Topics include sound, light and optics, basic electricity and magnetism, basic semi-conductor theory, atomic and nuclear phenomena. Mathematical treatment requires algebra and trigonometry and possibly some calculus. An alternative format of correspondence, lab and tutorial session covering this subject matter is in the experimental state. Prerequisite: PHYS 132. **3 credits**

PHYS 134 Physics 2 — Part 2 — see PHYS 133. Prerequisite: PHYS 133. **3 credits**

PHYS 135 Physics 1 Modified (Correspondence) — This correspondence course is made up of topics selected from the PHYS 136 correspondence course, in order to meet the specific needs of students wishing to enter a particular technology. **3 credits**

PHYS 136 Physics 1 (Correspondence) — Flexible entry correspondence course that provides students of technology with the principles of physics, particularly as they apply to technology. The relationships between technology and physics are emphasized, applications outlined and the scientific approach to problem solving is described. Study areas include measurement and data analysis, mechanics, elasticity and strength of materials, fluid mechanics and thermal energy. Prerequisites are basic maths, plane trigonometry and basic algebra. Equivalent to P/T Physics 1. ASTT accredited. **3 credits**

PHYS 504 Mining Geophysics — Presents the use of geophysics in mineral exploration to prospectors, geologists and other mining company personnel. Subject matter includes the theory behind the uses of each geophysical method; instrumentation and field procedures; interpretation. NOTE: this course will not be offered in 1986-87. **1.5 credits**

Trades Training

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Office of the Registrar

Admissions

Academic Requirements

Guidelines are established for admission to ensure you will be able to master the learning tasks covered in the program. Most of our programs require Grade 10 as a minimum, however, there are some that require specific Grade 12 subjects. All programs require students to have a good comprehension of the English language. Do not hesitate to apply if you feel your background and experience qualify you to enter any Institute program. Appropriate combinations of education and experience are considered. Our only interest is your success.

Grade 10 is accepted as a minimum entrance requirement for some of our programs, however, some employers may require Secondary School graduation for employment.

English Language Proficiency

All programs require students to have a good comprehension of the English language. Applicants whose first language is not English may be asked to provide test results from the Vancouver Community College, King Edward Campus, English Language Assessment Test.

Transfer from Regional Colleges

Students may transfer from regional colleges to the Training Access program. An application form should be completed and forwarded to Admissions with transcripts of completion of Common Core and/or Occupational Core. Admission dates are subject to space available in the program. Fees are applied accordingly.

Credit for Completion of Career Preparation Programs in Secondary Schools

Memorandums of Understanding have been signed between the Institute and Boards of School Trustees for many school districts. Credit may be given to students who have completed the secondary school's portions of the training, thus avoiding duplication of learning.

Continuous Entry/Exit Programs

Programs are offered throughout the year with varying start dates for each program. Students should contact the Program Advisors for information on the next available start dates.

Training Access is a flexible approach to technical/vocational training. The learning system is designed to help you acquire entry-level skills and knowledge in any of the 22 specialty areas of study available. The program is individualized, allowing students to progress at a rate compatible with their abilities and learning styles.

Admissions Procedures

Admission is on a first-come, first-served basis, and applicants are encouraged to apply early to avoid delays. Upon acceptance to a program students will be asked to pay a non-refundable deposit, with the remaining fees due by the first day of class. Students unable to pay their tuition fees should make financial arrangements prior to the start of class.

Apprenticeship Courses

For information on sponsorship in Apprenticeship training, contact the Ministry of Labor Apprenticeship Training Programs Branch at: 4946 Canada Way, Burnaby, B.C. V5G 4J6. Telephone: 660-7200.

Attendance

Regular and punctual attendance is essential for students to complete training and be granted a certificate. Students with poor attendance may not be permitted to write the final examination for the course, except in unusual circumstances such as excused absence. If students are absent for five (5) days without notifying the instructor, then it will be assumed students have withdrawn from training. For Apprenticeship students, three or more days of unexcused absence will result in withdrawal.

Students are required to contact their department when they are absent.

Certificates

Certificate of achievement will be granted to students successfully completing their programs of study.

Registration

Registration for courses is on a first-come, first-served basis. Students wishing to register for any course being offered may do so at any one of the Institute campuses. Tuition fees are payable in full at the time of registration and can be paid by cash, cheque, money order or approved credit, Visa or Mastercard. When tuition fees are to be paid by the employer, written authorization on company letterhead must accompany the registration form.

Cancellations

The Institute will make every effort to offer all courses as listed in the calendar. Nevertheless, the Institute reserves the right to limit enrolment, to select students, to cancel courses, to combine classes or to alter time of instruction without prior notice.

BCIT is the largest vocational-trades training centre in British Columbia. Our programs are designed to prepare students to enter employment, and to provide them with employment upgrading and retraining opportunities. The Institute provides extensive training options in Construction Industry Trades, Metal and Steel Trades, Piping and Electrical Trades, Drafting, Mechanics, Horticulture, and Foods and Hospitality.

Training Access

Training Access is a flexible approach to technical/vocational training in British Columbia developed to meet the needs of today's students as well as industry.

This learning system is competency-based, which means that you will be required to demonstrate your ability by means of written and/or practical evaluations. Everything to be learnt is clearly defined and divided into small units of knowledge. The skills common to more than one trade area are grouped into cores as shown on the technical training opportunities chart.

Each specialty area of study is different. A student studying full-time should be able to complete the program in 6-10 months, or less, if credit is received for previous training and experience (see individual program descriptions for details). The flexibility of this learning system allows for up to 12 months to complete training.

Please refer to the BCIT Technical Training opportunities chart for Training Access program offerings and campus locations. Portions of Training Access are also offered at various colleges throughout the province.

Prerequisite

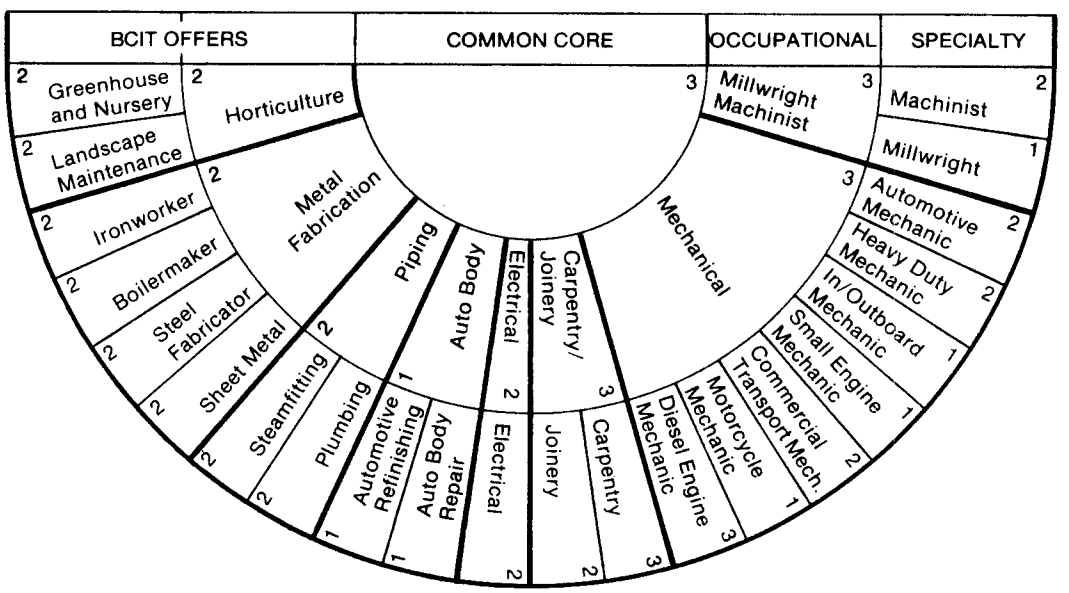
Training Access programs are open to men and women over 16 years of age with good comprehension of spoken and written English. Grade 10, with math and science, is recommended. However, learning assistance is available, so success depends largely on the student. Those whose first language is not English may be asked to provide results from a recognized English Language Assessment Test.

Career Potential

The program has been designed to increase employability in your chosen occupation. A Training Access Certificate will be awarded upon completion of all the required competencies, along with a detailed transcript indicating the knowledge and skills gained. Credit may be given for the first year of institutional training if apprenticeship employment is obtained.

Note: The courses identified with an asterisk (*) include the following three levels of Training Access: Common Core, Occupational Core and Specialty.

TECHNICAL TRAINING OPPORTUNITIES



1. Available at Maple Ridge Campus only
2. Available at Burnaby Campus only
3. Available at both Burnaby and Maple Ridge Campus

Aviation

Aircraft Maintenance

The Program

The Aircraft Maintenance training program will provide a good understanding of numerous subjects such as repairs, overhauls, and servicing of aircraft engines and related equipment and components to ensure airworthiness. Airframe components such as wings, tail assembly and sheet metal will also be examined.

Program Content

Theory of flight
Aircraft standards
Basic hand tools
Metallurgy
Aircraft systems
Aircraft powerplants
Airworthiness
Air regulations
Helicopters

Length of Program

12 months

Prerequisite

Grade 12 in either selected or combined studies, with Algebra 12 and Physics 11. Good colour vision is required. A mechanical background is recommended. Note: A medical certificate and proof of good colour vision may be a necessary requirement of the Ministry of Transport and future employers.

Career Potential

Training will enable the student to work on light-, medium- or heavy-fixed, or rotary-wing aircraft and provides the preparation necessary for employment in the aviation industry, first as an aircraft mechanic learner, and eventually as a mechanic or aircraft maintenance engineer (AME). Training is approved by the Federal Ministry of Transport. Graduates are eligible for 18 months credit toward 3 years practical experience required for the AME License.

Aircraft Structures

The Program

Aircraft structural repair training covers the manufacture, fabrication, repair and maintenance of the airframe to the aviation/aerospace industry standards. The program will provide the student with in-depth knowledge of sheet metals, composite materials, wood and fabrics as used in airframe components. Upon completion, students will be able to demonstrate a working knowledge of the principles of aircraft design by applying theory and shop practice to repair or manufacture aircraft components in accordance with manufacturers' specifications and standards.

Program Content

Aircraft standards
Materials handling
Layout procedures
Blueprint reading
Precision fitting
Sheet metal fabrication process
Aircraft material and processes
Airframe assembly process
General air frame repair processes
Corrosion prevention and treatment methods
Composite structures field repair procedures

Length of Program

6 months

Prerequisite

Grade 12 in either selected or combined studies, with Algebra 11. Drafting background is recommended. Note: A medical certificate and proof of good colour vision may be a necessary requirement of the Ministry of Transport and future employers.

Career Potential

Employment opportunities may be found in the manufacturing and repair fields of the aircraft industry. Graduates of Aircraft Structures may also continue their education in the Aviation Maintenance program.

Construction

Bricklaying

The Program

The Bricklaying program is intended to prepare students for entry level employment in the bricklaying trade. Basic theory and related information combined with shop practice will help develop competence in the performance of basic bricklaying principles.

Program Content

Practical use of basic masonry tools
Masonry units
Mortar
All phases of basic masonry construction
Trade-related international (metric) measurements
WCB regulations
Students will be required to build some projects within a set time to the given standards.

Length of Program

Up to 5 months. The program content has been organized into modules to ensure maximum flexibility for individualized training.

Prerequisite

Grade 10 recommended. Applicants must have a good working knowledge of the English language.

Career Potential

Employment opportunities exist with brick and stone manufacturers, large building construction firms, government and municipal agents and other related occupations.

Carpentry*

The Program

Training is intended to prepare students for entry-level employment in the carpentry trade. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing all basic carpentry tasks. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Program Content

Describe safe work practices
Use carpentry hand tools
Use carpentry power tools
Lay out site and building
Calculate quantities and costs
Build concrete forms
Set frames
Frame a building
Identify steel framing and drywall systems
Finish internal and external details

Length of Program

A full-time student may complete the Carpentry program in as little as 32 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Construction companies, plus government and municipal institutions which engage in industrial, commercial and/or residential building projects are potential employers.

Joinery*

The Program

Training is intended to prepare students for entry-level employment in the joinery trade. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing basic interior woodworking tasks. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Program Content

Select specialty materials
Use joints and fasteners
Use joinery shop equipment
Select cabinet hardware
Apply layout techniques
Machine cabinet details
Assemble cabinets
Install cabinet hardware
Prepare surfaces for finishes
Install glass
Install plastic laminate and sheet goods
Install cabinets

Length of Program

A full-time student may complete the Joinery program in as little as 30 weeks, or less if credit is received for related previous training or experience. However, the fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Students may seek employment with production and custom shops, in texture plants, in millwork and with specialized woodworking manufacturers.

Plumbing*

The Program

Students are prepared for entry-level employment in the plumbing trade. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing all basic plumbing-related maintenance tasks. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Program Content

Apply safe and acceptable work habits
Solve science problems related to liquids
Select common plumbing materials
Install valves, fittings and supports
Install pumps
Install compressors
Install potable water supply system components
Install draining and venting systems
Describe sewage disposal systems
Install a domestic hot water system
Install a hot water heating system
Install standard plumbing fixtures
Maintain plumbing systems and components

Length of Program

A full-time student may complete the Plumbing program in as little as 29 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Employment opportunities exist in residential, commercial and industrial plumbing fields.

Steamfitting*

The Program

Training will prepare students for entry-level employment as steamfitters/pipefitters. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing all basic steamfitting/pipefitting tasks. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Program Content

Apply safe and acceptable work habits
Solve science problems related to steam
Install a basic steam heating system
Select common piping materials
Install valves, fittings and supports
Install pumps
Install compressors
Install a hot water heating system
Install a basic steam heating system
Install manufactured fittings
Install fabricated fittings
Arc welding

Length of Program

A full-time student may complete the Steamfitting program in as little as 32 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

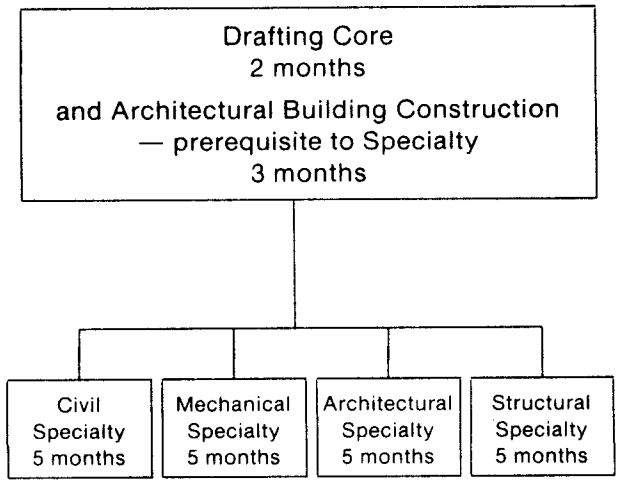
Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Typical places of work include thermal and hydro power plants, mines, chemical and industrial plants, petroleum refineries, pulp and paper mills, dairies, schools, apartment and office buildings, hospitals, shopping malls, laundries, ships, shipyards and oil drilling platforms.

Drafting



Prerequisite

Grade 12 with Grade 11 math. Good hand/eye coordination and technical aptitude. Students will normally enter at the core level although credit for prior experience and/or acquired knowledge may be given. Test required.

Drafting Core

Prepares the student with the basic knowledge and skills of drafting to enter any drafting specialty and includes introduction to drafting, math and surveying, and CAD training.

Length

Two months

Architectural Building Construction

Prepares the student to choose one of the four specialties available and concentrates on developing basic drafting skills. Includes introduction to Architectural specialty, introduction to building systems and graphic techniques and continuation of CAD training.

Length

3 months if credit is granted for drafting core. 5 months if combined with drafting core.

Career Potential

Possible employment at the junior drafter level.

Architectural Drafting

The Specialty

Prepares students to be drafters capable of relating to up-to-date standards of practical application and computer understanding.

Specialty Content

Special construction methods
Codes and bylaws
Continuation of CAD training
Working drawings

Length of Specialty

5 months

Career Potential

Employment may be found in architectural firms or related engineering companies.

Civil Drafting

The Specialty

Prepares the student to combine the required understanding of building construction with the requirements of municipal regulations.

Specialty Content

Basics of civil drafting as they combine with architectural building construction and highway design, municipal services, surveying; plus a continuation of CAD training

Length of Specialty

5 months

Career Potential

Students may be potential drafters and surveying assistants working for engineering firms, surveyors, municipalities.

Mechanical Drafting

The Specialty

Prepares the student to combine the understanding of building construction with the design and regulatory devices used in detailing building mechanical systems.

Specialty Content

Combines the mechanical processes of buildings (i.e. plumbing, electrical, heating and ventilating, gas) with building construction techniques.

Length of Specialty

5 months

Career Potential

Employment may be found in architectural offices specializing in systems design.

Structural Drafting

The Specialty

This drafting specialty covers specific detailed information on structural building components and the preparation of working drawings using architectural and structural techniques and requirements as they apply to building construction.

Specialty Content

Combines building construction with the design of reinforced concrete and structural steel.

Length of Specialty

5 months

Career Potential

Students may find employment in engineering offices with specialty concerns dealing with reinforced concrete and structural steel.

Electrical/Electronics

Appliance Repair

The Program

Appliance repair training includes the service and repair of domestic stoves, microwave ranges, dishwashers, washing machines, food waste disposers, water heaters, freezers, refrigerators and air conditioners.

Program Content

Trade tools and procedures
Electrical
Cooking appliances
Mechanical devices
Laundry appliances
Freezers, refrigerators and room air conditioners
Dishwashers and food waste disposers
Basic requirements for refrigeration and air conditioning
Water heaters
Solid state control of appliances
Test and measurement
Public relations
Portable appliance repair

Length of Program

10 months

Prerequisite

Grade 10. Must have a good working knowledge of the English language.

Career Potential

Employment opportunities may be found with department stores, major appliance stores and appliance servicing shops which deal with electro-mechanical processes. Many graduates have successfully started their own businesses.

Diesel Electrical Power Mechanics

The Program

Provides thorough understanding of the electro-mechanical skills which are necessary for entry-level employment and advancement into the various areas of electric power production.

Students are provided with the necessary basic theory and practical knowledge to assist "power production mechanics" who control and maintain diesel-electric generating units. They are taught how to start diesel and other related systems, adjust controls, observe instruments and warning lights to ensure proper functioning, and record data on log sheets. Students learn to open, close and tag electrical circuits, and report any malfunctions to the controller. They inspect equipment at regular intervals and attend to routine servicing duties such as adjusting, repairing, cleaning, oiling and greasing and become versed in using all power and hand tools.

Program Content

Mechanical (3 months)
Shop safety
Shop equipment and procedures
Engine bather
Welding
Automotive engines
Diesel engines and support systems
Governors
Operation and Maintenance

Electrical (5 months)
Electrical theory
AC and DC motors and generators
Electrical drawings
Automated systems
Voltage regulators
Governors
General knowledge
Power-plant operation and maintenance
Industrial plant operations
Control and instrumentation

Length of Program

8 months

Prerequisite

Grade 12 required. Students with prior Diesel/Heavy Duty Mechanics training may receive credit for previous training and/or experience.

Career Potential

Opportunities for employment may be found in plant operation. Potential employers include federal and provincial governments, hydro corporations, hospitals, mines, remote communities, airports, and companies which design, build and install complete assemblies.

Electrical*

The Program

Students are prepared for entry-level employment in the electrical trade. Basic theory and related information along with hands-on shop practice will enable the development of competence to perform all basic electrical tasks. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Program Content

Describe safe work practices
Apply the Canadian Electrical Code
Use electrical hand tools
Use electrical power tools
Identify common wiring installation materials
Install conductors, cables, raceways and boxes
Install lighting, switches and receptacles
Install simple motor controls
Construct simple three wire circuits

Length of Program

A full-time student may complete the Electrical program in as little as 30 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Work may be found in residential, commercial and industrial sites with contracting firms or with any one of the resource industries.

Electronics

The Program

Electronics training will provide the graduate with the skills to construct, install, maintain, analyze and troubleshoot electronics equipment and circuits. Students will learn the use of tools and test equipment; repair, adjust and test communication, audio and video systems; troubleshoot and interface microcomputer systems; and participate in more advanced analog and digital systems training.

Program Content

Level A
Fundamentals of electronics AC/DC theory
Safety in electronics
Tools for electronics
AC/DC theory circuits and network analysis
Measurement and instruments
Electro-magnetism and application

Level B
Semiconductor devices and theory
Characteristics of semiconductors
Power supplies
Oscillation
Amplification
Operational amplifiers
Communication circuits

Level C
Digital techniques and systems
Maintain digital circuitry
Maintain microprocessors and computers
Process technical information

Length of Program

39 weeks consisting of three 13-week levels.

Prerequisite

Level A — Grade 12 with Algebra 11; Level B — Completion of Level A* or pass assessment for Level A; Level C — Completion of Level B* or pass assessment for Level B. Good colour vision is required. *Students with previous training or a combination of work experience and training may receive credit for Level A or Level A and B. (Effective September 1, 1986 Algebra 12 and Physics 11 will be mandatory.)

Career Potential

This program trains graduates to undertake the installation, troubleshooting and repair of a variety of electronic equipment including microprocessors in the manufacturing and service departments of industrial and commercial establishments. A graduate would also be suitable to serve in the electronics sales field.

Power Engineering

The Program

Intensive training is provided in mechanical, electrical, instrumentation operation and maintenance procedures in all aspects of power plant and refrigeration operation. Instruction includes subject knowledge as well as practical application of knowledge in shop and steam laboratory projects, plus industrial plant visits. The course is approved by the Boiler and Pressure Vessels Branch with necessary credits for qualifying time for the Fourth Class Engineers Certificate of Competency for successful graduates.

Program Content

Fourth Class Power Engineering (certificate program)
Mathematics and applied science
Control and instrumentation theory/application
Sketching and blueprint reading
Workshop projects including repairs to plant equipment
Practical electricity
Welding
Basic machine shop practice
Boiler and steam plant operation

Length of Program

10 months

Prerequisite

Grade 12 with Algebra 11. Mechanical aptitude.

Career Potential

Career opportunities exist in production or processing plants such as oil refineries, sawmills, chemical plants, pulp mills, dairies, frozen food and fish packing plants, hospitals and other industrial operations. The opportunities for employment grow with each of four grades (4th, 3rd, 2nd and 1st) of certification which are approved by the Boiler and Pressure Branch for certificates of competency for successful graduates. Certification is inter-provincial.

Food and Hospitality

Baking

The Program

Training covers all aspects of the baking trade, including bread, cookies and special occasion cakes. Theoretical instruction will include safety, sanitation and hygiene, weighing and measuring techniques and devices, baking terminology, food handling and elementary management. The program's emphasis is on the theory and practical knowledge of basic commercial baking preparation.

Program Content

Food handling and storage
Sweet yeast production
Bread baking technology
Pies, cakes and flans
Cookies and petits fours
Sugar art work
Flowers of royal icing and marzipan
Analysis of materials and terms
Special occasion cakes including wedding cakes
Puff pastries
Buns and rolls
French pastries
Seasonal products
Plant safety factors; sanitation and hygiene
Elementary management
Operation of bakery machinery and use of hand tools
Customer relations

Length of Program

9 months

Prerequisite

Grade 10 or mature student. Applicants are required to present a recent medical certificate and proof of chest x-ray or TB test.

Career Potential

Employment opportunities may be found in large bakeries, hotels and restaurants, department stores, large food chain stores and small bakeries. Many graduates have successfully started their own businesses.

Professional Cook Training

The Program

Cook training covers all areas of short order, institutional, a la carte and banquet cooking. Students are trained to plan menus, prepare and present foods attractively, cook in quantities, bake and manage kitchen activities.

Program Content

Level 1 — Short Order Cook/Short Order Lab 1–5 Weeks
Salad; sandwich; grill; sanitation (must pass Burnaby Health Dept. Food Handlers' Certificate); safety; broiling; basic soup; basic dessert; roasting; gravies; garnish; seafood; breakfast cooking; basic vegetable; microwave use; poultry and meat identification; principles of cooking; service preparation; salad bar.

Lab 1 — Practical — 10 Weeks
Short order Lab 1 in short order kitchen and Culinaire Dining Room.
5 weeks — 06:00–13:00
5 weeks — 12:00–19:00

Training in Industry — 5 Weeks
With Instructor supervision.

Level 2 — Institutional Cook/Cafeteria and Institutional Lab 2–5 Weeks
Vegetables; poultry; sauces; seafood; soups; stocks; meat, poultry and fish cutting; salads; fancy sandwich; meat cooking; basic desserts and pastry; meat identification; sanitation; receiving and storing; daily records; basic menu construction; salad bar; service preparation.

Lab 2 — Practical — 10 Weeks
Institutional Lab 2 practical in cafeteria kitchen.

Training in Industry — 5 Weeks

Level 3 — A La Carte and Banquet Cook
A La Carte and Banquet — 5 Weeks.

Vegetables; soup; meat; poultry; seafood; sauces; buffet advanced work; pastry; yeast; cakes; advanced desserts; basic kitchen management; veal, pork and lamb cutting; storeroom control; banquet service; garde manager; ice carving; beef fat sculpture; curing and marinating; pates; terrines; galantines; a la carte cooking; buffet; banquets.

