Full - Time Programs



CALENDAR 1993 1994

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1993/94
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BCIT

British Columbia Institute of Technology

B.C.I.T. LIBRARY
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The BCIT Mandate

LIBRARY USE ONLY

The British Columbia Institute of Technology will be an **innovative** and flexible advanced technology enterprise which will focus on those **initiatives** that increase the level of **entrepreneurial activity** within the province.

Specifically BCIT will:

- establish **expertise** in specific **technological** areas and develop **applications** for British Columbia business and industry;

- facilitate **technology transfer** by providing **innovation,** industrial assistance and contracted **applied research;** and,

- provide a **highly trained workforce** vital to the **establishment** and continuance of advanced technology in **British Columbia**

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

LIBRARY
B. C. INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVE.
BURNABY B. C. CANADA

Message from the President



At BCIT we are proud of our performance in preparing first-class graduates for B.C.'s leading industries. Our job-ready reputation is a trademark that prevails whatever program you decide to choose.

At BCIT we focus on quality. In your review of the calendar you will find up-to-date programs taught by highly motivated educators who are also professionals in their fields. Our success formula blends the traditional focus on theory with practical career-oriented emphasis to ensure you have the tools to succeed.

A new direction for BCIT and an opportunity for you is the establishment of degree bridging programs in collaboration with the B.C. Open University. These programs are available in the Schools of Business, Health Sciences and Engineering Technology, usually through Part-time Studies. I urge you to consider these important opportunities for career development and lifelong learning offered by this institution and the B.C. Open University.

Our faculty, support staff and management are committed to ensuring that your education at BCIT is both challenging and rewarding. I wish you every success in the year to come.

Sincerely,

John Watson

Published by: B.C. Institute of Technology
Marketing & Development
Editor: Mary Bacon
Typesetting: Ronaye Ireland
Printer: Web Press Graphics Ltd.
Cover Design: ADMEDIA

Changes to Curricula, Regulations and Services

Although it is proposed to adhere to the programs of study as set forth in this calendar, the Institute reserves the right to make, without prior notice, whatever changes are deemed necessary to the programs of study, services or regulations. The Institute reserves the right to cancel any program or service.

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