Production A La Carte Banquet Hot and Cold Kitchen — 5 Weeks
A la carte/banquet Lab 3 practical in Culinaire Dining Room kitchen.

***Storing, Receiving, Purchasing and Basic Management* — 10 Weeks**
Practical in storeroom.

Length of Program

15 months consisting of 3-5 month levels

Prerequisite

Good health, a high standard of personal hygiene and the ability to stand and walk as required during busy periods. All applicants are required to present a Health Certificate as required by the Department of Health for the handling of food, and proof of a recent TB test.

An examination may be taken by anyone who has had industry experience or High School Career Preparation courses. Full credit will be given on the successful completion of the examination.

Level1 — Grade 10 or mature student.

Level 2 — Successful completion of Level 1 or challenge exam for Level 1.

Level 3 — Successful completion of level 2 or challenge exam for Level 2.

Note: The Professional Cooking program has three levels of instruction. Students must make application to all levels desired. Students are not guaranteed entry into the next level of training, and breaks in training could occur due to late applications, insufficient space in the next level or unsuccessful completion of previous level.

Retail Meat Processing

The Program

The meat processing course is designed to teach the many aspects of meat cutting and provide an environment in which students can be exposed to the efficiency, effectiveness and economics of current meat merchandising in preparation for employment. The training centre is well equipped with power machinery and the necessary meat cutting accessories. Maintenance, sanitation and proper care of equipment are stressed, and principles of safety are observed and practiced at all times. An introduction to merchandising and basic shop management is also provided through practical experience. Students are encouraged to take pride in their work for personal satisfaction and for good consumer relations. On-the-job training in industry for two weeks gives exposure to the retail meat industry which is very beneficial.

Program Content

Level 1 — Primary meat cutting provides training for persons who wish to seek employment in packing house locker plants or related fields. It provides sufficient meat cutting basics for those who have shown the necessary ability and potential for further advanced training.

Level 2 — Advanced meat cutting provides training oriented toward making students more readily employable in retail meat outlets.

Safety
Sanitation in the work area
Personal and equipment hygiene
Wholesale and block-ready primals
Retail block-ready cuts
Processing freezer orders
Service meat case merchandising
Self-service meat case merchandising
Processing poultry, pork, lamb, veal, fish and beef
Receiving
Basic management and all aspects of meat cutting
Use and carfe of equipment and hand tools
Customer relations

Length of Program

6 months (Level 1 — Primary Meat Cutting 3 months — Level 2 — Advanced Meat Cutting 3 months)

Prerequisite

Grade 10 or mature student. Applicants are required to present a recent medical certificate and proof of recent chest x-ray or TB test.

Career Potential

Following graduation from the retail meat processing course, students may find employment in packing houses, block-ready shops, locker plants and small butcher shops; the more successful students may be employed in supermarkets.

Retail Meat Wrapping

The Program

This program provides training for persons who wish to seek employment in packing houses, locker plants, retail meat shops and related fields. It provides sufficient meat wrapping knowledge and experience, making students more readily employable in the meat industry.

Program Content

Safety and sanitation
Health regulations
Personal hygiene
WCB regulations
Use of equipment
Housekeeping
Refrigeration factors (basic)
Meat wrapping
Customer contact
Meat identification
Shelf life and conversions
Culling and re-wraps
Case layout
Signage
Inventory (basic)

Length of Program

3 months

Prerequisite

Grade 10 or mature student. Applicants are required to present a recent medical certificate and proof of recent chest x-ray or TB test.

Career Potential

Upon successful completion of the meat wrapping program, students may seek employment in retail meat shops, delicatessens and other related shops.

Professional Restaurant Service

The Program

This program gives detailed instruction on how to serve food and beverages to guests in hotels, restaurants, dining rooms and clubs. Students are trained to work confidently in formal and informal settings. Instruction is given in the performance of proper sanitation procedures, rules of service and etiquette, table setting, presenting menus to guests and suggesting food courses and appropriate wines. Students will also be trained to identify and operate bar equipment, carve meat and prepare flaming dishes at table, select and serve wine or alcoholic beverages to guests and to perform cashier duties.

Program Content

Level 1 — Coffee Shop and Family Restaurants

Communications
B.C. Food Handlers Card
Safety
Identification of basic tableware and equipment
Setting of table for service
Setting and maintaining the dining room
Closing duties
Menu product knowledge
Menu presentation
Menu terminology
Selling techniques
Taking guest orders
Food serving
Liquor regulations
Alcoholic beverage classification
Interpretation of the wine menu
Principles and methods of cooking
Familiarization of food preparation (time in kitchens)

Guest check preparation
Handling cash
Reservations, greeting and seating of guests

Level 2 — Classical Dining Service

Identification of career opportunities
Knowledge of your establishment and city
Identification of employer/employee responsibilities
Survival first aid
Fire safety
Loss prevention and security
Food storage
Basic food chemistry
Mise en scene
Identifying basic tableware and equipment
Mise en place
Merchandising
Menu planning
Active selling
Russian service
French service
Gueridon service
Banquet service
Origins of spirits
Origins of wines
Basic mixology
Wine selection and service
Flambe beverages
Basic food chemistry
Garde manger
Hot kitchen
Classical desserts
Food and beverage control
Hospitality law
Electronic cash register operation
Performing hosting duties
Supervisory duties

Length of Program

Level 1 — 10 weeks
Level 2 — 10 weeks

Prerequisite

Good health, a high standard of personal hygiene and the ability to stand and walk as required during busy periods. All applicants are required to present a Health Certificate as required by the Department of Health for the handling of food, and proof of a recent TB test.

A prerequisite to Level 2 is successful completion of Level 1 or extensive experience equivalent to that standard.

Please note: The Professional Restaurant Service program has two levels of instruction. Students must make application to both levels if desired.

Students are not guaranteed entry into the next level of training, and breaks in training could occur due to: 1. late applications; 2. insufficient space in the next level; 3. unsuccessful completion of previous level.

Career Potential

Restaurants, coffee shops, dining rooms, hotels, motels, private clubs and tourist resorts.

Sausage Making and Smoked Meats

The Program

The manufacturing of sausage and smoked meats for wholesale and retail stores and delicatessens is a highly specialized skill. Training is designed to prepare graduates for employment by teaching all aspects of sausage making. Students are taught to use machinery and hand tools in the sausage making process in a well-equipped training centre with smokehouse and sausage making equipment. Maintenance of sanitation and proper care of equipment are stressed, and principles of safety are observed and practiced at all times. An introduction to merchandising and shop management is also provided. Students are encouraged to take pride in their work for personal satisfaction and for good customer relations.

Program Content

All aspects of sausage making and smoked meats
Use and care of equipment and hand tools
Sanitation in the working area
Personal and equipment hygiene
Safety practices
Introduction to merchandising and shop management
Customer relations

Length of Program

8 months

Prerequisite

Grade 10. Mature students who do not meet the educational requirements may have related work experience assessed. Good health and physical ability are required, along with a determination to succeed. Applicants are required to present a recent medical certificate and proof of recent chest x-ray or TB test.

Career Potential

Graduates of the Sausage Making and Smoked Meats program may obtain employment in supermarkets, independent butcher shops, sausage making shops, delicatessens and packing houses.

Horticulture

Forestry Crewperson

The Program

Forestry crewperson students are taught both theory and practical skills (emphasis is on practical field work) required by the forestry industry. Students will learn forest regeneration, survival and pre-juvenile spacing, site preparation and cone collection, and will acquire the skills necessary to use all power tools, hand tools and mechanical equipment required for clearing, spacing and planting. Recognition of the common insects and diseases and undesirable species, concluding with the pesticide application control program, is all part of the intensive training provided.

Program Content

Site preparation
Forestry division organization
Intensified forestry
Regeneration, survival and pre-juvenile spacing surveys
Traversing
Power chain saw safety and maintenance
Maintenance of personal physical condition
Cone collection
Tree planting
Exposure to common insects and diseases and recognition of problem areas
Mechanical juvenile spacing
Undesirable species control techniques
Survival first aid course
Pesticide application course

Length of Program

5 months

Prerequisite

Grade 10. Excellent physical condition is essential. Must have a good working knowledge of the English language.

Career Potential

Forestry crewperson training provides you with the opportunity to work outdoors for others or of becoming a contractor yourself. Opportunities exist for employment with federal and provincial governments, large forest companies, industrial research companies and many private companies.

Greenhouse and Nursery Worker*

The Program

Training will prepare students for entry-level employment as greenhouse and nursery workers. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing all basic greenhouse and nursery work.

Program Content

Identify plants
Propagate plants
Select nursery site
Select structures for growing
Operate environmental control systems
Select specialized equipment
Schedule crops
Grow field stock
Grow container stock
Grow greenhouse crops
Protect plants
Grade and pack nursery stock
Develop business awareness

Length of Program

A full-time student may complete the Greenhouse and Nursery program in as little as 26 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete, if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Successful graduates may find employment with established garden centres, greenhouses or nurseries. There is also good potential for self-employment.

Landscape Maintenance*

The Program

Students are prepared for entry-level employment as landscape maintainers. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing all basic landscape maintenance.

Program Content

Identify plants
Improve soil
Drain and irrigate
Use specialized equipment
Install turf
Maintain turf
Maintain plants
Protect plants
Plant displays
Estimate costs
Schedule work
Develop business awareness

Length of Program

A full-time student may complete the Landscape Maintenance program in as little as 26 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Successful graduates may find employment with established landscape maintenance firms, garden centres, nurseries, parks boards and with municipal and provincial ground crews. There is also good potential for self-employment.

Tree Trimmer

The Program

This is a practical hands-on course dealing with operations, maintenance and safety of tree trimming and climbing.

Program Content

Chainsaw operation
Survival first aid
Chipper operation
Ground safety
Falling and bucking
Boom truck operation
Climbing
Live wire operations
Pruning
Roping, topping for limb removal
Rescue

Length of Program

20 days

Prerequisite

Applicants should have a minimum of two months experience in tree trimming or be graduates of the Forestry Crewperson program for safety reasons.

Career Potential

W.C.B. Survival First Aid certification. Successful completion of the propram plus 1200 hours of supervised climbing and trimming near energized lines entitles trainees to write an examination for joint certification by B.C. Hydro and Western Utility Arborists Association. This certification is often required for employment with B.C. Hydro or with contractors who work for B.C. Hydro.

Special Equipment

Students should bring their personal rain gear, climbing boots, and personal safety gear (hard hat, eye/ear protectors, slash pants). Students need standard lineman's boots. Chainsaws should be brought by each student.

Mechanical

Auto Body Repair*

The Program

Training will prepare students for entry-level employment in the auto body repair trade. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing all basic auto body repair. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Program Content

Describe safe work practices
Use special hand tools
Use special power tools
Set up shop equipment
Operate welding equipment
Control and shape sheet metal
Paint minor surfaces
Describe auto body construction
Evaluate damage
Repair major structural components
Repair seats and soft body components
Repair body components
Describe and identify powertrains
Remove and replace specified automotive systems and accessories

Length of Program

A full-time student may complete the Auto Body Repair program in as little as 30 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Students may find employment opportunities with production, custom and independent body shops.

Auto Body Refinishing*

The Program

Training will prepare students for entry-level employment as automotive refinishers and spray painters. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing basic automotive refinishing techniques. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Program Content

Select respiratory protection equipment
Analyze paint finishes
Use hand tools
Use power tools
Mask surfaces
Use pre-cleaners and conditioners
Use filler materials
Use undercoats
Set up refinishing equipment
Use topcoats
Use rubbing compounds
Perform pre-delivery clean-up
Perform selected repairs

Length of Program

A full-time student may complete the Auto Body Refinishing program in as little as 28 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Employment opportunities may exist in auto body shops as well as industries involved with truck or appliance manufacturing, plus many related trade areas. Successful graduates may also eventually start their own businesses as refinishers.

Automotive Mechanics*

The Program

Training will prepare students for entry-level employment in the automotive trade. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing basic automotive maintenance. Upon successful completion of the program, students may wish to work toward a journeyed status in the trade by seeking employment as an apprentice.

Program Content

Service wheels, hubs and tires
Service brake systems
Service suspension systems
Service steering systems
Service engine components
Service cooling systems
Service electrical systems
Service fuel delivery systems
Service emission control systems
Engine analysis, troubleshooting and tune-up
Service transmissions
Service drives and drive shafts

Length of Program

A full-time student may complete the Automotive Mechanics program in as little as 32 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Graduates may commence an apprenticeship or obtain employment in service stations. Employment opportunities also exist with automobile accessory stores, as service and sales representatives, or graduates may choose to be self-employed.

Commercial Transport Mechanics*

The Program

Training will prepare students for entry-level employment as commercial transport mechanics. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing all basic mechanic maintenance for commercial vehicles. Upon successful completion of the program, students may wish to work toward a journeyed status in the trade by seeking employment as an apprentice.

Program Content

Describe safe work practices
Lift and block vehicles
Start, move and shut down selected vehicles
Hydraulic systems
Steering systems
Frames, suspensions and attachments
Hydraulic brake systems
Air brake systems
Air operated controls and accessories
Batteries and electrical circuits
Perform basic oxyacetylene cutting and heating operations

Length of Program

A full-time student may complete the Commercial Transport Mechanics program in as little as 30 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Employment opportunities may exist in specialty truck repair shops and bus fleet yards.

Computer Numerical Control (CNC) Machine Operator

The Program

The purpose of the program is to train students to operate CNC machines. Training is designed for machinists and other trades wishing to upgrade their skills in the operation of CNC equipment. Students must demonstrate ability to use conventional shop equipment before being trained to operate and program CNC equipment. Although training provides students with a basic background in the production of CNC programs, it is not intended to produce CNC programmers. The learning tasks involving programming only provide the operator with sufficient background to produce simple programs, and to edit existing CNC programs.

Program Content

Describe computers
Describe basic NC and CNC programming
Use CNC equipment
Process technical information

Length of Program

14 weeks

Prerequisite

Students should have a machinist or other trade certificate or 4th year apprenticeship or have equivalent demonstrated capability in the following areas: safe work practices, mathematical problems — machine shop geometry, angles, read and interpret drawings and use precision measuring instruments.

Career Potential

CNC machine operation is a high technology process. This precision method of machine operation has a variety of applications in machine shops, the aircraft industry, signmaking, shipwrighting and furniture production. Any piece of equipment with free-form flowing lines, precision, or where patternmaking is used, will make use of CNC machine operation.

Compressed Natural Gas/Liquid Petroleum Gas Installer (CNG/LPG)

The Program

Training will prepare individuals in the motor vehicle industry to install and service CNG/LPG conversions and accessories. Theory and related information along with shop practice will develop competence, so students may immediately seek employment in this specialized area.

Program Content

Safety
Basic test equipment
Characteristics of CNG/LPG
Engine and ignition requirements
CNG/LPG components
Installation
Refuelling
Tune-up
Troubleshooting

Length of Program

CNG — 30 hours — 5 days
LPG — 18 hours — 3 days

Prerequisite

Persons seeking entry into this course must show proof of journeyman status (certificate of apprenticeship or TQ acceptable) or have successfully completed a pre-entry evaluation. A CNG certificate of completion is required for the LPG portion.

Career Potential

Successful graduates may obtain employment in service stations, automobile accessory stores and motor vehicle manufacturers as service and sales representatives, or be self-employed.

Diesel Engine Mechanics*

The Program

Students are prepared for entry-level employment as diesel engine mechanics. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing all basic diesel mechanic maintenance. Upon

successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Program Content

Describe safe work practices
Lift and block engine assembly
Operate diesel engines
Service cylinder block assembly
Service cylinder head assemblies
Service engine systems
Service diesel fuel systems
Service electrical systems
Test and store engines
Remove and inspect engine drives

Length of Program

A full-time student may complete the Diesel Engine Mechanics program in as little as 39 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Graduates of this program may seek employment servicing trucks, ships and off-highway vehicles. Employers' businesses may include marine and power engineering, pipelines, pumping stations, mining, lumber industries and large construction companies.

Heavy Duty Mechanics*

The Program

Training prepares students for entry-level employment as heavy duty mechanics. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing all basic heavy duty mechanical maintenance and repair. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Program Content

Describe safe work practices
Lift and block heavy equipment in shop and field
Start, move and shut down selected equipment
Use hydraulic hoses and fittings
Maintain hydraulic equipment
Maintain braking systems
Maintain power trains
Service bearings and seals
Service track machine undercarriages
Service track machine final drives
Service track machine steering systems
Service wheel machine suspensions
Service tires
Service wheel machine final drives
Service wheel machine steering and front suspensions
Service working attachments
Service gas and diesel engine support systems
Service electrical systems and components
Service winches, hoists, cables, clamps and sheaves

Length of Program

A full-time student may complete the Heavy Duty Mechanics program in as little as 30 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Employment opportunities may be found with logging companies, heavy equipment repair shops, mines and municipalities.

Inboard/Outboard Mechanics*

The Program

Students are prepared for entry-level employment as inboard/outboard marine mechanics. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing basic inboard/outboard maintenance. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Program Content

Marine electrical system
Outboard engine support systems
Outboard engines
Outboard gearcase
Inboard engine support systems
Inboard engines
Outdrives
Inboard propulsion systems
Tilt and trim systems
Remote control systems
Rig a boat for an outboard motor

Length of Program

A full-time student may complete the Inboard/Outboard Mechanics program in as little as 32 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Employment opportunities may exist with marinas, shops which service and repair motors, department stores and a variety of private and public operations employing their own servicepersons and mechanics.

Machinist*

The Program

Training will prepare students for entry-level employment in the machinist trade. Basic theory and related information along with

hands-on shop practice will enable students to develop competence in performing all basic operations needed to make industrial parts and components. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Program Content

Describe safe and acceptable work habits
Use measuring tools
Solve problems using machinery's handbook
Apply heat treatment
Use drilling machine
Use contour bandsaw
Use shapers, planers and slotters
Use lathes
Use precision grinders
Use vertical and horizontal milling machines
Describe the fundamentals of NC and CNC
Build a project

Length of Program

A full-time student may complete the Machinist program in as little as 42 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Opportunities for employment may exist in machine shops in shipyards, mills, technical laboratories, hospitals, wire rope works and aircraft industry.

Millwright*

The Program

Training will prepare students for entry-level employment in the millwright trade. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing basic millwright duties.

Program Content

Safety practices and procedures
Hand tools
Measuring tools
Machine components
Millwright shop equipment
Install power drives
Machine installation
Basic pneumatic system and components
Basic fluid power systems and components
Material handling
Preventive maintenance
Mathematics

Length of Program

A full-time student may complete the Millwright program in as little as 38 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

There is a continuing demand for skilled millwrights. Graduates may find employment in pulp and paper mills, sawmills, refineries, chemical plants, mines, shipyards, and as independent jobbers.

Motorcycle Mechanics*

The Program

Training will prepare students for entry-level employment as motorcycle mechanics. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing work encountered in the motorcycle service industry. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Program Content

Identify and describe selected shop tools
Describe seal, gasket and bearing design and service
Describe two- and four-cycle top end theory and design
Perform two- and four-cycle top end service and rebuilding
Service electrical systems
Perform clutch service
Describe lubricating systems
Service power transmissions
Describe exhaust system design and maintenance
Perform crankshaft service
Service fuel delivery systems
Service final drives
Service brake systems
Service wheels and drives
Service frame and suspension systems
Perform selected service procedures

Length of Program

A full-time student may complete the Motorcycle Mechanics program in as little as 30 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Employment opportunities include working at motorcycle dealership service departments or motorcycle engine repair shops and parts or sales positions at all levels of this expanding industry.

Small Engine Mechanics*

The Program

Students are prepared for entry-level employment as small engine mechanics. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing basic small engine mechanical-related tasks. Upon successful completion of the program, students may wish

to work towards journeyed status in the trade by seeking employment as an apprentice.

Program Content

Describe the small engines trade
Use selected shop tools
Perform two- and four-cycle service and rebuilding
Service fuel delivery systems
Service diesel fuel injection systems
Service all types of recoil starters
Perform selected service procedures
Service electrical systems
Describe lubrication systems
Describe seal, gasket and bearing design and service
Service clutches and transmissions
Service hydraulic systems and components
Describe exhaust system design and maintenance
Develop business procedures
Sawfiling

Length of Program

A full-time student may complete the Small Engine Mechanics program in as little as 30 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Mechanics may find employment opportunities with department stores, construction firms, marinas, equipment rental shops, resorts, dealers in outboard motors and motorcycle shops.

Metal Working

Boilermaker*

The Program

Training will prepare students for entry-level employment as boilermakers (erectors). Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing basic vessel construction tasks. Upon successful completion of the program, students may wish to work towards journeyed status in the trade by seeking employment as an apprentice.

Program Content

Apply safe and acceptable work habits
Apply rigging
Use lifting equipment
Use specialized boilermaker tools
Apply oxyacetylene burning techniques
Arc weld
Fabricate and erect penstocks
Fabricate and erect tanks
Fabricate and erect boilers
Assemble and dismantle refinery components
Identify non-destructive testing (NDT)
Use fibreglass reinforced plastics (RFP)
Basic administration

Length of Program

A full-time student may complete the Boilermaker program in as little as 29 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Graduates may obtain construction and maintenance work in industrial and commercial plants dealing with steel fabricating, steam manufacturing, oil refining and chemical, petro-chemical, cement, atomic, fertilizer or water treatment. Breweries, sawmills, pulp and paper mills, hydro-electric facilities and many other industries and businesses also employ boilermakers.

Ironworker*

The Program

Training will prepare students for entry-level employment in the ironworking trade. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing basic ironworking activities. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Program Content

Describe safe work practices
Select ironworker hand tools
Select ironworker power tools
Arc weld
Fit structural shapes
Apply rigging
Use erection equipment
Erect steel structure and tower
Select reinforcing steel
Apply reinforcing steel

Length of Program

A full-time student may complete the Ironworker program in as little as 31 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Opportunities for employment may exist in pulp, mining, industrial and hydro-electric installations.

Sheet Metal*

The Program

Students are prepared for entry-level employment in the sheet metal industry. Basic theory and related information along with hands-on shop practice will enable students to develop competence in fabricating basic sheet metal products. Upon successful completion of the program, students may wish to work towards journeyed status in the trade by seeking employment as an apprentice.

Program Content

Safety
Select sheet metal
Mathematics
Seams and edges
Riveting
Soldering
Sheet metal hand tools
Sheet metal power tools
Sheet metal equipment
Sheet metal hand operated machines
Develop patterns using parallel line development
Develop patterns using radial line development
Develop patterns using triangulation
Construct a blowpipe
Construct a stainless steel project
Fabricate roofing projects
Welding

Length of Program

A full-time student may complete the Sheet Metal program in as little as 29 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Graduates may find employment in the construction and metal manufacturing industries and may specialize in design and layout or fabrication.

Steel Fabricator*

The Program

Training will prepare students for entry-level employment as steel fabricators. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing basic steel product fabrication methods. Upon successful completion of the program, students may wish to work towards journeyed status in the trade by seeking employment as an apprentice.

Program Content

Describe safe work practices
Read and interpret steel fabrication drawings
Make templates for shop construction
Fabricate projects
Clean and prepare surfaces
Use welding equipment
Develop patterns for shop construction
Use steel fabrication hand tools
Use steel fabrication power tools
Use steel fabrication shop equipment

Length of Program

A full-time student may complete the Steel Fabricator program in as little as 31 weeks, or less if credit is received for related previous training or experience. However, fee structures will allow for up to 12 months to complete if required.

Prerequisite

Grade 10 recommended. Must have a good working knowledge of the English language.

Career Potential

Employment opportunities exist in shipyards, with bridge and building fabricators, mining and logging industries and many custom fabrication shops.

Welding

The Program

This program is designed to develop the fundamental knowledge and skills required for initial employment in the welding industry. Technological developments in the industry demand that welders continually strive to update their welding skills to stay abreast of changes in machines, techniques and materials. Persons, with little or no welding background, are trained to meet recognized standards. It also offers a service whereby welders can be upgraded to obtain or renew various welding certificates to meet the requirements of "C", "B" and "A" welding levels.

Program Content

Level C
P1 Safe work practices
P2 Oxyfuel gas cutting
P3 Oxyacetylene welding and braze welding
P4 Shielded metal arc welding 1 (SMAW 1)
P5 arbon arc gouging — (AAC)
P6 Gas metal arc welding (GMAW 1)
Flux cored arc welding (FCAW 1)
RK1 Material handling
RK2 Blueprint reading 1
RK3 Welding metallurgy 1

Level B
P7 Shielded metal arc welding 2 (SMAW 2)
P8 Gas metal arc welding 2 (GMAW 2)
P9 Flux cored arc welding 2 (FCAW 2)
P10 Gas tungsten arc welding
RK4 Welding quality control and inspection procedures
RK5 Welding code standards and specifications
RK6 Blueprint reading 2
RK7 Welding Metallurgy 2

Level A
P11 Shielded metal arc welding 3 (SMAW 3)
P12 Gas Tungsten arc welding 2 (GTAW 2)
RK8 Metallurgy 3
RK9 Blueprint reading 3

Length of Program

Level C — Up to 7 months
Level B — Up to 4 months, depending on number of modules required
Level A — Approximately 2 months, depending on number of modules required

Prerequisite

Level C
Completion of Grade 10 recommended but an appropriate combination of work experience and education will be considered.

Level B
Students must have registered "C" welder status. Completion of Level B modules plus appropriate work experience will enable individuals to become registered B welders in British Columbia.

Level A
Students must have registered "B" welder status. Completion of level A modules plus appropriate work experience will enable individuals to become registered A welders in British Columbia.

Career Potential

The welding industry is carried on in diverse places such as fabricating shops, general repair shops, construction sites and mining, logging and oilfield camps.

Other Training Opportunities

Barber/Stylist

The Program

Current hair styles have created a demand for barber/stylists who are not only proficient, but who have the creativity to meet the personal grooming needs and desires of a wide variety of clients. Training is related to the care of hair, face and scalp. You will be taught how to cut, trim and style hair, using combs, brushes, clippers, shears, razors and dryers; shampoo hair, wave, curl, straighten and tint; and give other hair treatments such as permanent waving, setting, bleaching, colouring and rinsing. You will also learn to give facial and scalp massages. This program has been organized in cooperation with leading barber/stylists in the province as well as the B.C. Barbers' Association. Students are equipped with the necessary skills to enter employment as an apprentice barber/stylist. Following graduation and nine months' apprenticeship, students are eligible to write examinations and become journeyed in the barber/styling trade.

Program Content

Administration and introduction
Hygiene and sanitation
Honing and stropping
Shaping and styling
Scalp and hair treatments
Hairpieces and toupees
Cutting and colouring
Taper cuts
Personal and professional ethics
Instruments and implements
Shaving and facial massage
Shampooing and rinsing
Electricity and light therapy
Management and business administration
Science of barbering

Length of Program

9 months

Prerequisite

Grade 10 or mature student; recent medical certificate. A good working knowledge of the English language is essential. Persons must be 18 years of age to write the B.C. Barbers' Association exam.

Career Potential

Graduates of this program who have mastered the skills and have a pleasant manner can look forward to good employment opportunities in barbershops or hairstyling shops with the possibility of owning their own business after attaining journeyed status.

Basic Training for Skill Development (BTSD)

The Program

BTSD is designed to upgrade the knowledge and skills required for further training or employment. Training concentrates on developing those skills in which the student does not function effectively at the desired level. Skills previously mastered are recognized by the program. The program accommodates continuous entry of students and permits them to progress at their own rate, and is offered at the Maple Ridge campus only.

Program Content

Level 3 will prepare the student for entry into some skill programs and apprenticeship or for further basic training. Three main areas of study, communicative English, mathematics and vocational science, are taught to a grade 10 level.

Level 4 will prepare students for entry into apprenticeship or post-secondary programs. English, business or technical mathematics, basic chemistry, plus one of either physics, biology or chemistry are taught to a grade 12 level.

Length of Program

Level 3 — up to 18 weeks — grade 10 equivalent
Level 4 — up to 22 weeks — grade 12 equivalent

Preparation

Students must be at least 17 years of age and possess a good working knowledge of the English language. Students are also required to take pre-testing to determine appropriate level.

Career Potential

The program prepares students for entry into many apprenticeship programs as well as employment requiring a grade 10 or grade 12 equivalent.

Diamond Driller Helper

The Program

Diamond driller helpers assist qualified drillers to operate drilling equipment in rock and soil to facilitate blasting in mining or construction projects. They tap subsurfaces to explore the earth for mineral deposits, sample rock for suitability and seismic prospecting, as well as take core samples. Students are taught how to manipulate tools to connect, assemble and adjust equipment, and to handle air and water hoses, electric cable and drill bits as well as install drill bits. Students will also learn to position equipment to drill holes in specific locations, examine drill cutting or cores, and repair and maintain equipment. The program is intended to train persons not familiar with this industry to become proficient in the trade. It will equip successful graduates with the necessary skills to enter employment as a helper.

Program Content

Familiarization with Lonyear 38 drill
Transport, set up, operate and dismantle rigs
Supply pumps
Helicopter safety
Mechanical and electrical safety procedures
Welding
Hydraulics
Operate support equipment
Ecology's role in nature

Length of Program

5 weeks

Prerequisite

Grade 10 and a recent medical certificate showing good hearing and physical condition. The Mines Regulation Act requires individuals working at the mine face to be 18 years of age. Must have a good working knowledge of the English language.

Career Potential

Canadian drillers are in constant demand both in Canada and for foreign employment. Opportunities exist in most heavy industrial trades, mining, exploration companies, oil and mineral industries and related occupations.

Upholstery — Auto Trimmer

The Program

This program will prepare students for entry-level employment as automotive upholsterers. Basic theory and related information along with hands-on shop practice will enable students to develop competence in performing both basic and custom automotive upholstery work.

Program Content

Fire safety and first aid
General shop practice
Tools and equipment
Sewing machine operation
Button machine operation
Trim and hardware
Materials
Models and styles of automobiles
Door panels
Seats
Carpets — layout
Glass and sunroofs — cutting
Headliners — installation
Vinyl tops — fitting
Convertible tops

Length of Program

5 months

Prerequisite

Grade 10. Must have a good working knowledge of the English language.

Career Potential

Employment opportunities exist with automotive body shops, upholstery shops, auto seat cover centres and industrial upholstery trimming shops which specialize in a particular area of work, such as restoring car tops or custom work.

Upholstery — Custom Furniture

The Program

This program covers the theory and practical skills required by a custom furniture upholsterer. Students are taught how to use hand and power tools, layout, match materials, plus mark and cut to a particular design or style. Students learn the use of a sewing machine, cements, glues, buttons and tufting, and will also learn about estimating jobs and good business practices.

Program Content

Fire safety and first aid
Tools and equipment
General shop practice
Frames and styling
Layout and matching techniques
Marking and cutting
Sewing machine operation
Fabrication foam and felt
Cement, glues and solvents
Design and styling
Installation and fitting
Buttons and tufting
Estimating
Good business practice

Length of Program

5 months

Prerequisite

Grade 10. Must have a good working knowledge of the English language.

Career Potential

Employment opportunities may be found with furniture manufacturers, department stores, furniture refinishing and recovering firms. Many graduates have started their own businesses.

Business Careers

Business Career programs are offered at the Institute's Maple Ridge campus only and include Accounting, Bookkeeping, Clerk Typist, Legal Stenography, Legal Typist and Stenography.

Career Options

Accounting

The majority of graduates from this program start as accounting trainees or clerks and may advance, with further training, to become accountants or office managers. Duties could include balancing books, compiling reports, maintaining accounts receivable and payable, handling cash transactions and preparing payrolls and financial statements. Transfer credits for accounting examinations may be obtained from professional accounting associations and some post-secondary institutions.

Bookkeeping

A demand exists for trained personnel to start as bookkeeping clerks or bookkeepers, who are able to balance books, compile reports, maintain accounts receivable and payable, prepare payrolls and handle cash transactions. With experience and proven initiative they may progress to become senior bookkeepers or office managers.

Clerk Typist

Clerk Typists may find employment in businesses ranging from large corporations to one-person offices. Positions, responsibilities and duties are varied. A day's work may include typing, answering routine correspondence, record-keeping and receptionist duties.

Legal Stenography and Legal Typist

Personnel qualified to work in lawyers' offices will find duties are varied and interesting. Graduates may find employment in a law firm, real estate or insurance company. Typing of legal documents for the conveyance of real estate, incorporation of a company, or winding up an estate are all part of a day's work. Duties may also include the preparation of the various steps to be taken in a civil law suit from lawyer/client consultation to final judgement.

Note: A Legal Stenographer possesses shorthand skills, whereas a Legal Typist does not. Both have machine transcription skills.

Stenography

Successful graduates of this option could find employment as junior secretaries. Upon demonstrated on-the-job performance, a secretary could advance to senior or executive secretarial levels. Stenographers have varied duties to perform during the course of a working day, such as taking dictation, typing, keeping records, replying to routine mail, performing receptionist tasks and making business appointments.

Word Processing

Word Processing is available as an elective module to all students who successfully complete their chosen option within the maximum course duration and who have a minimum proven typing speed of 50 wpm. In view of today's sophisticated equipment and technological advances, all students who meet this criteria are encouraged to avail themselves of word processing training.

Length of Program

Accounting	Up to 10 months
Bookkeeping	Up to 6 months
Clerk Typist	Up to 5 months
Legal Stenography	Up to 5 months
Legal Typist	Up to 5 months
Stenography	Up to 7 months

Extensions in all programs may be available as required (upon instructor recommendation). Students who show outstanding ability may complete their courses in less than the stipulated time.

Prerequisite

The following educational guidelines are recommended; however, an appropriate combination of work experience and/or education will be considered.

Accounting	Grade 12
Bookkeeping	Grade 12
Clerk Typist	Grade 10
Legal Stenography	Grade 12 Typing 50 wpm* Shorthand 80 wpm*
Legal Typist	Grade 12 Typing 50 wpm*
Stenography	Grade 12

*The standard required is completion of Level 3 Typing or its equivalent. Pre-testing may be required for admission to these programs.

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Continuing Education at BCIT

The Continuing Education Division provides training opportunities to more than 8000 students annually. This is job-related training designed for serious students who demand excellence from the Institute and themselves.

Consistent with increasing training opportunities while maintaining high standards, Continuing Education provides new job-related course offerings and up-to-date teaching materials at the Institute's Burnaby, Sea Island and Maple Ridge campuses.

For more information please contact:

BCIT
3700 Willingdon Avenue
Burnaby, B.C.
V5G 3H2
Telephone: 434-1610 or
434-5722
Telex: 04-356651

Registration

Registration for courses is on a first-come, first-served basis. Students wishing to register for any course being offered may do so at any one of the Institute campuses. Tuition fees are payable in full at the time of registration and can be paid by cash, cheque, money order or approved credit, Visa or Mastercard. When tuition fees are to be paid by the employer, written authorization on company letterhead must accompany the registration form.

School of Academic and Vocational Studies

Communication

Learning and Study Skills for Adults — 12 hours

Prepares adults to resume their vocational/academic education. Topics include how to study, how to write an examination, reading with understanding, use of reference materials and resources such as libraries, audio-visual aids, time management and communicating with instructors. Instruction will give adult students the competence and confidence necessary to successfully re-enter the learning world.

Applying for a Job — 6 hours

Beneficial to anyone looking for employment, but especially to those applying for their first job. Includes application forms, writing a good resume, pre-employment tests, proper appearance for an interview, the job interview. Upon successful completion of this course students will have the necessary preparation to seek employment.

Mathematics

Industrial Mathematics — Basic — 30 hours

Designed to strengthen basic math skills for such trades as carpentry, mechanical, millwright and welding. Lectures and homework problems cover basic operations (addition, subtraction, multiplication and division), fractions, decimals, metric system, square roots, ratio and proportion, percentage, measurement of length, area and volume. Prerequisite: Grade 8 arithmetic helpful, but not required.

Industrial Math — Advanced — 30 hours

A continuation of Industrial Math-Basic which introduces students to elementary algebra, geometry and trigonometry. The aim of this course is to give a grasp of practical mathematical methods adequate for the solution of elementary problems in mechanics, carpentry and the steel trades. An ideal refresher course for apprentices with weak mathematical backgrounds. Prerequisite: Industrial Math — Basic (or equivalent knowledge).

Computer Mathematics — 30 hours

Strongly recommended as essential background to digital electronics, microprocessors and assembly language programming. Simple examples and thorough explanations are used to develop the skills needed to understand computer architecture and advanced software applications. Topics include number systems and bases, signed numbers and two's complement notation, carries, overflow and flags, logical operations and shifting, multiplication and division, multiple precision, fractions and scaling, ASCII conversions, floating-point numbers. Demonstration of IBM-PC Assembly Language Programming is included.

Computer Mathematics For Business — 48 hours

Develops practical mathematical skills for business activities: bookkeeping, accounting and forecasting of trends. Hands-on computer training gives students employable skills in business mathematics and helps to reinforce abstract concepts. Topics include basic mathematics review, exponents and logarithms, progressions, simple interest, simple discount, computer modelling and simulation, introduction to business software. Prerequisite: Grade 12 Mathematics.

Math for Electricians — Part 1 — 60 hours

Designed to prepare students for a career in electrical work, this mathematics upgrade will strengthen the understanding of basic electrical concepts. Especially recommended to Electrical students about to enter their first year of apprenticeship studies in the electrical trade, coverage includes the fundamental electrical laws and their mathematical expression, algebra refresher, DC electricity and resistive circuit analysis.

Math for Electricians — Part 2 — 60 hours

Provides students with the mathematical background they need to understand AC electricity. This course is recommended to students about to enter their second year of apprenticeship studies in the electrical trade and to all others who are seeking a thorough understanding of AC principles. Prerequisite: Math for Electricians — Part 1 (or equivalent knowledge).

Math for Electronics — Part 1 — 60 hours

This course is the first of four math courses in the Electronics Technician Program and is City and Guilds of London certified. Provides students with the mathematical background needed for Physical Science and other First Year courses in the City and Guilds Program. Topics include arithmetic operations, algebra, direct and inverse proportionality, linear graphing, geometry and trigonometry, statistics. Prerequisite: Grade 12 Math.

Math for Electronics — Part 2 — 60 hours

A continuation of Math for Electronics — Part 1 in the City and Guilds of London Program which covers formulas, laws, analytical methods, exponential rates of change, trig functions, intermediate statistics, binary arithmetic and Boolean Algebra. Prerequisite: Math for Electronics — Part 1.

Math for Electronics — Part 3 — 60 hours

The City and Guilds certified follow-up course to Math for Electronics — Part 2, this course equips students to handle the mathematical details in Third Year Electronics Technician courses. Includes non-linear graphing, applied differential and integral calculus, advanced trigonometry and statistics. Prerequisite: Math for Electronics — Part 2.

School of Computing and Electro-Mechanical Studies

Aviation

Aircraft Drafting — Introduction — Level 1 — 30 hours

Includes aircraft drafting terminology, drafting skills, linework and use of instruments, lettering and lettering sets, plane and descriptive geometry, orthographic projection using logic, auxiliary views, sections and conventions, pictoral views, dimensioning and scale, plus detail and assembly drawings. Aircraft maintenance mechanics and engineers, as well as others with a keen interest in the aerospace industry, will find this course valuable.

Aircraft Drafting — Introduction — Level 2 — 30 hours

A continuation of part 1. The successful completion of parts one and two of this program provides the preparation to enter the aircraft drafting industry; a certificate attesting to this achievement will be awarded.

Aircraft Electricity — Basic — 30 hours

Of assistance to potential or working aircraft maintenance engineers who work on light aircraft. Students will become competent in the performance of basic electrical tasks and will receive sufficient knowledge to enter the avionics field. This course is a prerequisite for Basic Avionics and Aircraft Instruments.

Aircraft Instruments — Basic — 30 hours

Persons interested in knowing how to overhaul aircraft instruments, as well as those wishing to upgrade their knowledge of aircraft instruments and related systems will find this training of practical value. General aircraft instruments — such as radios, compasses and oxygen systems are reviewed. Prerequisite: Basic Avionics or Basic Aircraft Electricity (or equivalent knowledge) recommended.

Aircraft Maintenance Engineer's Upgrade to B Licence — 36 hours

Licensed aircraft maintenance engineers who intend to write the Ministry of Transport examination for a category B endorsement will receive detailed theoretical instruction on material on wood structure, welded steel structure, stressed skin structure, fabric covering, corrosion control, material identification and non-destructive testing.

Aircraft Maintenance — Introduction — Level 1 — 36 hours

Designed for the aircraft mechanic, aircraft maintenance engineer, aircraft and helicopter pilots. Students awaiting entry to the Institute's full-time aircraft maintenance program will also find this valuable. Presents the theoretical background of associated systems and knowledge of accepted aircraft maintenance practices.

Aircraft Maintenance — Introduction — Level 2 — 36 hours

A continuation of Introduction to Aircraft Maintenance — Part 1, designed for aircraft mechanics, potential aircraft maintenance engineers, aircraft and helicopter pilots. Students awaiting entry to the Institute's full-time aircraft maintenance program will also find this valuable. A certificate is awarded upon successful completion.

Aircraft Sheet Metal — Basic — 30 hours

Training in basic aircraft structure, sheet metal structural material, sheet metal layout and forming, bend allowance, fabrication, compound forming and curving metal provides students with practical knowledge of aircraft repair and maintenance. Examines the applications of sheet metal to aircraft through hands-on training at the Institute's Sea Island hangar.

Aviation Storesperson — 30 hours

Persons currently involved with aviation parts and equipment receive advanced instruction about the operations of a stores department, and the handling of sophisticated aerospace equipment. A broad understanding of basic parts and inventory control will be gained, thus providing competent aviation storespersons.

Avionics — Basic — 30 hours

Provides a good working knowledge of avionics equipment. The course builds on the foundation of electronics and expands students' horizons into the realm of avionics. Prerequisite: The Basic Aircraft Electricity course or equivalent experience.

Gas Turbine — Basic — 36 hours

Anyone who wants to know how a gas turbine engine works will find this course, which includes a field trip to the gas turbine engine overhaul facilities at CP Air, informative. It is presented in technical language understood by all students. Potential students for this program include aircraft maintenance engineers, students awaiting entry to the Institute's full-time aircraft maintenance engineer program, aircraft mechanics, pilots and owners, diesel mechanics.

Ground School for Commercial Pilot's Licence — 30 hours

Training in this advanced course prepares students to write the Ministry of Transport examination for a commercial pilot's licence (students must have a private pilot's licence and the specified amount of flying hours before writing the examination.) Meteorology, aircraft engines and airframes, air navigation techniques, aerodynamics, the theory of flight, instruments and electronic navigation, airmanship and air regulations are examined.

Ground School for Private Pilot's Licence — 30 hours

Prepares students to write the Ministry of Transport examination for a private pilot's licence. The course also serves as an excellent introduction for those wishing to gain an understanding of aviation theory. Aerodynamics, aircraft engines and airframes, air regulations and air traffic control, air navigation and flight planning, meteorology, radio systems, communications and medical factors of flight are examined.

Ground School for Advanced Private Pilot's Licence — 18 hours

Designed for persons who have completed the basic private pilots' ground school course or those preparing to write the Ministry of Transport Private Pilots' Licence. Also serves as preparation for the Ground School for Commercial Pilots' Licence course. Offers in-depth study of meteorology, navigation, air regulations and airmanship in co-operation with the aviation and aerospace industries.

Ground School for Ultralight Pilot's Licence — 30 hours

Prepares students to write the Ministry of Transport examination for an ultralight licence and is similar to the Ground School for Private Pilot's Licence course. Emphasises those areas specifically pertinent to ultralight aircraft operation: aerodynamics, air frames, navigation, meteorology, air regulations, airmanship and the theory of flight, as they pertain to the operation of ultralight aircraft.

Air Regulations — 30 hours

Designed for aircraft maintenance engineers or potential engineers who wish to learn the correct procedures for certifying aircraft products and repairs. Theoretical instruction is given in aeronautics Acts, air regulations and air navigation orders. The engineering inspection manual is reviewed extensively. Upon successful completion students will have obtained a sound knowledge of correct certification procedures for the aircraft industry.

Light Aircraft Reciprocating Engines — 30 hours

For engineers and pilots who wish to upgrade their knowledge of aircraft engines or perform their own repairs and maintenance. Includes hands-on instruction using reciprocating engines on small aircraft, and classroom lectures. Stresses rules and regulations pertaining to owners and operators working on aircraft engines.

Introduction to Helicopter Maintenance — 36 hours

Designed to satisfy the basic needs of helicopter mechanics, this course will be an asset to all pilots and owners, as well as students awaiting entry to the Institute's full-time aircraft maintenance program. Presents theoretical background of associated systems found in helicopters and teaches acceptable maintenance practices.

Ultralight Aircraft Maintenance — 30 hours

Designed to provide owners or pilots involved with the fast-growing ultralight recreational aircraft industry with the experience necessary to maintain and repair ultra light engines and airframes. Instruction includes airframe structure, metallurgy of metal alloys, non-destructive testing, shop practice and tools, flight control systems and the theory of flight.

Aviation Welding — Basic — 36 hours

Introduces students to aviation welding — tungsten inert gas (TIG), stainless steel and aluminum welding. Of interest to the certified mechanic as well as the aircraft maintenance engineering student. Focuses on cyber TIG (pulsed current gas tungsten arc welding) as it applies to the aircraft industry. Includes equal portions of theoretical and practical instruction.

Computers

LOGO For Elementary School Teachers — 12 hours

Learn how to integrate computers with other forms of instruction in the classroom. Introduces LOGO as a programming language and shows how to write simple programs with interesting educational applications. This course features classroom instruction, hands-on training, a lecture on the future of computer assisted instruction and a demonstration of state-of-the-art software developed at the Massachusetts Institute of Technology. This new software is designed to stimulate creative thought in both children and adults. Prerequisite: Introduction to Computer Operations (or equivalent knowledge).

Introduction To Computer Operations — 9 hours

Designed specifically for students who have no previous experience with computers. Using the Apple IIe computer system, students quickly master the basic keyboard skills and learn the "do's" and "don't's" of computer use. Hands-on instruction covers the disk operating system, use of peripherals, program execution, preparation of back-up copies, disk initialization and file transfer. Upon successful completion of this course, students are prepared for specialized computer courses in programming, project management, business applications and computer repair.

Fundamentals of Computer Programming — 30 hours

Develops basic programming skills which can be put to immediate use. Builds a solid foundation in structured programming which will be of long-term benefit to students in advanced courses and applications. Topics include print statements, embedded cursor commands, call numbers, screen formatting, input statements, counters and timing loops, conditional statements, subroutines, graphics-high and low resolution, sound generation, introduction to machine/assembly language. Prerequisite: Introduction to Computer Operations (or equivalent knowledge).

Microcomputer Systems Maintenance — Part 1 — 30 hours

This is the first of a two-part advanced course for those with a background in electronics which includes the use of test instruments and the ability to read electronic schematics. Upon successful completion of Microcomputer Systems Maintenance Part 1 and 2, students receive a MICROCOMPUTER SYSTEMS MAINTENANCE PROGRAM CERTIFICATE. Microcomputer Systems Maintenance Part 1 reviews analog/digital electronics, provides basic instruction in microcomputer architecture, presents troubleshooting methodology for sophisticated systems and offers hands-on training in advanced uses of test instruments. Students also practice soldering and desoldering of electronic components. Prerequisite: Electronics — Intermediate (or equivalent knowledge).

Microcomputer Systems Maintenance — Part 2 — 30 hours

A continuation of Microcomputer Systems Maintenance Part 1 in which the knowledge and skill developed in Part 1 are applied to the repair of the Apple 2 computer systems series. Students receive hands-on instruction in the repair of keyboards, disk drives, controllers and monitors. Software aids to fault diagnosis are demonstrated. Upon successful completion of the Microcomputer Systems Maintenance Program, students will have obtained the repair skills for the Apple II and related computers and will recive a MICROCOMPUTER SYSTEMS MAINTENANCE PROGRAM CERTIFICATE. Prerequisite: Microcomputer Systems Maintenance Part 1.

Introduction to Computer Repair — 60 hours

For those with a limited knowledge of math and science. The course will enable successful students to repair common faults on microcomputer systems and assist them in deciding whether they have the aptitude for a career in computer repair. Training includes a hands-on introduction to electronics and troubleshooting. Instruction covers systems architecture and operation, use of diagnostic software, repair of keyboards, disk drives and monitors. Prerequisite: Grade 11 Math and Science.

VAX Assembly Language Programming — 30 hours

For students who wish to improve their understanding of minicomputer operations and architecture. Instruction begins with a functional overview of the VAX minicomputer and a non-technical explanation of its highly sophisticated operating system. Topics include: terminal operation, log-on, log-off, system harware components, practice using the 10 DCL commands, program composition, inputting, compiling, debugging, linking and running programs in macro. The instructor will assist students to write programs suited to their interests and needs. Prerequisite: 3 months exposure to a computer system or computer programming course and high school algebra. Students lacking this background are advised to enroll first in Computer Mathematics Grade 11 Math and Science.

Introduction to Microcomputers for Business — 15 hours

For managers interested in computerizing their offices and individuals with a keen interest in computerization of the business world. Participants will receive an overview of computer software and systems. Course content includes demonstrations of popular software packages: word processing, data base management, spreadsheets and accounting. Successful graduates will have an enhanced appreciation of the applications and limitations of microcomputers in business as well as hands-on experience with business software.

Microcomputer Technician — Part 1 — 120 hours

This course is Part 1 of a hardware-intensive, 360 hour microcomputer program designed to equip students with employable skills in microcomputer maintenance. Upon successful completion of all three parts, students recieve a MICROCOMPUTER TECHNICIAN PROGRAM CERTIFICATE. Microcomputer Technician Part 1 is primarily an electronics upgrading course to prepare students for computer specialization. Topics include: electrical circuits refresher; basic electronics: rectifiers, power supplies, transistors, thyristors, opto-electronics; digital circuits: logic functions, boolean algebra, circuit design and construction, specialized logic functions, logic families, number systems; digital test equipment: the oscilloscope, waveform measurements, characteristic-curve tracers, building a tracer, IC signature using a tracer, the logic probe, the logic tracer, the current tracer, the logic clip, the signature analyser. Prerequisite: Grade 12 or equivalent mathematics skills and a working knowledge of basic electrical circuits. Students lacking this background are advised to consult the Continuing Education department before enrolling.

Microcomputer Technician — Part 2 — 120 hours

In Microcomputer Technician-Part 2 students apply the skills developed in the preceding course to microcomputer systems. Provides a thorough explanation of microcomputer architecture adequate for the development of intelligent troubleshooting methods. Theory examines system power supply, main board, bus

structure, system clocks, video generation, I/O structure, the keyboard, peripheral devices, disk drives, the video monitor, the chip map. Specially designed lab projects help students to understand these topics. In the lab work students troubleshoot the main system components and develop a sound approach to troubleshooting microcomputer systems. Prerequisite: Microcomputer Technician Part 1, or relevant experience and consent of the Continuing Education department.

Microcomputer Technician — Part 3 — 120 hours

Microcomputer Technician-Part 3 completes the training offered in the Microcomputer Technician Program by introducing students to the fundamentals of computer programming as they are useful to technicians; by providing basic training in computer interfacing which is extremely important for customizing hardware applications in special installations; and for troubleshooting faults which resist solution by elementary methods. Topics include the resident monitor, using the monitor to locate problems, the resident basic interpreter, basic programming, writing diagnostic software, I/O devices as memory locations, accessing I/O with software, basic commands, I/O slots and game connector, hard-wired interface circuits, the programmable interface adapter, digital/analog interface circuits. Prerequisite: Microcomputer Technician-Part 2.

Artificial Intelligence and Expert Systems — 16 hours

This exploratory course introduces students to state-of-the-art computer applications which will soon have a profound effect upon how industry is organized and run. Lectures and demonstrations cover the computer as a learning and thinking machine, logical analysis of natural language, programming in LISP and PROLOG. Simple expert systems will be developed and demonstrated, including a system to assist technicians to diagnose microcomputer faults.

Computer Interfacing — 18 hours

Designed to equip students with skills for custom installation and specialized applications of computer systems, the course covers the main ways in which a microcomputer may be interfaced to the outside world. Topics include logical and physical device drivers, accessing devices through software, I/O slots and the game port, hard-wired interface circuits, programmable interface circuits, digital/analog interfacing. Hands-on training includes the construction of selected interface devices. Prerequisite: Introduction to Computer Repair (or equivalent knowledge).

Computer Terminal Operator — 18 hours

Prepares students for work as terminal operators using the Institute's VAX Minicomputer. Students learn how to log on and off terminals, how to use editors and simple word processing. They receive hands-on training in the use of the 10 DCL commands and are given an overview of minicomputer systems, their architecture, function and place in the modern world.

Computer Mathematics — 30 hours

The Computer Mathematics course is strongly recommended as essential background to digital electronics, microprocessors and assembly language programming. Simple examples and thorough explanations are used to develop the skills needed to understand computer architecture and advanced software applications. Topics include number systems and bases, signed numbers and two's complement notation, carries, overflow and flags, logical operations and shifting, multiplication and division, multiple precision, fractions and scaling, ASCII conversions, floating-point numbers. A demonstration of IBM-PC ASSEMBLER Language Program is included.

Computer Mathematics for Business — 48 hours

Develops practical mathematical skills for business activities — bookkeeping, accounting and forecasting trends. Hands-on computer training gives students employable skills in business mathematics and helps to reinforce abstract concepts. Topics include basic mathematics review, exponents and logarithms, progressions, simple interest, simple discount, computer modelling and simulation, introduction to business software. Prerequisite: Grade 12 Mathematics.

Microcomputer Communications — Part 1 — 12 hours

A hands-on introduction to the field of computer communications. Training begins with an overview of communications, including electrical, microcomputer and telecommunications hardware. Topics include terminals and microcomputers, I/O control, modems, transmission modes, data transmission standards, serial data transfer: RSC-232-C; parallel data transfer: IEE-488; modulation, data codes. Prerequisite: Grade 10 Math and Basic Electricity (Ohm's Law and schematic diagram interpretation).

Microcomputer Communications — Part 2 — 18 hours

A continuation of Microcomputer Communications-Part 1 in which students are taught the fundamentals of microcomputer architecture as they pertain to communications. Training covers the communications business structure, machine language basics, microcomputer/terminal interfacing, modern operation and repair. Prerequisite: Microcomputer Communications — Part 1 (or equivalent knowledge).

IBM-PC ASSEMBLY Language Programing — 16 hours

An ideal course for those wishing to understand IBM-PC architecture and for those requiring more control over the IBM-PC than is available from high level languages. After a review of number systems, classroom lectures cover 8088/8087 fundamentals and assembly language programming. With guidance and lectures from the instructor, students begin individual programming projects suited to their interests. Topics include the design of the 8088/8087 chips, co-processing on the IBM-PC, program transfer instructions, sub-routines, addressing modes, segmented memory and I/O, interrupts and strings, code macros, relation of assembly language to other computer languages. Prerequisite: Computer Mathematics (or equivalent knowledge).

Robotics and Expert Systems — 16 hours

An introduction to the programming techniques used in the development of an expert system for the control of an industrial or personal robot. Students will be taught how to write programs which learn and reason, and will develop simple programs for the control of a simulated robot.

Introduction to PROLOG — 16 hours

PROLOG is the new language of the Japanese Fifth Generation Project. It is ideally suited for non-numerical information processing and for representing human reasoning in the form of EXPERT SYSTEMS. This course introduces students to state-of-the-art programming methods and provides them with hands-on training in the use of PROLOG and individual assistance in writing PROLOG programs suited to their own needs. Topics include the nature, syntax and semantics, advantages/disadvantages of PROLOG, and introductory programming in PROLOG.

Introduction to LISP Programming — 16 hours

LISP is the primary language for artificial intelligence applications in North America. This course is intended to provide students with an elementary appreciation of the power and applications of this language. Hands-on training using the language is included.

Topics include: functional programming languages, syntax and semantics of LISP, advantages/disadvantages of LISP, examples of LISP programs, applications of LISP, the future of functional languages.

Computer Assisted Project Management — 30 hours

Demonstrates the methods and great benefits to managers of computer assisted management including reduced stress, better control, reduced cost and shortened schedules for projects. Upon successful completion of this course, students will be able to make effective use of project management software in business and industry. Emphasis is on applications within the construction industry. Topics include overview of project management software: PERT and CPM, system requirements, limitations and specifications; operation: menus and display, definition of parameters, start-up and execution, creation of new projects, time schedule display, project modification; course summary: final job description, print-out of summary report, saving the project on disk. Prerequisite: Experience with project management or job scheduling helpful.

Electrical

Electrical Code — Basic to Intermediate — 60 hours

This course is designed to give students a good working knowledge of the Canadian Electrical Code (except for high voltage). Upon successful completion, students will be prepared to write either Class C or Class B contractors license examination. Training is designed to ensure that installation work will meet Canadian Standards. Coverage includes the Electrical Safety Act, inspection authorities, contractor responsibilities, approval agencies, examination regulations and requirements. Code Topics include:

- Section 4 Conductors;
- Section 6 Services;
- Section 8 Demand and Loading;
- Section 10 Grounding;
- Section 12 Mining Methods;
- Section 14 Protection and Control;
- Section 16 Class 1 and Class 2 Circuits;
- Section 18 Hazardous Locations;
- Section 26 Installation of Equipment;
- Section 28 Motors and Generators;
- Section 30 Installation of Lighting;
- Section 32 Fire Alarm Systems;
- Section 42 Electrical Welders;
- Section 46 Emergency Systems and Unit Equipment;
- Section 62 Heating Systems;
- Section 68 Swimming Pools;
- Section 72 Mobile Homes;
- Section 78 Marinas and Yacht Clubs.

Prerequisite: Knowledge of wiring methods and terminology.

Electrical Code — Advanced — 60 hours

Training covers all sections of the current electrical code, with particular emphasis upon high voltage requirements. Instruction is designed to prepare students for writing the Class A contractors license examination. In addition to the material in Electrical Code-Basic to Intermediate, topics include circuit conductors: types, construction, shielding; termination: splicing, stress control, hazardous locations; switch gears: OCB, ACB, load break, horn gap, metal clad, metal enclosed; control and protection: HV fuses, fault current, current relays, ground detection; grounding: high pot test, ground mat, testing methods and equipment; maintenance: substation, vault, transformer, switches; pole construction: overhead line regulations, rigging methods, clearance requirements. Prerequisite: Journeyman level of knowledge and experience, three phase and high voltage experience recommended.

Electrical Code — High Voltage — 9 hours

A short course designed for students who already have a good background in the electrical code and who need specific upgrading to HV regulations and requirements. Coverage includes circuit conductors, cable termination, HV switchgear, protection, grounding and maintenance of HV installations. Prerequisite: Journeyman knowledge and experience.

Electrical Estimating — Basic — 16 hours

An ideal course for electricians who wish to become familiar with the procedures for estimating electrical work. Basic estimating concepts for small to medium jobs are taught. Specific topics include the fundamentals of estimating labour and materials cost, pricing and quotations. Prerequisite: Familiarity with electrical terminology and wiring methods.

Electrical Estimating — Intermediate — 16 hours

A continuation of Electrical Estimating-Basic in which students are taught the fundamentals of commercial and industrial estimating including analysis of request for quotation and bid documents, materials take-off from prints and schematics, labour costing, preparation of bid documents. Prerequisite: Electrical Estimating — Basic.

Electrical TQ — Part 1 — 39 hours

Electrical TQ-Part 1 is the first of a two-part program designed as a review/refresher of the electrical trade. Successful completion of this two-part program is adequate preparation for the Electrical TQ examination. Students desiring to write this examination are advised to confirm their eligibility before enrolling in the program. Electrical TQ-Part 1 topics include general trade knowledge: meggers, hydrometers, magnetic flux, series parallel circuits; transformers; motors, generators and alternators, motor control. Prerequisite: Journeyman level of experience in electrical work.

Electrical TQ — Part 2 — 36 hours

A continuation of Electrical TQ — Part 1 which rounds out the review/refresher of the electrical trade. Topics include measuring and test instruments, industrial electronics, electrical code. Prerequisite: Electrical TQ — Part 1 (or consent of department).

Climatic Controls — 24 hours

Climatic Controls covers theory, devices and installation methods for temperature and humidity controls in commercial buildings, schools, etc. The course is mainly concerned with an introduction to electronic circuits, components and their function in relation to the basic principles of design, operation and maintenance of heating, ventilating and air conditioning systems.

Fire Alarms — 9 hours

Persons interested in the installation, maintenance and troubleshooting of modern fire alarm systems will find that the practical approach to training in this course fulfills their requirements. Topics include detection devices and systems, circuit wiring and classification, staged systems, symbols, terminology and convections. Prerequisite: High school knowledge of electricity and some wiring experience.

High Voltage — Basic — 42 hours

Will enable HV installers, operators and maintenance personnel to perform their work safely and effectively. Hands-on training of HV cables is included. Topics include general concepts and terminology, switches and circuit breakers, protection and control, HV cables and terminations, medium voltage switchgear, HV fuses. Prerequisite: Journeyman level of knowledge and experience. The Continuing Education department reserves the right to deny admission into this course when a candidate's experience is inadequate for high voltage training.

High Voltage (Basic to Intermediate) — 45 hours

Course offers review of essential prerequisites: mechanical, electrical. High voltage definition: general, specific, rated levels, BIL; minimum HV terminology: interpretation of meaning, code relationships, causes of effects of HV phenomena, demonstrations and explanations; electrostatic stress: in theory and practice; HV cables and conductors: typical HV cables for distribution voltages, essential differences between HV and LV cables, essential differences when terminating, stress reduction principles, voltage ratings and insulation levels; HV cables and terminations: metallic shielding; use and misuse; shield grounding of HV cables through zero-sequence sensors: the correct way; the incorrect way; potheads and terminators: purpose, applications; fundamentals of

HV switches: horn-gap, disconnect, load-break; basic HV fuse knowledge: types, characteristics, applications; distribution switchgear, in common use: metal clad, metal enclosed, different features; different applications. Prerequisite: Journeyman level of experience in electrical work.

Lighting Basic — 60 hours

The course is designed for journeymen wiremen in the electrical trade. Will upgrade participants skills in the installation, maintenance and design of electrical lighting systems in common use. Specific areas for detailed study include: lighting principles, terminology and standards; common lamp types, their operation and performance; control systems; basic system design and luminaire selection; lighting system installation and Canadian Electrical Code; maintenance and repair of various systems; recent developments in lighting technology supported by audiovisual materials and demonstration units. Performance objectives for the participant will include: assembling and connecting fixture components, and assessing by measurement and observation their operation; light level measurement, connecting and operating control equipment, design problem solving including Electrical Code considerations. The important role of the lighting system in electrical installations, together with the rapid development of new technology in this area, creates a necessity for upgrading the Electrical Journeyman in the field today. Prerequisite: Familarity with wiring methods and Electrical construction.

Marine Electrical/Electronics — 48 hours

Course covers AC Machines and Operation, AC Generators; alternators in parallel; synchronising, the synchroscope, synchronising lamps. Parallel operation: excitation and throttle control. Load sharing: kW loads and kVAr loads. DC machines: testing, output, efficiency and losses. Special DC machines: the rotating amplifier. The transformer: referred values of resistance, reactance and impedance. Efficiency of a transformer. The transductor — instrument transformers: the current transformer (CT), the voltage transformer (VT). The auto-transformer: fixed ratio and variable ratio types. The Alternator: rotating armature and rotating field types. Excitation arrangements: rotary (brushless alternator) and static systems. The alternator on load: voltage regulation and phasor diagram. Prediction of voltage regulation: synchronous impedance method, ampere-turn method. Synchronising torque. The Induction Motor: principle of operation. Rotor to stator relationships. Relation between rotor losses, rotor input power and rotor output. Electronics: the semiconductor diode. The Zener diode. The junction transistor. Transistor characteristics: circuit configurations, load lines, leakage current. Prerequisite: 3 years experience in electrical trade.

Math for Electricians — Part 1 — 60 hours

Designed to prepare students for a career in electrical work, the course is a mathematics upgrade which also strengthens the understanding of basic electrical concepts. Math for Electricians is recommended especially to students about to enter their first year of apprenticeship studies in the electrical trade. Coverage includes the fundamental electrical laws and their mathematical expression, algebra refresher, DC electricity and resistive circuit analysis.

Math for Electricians — Part 2 — 60 hours

Provides students with the mathematical background they need to understand alternating current (AC) electricity. This course is recommended to students about to enter their second year of apprenticeship studies in the electrical trade and to all others who are seeking a thorough understanding of AC principles. Prerequisite: Math for Electricians — Part 1 (or equivalent knowledge).

Motor Control — Basic — 30 hours

A practical, hands-on course in motor control. Instruction covers the basic principles of conventional motor control for those working in industrial settings. Topics include fractional horsepower, starters, magnetic line voltage starters, pilot devices, circuit layout, interpretation and application of schematics and wiring diagrams. Prerequisite: Some wiring experience and basic electrical knowledge.

Motor Control — Intermediate — 30 hours

A continuation of Motor Control-Basic in which students are introduced to three-phase, multispeed controllers, synchronous motor controls, DC controllers, motor drives and programmable controllers. Ample hands-on training provides students with a solid grasp of motor control principles and industrial applications. Upon successful completion of Motor Control-Intermediate, students are equipped to install and service motor control circuits. Prerequisite: Motor Control-Basic.

Residential Wiring — Basic — 36 hours

Anyone interested in installing residential wiring or altering existing electrical wiring will find this course extremely helpful. Safe wiring practices, simple circuit design, device installation and electrical code are all covered.

Residential Wiring — Intermediate — 36 hours

A continuation of Residential Wiring — Basic which gives students further lab practice and the opportunity to work on complex electrical circuits. In many cases, successful students will attain a sufficiently high level of practical understanding and skill that they will be able to completely wire a new house. Topics include service grounding, hot tubs, water hazards, code and safety requirements, sizing of service conductors and voltage drops. Prerequisite: Residential Wiring-Basic.

Small Motor Maintenance — 18 hours

A practical, hands-on course in the maintenance of small motors. Students are encouraged to bring in defective motors for study and repair. Topics include magnetism, rotating magnetic fields, single phase, starting switches, switch replacement, testing split phase motors, replacing windings in split phase motors; servicing single phase motors: furnace motors, drill motors, saws, fans. Upon successful completion of Small Motor Maintenance, students will be able to correct most small motor faults.

Welding and Rigging for Electricians — 48 hours

Provides the student with the theory and safety required for developing the practical skills of Arc Welding. The student will be able to select welding electrode sizes and types to suit varied material thicknesses and applications, operate and adjust all common types of constant current welding machines, and produce satisfactory welds in all common joint configurations. Topics include: use and safety of the oxy-acetylene cutting process, use and safety of the oxy-actylene brazing, application of different fuel gases used in industry, repair to the equipment, rigging and material handling: basic knots and hitches, breaking strengths and safe workingloads, calculations of reeving arrangement, leadline pull and mechancial advantage, rigging applications (pulley and tackle), final theory test and practical rigging assignment; safety and job-organization: special precautions and dangers in welding, fabrication, rigging.

Industrial Electronics

Digital Electronics — Basic — 36 hours

An ideal course to launch a career in industrial control, computers or state-of-the-art consumer electronics including home and car stereo. Digital Electronics — Basic is the first part of a three part program in Digital Electronics. Upon successful completion of all three parts, students receive a DIGITAL ELECTRONICS PROGRAM CERTIFICATE. Digital Electronics — Basic covers control and communications circuits, practical design principles, troubleshooting; and includes circuits analysis review, introduction to digital systems, binary numbers, numbers in different bases, binary codes, logic functions, using integrated circuits, design of combinational logic circuits, interfacing to TTL, the 7-segment display. Prerequisite: Basic Electronics or knowledge of Ohm's Law, Kirchoff's Laws, Diodes and Transistors.

Digital Electronics — Intermediate — 36 hours

A continuation of Digital Electronics — Basic which introduces students to memory systems, flip-flops, counters, shift registers and arithmetic circuits. Practical skills are developed in a series of lab projects designed to prepare students for troubleshooting real circuits. Industrial and computer applications are stressed. Prerequisite: Digital Electronics — Basic (or equivalent knowledge).

Digital Electronics — Advanced — 36 hours

Concentrates on digital/analog interfacing, covering operational amplifiers and both A/D and D/A conversions. Students learn how to modify existing circuitry to meet changing requirements. A combination of practical design tips and supporting labwork equips students with sophisticated troubleshooting skills and prepares them for courses in computer architecture. Prerequisite: Digital Electronics — Intermediate (or equivalent knowledge).

Industrial Electronics — 60 hours

A practical course designed to give students experience in constructing basic electronic circuits. The circuit knowledge gained from the lab work will be of enormous benefit to those trying to learn the art of troubleshooting modern electronic circuits. Topics include use of multimeter, oscilloscope and other common test instruments, semi-conductor theory, P-N junction, diodes and LEDs, bi-polar junction transistors, thyristors and opto electronics. An introduction to Programmable Controllers is included. Prerequisite: Electronics-Basic (or equivalent knowledge).

Programmable Controllers — Basic — 15 hours

This is the first of a three-part program in Programmable Controllers. Upon successful completion of all three parts, students receive a PROGRAMMABLE CONTROLLERS PROGRAM CERTIFICATE. Programmable Controllers-Basic provides students with the fundamental knowledge needed to operate a programmable controller and provides an overview of the programmable controller as a device in modern industry. Topics include functional overview of programmable controllers, advantages of programmable controllers over conventional relay systems, hardware requirements for programmable controller systems, peripheral devices, system operation, introduction to programming and data manipulation. Prerequisite: Industrial wiring experience and familiarity with motor control schematics.

Programmable Controllers — Intermediate — 30 hours

A continuation of the Programmable Controllers — Basic course which explores industrial applications and provides hands-on training in programming and system operation. Instruction covers advanced circuitry, specialized modules, installation, troubleshooting, data manipulation routines, data communications, graphics and diagnosis. Prerequisite: Programmable Controllers — Basic (or equivalent).

Programmable Controllers — Advanced — 30 hours

Students learn to make effective use of programmable controllers and develop the ability to write efficient programs with important industrial applications, upon successful completion of this course. Topics include use of cassette loaders, graphics capabilities of the industrial terminal, automatic report generation and diagnostic programming, analog inputs and outputs, counters and ASCII files, data highways, small processors, introduction and demonstration of computer assisted control. Prerequisite: Programmable Controllers-Intermediate.

Introduction to Robotics — 18 hours

An overview of the robotics field — both personal and industrial. Hands-on training is included using a robot learning system. Students are introduced to design and maintenance problems of robotics technology and to the tremendous potential of robotics in the workplace of the future. Students are given an overview of each of the fundamental systems in a robot: mechanical, electrical, electronic and computer. They are taught to program a robot using the assembler of its on-board microprocessor. This course is highly recommended to those considering a career in robotics.

Microprocessors — Basic — 30 hours

Designed to give students a working knowledge of basic microprocessor principles and helpful to students of industrial electronics and computers. Microprocessor trainers are used to give students the hands-on exposure needed for a concrete grasp of microprocessor operation and function. Topics include microprocessor organization and architecture, address decoding, programming model, memory mapping, programming techniques, straight line, branching, looping, interface techniques, I/O, serial/parallel, A/D and D/A. Prerequisite: Digital Electronics — Intermediate (or equivalent knowledge).

Telecommunications and Electronics

Electrical Principles — Part 1 — 60 hours

Part 1 of the accredited City and Guilds of London Telecommunications Program, Electrical Principles is a mathematically oriented course for those seeking certification as Electronic Technicians. The intent of the course is to give students a systematic understanding of electrical fundamentals. Topics include circuit theorems, Ohm's Law, Kirchoff's Laws, capacitors and capacitance, the magnetic field, electromagnetic induction, alternating voltage and currents, single phase AC circuits, measuring instruments and measurements. Prerequisite: Physical Science and Math for Electronics — Part 1

Electrical Principals — Part 2 — 60 hours

A continuation of Electrical Principles — Part 1 which is also part of the accredited City and Guilds of London Telecommunications Program. Electrical Principles — Part 2 is a strong, mathematical presentation of the electrical theory which is a necessary part of a Technician's education. Topics include circuit theorems, Thevenin's Theorem, Norton's Theorem, AC circuits, three phase supply, DC transients, electrical machines, measuring instruments and measurements. Prerequisite: Electrical Principles — Part 1

Basic Electronics — 36 hours

A hands-on introduction to the modern electronics field. Students learn the fundamentals of DC electronics using such tools of the trade as multimeters, oscilloscopes and signal generators. Topics include atomic structure, basic electrical units: amps, volts, Ohm's, Watts, safety, color code, schematic symobls, Ohm's Law, series circuits, parallel circuits, combination circuits, introduction to AC concepts. Prerequisite: Grade 10 Math and Science

Electronics — Intermediate — 36 hours

A hands-on continuation of Electronics — Basic which introduces the student to AC Electronics. A practical grasp of AC principles is achieved through lab work which reinforces the theory presented in lectures. Topics include magnetism, generation of sinusoidal waveform, inductance, capacitance, capacitive reactance, inductive reactance, transformers, diodes, power suppliers. Prerequisite: Electronics — Basic.

Electronics — Advanced — 36 hours

Electronics — Advanced completes our series of hands-on electronics courses designed to give students a practical grasp of the modern electronics field and to prepare them for specialized study in computer repair, telecommunications and TV/VCR service. Topics include diodes as rectifiers, zener diodes as voltage regulators, transistors as linear amplifiers and switches, operational amplifiers, multivibrators, digital IC's. Prerequisite: Electronics — Intermediate.

Microelectronic Systems — Part 1 — 60 hours

For students with a solid grasp of electronics, this City and Guilds certified course is a challenging, hands-on introduction to microprocessor technology. Topics include systems defined in terms of 1/0, structure of simple systems, analog and digital systems, microprocessor system, hardware and software, registers, logic circuit families. Prerequisite: Completion of the First Year City and Guilds Telecommunications Program (or equivalent knowledge).

Microelectronic Systems — Part 2 — 60 hours

A hands-on continuation of Microelectronic Systems — Part 1, this course is also City and Guilds of London certified. Microprocessor systems sufficiently complex to be classified as computer systems are the focus of this course. Lab work and lectures give students a practical grasp of microprocessor applications and troubleshooting methodology. Topics include binary and logic, fetch/execute cycle, program creation at machine code level, instruction sets, program loops, data/instruction storage, bus mechanisms and communications, interfacing. Prerequisite: Microelectronic Systems — Part 1.

Microelectronic Systems — Part 3 — 60 hours

Microelectronic Systems — Part 3 is a City and Guilds of London certified course dealing with microcomputer hardware and configuration. It provides advanced training to electronic technicians specializing in applied computer technology. Lectures combined with lab work develop a broad-based understanding of computer systems which can serve as the foundation for work in computer maintenance and custom installation. Topics include I/O timing, interfacing devices, decoding, sub-routines, stack, interrupts, microelectronic stores, memory organization, timers, programming. Prerequisite: Microelectronic Systems — Part 2.

Optic Electronics/Fibre Optics — 36 hours

The theory of fibre optics will be covered in detail in this course, including laser emission and principles, injection laser Diodes (ILD's), optical principles (mirrors, lenses and prisms) and practical systems. The student will do electronic lab work and terminating of fibre cable. The second part of the course covers optical sensor using advanced pulsing technology to distinguish between ambient-light levels. Various sensing heads and logic modules will be discussed and included in lab work.

Communication Studies — 60 hours

A certified City and Guilds of London course designed to develop the oral and written communications skills of technicians. Topics include written and oral communication, graphical communication, use of libraries, selection and synthesis of information, customers' telecommunications needs in modern society, technical report writing. Student evaluation is based upon the preparation and delivery of a technical report before an audience.

Physical Science — 60 hours

A certified City and Guilds of London course covering the basic physical science required of electronic technicians. In this course, physical concepts and fundamental laws are presented systematically and developed mathematically using algebra and statistics. Topics include material properties and statics, Hooke's Law, principles of pressure in fluids, motion and energy, heat and temperature, electricity, electromagnetic effects. Prerequisite: Mathematics for Electronics — Part 1.

TV Repair — Part 1 — 45 hours

An introduction to electronics, circuit theory, troubleshooting and repair techniques with emphasis on TV servicing. Topics include electronic components: resistor, capacitor, diode, inductor and transformer; transistors and integrated circuits: NPN, PNP, common base, common collector, analog circuits, IC types and functions; power supplies: basic ps (full wave, half wave, bridge), linear ps (voltage regulator) and switching power supply; testing instruments: analog multimeter, DVM and oscilloscope; Ohm's Law and basic electronics principles; frequency generator: multivibrator, oscillator, signal mixer and separator; telecommunications: AM,

FM, side bands, antenna and impedance; TV systems and standards: raster, field, frame, interlace, composite video, luminance, chrominance, colour component, colour burst, sync signal; TV block diagram analysis; symptoms and indications; guided repair practice.

TV Repair — Part 2 — 45 hours

A practical, hands-on continuation of TV Repair — Part 1 which applies the circuit knowledge gained in Part 1 to actual service work. Topics include sync and high voltage circuits, sound systems, video and matrixing circuits, repair procedures, service adjustment, alignment. Prerequisite:TV Repair — Part 1.

TV Repair — Part 3 — 45 hours

An introductory course in VCR service which covers mechanical jigs and fixtures, alignment tape, system-control, record-playback checks, color and service system problems. Prerequisite: TV Repair — Part 2.

Math for Electronics — Part 1 — 60 hours

This course is the first of four math courses in the Electronics Technician Program and is City and Guilds of London certified. Training provides students with the mathematical background needed for Physical Science and other first year courses in the City and Guilds Program. Topics include arithmetic operations, algebra, direct and inverse proportionality, linear graphing, geometry and trigonometry, statistics. Prerequisite: Grade 12 Math.

Math for Electronics — Part 2 — 60 hours

A continuation of Math for Electronics — Part 1 in the City and Guilds of London Program which covers formulas, laws, analytical methods, exponential rates of change, trig functions, intermediate statistics, binary arithmetic and Boolean Algebra. Prerequisite: Math for Electronics — Part 1.

Math for Electronics — Part 3 — 60 hours

The City and Guilds certified follow-up course to Math for Electronics — Part 2, this course equips students to handle the mathematical details in Third Year Electronics Technician courses. Course content includes non-linear graphing, applied differential and integral calculus, advanced trigonometry and statistics. Prerequisite: Math for Electronics — Part 2.

Mechanical

Air Brakes for Drivers — 21 hours

Drivers who plan to write the Provincial Air Brake Endorsement ticket to enable them to drive vehicles equipped with air brakes, will find this instruction valuable. Provides the introduction to air brakes theory necessary for that ticket. While driver training is not provided, driver demonstrations and tips on driving provide an important part of the curriculum. Classroom instruction includes a discussion of the five basic components of an air brake system: warning devices, valves, tractor/trailer operation, troubleshooting and safety.

Air Brakes for Mechanics — 30 hours

An ideal refresher for mechanics who have had limited experience servicing air brakes and for owners and operators of trucks or fleets who wish to be informed about their vehicles' braking systems. Includes the principles of air brakes, purpose and function of system components, existing air brake schedules and current dual air systems for truck and tractor/trailer units, maintenance, repair and troubleshooting.

Auto Air Conditioning — 30 hours

Mechanics who wish to increase their job opportunities by adding specialized knowledge about automotive air conditioning systems to their skills will find this course valuable. Successful graduates will have a thorough understanding of automotive air conditioning systems and will be able to service and install these systems according to manufacturers' specifications. Students should have completed a substantial portion of an apprenticeship or have experience with automotive mechanics before enrolling in this hands-on course. Includes theory of operation, system operation, components, controls, basic systems, system servicing, adjustments, performance tests, system repairs and diagnosis.

Auto Electronic and Emission Control — 42 hours

This advanced course gives experienced automotive mechanics specialized instruction in carburetion and advanced tune-up techniques. Explores the repair and maintenance of electronic components and emissions control devices in automobiles. Although basics are covered, normal service practices should be known. Topics include carburetion, electronic carburetion, fuel injection, turbocharger operation, engine electrical, ignition systems, charging system theory and testing, operation and testing of emissions controls. Upon successful completion of the course, students will be specialized in advanced automotive engine diagnosis, troubleshooting, and repair. Supervisors of automotive mechanics will find the course valuable.

Automotive TQ Refresher — 60 hours

Provides students with the necessary theoretical instruction to enable them to write the Provincial Automotive Mechanics' Examination. Students should have a comprehensive working knowledge of automotive skills and intend to write the exam. Topics include safety, shop equipment, air conditioning, internal combustion engines (gas and diesel), cooling systems, fuel delivery systems, emission control systems, electrical systems, power train, suspensions, steering and brakes.

Auto Tune-Up — Basic — 42 hours

This highly-developed auto tune-up training course will allow novices or do-it-yourselfers to perform automotive tune-ups. Students should be familiar with automotive parts, tools and shop safety prior to enrolling. Successful graduates will have a working knowledge of automotive tune-ups, simple carburetion adjustments and engine operation theory. There will be instruction in the use of common electrical test equipment and instruments. Emphasis is placed on hands-on instruction.

Autobody Repair — Parts 1 and 2 — 84 hours (part 1: 48 hours, part 2: 36 hours)

Anyone interested in restoring cars or seeking employment as assistant in autobody repair shops would benefit from this course. You will learn to use grinders, sanders, oxyacetylene welding, dollies, hammers and pulleys in various applications to repair older automobiles. Part 1 teaches fundamentals of the trade: oxyacetylene welding, brazing, straightening and shrinking metal, applying hot and cold fillers. Part 2 builds on these fundamentals and students proceed with body work on their own vehicles. Expert guidance is available.

Auto Preparation and Spray Painting — 42 hours

For anyone interested in learning the technical aspects of auto body preparation and paint spraying. This practical hands-on course will increase graduates' employment opportunities and will develop competence among do-it-yourselfers. Students who have completed the two-part auto body repair course will be particularly interested in this course.

Auto Trim and Upholstery — 24 hours

Anyone interested in learning how various pieces in vehicles fit together and hold upholstery in place should enrol in this introductory course. Provides participants with the opportunity to reupholster seats or replace carpets in their own vehicles. Offers hands-on experience with automobile seats, floor mats and trim.

Automatic Transmissions — 48 hours

An ideal refresher for automotive mechanics who require upgrading in automatic transmissions. Of benefit to apprentices or mechanics seeking specialized employment in the automatic transmission field. Upon successful completion, students will be able to trace paths of power in transmissions, diagnose problems and prescribe repair procedures. Instruction is held in both the classroom and the shop and includes vehicle drive line, gear ratios, simple planetary gears, fluid coupling, torque converters, lock-up, basic hydraulics, valve bodies, Simpson gear sets, power glide (two speed), FMX (three speed), AOT (four speed), automatic trans axles, pressure testing and linkage adjustments.

Automobile Brake Servicing — 30 hours

For mechanics who require upgrading in brake servicing or students seeking specialized employment working with automotive brakes. Students should have a minimum of three years mechanical experience before enrolling in this advanced, hands-on course. Successful graduates will be able to perform almost any inspection/repair necessary on disc/drum brake assemblies. Provides intensive training in hydraulics, friction, single piston master cylinder, hoses, dual piston master cylinders, wheel cylinders, valves, tubing, fluids, brake drums, drum brake assemblies, disc/rotor, disc brake assemblies, parking brakes (propeller shaft and rear axle types) and power brake boosters.

Compressed Natural Gas Conversion (CNG) — 30 hours

Designed to prepare persons in the motor vehicle industry to install and service CNG conversions and accessories. Students must have proof of journeyed status as automotive mechanics or

successfully complete a pre-entry examination before enrolling. Successful graduates may seek employment with CNG conversion centres, service stations, automobile manufacturers, accessories stores, or be self-employed. Topics include safety, basic test equipment, characteristics of CNG, engine and ignition requirements, CNG components, installation, refuelling, tune-ups and troubleshooting.

Liquid Propane Gas Conversion (LPG) — 18 hours

This 18 hour course is intended for students who have successfully completed the 30 hour CNG conversion course. Provides theoretical and practical instruction in the installation of an LPG alternate fuel system for automotive or heavy duty vehicles. Students receive a government certificate upon successful completion of the course.

Liquid Propane Gas Conversion (No CNG Required) — 30 hours

Designed for experienced mechanics who do not require training for CNG conversion. The 30 hour course covers theory and practical training requirements for government certification upon successul completion. Students must have a minimum of four years related experience in the automotive industry or pass a pretest which is written during the first session.

Engine Rebuilding — 36 hours

In this course, students will overhaul an automotive engine according to the manufacturer's specifications. Instruction includes engine theory, component inspection, supervision of disassembly and reassembly, plus necessary machining for the automotive trade. Upon successful completion, students will be able to perform basic engine rebuilding with some assistance depending on overall trade knowledge. Students may supply an engine if they arrange for the automotive body to be towed away when the engine is removed. The course is scheduled on Saturdays, permitting extended shop time.

Front End Alignment — 42 hours

An ideal refresher for experienced automotive mechanics who require upgrading in front end alignment work. Of benefit to apprentices or students seeking specialized employment in front end alignment work. The course teaches the use of alignment equipment, steering geometry, suspension systems, steering linkage and gears. Emphasis is on fault diagnosis. Enables graduates to perform front end alignment fault diagnosis and repairs to acceptable standards.

Heavy Duty Mechanics for Owners/Operators — 48 hours

Designed to familiarize heavy equipment owners or operators with preventive maintenance, servicing and repair of heavy duty mobile equipment. Instruction is provided in starting and moving equipment, various engines, drive trains, frames and suspension; hydraulics, steering, brakes, electricity, servicing and troubleshooting. Upon successful completion of this course, students will be able to diagnose simple problems, recognize the importance of proper maintenance and the fundamental procedures for servicing heavy duty mobile equipment.

Heavy Duty Electrical Troubleshooting — 48 hours

For heavy duty truck and equipment owners or operators, and of interest to those experienced with hydraulic equipment, or heavy duty apprentices. Reviews theory, demonstrates test procedures and outlines troubleshooting procedures on circuits and components related to trucks, buses and heavy equipment. Topics include electrical theory, circuits and math; test instruments; batteries and chargers; starters; DC charging systems — generators and regulators; alternators; basic ignition system; transistorized ignition system; automatic shut-down systems on diesel engines; miscellaneous electrical circuits on trucks, buses and heavy equipment. Successful graduates will understand and be able to troubleshoot problems in heavy duty equipment systems.

Heavy Duty Mechanical TQ Refresher — 60 hours

Provides students with the necessary instruction to enable them to write the provincial Heavy Duty Mechanics examination. Students should have a comprehensive working knowledge of heavy duty mechanics skills and intend to write the exam. Theoretical instruction is given in various types of engines, engine tune-up, electrical systems, hydraulics, brakes, running gear, clutches and torque, transmissions, rear end and winches.

Heavy Duty Transmission and Differentials — 48 hours

A refresher for experienced heavy duty mechanics who require upgrading or for apprentices who seek further information on clutches, torque converters, transmissions and differentials. Topics include the operation of planetary transmissions, torque converters, hydraulic pumps and controls and bevel gear differentials, valves and hydro-dynamics. It is recommended that students have a basic knowledge of the various types of transmissions and differential components and terminology as well as practical experience in heavy duty mechanics before enrolling in this course.

High Performance Auto — 30 hours

For those who wish to learn to modify engine carburetion and achieve high speed performance from a stock engine. Instruction will be delivered through a combination of theory, demonstrations and hands-on experience and include design concepts, superchargers, turbochargers, nitrous oxide and other aspects of building American engines into high performance engines. Successful graduates of High Performance Auto will be able to rebuild the top end of an American engine. They will know how to invest wisely to obtain maximum horsepower and economy from stock engines. Although students need not be journeyed mechanics, a sound understanding of automotive engine theory and operation is required. The course utilizes off-campus commercial shop facilities for the hands-on training.

Industrial Hydraulics Stationary — 42 hours

Designed to assist the maintenance personnel of industrial sites in the testing, repair, examination and troubleshooting of basic fluid power circuits and component parts. Explains, demonstrates and identifies basic fluid power circuitry and components and basic hydraulic theory. Students will study the principles and practices of reservoirs, fluid conditioners, fluids, conductors, pumps, pressure control, flow control, directional control, actuators, seals, types and graphics for symbols, circuitry identification and interpretation, plus practical work on pumps, valves, actuators, and circuits. Successful graduates will be conversant with fluid power and hydraulic theory and capable of examining, testing, adjusting and repairing basic fluid power components.

Industrial Hydraulics — Advanced — 30 hours

Students should have completed Basic Hydraulics or have related trade experience before enrolling in this advanced course designed to familiarize them with industrial hydraulics. Instruction is provided in troubleshooting duties, skills and aids and developing good work habits; problem-solving using senses, a systematic

approach, mathematical formula/calculations. The need for planned maintenance and its benefits are also examined. The course is 90% hands-on training. Graduates should be able to perform hydraulics troubleshooting on both stationary and mobile equipment. Of benefit to mechanics, installers of equipment, and trade specialists such as millwrights or machinists.

Mobile Hydraulics — 36 hours

For heavy equipment mechanics or operators who wish to upgrade their knowledge of hydraulics as applied to forklifts, front-end loaders and stationary equipment. However, the emphasis is on mobile rather than stationary equipment. The object of the course is for students to understand hydraulics, fluids, reservoirs, pumps, motors, valves, hoses and fittings, cylinders accumulators, coolers and schematics, as well as analyse component failures, troubleshoot and perform maintenance diagnosis and testing. Topics include hydraulic principles, fluid and accessories, piping and fitting, pump operation, principles of actuator operations, principles of valve operations, mobile circuits and schematics, power steering, hydrostatic drives, leakage and sealing. Graduates of the course should be able to analyze component requirements, diagnose failures and prescribe solutions.

Machine Shop Operator — 36 hours

Provides a general understanding and practical experience in machine shop operation as well as instruction in the safe operation of machine shop equipment. Training is predominantly hands-on and details the operation of drills, saws and lathes and provides milling experience. Students progress according to their capabilities; shop projects are self-paced and sequentially arranged. Students in related trades such as automotive mechanics who wish to learn to do their own heads and valves on a machine, may also benefit from this course. Upon successful completion, students may undertake an apprenticeship in the machining trade. Advanced level machinist courses such as Tool and Die, CNC Machinist — Level 1, or CNC Machinist — Level 2 would be appropriate.

Introduction to Auto Mechanics — 60 hours

Designed for persons with no formal training in auto mechanics who wish to learn theory and practical skills to enter other related areas. The course is also suitable for general enthusiasts who wish to complete minor automotive repairs and systems analysis. Covers hand tools, automotive fasteners, shop equipment, lubrication, cooling, safety inspection, tire service and exhaust service. Successful completion qualifies students to take courses in steering, suspension and wheel service, brake service, electrical systems, engine tune-up and air conditioning. The course is divided equally between theory, demonstration and shop practice.

Principles of Numerical Controls (NC) for Machine Shop Operators — Level 1 — 48 hours

Allows those interested in machine shop operation to keep up-to-date with state-of-the-art equipment by learning on the latest computerized equipment. Examines the operation of a CNC lathe with reference to machining centres as necessary. Topics include review of basic geometry and trigonometry, terminology and definitions of terms used with CNC, writing and debugging CNC programs, entering programs into the machines and editing, setting of tool offsets and use of tool nose radius compensation. Extensive use is made of the Institute's six EMCO training machines as well as the SL3H MORI SEIKI lathe. The course consists of approximately 30% theory and 70% hands-on training including entering and editing programs, as well as setting tools and operating the machine.

Principles of Numerical Controls (NC) for Machine Operators — Level 2 — 42 hours

Offers higher-level instruction for experienced persons performing machining functions by CNC. Students wishing to enrol should have completed Principles of CNC — Level 1, however, related training and/or experience may be assessed by the instructor. The course emphasizes advanced CNC machine shop operations with student computer boards and CNC training equipment. Successful graduates will have a sound theoretical knowledge of the principles of operating machining equipment by computer. A level 3 course is under development.

Power Train — 24 hours

For students with basic knowledge of the operating principles of the power train. The course starts with a review of the basic operating principles and culminates with the complete operating and adjusting procedures for most modern differentials including the component purpose and construction; power flow in conventional and anti-spin differentials; pre-removal checks; proper disassembly and assembly procedures; proper procedures to ensure safe and reliable operation. Will enable successful graduates to list the components in the power train and in conventional and anti-spin differentials, inspect components for wear, describe operating principles and adjust components to manual specifications. Students should be experienced in the trade or in the latter half of an apprenticeship before enrolling.

Machinist TQ Refresher — 60 hours

Provides students with the necessary instruction to enable them to write the provincial Machinist examination. Students should have a working knowledge of machining skills and intend to write the exam. Theoretical instruction is given in safety and covers the regulations for use of hand tools, instruments and equipment; blueprint reading; grinders; metal lathes; milling machines; vertical boring and turning machines; horizontal boring, drilling and milling machines; shapers, planers and slotters; power drills and saws.

Millwright TQ Refresher — 60 hours

Provides students with the necessary instruction to enable them to write the provincial Millwright examination. Students should have a working knowledge of milling skills and intend to write the exam. Theoretical instruction is given in general fitting practice; hydraulics, pneumatics and lubrication; material handling; machine components and machine installation.

Small Engine Repair — Basic — 30 hours

Designed for the maintenance and tune-up of small engines: lawn mowers, chain saws and rototillers. Theory and demonstration combined with hands-on experience is given to enable students to undertake the operation, maintenance and repair of small gasoline engines. Students overhaul a small engine in the course. Students are encouraged to bring a lawn mower, chain saw or other small engine which requires an overhaul to the shop.

Tool and Die Maker — Basic — 30 hours

This exploratory course introduces students to the theory and skills of a tool and die maker using present day production methods. Instruction covers jig making, piercing dies, single-double compound and progressive dies and will enable students to perform such skills to acceptable standards. Consists of two-thirds theory and lays a good foundation for the intermediate course, which is primarily hands-on. The course is a good introduction to the CNC machine operator course. Prior to enrolment, students should have had some experience/training in machine shop operation/metal fabrication.

Tool and Die Maker — Intermediate — 48 hours

Builds upon basic tool and die making through intensive, hands-on instruction and practise. The course gives in-depth instruction in jig making, piercing dies, single-double compound and progressive dies and enables students to focus on industry requirements for tool and die making, stressing practical production. Students who complete this course successfully will be able to make advanced dies.

Diesel Engines, Automotive — 30 hours

Designed to upgrade automotive mechanics to deal with late model cars and diesel fuel injection systems. The mechanic will diagnose problems in automotive diesel engines by systematically troubleshooting the fuel injection and speed control systems and solve problems by repair, adjustment or replacement of parts. Students will work on Detroit series, Cummins, GM 5.7 L and 3.8 L, Volkswagen Rabbit, Peugeot and Mercedes Benz through a combination of theory and hands-on instruction proceeding to almost exclusively shop work. Students should be journeyed automotive mechanics or at least in the third year of an apprenticeship before enrolling in this course.

Motorcycle Maintenance — 24 hours

For motorcycle owners who wish to perform their own tune-ups, brakes or other servicing and for anyone who works on motorcycles. Comprehensive instruction covers the basic theory of two and four-cycle engines, complete tune-up procedures, disc and drum brake maintenance and electrical troubleshooting. Instruction is primarily in the shop but includes some theory.

Outboard Engine Maintenance — 24 hours

Designed to enable boat owners to service their own engines the course is essentially for the maintenance and tune-up of outboard engines. Instruction is hands-on with supporting theory and includes basic tune-up, troubleshooting and servicing motors, and examination of the fuel and electrical systems of these engines. Successful graduates may find job opportunities with summer resorts, camps or marinas.

Inboard/Outboard Engine Maintenance — 24 hours

A course for the maintenance and tune-up of inboard/outboard engines which has been designed to enable boat owners to service their own engines. Topics include theory, tune-ups, troubleshooting and servicing of motors and outboard units, and examination of the mechanical, electrical and fuel systems of these units. Successful graduates will feel confident about their diagnosis and repair of the inboard/outboard engine.

Non-Destructive Testing

Introduction to Non-Destructive Testing (NDT) — 18 hours

A survey of the field of non-destructive testing. Introduces students to the different types of NDT — radiography, ultrasonics, magnetic particle and liquid penetrant. Certificiation criteria, employment opportunities and training requirements for those seeking careers in NDT are discussed. Prerequisite: Grade 12 math and science.

Refrigeration

Electrical Code For Refrigeration — 60 hours

Instruction is tailored specifically to meet the needs of those working in industrial refrigeration. Examines the electrical code as it pertains to refrigeration including safety, service sizing, motors and wiring practices. Successful graduates of this course are prepared to write the restricted class B Contractor's license. Prerequisite: Journeyman level of understanding for industrial refrigeration.

Domestic Refrigeration — Basic — 45 hours

This is the first of a three-part program in domestic refrigeration. The three parts together cover all aspects of domestic refrigeration equipment including refrigerators, ice makers and room air conditioning units. In-depth instruction is provided in all facets of repair and custom installation. Upon successful completion of this course, students receive a Domestic Refrigeration Program Certificate. Domestic Refrigeration-Basic covers elementary refrigeration theory and basic electricity as it applies to refrigeration service, magnetism, resistive circuits, inductance, capacitance, split phase inductance motors, temperature measuring scales, pressure and gas laws. Prerequisite: Good mechanical aptitude.

Domestic Refrigeration — Intermediate — 45 hours

Extensive hands-on training provides students with the practical skills they need for service work. By building an actual working refrigerator, students learn the use of such refrigeration tools as compound gauges and vacuum pumps. Topics include tubing connections, fluidic circuits, refrigeration electrical circuits, defrost systems, deep freezes and icemakers, temperature controls, principles of silver soldering. Prerequisite: Domestic Refrigeration — Basic

Domestic Refrigeration — Advanced — 45 hours

Domestic Refrigeration — Advanced is a hands-on course in the repair and custom installation of room air conditioning units. Students are taught fundamental air conditioning principles, including absolute versus relative humidity, physical units of heat and the laws governing air flow patterns. Students apply these fundamental refrigeration laws to practical problems such as calculation to unit size for custom installation. Hands-on instruction is provided for both installation and repair, making this a complete course in room air conditioning units. Prerequisite: Domestic Refrigeration — Intermediate.

Industrial Refrigeration — Basic — 36 hours

The fundamental principles of industrial refrigeration are presented together with demonstrations and hands-on training using industrial trainers. Training is designed to enhance troubleshooting skills and assist students in coping quickly with refrigeration problems. Topics include principles of refrigeration, system components, refrigeration system practices, troubleshooting methods.

Industrial Refrigeration — Intermediate — 36 hours

A continuation of Industrial Refrigeration-Basic which provide instruction on larger and more complex refrigeration systems of all types. Load calculation, custom installations, fulfillment of design and functional criteria and sophisticated troubleshooting methods are taught. Upon successful completion of Industrial Refrigeration-Intermediate, students will be able to diagnose and take corrective action for approximately 80% of system problems. Topics include two stage systems, indirect systems, refrigerants, centrifugal compressors, low and high temperature lubrication, chill water and brine coils, introduction to heat pumps, commercial and industrial dehumidifying systems. Prerequisite: Industrial Refrigeration — Basic.

Refrigeration TQ — Part 1 — 36 hours

Refrigeration TQ-Part 1 is the first of a two part program designed as a complete overview/refresher for industrial refrigeration. Successful completion of both parts prepares students for writing the Trade Qualification examination in refrigeration. Students intending to write the Refrigeration TQ-Part 1 examination are advised to determine their eligibility to write prior to enrolling in the program. Topics include refrigeration theory, reciprocating compressors, condensors, evaporators, flow control devices and accessories. Prerequisite: 3 years experience with industrial refrigeration.

Refrigeration TQ — Part 2 — 36 hours

Refrigeration TQ — Part 1 completes the survey of industrial refrigeration and brings successful students up to TQ standards. Topics include ammonia systems, halo carbon systems, capacity modulation and system balance, secondary refrigerants (brines), load calculations, system dehydration, air cleaning equipment, air distribution, automatic control systems, humidifying/dehumidifying equipment. Prerequisite: Refrigeration TQ — Part 1.

School of Construction and Natural Resource Studies

Construction

Advanced Benchwork (Cabinetmaking and Finishing) — 24 hours

Designed for advanced students this course is a sequel to cabinetmaking. Provides shop space and expert instruction for individual projects. Project selection and materials are the students responsibility. Prerequisite: Previous woodworking course or the instructors approval. Class size is limited to allow for individual instruction.

Benchwork Upgrade — 40 hours

Accomplished cabinet builders and benchwork students will benefit greatly from the individualized training delivered in this course. The self-paced format permits students to progress at their own speed. The instructor will review advanced woodworking skills according to the average level of class competence and build on this with individualized instruction. Each student must design a major shop assignment and supply the necessary project materials based on drawings approved by the instructor. Learning materials are available through the benchwork apprenticeship and upgrading program for individual projects. Class size is limited so students are encouraged to register early.

Blasting — 15 hours

This specialized training will enable persons interested in carrying out commercial or private blasting operations to perform them safely and efficiently. Students will learn the principles of non-electric detonation of explosives and will gather the technical knowledge and hands-on experience necessary to carry out such blasting. The course covers the theory necessary for writing the Workers Compensation Board ticket for non-electric blasting and includes a field trip to perform a one-day line blast.

Blueprint Reading for Construction — 30 hours

Designed for persons working in the construction trades who wish to read blueprints. Students should have some related building trade experience although it is not mandatory. Students learn to complete projects and problem-solve in the classroom. Instruction is given in all aspects of building specifications, including metric conversion, foundations, millwork and scheduling. Successful graduates will understand the structural principles of buildings and be able to read blueprints for architectural construction and related electrical, plumbing and interior finishing.

Cabinet Making — Basic — 30 hours

Of benefit to those who wish to increase their job opportunities by learning new skills. It will also appeal to hobbyists familiar with hand and power tools who are interested in cabinet making. Course content includes cabinet parts and layout, basic joints used in wood construction, standard sizes and construction methods, assembling with glue, preparation for finishing, and the use of router and templates. Furniture design principles plus furniture joints and finishing methods are also studied.

Fibreglass Fabrication and Repair — 24 hours

Persons involved with the fabricating of fibreglass for marine repair, product production or any related application will find this course invaluable. Students are instructed in basic fiberglass fabricating skills through practical shop instruction and demonstrations. Training also deals with fiberglass adhesion theory by reviewing existing commercial products and application techniques.

Traffic Control Training — 6 hours

A short, comprehensive course covering all the skills necessary to meet minimum provincial standards for persons seeking employment as flagging personnel at highway construction projects. Instruction is delivered in a practical setting and includes safety, employer relations, traffic control and on-site responsibilities. Audio-visual aids augment the practical instruction. Developed in co-operation with the Ministry of Transportation and Highways.

Carpentry TQ Refresher — 56 hours

Will provide students with the necessary instruction to enable them to write the provincial carpentry trade qualification examination. Students should have a working knowledge of carpentry skills and intend to write the exam. Theoretical instruction is provided in foundations; concrete form construction; framing; boarding, sheathing and scaffolds; roof construction; exterior finish; interior wall covering; interior finish; stair building; heavy timber construction; carpentry in masonry construction.

Stair Construction — Traditional — Circular — 20 hours

Designed for journeymen carpenters or those with a minimum of two years related trade experience. The course will review mathematics, design, construction and related building codes. Upon successful completion, students will be able to calculate, design and build stairs to building code standards, including circular and simple concrete.

Concrete Formwork — Design and Construction — 24 hours

For carpenters, contractors, those who work with concrete sales-delivery, form rentals, re-bar installation and construction laborers. Instruction will be provided in footings, wall formwork, column formwork, concrete stairs, beams, girders, slabs and concrete technology. Upon completion, successful students will have acquired the theoretical knowledge to identify and apply different types of concrete formwork in both light and heavy construction, and the practical experience to construct a stair and landing project in a loose forming system.

Construction Supervision and Project Management — 24 hours

For persons with competent trade skills in the construction industry who wish to acquire management skills. Thorough instruction is provided in project planning, scheduling, contract development, tendering, quotations, start-up, records, cost control, supervisory skills, and communications. Upon successful comple-

tion of this course, students will have a theoretical foundation in residential, multi-residential, light industrial project supervision, scheduling, contract administration and cost control.

Construction Estimating — Basic — 21 hours

Designed for anyone who provides construction quotations. Construction foremen and managers as well as those considering self-employment in the industry will derive the greatest benefit from this course. Instruction will include types of estimates and their requirements, construction planning, calculating quantities, scheduling and costing. Detailed classroom projects are used to re-inforce learning material. Upon successful completion, persons should be able to cost out a job, bid a quotation and guarantee the price quoted.

Floor Covering: Sheet Goods Installation — 24 hours

Examines the latest installation techniques of a variety of sheet floor covering products. In-depth instruction is provided in layout and pattern matching, fitting techniques, seaming practice, chemical and heat rod seam welding, flash covering, new products and their installation. Successful completion of this course will enable graduates to install a variety of sheet floor coverings.

Carpet Installation — Basic — 24 hours

An introductory, comprehensive course on carpet laying for those seeking employment in the industry. Because this business can be undertaken with relatively small capital investment, the course is suitable to students taking training for self employment. Students are given hands-on training in the use of tools and application methods as well as theoretical instruction about fabrics and related information. Successful graduates will have learned professional applications, unit pricing and job estimating. There is no prerequisite but students should be in good health.

Framing, Roofing and Layout — 28 hours

West-coast framing and layout is covered in this course which is designed for students with little or no practical experience as carpenters. Essential skills for careers in carpentry and residential construction are taught at an on-site building which simulates an industrial setting. Students will construct a basic residential shell therefore some physical activity is required; the program is approximately two-thirds hands-on. Successful graduates will have a complete theoretical understanding of traditional framing and will be capable of performing some assembly skills.

Furniture Finishing and Refinishing — 12 hours

This general interest course will appeal to students with little or no experience in furniture finishing. It is suitable for hobbyists as well as furniture manufacturers. Students will learn the theory and skills to refinish a sizeable project. Instructor's demonstrations are coupled with practical experience in various refinishing techniques, applications to new wood and French polishing. The use of various oils, resins and surface coverings is examined.

Introduction to Glazing — 12 hours

For individuals who wish to learn glass cutting and basic glazing skills. Of interest to students who are considering an apprenticeship in the trade or related construction trades. Content includes cutting glass, finishing glass, placement, aluminum frame assembly, door systems and wall systems. Upon successful completion of the Glazing — Basic course, students will know how to cut and finish glass.

Finishing Carpentry — 30 hours

Will enable established carpenters to complete interior residential finishing to professional standards. Recommended for students who are carpenters or for those who have worked in the trade for more than three years. Essential skills include door hanging, window installation, cabinet installation, material finishing and the application of various hardware. Students learn by working on shop assignments and should have a sound knowledge of the proper use of carpentry hand and power tools before enrolling in this course.

Masonry and Bricklaying — Basic — 32 hours

This introductory, hands-on training is designed for students who wish to learn basic masonry and bricklaying skills. About 60% of the training is practical and includes proper use of hand tools; patio, barbecue, chimney and fireplace construction. Theoretical instruction covers the manufacture of cement, brick and rock construction, blueprint reading and related design information. Those who wish to investigate the possibilities of a career in bricklaying will gain sufficient exposure to the industry to make a choice. However, the time-restricted, modular projects are not intended to develop skills to professional standards.

Painting and Decorating — Levels 1 and 2 — 48 hours: 2 x 24 hours

Persons with little or no experience in the painting industry may learn pre-apprenticeship-level skills and become employable in the trade. Level 1 is approximately 50% theory and 50% practical with emphasis on developing a sound foundation for career oriented students. Level 2 provides a practical follow-up for successful students and simulates working conditions. The instructor will incorporate classroom instruction and demonstrations to develop student skills to that of a professional apprentice painter, able to work independently with little or no supervision. The application of advanced wall coverings, wood finishing, graining and general painting are covered. Students with considerable trade experience may enter directly into Level 2 upon confirmation by the instructor, during the first session.

Painting and Decorating — Basic — 32 hours

Persons with little or no practical experience will learn fundamental skills applicable to industrial painting. The course covers theory, safety and practical skills development. Students will complete shop projects as well as written assignments. Upon completion, the successful graduate will be qualified to seek employment at an apprentice level in painting and decorating or may take advanced courses in wall covering, spray painting and estimating.

Painting Estimating — Commercial — 20 hours

For experienced painters who wish to become competent in residential and light commercial painting estimating this advanced course. Curriculum covers unit pricing, cost takeoffs, contract submission. Final grades are determined by the submission of a project as well as class participation, which includes practical estimate projects. Upon successful completion of this course, students should be able to price small- and mid-sized painting projects accurately to professional trade standards. Suitable for persons who show entreprenurial initiative and ideal for competent painters who require to estimate jobs accurately.

Painting TQ (Theory) — 48 hours

Provides experienced students with the theoretical instruction to enable them to write the provincial painting examination. Students should have a working knowledge of painting skills. Theoretical instruction is given in basic components of paint and color

mixing, basic tools and equipment, surface preparation of interior and exterior surfaces, procedures for application of coatings by brush and roller, safety regulations, paint failures, natural wood finishings including staining and graining, wall coverings, spray painting and related equipment, corrosion control and industrial coatings, and trade mathematics.

Transit and Level — Basic — 21 hours

Offers introductory instruction in the operation of level and transit as applied to construction layout, pipe layout and note keeping. As the construction industry becomes more active there will be increased demand for skilled workers. Hands-on training will give students an advantage when competing for such opportunities as they will have learned the operation of a transit and level through actual practice. Prerequisite: Grade 10 math.

Transit and Level (Upgrade) — 21 hours

Transit and level students will find advancement possible from the knowledge and practice gained in this course. The instructor will review basic theory and evaluate each student's skills in order to provide individualized instruction. The course instructs students in trigonometry, problem solving and proper layout methods for transit and level, advanced layout for construction, piping and related trades. This course is not intended to produce surveyors, but to upgrade those who must use transit and level as part of their job requirements. Suitable for carpenters, ironworkers, layout foremen, road builders and excavators. Graduates will be able to do advanced layout on the transit and level to professional standards. Prerequisite: Students must have completed the basic course or have equivalent field experience before enrolling.

Residential Building Procedures — 18 hours

Focuses on the planning, estimating and construction of new single or multi residential units. Designed for owners, first time builders or novice carpenters. This course reviews all phases of wood frame construction, finishing, cost control and on site supervision. Students are encouraged to utilize a proposed new residential building or renovation project for learning purposes.

Industrial Rigging and Safety — 24 hours

Designed for participants with limited or non-existent rigging and signalling experience. The course starts with a comparison of the two main types of cranes in heavy construction culminating with a comprehensive evaluation of all rigging and signalling procedures necessary for their safe and efficient operation. It identifies crane abilities and limitations, proper signalling procedures, proper rigging procedures (includes reeving, splicing and knot tying fundamentals), sling and sling accessory inspection and evaluation techniques and on-the-job safety procedures. Enables participants to explain the general workings and limitations of conventional and tower cranes; direct cranes confidently and effectively under any type of hoisting condition; calculate the safe working load for all lifting devices; inspect slings and sling accessories for wear; evaluate the correct rigging, lifting and transportation procedures for all lifts; explicate the fundamentals of splicing and knot tying; carry out all assigned rigging tasks safely and efficiently. Participant will pass both a written and practical examination.

Complete Commercial Spray — 20 hours

Students who understand painting theory and have some practical experience and maintenance engineers, manufacturers and ironworkers, will find this upgrade course useful. Topics include industrial health and safety; spray painting theory; air — pressures and volumes; paint and coating measures; air compressor operation; equipment assembly and maintenance, paint failures, causes and cures; practical application; spray booths, functions and types. Upon successful completion, students will be aware of professional standards and capable of working under supervision.

Wall Covering Applications — 24 hours

Designed to introduce experienced painting students to professional wall covering techniques. The course reviews surface preparation, material selection, application procedures and production methods for commercial projects. Students will practice hanging wall covering in shop assignments. The course includes material costs.

Steel Stud Construction — 16 hours

Designed for persons with a minimum of two years experience in building construction. Students are expected to have a basic understanding of traditional West Coast framing and construction methods. The course covers steel stud construction techniques, layout and assembly to building code. It is equally divided betweeen theory and shop practicals. A certificate is provided upon successful completion.

Residential Roofing Application — 24 hours

This short course covers roofing applications for asphalt shingles, cedar shakes and fabricated aluminum. Suitable for experienced carpenters and builders who want to be able to complete typical residential improvements, repairs and re-roofing. Upon successful completion, students will be able to do commercial estimates and apply roofing to trade standards. The course will not include full-scale shop projects. Instead, modular components will be completed on an individual basis for practical training. (50% theory — 50% practical).

Cedar Shake Roofing — 16 hours

Individuals interested in learning how to apply cedar shake roofing will learn the knowledge and skills necessary to do the job properly in this short, specialized course. Of benefit to journeyed carpenters, carpentry apprentices and do-it-yourself homeowners. There is no prerequisite but students should be able to work well with carpentry hand tools. In addition to the hands-on training in the installation of shakes, the course includes roofing theory application procedures, estimating and water runoff.

Drywall Installation and Finishing — 24 hours

Covers the basic drywalling skills required by the construction industry — layout and application, estimating, taping tools, airless paint machines and contour shaping. Hands-on experience will be gained through mock-up assignments. Graduates will be capable of remodelling basements or complete homes and installing drywall in homes.

Vinyl Siding Applications — 16 hours

Designed for manually skilled individuals interested in learning how to apply siding for the purpose of increasing carpentry skills or earning a supplementary income, and homeowners and do-it-your selfers. The course utilizes — the Institute's telecourse study guide and video resources from the How to Install Vinyl Siding program. Content includes materials and accessories, estimating, tools, safety, preparation and application procedures.

Log Building Construction — 67 hours

Offers practical experience through the erection of a small building, using saddle notch building techniques. Provides an introduction to the designing and blueprinting of log building construction. Practical instruction is held off campus and includes the use of tools and equipment, design techniques, making founda-

tions from wood, framing, roofing, stairs, cutting for windows and doors. Students must provide their own chain saws. Although there is some career potential for log building construction, the course is designed primarily for landowners who wish to construct their own log buildings.

Log Grading and Scaling — 160 hours

Assists persons with little or no experience in scaling to become provincially certified log scalers and graders. Passing the final examination is the first step toward becoming a scaler and, through practical experience, students will acquire more speed, knowledge and confidence. Includes instruction in determining species and measuring diameters and lengths emphasizing the Log Scale; how to recognize defects from surface indications and make adjustments to diameter and length for them; making out tallies and summaries of scale; grading rules and circular letters for log grades; registered timber marks and their significance as well as check scales; sawmill studies, scaling minor forest products, the cubic foot scale, general properties and uses of Coast species; the Forest Act and regulations which affect log scaling.

Sign Painting — Basic — 60 hours

Ideal for painting and decorating apprentices and pre-apprentices who wish to brush up on the various aspects of sign painting. Extensive instruction is given in basic alphabets and layouts. Surface preparation, brush techniques, silk screening and safety regulations are also examined. Upon successful completion of the course, students may operate their own sign painting business or seek employment with existing operations.

Sign Painting — Upgrade — 24 hours

Persons employed in the sign painting industry for at least a year or recent graduates of Sign Painting — Basic should enrol in this course. Provides essential upgrading for persons presently in the sign painting business and advanced techniques and applications not covered in the basic course. Students will learn advanced lettering techniques and other advanced instruction to attain required professional standards. This will be accomplished by completing individual projects agreed to with the instructor. All materials required for this course are supplied.

Drafting

Drafting — Basic — 42 hours

Those who wish to express creative ability should explore a career in drafting by enrolling in this introductory course. Provides a foundation in basic drafting including equipment and tools, line work, lettering, applied mathematics, plane geometry, orthographic projection, dimensioning, sections, charts and graphs. Will prepare students for careers in drafting or for further drafting studies. Students will be expected to complete an example of an achitectural project, a civil project, a mechanical project and a structural project. They will also be introduced to computer-assisted design (CAD).

Drafting — Advanced — 42 hours

Expands on the basic drafting course and allows students to progress into their desired drafting specialty, including architectural, civil, mechanical and structural. Students pursue one of these in-depth, touching on the others as they interrelate. Part of the required project for this course will be produced on a computer. The basic and advanced drafting courses will provide successful students with an overview of the parameters affecting building design and construction.

Industrial Rendering and Drawing — 30 hours

Of value to practising interior designers, drafters and those in related fields, this course will assist potential interior designers to assess creative abilities for a possible career. Provides an opportunity for the layman to study interior design from a graphic viewpoint. Industry experience is recommended before taking this course. Course content includes demonstrations and lab assignments covering sample boards, renderings, sketches, floor plans, elevations, projections and lettering. A variety of media and materials will be explored. Experiments in residential and commercial space will be presented graphically in course projects.

Introduction to Computer Assisted Drafting (CAD) (seminar) — 10 hours

Examines the essential concepts of CAD. Anyone with career aspirations in drafting will need this seminar to keep pace with changing technology in the field. Discusses the computer's distinguishing characteristics, attributes and shortcomings. Dowco's Holguin Ceads-Cadd System operating on a Hewlett-Packard HP 1000 minicomputer will be compared to other mini, micro and mainframe CAD systems. Class size is limited to ensure students hands-on time and to enable them to complete a simple sketch for plotting, by the completion of the seminar.

Piping, Plumbing and Gas

Air Conditioning — Basic — 30 hours

This exploratory course provides a foundation in basic air conditioning and refrigeration theory through a combination of classroom and shop instruction which includes maintenance, troubleshooting and minor systems design projects. For persons wishing to pursue a career working with air conditioning and building service workers/physical plant personnel to advance their careers. Students should have a general understanding of air ventilation/refrigeration equipment before enrolling in this course. Graduates will be able to assess and prescribe equipment requirements as well as perform troubleshooting and repairs.

Blueprint Reading for Piping — 30 hours

This theoretical course will help piping trades personnel who are moving toward supervisory roles or wish to otherwise advance their careers. Designed for students who are familiar with piping and have had some experience in the industry. Topics include reading drawings, project drawings, specifications, standard details, drawing co-ordination, sketching, sleeve and deck layout, piping drawings. Graduates will understand blueprints as they relate to the piping trades and know how to apply them.

Cross Connection Control — 24 hours

Designed for persons involved in the installation and maintenance of backflow prevention devices for pollution of domestic water supply. The successful completion of a final examination will certify students as trade specialists in this area. Students will be able to assess the inter-connection of hazardous equipment and situations involving the pollution or contamination of water supply systems, and take the appropriate preventive action. Definitions, regulations, types of cross connection controls and locations where cross connections occur will be covered.

Domestic Gas Appliance Servicing — 30 hours

Persons involved with the installation or maintenance of domestic appliance equipment are required to complete this course successfully. Graduates will be awarded a provisional ticket enabling them to perform domestic gas servicing and installations. The ticket is contingent on the student having been employed in the industry for one year. Instruction covers atmospheric gas burners, orifice sizing, domestic ranges, dryers, refrigerators and the regulations governing these appliances.

Gas Fitter — B License (previously grade 1) — 84 hours

This course is a requirement of the Ministry of Labour Gas and Safety Branch for students wishing to write the examination to qualify as a Gas Fitter — B license. Comprehensive instruction is provided in the history and types of gas; gas laws; piping materials, methods, and sizing; atmospheric and other burners and pilots; combustion; flame safety; venting; regulations; valves; electricity; domestic and commercial appliances. Instruction is both theoretical and practical and includes off-campus visits to B.C. Hydro's training facilities. Upon entry to this course, students should confirm their final examination requirements with the Ministry of Labour Safety Engineering Services division; phone 879-7531.

Gas Fitter — A License (previously grade 2) — 150 hours

This course is a requirement of the Ministry of Labour Gas and Safety Branch for students wishing to write the examination to qualify as a Gas Fitter — A license. Comprehensive instruction is provided in pipe and, valve sizing, purging and cleaning, pressure regulations and meters, manifolds, flame safety, control systems, all types of burners, appliances, venting, combustion air and ventilation, start-up procedure, standby fuels, direct fired make-up air and regulations, combustion analysis, cathodic protection and input calculations on high-pressure meters. Instruction is both theoretical and practical and includes off-campus visits to B.C. Hydro's training facilities. Students must have had a B license for a minimum of two years to qualify for A license. Prior to taking this course, students should confirm their final examination requirements with the Ministry of Labour Safety Engineering Services division; phone 879-7531.

Gas Grade 2 Fitter — Math and Science — 48 hours

Provides the math and science background necessary to enable you to pass the Gas Fitter A licence examination. In order for a student to write the provincial Gas Fitter A licence exam he must have held a valid Gas Fitter B license for a period no less than two years. Mathematics instruction includes algebra and formulas while science instruction deals with electricity and chemistry.

Industrial Ventilation — 30 hours

Examines how to control airborne contaminants and heat stress in industrial ventilation systems. Of interest to mechanical contractors, industrial safety officers, and those involved in the design, installation or evaluation of industrial ventilation systems. Graduates will be able to design basic industrial ventilation systems to acceptable standards. Topics include fundamentals of air flow, general ventilation, ventilation for heat stress, hood design principles, specific operations of hood designs, duct sizing and design, fans, air cleaning, make-up air, legal requirements and air flow measurements.

Plastic Pipe Fusion for Gas Fitters — 7 hours

Students are trained to use specialized equipment in the joining of plastic piping in this short, intensive course. Designed to upgrade gas fitters to work with plastic pipe, using state-of-the-art equipment and technology, however, anyone who works with plastic as a piping medium will benefit from this course. Instruction covers the knowledge and skills necessary to operate and maintain the equipment used in the fusion of plastic pipe. Graduates will understand the special procedures for different piping products and how they vary with weather and temperature.

Plumbing — Residential — 24 hours

This general interest course will appeal to homeowners with do-it-yourself aptitude and will provide sufficient skills for graduates to feel confident about the quality of their workmanship. Topics include drainage systems, water systems, fixture selection and installation, etc. regulations, materials and blueprints. Two hands-on sessions deal with the cutting and soldering of plumbing materials. Graduates will understand the basic plumbing system within residential standards and know how to diagnose and repair minor problems, and install minor fixtures and plumbing additions to residential systems.

Plumbing TQ Refresher — 60 hours

Provides students with the necessary instruction to enable them to write the provincial Plumbing examination. Students should have a working knowledge of plumbing and intend to write the exam. Theoretical instruction is given in trade math and science; piping materials; valves, fittings and supports; rigging; pumps; water supply and distribution; blueprint reading; hot water heating systems; maintenance and repair; finishing; roughing-in; draining, venting and sewage; cross connection control and the B.C. Plumbing Code.

Plumbing — Estimating — 60 hours

For plumbing or supervisory administrators who wish to be proficient in cost estimating. Students should have a basic knowledge of plumbing theory. Upon completion, gradutes will be able to prepare competitive bids on residential and light commercial projects. The course covers an introduction to drawings, structure, architecture and mechanics and how they are compiled; an introduction to basic estimating, take off plumbing, take off plumbing labour, complete quantity sheet; take off mechanic laboratory, complete quantity sheet; pricing materials in labour, summary preparation and percentage calculations, overhead, costing, planning.

Process Piping Layout and Design — 36 hours

For students interested in pursuing a career in process piping layout and design. The course instructs students in the drafting and basic fundamentals of process piping techniques using short lectures, discussion and exercises in orthographic projection, isometric detailing, component dimensioning and material take-off, plus drafting. The free hand sketch method for isometrics is used extensively.

Propane Tank Filler (Certification) — 8 hours

Developed for dispensing personnel, the course covers the physical properties of propane, sources and users, equipment, filling procedures for motor fuel tanks and cylinders, and cylinder re-examination. Upon completion, students receive a certificate of completion for display at their place of employment, as well as a wallet sized card.

Steamfitter TQ Refresher — 60 hours

Provides students with the necessary instruction to enable them to write the provincial Steamfitting examination. Students should have a working knowledge of steamfitter skills and intend to write the exam. Theoretical instruction is given in pipe work, hot water systems, controls and valves, low pressure systems, maintenance and repair, high pressure systems, and pumps.

Steel and Welding

Blueprint Reading — Welding and Steel Fabrication — 30 hours

Designed to upgrade welders skills and job opportunities. Training covers all aspects of blueprint reading as it applies to welding. Provides students with the of knowledge required to read fairly complicated structural drawings and to apply these instructions to the material used to complete a structure. Sessions are assignment-intensive and begin with progressive open-forum discussions coupled with assignments bearing directly on those discussions. An advanced course follows for students who require higher level training.

Oxyacetylene Welding — 24 hours

Students in this course will learn sufficient welding skills to weld with oxyacetylene equipment whether they wish to pursue a professional trade or are hobbyists with their own equipment. Successful students will learn how to weld light gauge steel and small gauge pipe and weld/braze cast iron. Instruction is also given in the care of equipment, safety and safety standards. The course may be credited for training endorsement when the student maintains a registered welders log book.

Plate and Pipe Development for Steel Fabrication — 36 hours

Students will learn the three methods of plate and pipe development for steel fabricators through a series of theoretical and practical sessions. Of benefit to welders and fabricators with a basic understanding of fabrication who wish to upgrade their skills for advanced projects and design. Classroom instruction focuses on making templates while shop experience will use those templates to shear, burn, form and tack plates together to make an elbow and a square to round.

Sheet Metal — Basic — 24 hours

An introductory course in sheet metal fabrication and shop work for employees of sheet metal shops or those seeking employment in this field. Instruction is about two-thirds shop and one-third classroom, and includes blueprint reading, simple layout, shop calculations, soldering and brazing. Students who complete this course may enrol in the second level sheet metal course where instruction is almost all hands-on and includes pattern making. Students should be familiar with or experienced in metal work, machine shop operations or sheet metal work before enrolling in this course.

Stainless Steel Kitchen Equipment — 39 hours

For students with an employment background in sheet metal who wish to learn to fabricate and build stainless steel kitchen equipment. The course may lead to career-oriented employment in the making, repairing and installing of such equipment if related training in welding and plumbing is taken. Students learn the characteristics of stainless steel, tools and techniques used to work and polish stainless steel, countertop edges and layout, typical stainless steel cabinet layout, all coved stainless steel sink bowl layout, typical pot sink layout, condensate and convection hoods layout. Tungsten inert gas (TIG) welding of stainless steel is included.

Steel Fabrication — Basic — 42 hours

Reviews the theory and practical requirements of steel fabrication. The course focuses on mathematics, pattern development, blueprint reading, welding and proper use of industrial machines. It also provides students with the opportunity to follow a typical steel fabrication project from initial design to shop production.

Steel Fabrication — Estimating — 36 hours

Offers those with a practical background in steel fabrication a basic understanding of steel fabrication estimating. Instruction details all phases from material take-off to erection of a project. Students should have shop experience, be able to read blueprints and have a basic understanding of math before enrolling in this course. Upon successful completion, students will be able to obtain plans and specifications, complete material take-off, understand pricing, labour costs, project material cost and be able to maintain costing records. Several practical assignments provide experience in steel fabrication estimating for industry projects.

Structural Steel Design — Basic — 36 hours

For draftsmen and technicians with limited background in structural theory. Will help students understand the design criteria and CSA S16 requirements in both limit states design (LSD) and allowable stresses design (ASD) methods. Upon successful completion of the course, students will understand the different approaches and code requirements in LSD and ASD methods and be versed in the application of simple formulas to obtain critical member forces, design members subjected to axial tension or compression, bending and combination of axial and bending in accordance with CSA S16, and be able to design simple welded or bolted connections.

Tungsten Inert Gas (TIG) Welding — 32 hours

Provides both theory and practice for welders who wish to become proficient in TIG welding used extensively in the welding of aluminum and stainless steel. This upgrade course may provide greater job opportunities to persons working with these metals. Students should have basic arc welding and understand arc welding theory before enrolling in this course. Students will understand the trade standards and requirements upon successful completion of the course. The course can be credited for training endorsement when the student is maintaining a registered welders log book.

Gas Metal Arc — Flux Cored Arc — 60 hours

Students will learn how to set up and operate manufacturers gas metal arc or flux cored arc welding power sources. Practical training covers welding plate (gauge to unlimited thickness) in all positions, utilizing fillet and v-butt welds, welding pipe in rolled and fixed positions. All welding will be to CSA and ASMe code level.

Welding — Basic — 40 hours

An ideal course for inexperienced welders to learn different types of welding using various metals. Successful students will understand the various types of welding machinery and be able to identify and use various electrodes in flat, vertical, horizontal and overhead positions; the various types of joint geometry and blueprints associated with welding and the safety aspects of the welding shop. Instruction is primarily hands-on and includes classroom theory, shop demonstrations and films. The course can be credited for training endorsement when the student is maintaining a registered welders log book.

Welding — Upgrade — 40 hours

Allows welders to work one-on-one with the instructor for individualized help with any aspect of welding. The course is designed to help students prepare for welding examinations for certification. Students will have a good understanding of the requirements of the particular welding certification examination they plan to write. Students are advised to confirm testing eligibility with the Welding Bureau or the Ministry of Labour. Welders should have a minimum of one years experience welding heavy gauge metals before enrolling in the course. The course can be credited for training endorsement when the student is maintaining a registered welders log book.

Welding TQ Refresher — A Level — 36 hours

Provides experienced students with the necessary instruction to enable them to write the provincial certification exam to A level. Theoretical training covers RK9 — metallurgy 3, RK10 — blueprint reading 3. The theory of SMAW advanced and GTAW pipe and various alloys is discussed.

Welding TQ Refresher — B Level — 36 hours

Provides experienced students with the necessary instruction to enable them to write the provincial certification exam to B level. Theoretical training covers RK5 — welding quality control and inspection, RK6 — welding codes, standards and specifications, RK7 — blueprint reading 2, RK8 — Metallurgy 2. The theory of GMAW, FCAW, GTAW and safety is covered.

Fundamentals of Welding Technology (Welding Institute of Canada) — 48 hours

The welding industry recognizes this course as a requisite for various codes and standards. It is particularly beneficial for those seeking supervisory positions within the industry. A diploma is awarded by the Welding Institute of Canada to students who pass the closed-book final examination. Twelve modules are contained in the course: health and safety, basic joints, blueprint reading and preparation, symbols for welding, welding processes and equipment, power sources for welding, electrodes and consumables, distortion and residual stress, basic metallurgy and material specification, basic welding and metallurgy of structural steels, weld faults and causes, basic inspection technology, mechanical testing of welds. Training is theoretical but includes shop observation. Considerable home study and assignments can be expected. **Please note:** A welding manual priced approximately $150 will be required.

Welding Inspection and Quality Control (Welding Institute of Canada) — 36 hours

Designed to upgrade welders to welding supervisors. A national diploma is awarded by the Welding Institute of Canada and is of special value to future welding supervisors or inspectors. Topics include basic concepts of quality control and inspection; survey of weld testing; visual inspection of welds; factors affecting weld quality; arc welding faults; mechanical inspection and testing of welds; liquid penetrant testing; chemical and metallographic inspections; magnetic particle testing; radiographic inspection principles and interpretation; radiographic inspection; codes; ultrasonic inspection; concepts, methods and weld testing; ultrasonic inspection, codes, practices and certification, codes, specifications and standards; welding inspection qualification. This theoretical course will require considerable home study time. **Please note:** Students will require a manual price approximately $130.

Industrial Rigging and Safety — 32 hours

Designed for participants with limited or non-existent rigging and signalling experience. Compares the two main types of cranes prominent in heavy construction and delivers a comprehensive evaluation of all rigging and signalling procedures necessary for safe and efficient operation. It identifies crane abilities and limitations, proper signalling procedures, proper rigging procedures (reeving, splicing and knot-tying fundamentals), sling and sling accessory inspection and evaluation techniques and on-the-job safety procedures. The course will enable participants to explain the general workings and limitations of conventional and tower cranes, direct cranes confidently and effectively under any type of hoisting condition, calculate the safe working load for all lifting devices, inspect slings and sling accessories for wear, evaluate the correct rigging, lifting and transportation procedures for all lifts, explicate the fundamentals of splicing and knot-tying, carry out all assigned rigging tasks safely and efficiently. Participants will pass both a written and practical examination.

Autobody — MIG Welding — 24 hours

This specialty course provides upgrading training for persons employed in the autobody repair industry as well as students studying autobody repair who require additional training in MIG welding. Taken together with Continuing Education's two-part autobody repair course, this course gives students a good foundation for employment in the autobody repair industry. Students in the course use MIG welding equipment to perform rust repair or other metal replacement to late-model vehicles.

Blueprint Reading for Welders — Advanced — 30 hours

A continuation of the basic course, designed to further upgrade welders' skills and employability by dealing with more complicated aspects of layout. Sessions will begin with progressive open-forum discussions and be followed by assignments bearing directly on those discussions. Practise will augment instruction so that students will be capable of immediately recognizing the process required. Upon successful completion of the basic and advanced courses, students will be able to lay out and assemble, with speed and accuracy, almost any work in a conventional shop.

Reading Shipyard Blueprints — 36 hours

Designed for shipyard employees who wish to expand their knowledge of ship building, types of vessels, parts of ships, shipyard blueprints, symbols and abbreviations, structural terminology, line drawings and computer-assisted drawings. Graduates of this course will not become marine engineers, but will be familiar with all aspects of building modern ships:tow boats, barges, ferries, freighters, fishing vessels, tankers, ice breakers, etc. Successful students will be able to read and interpret any marine structural drawing and operate in any shipyard with minimal supervision. The course is assignment-intensive and comprises open-forum discussions on the subjects and ends with home assignments for individual sessions.

Technical Appliance Repair

Appliance Repair — Part 1 — 30 hours

This is the first of a four part program in appliance service. The four parts cover most major household appliances, including microwave ovens. Upon successful completion of all four parts of this program, students will receive an APPLIANCE REPAIR PROGRAM CERTIFICATE. Appliance Repair Part 1 covers the fundamentals of electricity as they apply to household appliances. Topics include electrical safety, resistance, voltage, current, inductance, capacitance, magnetism and electrical laws. Hands-on training with multimeters and laboratory circuits provide a practical foundation for classroon lectures.

Appliance Repair — Part 2 — 30 hours

Training centres upon the construction and function of electronic circuits in modern appliances. Students build voltage regulators and engage in sufficient labwork to give them a working knowledge of diodes, zeners, transistors, LEDs and regulators. The instruction and lab work will provide students with an understanding of the most common electronic components in household appliances. Prerequisite: Part 1 (or equivalent knowledge).

Appliance Repair — Part 3 — 30 hours

Appliance Repair Part 3 applies the circuit knowledge gained in Parts 1 and 2 to major household appliances. Topics include: reading schematics, appliance circuitry, mechanical systems, ranges, including self-cleaning systems; dryers, with standard and electronic control; dishwashers, laundry circuits, including timers and mechanical systems; customer relations. Upon successful completion of Appliance Repair Part 3, students will be able to work safely upon most major household appliances (except for refrigerators) and to analyse and correct most common faults. Prerequisite: Part 2 (or equivalent knowledge).

Appliance Repair — Part 4 — 30 hours

For those with a background in basic electricity and electronics, this is a complete course in microwave ovens covering both new and old designs. Successful students will be able to diagnose and correct all common faults in microwave ovens. Topics include: microwave generation, biological effects of microwave radiation on food, advantages/disadvantages of microwave ovens, automatic cooking, convection ovens, space saver ovens, customer protection and technician safety, transformers, high voltage, motors, timers, overheat devices. Prerequisite: Part 3 (or equivalent knowledge).

Horticulture

Professional Floristry Design — 48 hours

For persons interested in professional floristry design. Detailed instruction introduces students to the floristry business and equips them with the necessary competence to operate as a professional. Design theory, color principles, product knowledge and availability, plant care, efficient use of materials, costing and pricing formulas, in-store sales and wire service are taught. Flowers will be supplied in this course, which features hands-on training with supporting theoretical instruction.

Floristry — Design Upgrade — 36 hours

Instruction and practical training will benefit students who wish to expand and update their knowledge of floristry design. Types of designs covered in this course will be European influences, parallelism, contemporary, new conventions. Theoretical instruction will be supported by hands-on training. Floral materials will be supplied.

Christmas Floral Arrangements — Professional — 24 hours

Provides students with hands-on training in all types of floral Christmas decorations. They will learn to design floral table and mantel arrangements, wreaths, corsages. Flowers will be supplied. Successfull completion of the course enables students to create the various arrangements.

Introduction to Horticulture — 30 hours

Those employed in ground maintenance will find the knowledge gained in this introductory course essential to their careers; of interest to home gardening enthusiasts. Basic horticulture theory, landscaping techniques, disease and insect pest identification are covered together with plant association of trees, shrubs and perennials, how to design a small garden, lawn establishment and care, proper pruning techniques; understanding of soil management and care, plant propagation, organic gardening techniques, winter flowering shrubs, greenhouses and coldframes, bulbs, difficult and rare plants.

Landscape and Garden Design — 24 hours

Those who successfully complete the course will know how to design landscape, prepare and read a site plan, identify uses of space and material functions. Designed to enable graduates to design and maintain their yards and gardens successfully. Will increase the job opporunities of persons focusing on horticulture. Topics include general layout, estimating and cost management, grading and drainage, structural facilities and materials, soil improvements, plant materials, grass, maintenance, landscape philosophy and history of landscape design.

Pesticide Control — 24 hours

Offers students who must write the Provincial Pesticide Dispensers examination, as required by the Pesticide Control Act, the necessary knowledge to complete the examination successfully. Theoretical instruction is given in all facets of pesticide control which will be required for the examination. Students must be 19 years of age and pay $10 to write the examination. Those who pass will be certified and licensed to dispense pesticides in one or more of nine different categories.

Plant Identification — 24 hours

This general interest course is suitable for professional landscapers or others whose occupation requires a knowledge of plants common to the area, and will also please recreational and outdoors enthusiasts who simply wish to be better informed about vegetation common to the area. Students will be taught proper terminology and methods of identifying most plants which grow on the West Coast of Canada, greenhouse plants and household plants. Theoretical instruction is complemented by field trips.

Plant Propagation — 18 hours

Nursery workers or those in similar occupations will find the knowledge gained in this specialty course essential to their careers; of value to home gardening enthusiasts. Students are taught about growing plants and the wide variety of methods for starting new plants. Topics include stem and leaf cuttings, root cuttings, divisions and layering, planting procedures for seeds, environmental factors, propagation houses, grafting and budding, and bulb planting.

Apiarist Training — 16 hours

Become a honey farmer for fun or profit. This short, specialty course will provide students with the necessary knowledge of bee keeping to enable them to establish and maintain a small apiary. The course covers disease recognition and treatment, honey flow, swarm control, and packaging. Field trips and guest speakers are utilized in the instructional process.

School of Health Sciences Studies

Industrial Safety — First Aid

Introduction to CPR — Heartsaver — 3 hours

This introductory course in cardio-pulmonary resuscitation is ideal for persons with no previous experience in CPR. It acquaints students with the risk factors associated with heart disease and methods to reduce those factors; signals for action when a person is thought to be experiencing a heart attack are explored. Instruction includes how to activate the emergency medical services network, perform one-person CPR on a training mannequin and manage a conscious person with an obstructed airway.

Introduction to CPR — Lifesaver — 5 hours

Expanded course in CPR builds on the foundation laid in Heartsaver and is designed for persons with previous CPR experience. Instruction focuses on one- and two-person CPR plus airway obstruction for conscious/unconscious adults and infants, infant resuscitation, signals and action, risk factors and activating the emergency medical services network.

Standard First Aid — St. John — 20 hours

A comprehensive safety-oriented first aid training course offered to anyone over the age of 16 who is in good health and wishes to deal with emergencies in a non-professional capacity. Students will learn how to interpret symptoms of illness and injury, assess priorities in emergency situations, start rescue-breathing, stop bleeding, treat choking, fractures and other injuries. CPR is not included in this course. The Standard First Aid — St. John course is a prerequisite for such courses as Early Childhood Education, Registered Nursing, the Marine Institute Mates Ticket and for some athletic and industrial programs. Students who pass the final examination are awarded a nationally recognized certificate which is valid for three years.

Survival First Aid — 4 hours

Those who may be required to deal with injuries in emergency situations until professional help arrives will gain the knowledge and confidence to deal with those situations effectively. The course teaches students how to handle breathing problems, bleeding and unconsciousness through a variety of teaching methods. Designed by the Workers' Compensation Board, certificates are awarded by the WCB to successful graduates.

Trauma First Aid — 7 hours

State-of-the-art equipment and the latest techniques for ambulance attendants are detailed in this comprehensive one-day course. Instruction is geared toward first aid respondents who have been in the workforce for a number of years and require upgrading. The overall purpose of this course is to review information in patient assessment, upgrade skills in pre-hospital trauma care and analyze recent developments in these fields; provide practical hands-on application of this information. Of benefit to industrial first aid attendants, first aid officers, ambulance attendants (EMA 1), police officers, fire service personnel and other first aid responders.

Auto Extrication — One day, usually about eight hours

Students are trained to remove persons from automobiles involved in motor vehicle accidents without causing them further injury. Will appeal to fire fighters and other professional rescue personnel. Students who enrol in this course are expected to be versed in first aid procedures. Training will enable students to assess the situation and diagnose potential injuries, then perform appropriate techniques for opening the car. Instruction includes a seminar, followed by hands-on experience ripping open wrecked cars. Although a minimum of equipment is utilized, students are taught the intricacies of the latest equipment including the jaws of life.

Industrial First Aid — 60 hours

Offered in co-operation with the St. John Ambulance Society, training includes air passage obstruction, cardiopulmonary resuscitation, hemorrhage control, wound care, fracture management and recognition of major injuries. Upon completion of the course, students will be examined for certification by the Workers' Compensation Board.

Industrial First Aid (Maple Ridge) — 60 hours

Offered in co-operation with the Maple Ridge First Aid Training School, training includes air passage obstruction, cardiopulmonary resuscitiation, hemorrhage control, wound care, fracture management and recognition of major injuries. Upon completion of the course, students will be examined for certification by the Workers' Compensation Board.

Transport of Hazardous Goods for Drivers — 7 hours

The "Transportation of Dangerous Goods Act" will be covered with respect to the rules and regulations that drivers transporting hazardous materials must comply with. The subjects covered will be safe truck operation, classification, labelling and placarding of dangerous goods, regulations and regulatory agencies, characteristics of dangerous goods, contingency planning.

School of Management Studies

Professional Certificate Programs

Court Reporting — 3 Year Certificate Program

This program is three years in length, consisting of three semesters of three months each year. Semesters include five hours per week of instruction at the Institute plus approximately 10 hours per week of home study. This comprehensive program will enable successful graduates to seek employment as fully-qualified court reporters. Students will be able to record court proceedings on a stenographic machine which types phonetic shorthand at 200 wpm, and transcribes them to typewritten format. Much effort is required to achieve proficiency in the use of the stenograph machine. Curriculum includes English, legal terminology, medical terminology, transcription, stenographic shorthand and operation of the judicial system. Employment opportunities are currently exceptionally good and exist within the judicial system as well as with the RCMP and lawyers. Prerequisite: Graduation from grade 12 plus a typing speed of 40 wpm. A good command of the English language is essential and working experience in a related field is beneficial.

Legal Steno/Typist Certificate Program — Part 1 and Part 2 — 78 hours (part 1: 30 hours; part 2: 48 hours)

This legal steno/typist certificate program will appeal to those seeking advancement into this clerical specialty. The first part is an orientation to legal stenography which will enable students to decide if they wish to pursue this career. The second part includes theoretical and practical work in legal paperwork, documentation, correspondence for law in the fields of civil and criminal, litigation, divorce, labor law, wills and estates, corporate and conveyancing. Graduates will be qualified as junior legal stenographers and may work in insurance, estate companies, large businesses and with notaries public. Prerequisite: Typing speed of 45 wpm; shorthand is desirable.

Legal Assistant Certificate — 60 hours

The legal assistant program is for those students who have completed both parts of the legal steno/typist program or have at least three years legal experience. The course is designed to provide the knowledge required for employment in the management of a law firm.

Medical Office Assistant — Clinical Procedures — 36 hours

Students will learn the use of medical equipment, how to perform laboratory tests and assist physicians with specific examinations. The MOA — Clinical Procedures course is about 60% theory and 40% hands-on training. Students should have basic secretarial skills before enrolling. This is one of five courses in a comprehensive medical office assistant certificate program. A medical office assistant (MOA) certificate is presented to students who successfully complete the MOA Clinical Procedures course, plus MOA — Office Practice, MOA — Terminology, MOA — Anatomy and Physiology, and MOA — Medical Transcription.

Medical Office Assistant — Office Practice — 36 hours

Students will learn to perform the clerical duties associated with medical office assistance. Essential for students who must understand medical forms, perform private and insurance billing, know about community resources and be proficient in the day to day operation of the medical office. This is one of five courses in a comprehensive medical office assistant certificate program. A medical office assistant (MOA) certificate is presented to students who successfully complete the MOA — Office Practice course, plus MOA — Clinical Procedures, MOA — Terminology, MOA — Anatomy and Physiology, and MOA — Medical Transcription.

Medical Office Assistant — Terminology — 42 hours

Successful graduates of this program will be able to use basic medical terms and know how to spell and pronounce them. Of great value to students who are pursuing the MOA certificate program and of interest to others who need to understand medical terminology such as lawyers, insurance personnel and counsellors. Course content is concentrated; most students require a great deal of home study to absorb the material. This is one of five courses in a comprehensive medical office assistant certificate program. A medical office assistant certificate is presented to students who successfully complete the MOA — Terminology course, plus MOA — Clinical Procedures, MOA — Office Practice, MOA — Anatomy and Physiology, and MOA — Medical Transcription.

Medical Office Assistant — Anatomy and Physiology — 36 hours

Successful graduates of this program will understand human anatomy and physiology. Students learn the parts of the body and how they work together. Course content includes an analysis of the body system and its diseases including the medical terms which describe them. Transcription of medical letters and reports is also included. This is one of five courses in a comprehensive medical office assistant certificate program. A medical office assistant (MOA) certificate is presented to students who successfully complete the MOA — Anatomy and Physiology course, plus MOA — Clinical Procedures, MOA — Office Practice, MOA — Terminology, and MOA — Medical Transcription.

Medical Office Assistant — Medical Transcription — 36 hours

Designed for persons employed as medical office assistants or students taking medical office assistant training who require additional medical transcription instruction and experience. Of assistance to persons employed in clinics, doctor's offices, hospitals and other medical areas needing more transcription experience. Includes transcribing medical letters, consultations, and admissions from tapes; surgical, pathology and special consultation reports. Students will utilize dictaphone equipment and typewriters in this course. Students enrolling in this course should have a medical background, or be working or training to work in a medical office assistance environment. This is one of five courses in a comprehensive medical office assistant certificate program. A medical office assistant (MOA) certificate is presented to students who successfully complete the MOA — Medical Transcription, MOA — Anatomy and Physiology course, plus MOA — Clinical Procedures, MOA — Office Practice, and MOA — Terminology.

Word Processing — Level 1 (Wang) — 60 hours

Students with a minimum typing speed of 45 wpm can learn the basics of word processing in this hands-on course using state-of-the-art equipment-Wang and IBM. Learn to create, edit, print and file documents for business applications; including inserting, deleting, copying and moving text, creating headers and footers, automatic hyphenation and pagination and merging documents to be printed. This is the first of a three-part word processing certificate program

Word Processing — Level 2 (Wang) — 30 hours

This is the second of the three-part word processing certificate program. Level two commences with a refresher of basic skills followed by instruction in complex editing, sorting, setting up and using glossaries and batch work. Prerequisite: Word Processing — Level 1.

Word Processing — Level 3 (Wang) — 30 hours

This is the third of the three-part word processing certificate program. A refresher of basic skills is followed by expanded instruction in the use of glossaries and the math pack. Students will also learn the fundamentals of decision procedures and software. Upon successful completion of Word Processing — Levels 1, 2, and 3, students will be able to perform almost any function on a Wang word processor and be employable as word processing operators.

Word Processing — Level 1 — 60 hours

Students with a minimum typing speed of 45 wpm can learn the basics of word processing in this hands-on course using CPT and Olympia state-of-the-art equipment. This is the first of a three-part word processing certificate program. Learn to create, edit, print and file word processing documents for business applications including inserting, deleting, copying, and moving text as well as creating headers and footers, automatic hyphenation and pagination and merging documents to be printed.

Word Processing — Level 2 — 30 hours

A continuation of professional word processing principles and practices are taught on CPT word processors. This is the second of a three-part word processing certificate program. Level two commences with a refresher of basic skills followed by instruction in complex editing, sorting, setting up and using glossaries and batch work. Most word processing applications used in business will have been explored should students choose to seek employment at this stage. Prerequisite: Word Processing — Level 1.

Word Processing — Level 3 — 30 hours

This is the third of a three-part word processing certificate program. A refresher of basic skills learned in the first two levels is followed by expanded instruction in the use of glossaries and the math pack, as well as fundamentals of decision procedures and software. Upon successful completion of Word Processing — Levels 1, 2, and 3, students will be able to perform almost any function on a Wang word processor and will be employable as word processing operators.

Word Processing — Wordstar — 30 hours

Students are trained to use the common word processing software Wordstar for word processing applications to many microcomputers. Instruction is completely hands-on, computer-assisted learning with support available from the instructor; a book parallels the computerized instruction. Students use an Olympia EX 100 computer in this course but the software will be similar regardless of the computer used by the student after graduation. Covers typical word processing functions, such as copying, moving and inserting type as well as business and writing functions.

Supervisory Training for Word Processing Operators — 30 hours

Designed for those already in or wishing to enter supervisory word processing positions; no actual word processing training is provided. Students will learn the difference between word and data processing and about four major types of word processing equipment: OIS, computer based, stand alone and shared logic. The course is strictly classroom instruction. Will enable students to choose proper systems for their particular application as well as select word processing personnel.

Basic Keyboarding — 24 hours

Teaches the operation of the basic keyboard including the alphabetic and numeric keyboard as well as the 10 key numeric pad. The goal is to provide the student with the skills necessary to use computer terminals, information processors and other keyboards, such as typewriter keyboards.

Office Management Procedures — 36 hours

Those with basic typing ability who wish to improve their employment opportunities or initiate clerical careers should study Office Procedures. Instruction covers a range of skills required to demonstrate competence to a potential employer as well as skills required to find employment. These include job search techniques, resume preparation, employment letters, application forms, interview techniques, attitude, grooming and human relations. Office skills include business communications, mail handling, telephone and telecommunications, copying and duplicating, dictation and transcription, records management, organizational methods, time management, meetings and travel. Students should be able to type before enrolling in this course. Successful completion of this course will equip students with the fundamental skills required by most offices today.

Secretarial Training — Basic — 30 hours

Students who have taken a basic typing course or have equivalent experience, will be introduced to the duties and responsibilities of the secretarial profession with emphasis on duties such as filing, mail handling, telephone techniques and general office procedures. An introduction to the dictaphone will be included, dependent upon the student's progress. Instruction in resume preparation and job search techniques is provided to encourage career growth. Upon successful completion, students will be able to apply for employment as a secretary.

Executive Secretarial Training — 36 hours

This advanced course is designed to enhance secretarial skills to an executive level to enable graduates to apply for senior secretarial positions. Students should have been previously employed as a secretary or have graduated from Secretarial Training — Basic. Shorthand is also an asset. Personal instruction is given in proper office etiquette, manners and grooming required by executive secretaries. Training is also provided in making travel arrangements, setting up itineraries, arranging meetings and other responsibilities.

Shorthand, Pitman — Basic — 60 hours

Will aid anyone who requires shorthand for clerical employment or who wishes to increase efficiency in other professions where accurate note-taking is essential. Instruction is provided in the 26 characters which represent the 24 sounds, the dots and dashes which represent the 12 vowel sounds and how to write them. Students learn the theory, transcription and speed development used in Pitman shorthand. Pitman is the most accurate form of shorthand and is required in most senior positions in business offices.

Shorthand, Pitman — Refresher — 48 hours

Reviews the basics of Pitman shorthand, with particular attention to basic outlines, short forms and speed enhancement. Suitable for students who want to refresh their shorthand skills or who have taken a basic course and want more practice. Prerequisite: Previous Pitman shorthand course or equivalent.

Electronic Switchboard Receptionist — 30 hours

Designed for persons with basic clerical skills who wish to upgrade their career opportunities as switchboard receptionist. Students should have a basic working knowledge of typing. Instruction will also include telex, filing, mailing, arranging couriers, dictaphone and related office procedures. The course offers a combination of theoretical instruction and hands-on training on modern electronic switchboards.

Typing — Basic — 30 hours

A course for beginners who wish to learn touch typing and its common applications. The foundation in keyboarding laid in this course will be instrumental in advanced clerical and secretarial training and practical computer training. Students use IBM electric typewriters and learn to set up various types of letters, forms, and memos. The fundamentals of spelling, punctuation, grammar and dictionary skills are covered. Upon completion of the course, students should have a typing speed of 35 to 40 wpm and qualify to enrol in the Typing — Advanced course.

Typing — Advanced — 30 hours

Persons with basic typing ability of 35 wpm will be able to build speed as well as increase typewriter applications. Students use IBM selectric typewriters learning business forms and machine transcription and may be introduced to electronic typewriters (if time permits). Special typing problems, proofreading and correcting are studied. Successful students will be able to type 55 — 60 wpm at the completion of the course and ready to enrol in word processing courses.

Business Accounting

* Accounting — Introductory Part 1 — 24 hours

Briefs students on the purpose and nature of accounting and financial statements, revenue and expenses, as well as completion of the accounting cycle. Accounting systems, accounting for purchase and sales of merchandise, internal control and cash transactions, plus receivables and payables are examined.

* Accounting — Introductory Part 2 — 24 hours

A continuation of Accounting — Introductory Part 2. Includes inventory and valuation systems, and the effect of pricing errors on financial statements; long-term assets and liabilities — plant and equipment, depreciation, bonds, debentures, etc; owner equity — sole proprietor, partnerships, corporations, corporate organization and share structure; corporate earnings and payroll accounting — earnings per share, cash and stock dividends, stock splits and retained earnings.

• Accounting — Intermediate — 36 hours

Provides the basis for a thorough understanding of accounting principles and procedures necessary for the successful operation of a business. Course content includes plants and equipment, natural resources and intangibles, partnerships, corporations, working capital and cash from statements, financial statement analysis and interpretation, departmental and responsibility accounting and manufacturing accounting. Prerequisite: Accounting — Introductory Part 1 and 2.

Payroll Procedures — 18 hours

Designed for those seeking employment in a payroll department, or as secretary to a small business who must perform the payroll function. Instruction is given in the use of various tables for deducting income tax, UIC, CPP, WCB deductions, as well as the completion of T4 forms and separation slips. Students also receive practical training in typical month-end and year-end reporting. Will enable students to perform basic payroll duties.

• Taxation — 36 hours

Small business owners and operators as well as those with a keen interest in personal and corporate taxation will derive an excellent overview of the income tax act. Successful graduates will be able to quickly and correctly prepare complex income tax returns and could consider entrepreneurial initiatives in this field. Emphasises computations of net income, capital costs allowance, capital gains and losses, computations of taxable income.

* Now part of Management Part-time Studies and may be absorbed into their program.

Business Administration

Assertiveness for Women: Solving Problems with Co-Workers — 6 hours

A one-day workshop for women who must report to supervisors, and of interest to female supervisors. The interactive instruction will help you resolve conflicts with co-workers and superiors in a tactful and direct manner, motivate others to change, communicate your personal and departmental needs to superiors and handle criticism from peers or superiors effectively.

Board Room Procedures — 18 hours

Anyone whose responsibilities include planning or participating in meetings will find the group instruction in this course ideal. Introduces students to the proper procedures and techniques for arranging a meeting, setting up an agenda, protocol, concluding a meeting, and setting up follow-up meetings. Rules of order will be covered in some depth. Includes role playing and group participation. Principles of parliamentary procedure and planning a conference will also be discussed.

Bookkeeping — Basic — 30 hours

This introductory course is oriented toward owners, managers or bookkeepers of small businesses. It is related to many of the Institute's Continuing Education business, office and clerical courses and provides a solid foundation for developing competence and employability in the business office environment. Includes accounting terminology, recording process, ledgers and trial balance, financial statements, accounts receivable, inventory and salaries. Provides a basic knowledge of bookkeeping and accounting. Enables students to identify basic internal control procedures.

Business Communications — 30 hours

This writing course will help persons in business who must deal with communications requirements. Successful graduates will have learned what makes a good business letter, technical report, office correspondence and oral communication. Designed primarily for secretaries, small business owners and managers, but would be a valuable asset to any career where communication is required.

Commercial Law — 36 hours

A must for anyone in business who needs to know what can and cannot be done in business and its legal ramifications. Introduces contract law, contract of sale, consumer protection, restrictive trade practices, corporation, and unincorporated organizations.

Conveyancing — 60 hours

An in depth course for legal support staff. Training will cover land title procedures, general typing procedures to be filed in land title office, property searches, methods of conveyancing titles, terminology, documentation, agreements for sale, mortgages, miscellaneous clauses and letters, builders liens and Lis Pendens. Course materials will be provided. Prerequisite: Legal stenographers course or equivalent experience, with instructors approval.

Data Processing — Parts 1 and 2 — 25 hours (2 X 12.5 hours)

Provides a good theoretical background to hardware and software and explains what data processing is. This two part course fulfills the requirements of the Accredited Public Accountants Computers 430 course. Part 1 introduces students to data processing, programming, hardware and software, program development, data representation and input, output, and communications. Part 2 covers computer operation, software systems, data-base management systems, alternate solutions and management and planning of computer systems. Predominantly theoretical, the course offers limited hands-on experience.

Economics — 36 hours

Anyone interested in economics will be stimulated by this introductory course as it helps develop an understanding of the organization and operation of the Canadian economy. It explores national income, money and banking trade, employment, inflation and growth, with an overview of economic theory and policy.

Fundamentals of Financial Management — 36 hours

Of value to those who currently own or manage a business. Covers the basics of financial management. Focus is on the use of financial statements, working capital, projecting cash flow, external financing, and re-investing your surplus; Budgeting under various conditions, distributing your surplus and planning for the future.

Purchasing — 36 hours

A combination of classroom instruction and mock assignments is used to teach students the principles and and practices of business purchasing including the organization of the purchasing department and its relationship to other departments, policies and procedures on negotiations with vendors, transportation, quality determination, quantity, source and prices.

Salesmanship and Promotion — 27 hours

Designed to give students with little or no experience formal training in the practice of selling and the principles of sales management. Emphasizes theory of selling an image and letting a product sell itself. Role playing will augment classroom lectures, encouraging students to develop competence in this technique. Instruction will include product knowledge, presentation, dealing with customers, closing an agreement, goals and time management and sales management.

Small Business Management — 30 hours

Ideal for those considering establishing a small business, of value to those already managing a small business. Will help students to decide whether or not to initiate a business. Licensing requirements, financial investment, whether to operate from the home, making better business decisions, business plans and controls, how to organize, manage and motivate people, and how to communicate effectively will be discussed.

Stockmarket Analysis — 24 hours

A general interest course which will increase beginners' knowledge of the stockmarket and how it operates. Students are taught what to look for when starting a stock portfolio and strategies for playing the stockmarket are discussed. The instructor-broker will examine common types of investment, market structures, buying and selling; mock investments will be analysed to complement

theoretical instruction. Portions of the course are held at a brokerage house so students may gather practical experience with stockmarket computers and view first-hand the modern techniques of buying and selling.

Public Relations — 30 hours

Anyone interested in commercial public relations practice as for small and medium-sized operations will gain from the theoretical instruction in this course. Will provide students with the necessary knowledge of public relations functions for businesses, associations and other organizations, so that they will be versed in these basics and competent in the organization of a public relations department for a small or medium-sized operation, and understand how to communicate with external organizations.

Effective Public Speaking — 27 hours

Designed to assist students with little experience in public speaking to overcome anxiety when speaking in group situations. Students will examine public speaking in a group and on a one-to-one basis. Students should be prepared to participate in speaking/listening exercises, giving reports, debates and impromptu speeches.

Introduction to Real Estate Appraisal — 30 hours

For those who want an introduction to the field of appraising real property. Particular attention is given to the use of fundamental appraisal principles and tools for the valuation of residential properties. The purpose, function and nature of value are examined, as are the basic principles and legal aspects of real estate. The course includes field trips to an array of real estate types, instruction in how to inspect property, a visit to a fee appraisal office and touches on renovations and additions. Successful completion of this course will not make students real estate appraisers.

Retail Merchandising — 36 hours

Ideal for those with some retailing experience who may be seeking advancement into merchandising management positions. An introduction to all aspects of retailing is provided so students may develop the competence required for such advancement. Upon completion, the student will be able to make sound buying decisions, develop sales forecasts and plan effective merchandise presentations. Emphasizes budgeting and profit planning techniques using operating records.

Computer Mathematics for Business — 48 hours

Will develop practical mathematical skills for business as used for bookkeeping, accounting and forecasting of trends. Hands-on computer training gives students employable skills in business mathematics and helps to reinforce abstract concepts. Prerequisite: Grade 12 mathematics.

Supervisory Training — 24 hours

Successful completion of this course will enable students to assume supervisory roles and operate their departments with efficiency and competence. Topics include: setting goals and objectives, motivating employees, delegating duties, resolving conflicts with employees and supervisors, providing clear and firm direction to staff, delegating authority while maintaining control, and supervisory responsibilities.

Food Training

Wine — An Introduction — 16 hours

For the newcomer to wine, wine theory is presented through a combination of brief lectures, films, reading assignments, group discussions and presentations by experts in the field followed by systematic sensory evaluation of wine typical to a particular region or grape variety. Upon completion of the course, students will be able to explain wine-making practices in several countries, identify label information according to legal definitions, describe the taste characteristics of red, white, and sparkling products, as well as discuss storage techniques and service procedures.

Hospitality Training

Bartending — 36 hours

Students are introduced to the necessary theory and practical skills required to operate in this important area of the hospitality industry. Instruction is provided in traditional mixing and serving techniques for numerous cocktails as well as wines and beers. Bar management, ordering, stock control and basic customer relations skills are also emphasized. Upon successful completion, students will be able to mix most common cocktails and know enough about beers and wine to seek employment in a restaurant, small lounge or neighbourhood pub.

Bar Management — 12.5 hours

Students who wish to establish or manage a small bar operation will gather the necessary expertise by successfully completing this short course. Reviews the history of alcoholic beverages. Theoretical instruction includes inventory and set-up, ordering and regulations, cash systems, sales reports, fraud systems, service, menu planning, marketing and public relations, and alcohol abuse. Includes a wine seminar. Ideal for someone currently employed in a bar whose responsibilities may include supervision. Will increase the job opportunities of students who have graduated from the Bartending course, thus providing a comprehensive package of bartending practice and management.

Cocktail Service — 8 hours

This career-oriented course will prepare anyone interested in the cocktail service portion of the hospitality industry for employment. Topics include public relations, history of various liquor forms, cocktail pricing, tray set-up and organization, bar terminology, wine service and other beverages, bar food service; common cash systems and floats, sales reports, opening and closing duties, regulations, and alcohol abuse. Employment opportunities may be found in restaurants, cocktail lounges, bars, pubs and other licensed premises.

Tour Guide — 30 hours

Provides the basic skills necessary to effectively organize and handle tour groups. Topics include tour group management, tour logistics, communication skills, handling emergencies, resource development, personal development. Students who successfuly complete this course will have a solid base for employment as tour guides. The course was developed at the request of the hospitality industry.

Cake Decorating — Basic to Advanced — 30 hours

Persons with artistic ability and a knack for creative design will find this course develops a skill which could bring pleasure, a second income or even a career. Teaches the various techniques involved in professional cake decoration. Students learn the art of coating cakes, applying borders, writing and flowers on cakes, color combinations, color tinting, non-icing decorations and surface textures. Upon successful completion of this hands-on course, students will be able to decorate many types of cakes, including wedding and other specialty cakes. Employment may be sought with a bakery or graduates may opt for self-employment.

Cooking TQ Refresher — 60 hours

Provides students with the necessary theory to enable them to write the provincial cooking examination. Students who enrol in this course require working knowledge of cooking and should intend to write the Ministry of Labour's Cooking trades qualification exam. Topics include tools and equipment; meats, fish and poultry — refrigeration, freezing, thawing, cutting, trimming, preparation, roasting, baking, grilling, broiling; sauces and stocks; entrées and main dishes; potato and vegetable cooking; farinaceous and cereal dishes; egg dishes; soups; short-order work; delicatessen, appetizers and cold buffets; breads and buns; pies, cakes and desserts.

Industrial Building Service Worker

Building Service Worker — Basic — 30 hours

Persons interested in seeking employment as building service workers or needing to understand the complexities of industrial cleaning will find this course useful. Training is strictly hands-on and provides an ideal introduction to the industry. Instruction is given in the care of floors and carpets, use of maintenance equipment, washroom sanitation, employee relations, repair and maintenance of small equipment. Graduates may seek employment in maintenance departments or janitorial firms.

Building Service Worker — Supervisory — 24 hours

Designed for maintenance managers, maintenance crew supervisors, executive housekeepers in hospitals and institutions, hotels, cleaning contractors and other managerial positions within the building service worker industry. Training is basically theoretical with some hands-on training. Students learn to deal effectively with problems common to entire buildings rather than specific cleaning jobs. Employee relations and morale, as well as advanced cleaning techniques are explored. Successful graduates of this course may lead a large cleaning crew or choose to become self-employed.

Physical Plant Equipment Maintenance — 30 hours

Designed for persons interested in the performance, operating principles and application of mechanical systems and equipment required in recreational facilities. Instruction covers air conditioning systems, refrigeration, artificial ice installations, swimming pools, fire protection systems, boiler pumps, fans and electric motors. Graduates may seek employment servicing such equipment with hotels/motels, community centres, parks boards, apartments, arenas or other recreational facilities.

Swimming Pool Operations and Maintenance — 24 hours

Persons who desire a better understanding of the maintenance and operation of swimming pools and their equipment should enrol in this course. Through a combination of hands-on and theoretical instruction, students learn the proper care and maintenance of swimming pools. Suitable for professionals in the field or owners of private swimming pools.

Media Communication

Interior Design — Basic — 30 hours

For practising interior designers and draftsmen, as well as persons employed in related occupations such as signage, fashion, stage/theatre/TV and industrial designers. Will also assist potential interior designers to assess their creative abilities for a career, or provide the layman with an opportunity to study interior design from a graphic viewpoint. Provides the practical knowledge and skills to communicate professionalism in the merchandising of interior design ideas. Demonstrations and laboratory assignments will cover graphic presentation techniques: sample boards, renderings, sketches, floor plans, elevations, projections, lettering, media and use of materials. Experiments in both residential and commercial space will be graphically presented in course projects.

Photography — Basic — 24 hours

For students who wish to know what cameras and accessories to buy and to increase their photographic skills. Combines theoretical instruction with hands-on training. Studies manual and automatic cameras enabling students to make informed decisions when purchasing new/used cameras and accessories. Students are required to supply a 35 mm camera. Discusses film types, care and handling of equipment, composition and design, people and candid photography, creative techniques, flash photography, close-ups, scenic and travel photos and some common tricks of professionals. Students will try to produce final photo images as they were visualized, gain new approaches to photography as an art medium, and apply techniques and equipment used by both amateurs and professionals.

Photography — Advanced — 24 hours

Students wishing to be professional or serious amateur photographers will take great strides toward that goal by enrolling in this course and building on Photography — Basic. Upon successful completion, students will be confident in their particular field of photography and will be prepared for advanced level specialty courses and workshops. The course is mostly hands-on and covers photographic problem situations, portrait lighting, night exposures, still life and action photography, specialized lenses and other equipment. Students are required to supply a 35 mm camera.

Commercial Photography — Level 1 — 24 hours

Provides a sampling of the various commercial applications of photography with emphasis on fashion photography. Discussion of fashion photography theory and the fashion industry will augment instruction in various photographic exercises. Instruction analyses art versus commercial work while concentrating on portfolio shooting for model and photographer. Ethics, make-up applications and lighting set-ups are taught through a series of shooting sessions with models. Students must have a 35 mm camera. Instruction is given in photographer/client and photographer/model relationships, concept planning and dealing with model agencies. Students work with models on a one-to-one basis and create fashion photographs based on preplanned concepts. The challenge will be to illustrate a garment and create a mood to complement the concept.

Commercial Photography — Level 2 — 24 hours

For those who wish to pursue a career as a commercial photographer. Students will be shown model portfolios to discuss photography tests, cost and photographic needs. Instruction will be given on model wardrobe planning and make-up for shooting, lighting and color versus black and white prints. Students require a 35mm camera for location and studio shoots with models and products. All projects will be critiqued by a professional. Students will have their own presentation portfolio upon completion of the course.

Fashion Photography — 9 hours

This workshop will provide students with the basics of fashion photography. Instruction on make-up, lighting and fashion will be covered the first evening, followed by an all day photography session with professional models. Students must have a 35mm camera. The instructor will discuss the photography session with the student and will critique each students work.

Photographic Darkroom — Basic — 18 hours

This is an ideal course for persons interested in learning about the black-and-white photographic darkroom. Designed for amateur photographers who have completed the Photography — Basic course or have equivalent experience. Various processing techniques are explored so students become competent in processing film and developing prints. Students are instructed in the use of darkroom equipment including enlargers and lights. Instruction is limited to black and white photography. Upon successful completion of the course, students will be able to set up and operate their own darkrooms.

Darkroom for Advanced Printing — Workshop — 9 hours

Students wishing to improve the quality of their printing and expand their knowledge will find this workshop beneficial. The instructor will provide demonstrations on different types of paper, use of chemicals and advanced printing techniques. Students will use this information to work on their individual projects. Each project will be critiqued at the end of the workshop by the instructor.

Portraiture Workshop — Basic — 9 hours

This workshop is ideal for anyone wishing to learn how to take a good portrait. Student orientation on clothes, colors, and setting will begin the workshop, followed by instruction on lighting equipment, flash and daylight lighting. Students will do a photography session using their own 35mm cameras. All projects will be individually evaluated at the end of the workshop. Upon completion, each student should feel confident of their ability to make good portraits.

Advanced Portraiture Workshop — 9 hours

Provides students with the knowledge to take better portraits. Topics includes colors and clothes, lighting, make-up, different styles of portraits. Students will photograph different portrait subjects in the studio and outside (weather permitting) in an all day photo session. A 35mm camera is a must. A critique on performance will follow the photo session.

Wedding Photography Workshop — 9 hours

Students with a 35mm camera and a keen interest in wedding photography will find this course ideal. It will provide all the basics needed to take good wedding photographs including color and clothes, setting, lighting, various styles of portraits. Students will participate in an all day photo session with models in the studio

and outdoors, weather permitting. The instructor will review each student's photographs individually and discuss their style at the end of the course.

Product Photography Workshop — 9 hours

Will appeal to anyone with a 35mm camera and an interest in product photography. Classroom discussion will introduce students to the various approaches to this specialized area. Practical instruction will be given on different lighting techniques and arranging a photoset. Each student will do a complete shoot; set-up, lighting and photography, which will be critiqued at the end of the workshop.

Graphics — Level 1 — 30 hours

Persons with an interest but no previous experience in graphic arts are encouraged to enrol in this exploratory course to foster that interest and determine their career potential. Students are introduced to the field through a series of practical projects which focus on advertising and brochure publication. Instruction will aid students in learning the fundamental and mechanical techniques applied to preparing artwork for reproduction/presentation. Includes layouts of various publications, type specifications, typesetting and paste-up, basic printing and other reproduction techniques and requirements.

Graphics — Level 2 — 30 hours

A continuation from Graphics — Level 1 enables students to further develop the knowledge and skills associated with the graphic arts profession. The fundamentals of layout and paste-up are explored for brochures, annual reports, magazines, display advertising, packaging and logo design. Students will be taught how to make these camera-ready. An introduction to typesetting equipment, photographic techniques, film stripping and printing equipment is provided. Levels 1 and 2 students will be able to prepare a professional, comprehensive presentation to a prospective client. Prerequisite: Graphics — Level 1.

Silk Screening — Basic — 32 hours

For students who wish to explore silk screening as an art medium and printing technique. Students receive hands-on training in the design, construction and production of silk screen printing. Instruction is given in profilm application, posters, photo screen techniques, ink selection, single and multi-coloured stencils, paper, film and photo stencils. All necessary materials are supplied.

Employment Opportunities

Cashier Training — 18 hours

Provides practical training in the operation of various types of electronic cash registers. Theoretical instruction is given in clerical procedures ringing off and cashing out, and public relations. The course is approximately 80% hands-on training. Successful graduates will have marketable skills and may seek employment in cashier-clerk positions.

Dental Office Co-ordinator — 30 hours

For persons with basic office skills who wish to specialize in dental office practice. Instruction includes telephone manners, scheduling appointments, billing (private and insurance), bookkeeping, purchasing supplies, inventory and keeping dental records. Because instruction commences at an intermediate clerical level and progresses to the specialization, students should have a foundation in office skills before enrolling in this course. Successful graduates will be able to perform the duties of a dental receptionist.

Vocational Instructor Training — 21 hours

Persons who wish to teach who have not had previous teaching experience will benefit from this course. Of benefit to potential instructors who want to teach technical, applied technology, vocational and commercial subjects, part-time. Includes classroom/shop teaching techniques, how to develop the curriculum, teaching method, learning materials for the course/program. Successful students will learn how to effectively pass on their knowledge to others.

Security Officer Training — 36 hours

For persons 19 years of age or older seeking employment as a security officer. Instruction includes what is expected of a security officer, physical security and locks, parking and traffic control, fire control, bomb threats and search techniques, in-house security, first aid, co-operation with the police, legal aspects and rights of a security officer. Upon successful completion, students will have the necessary training to perform general security guard duties. Applicants will be screened.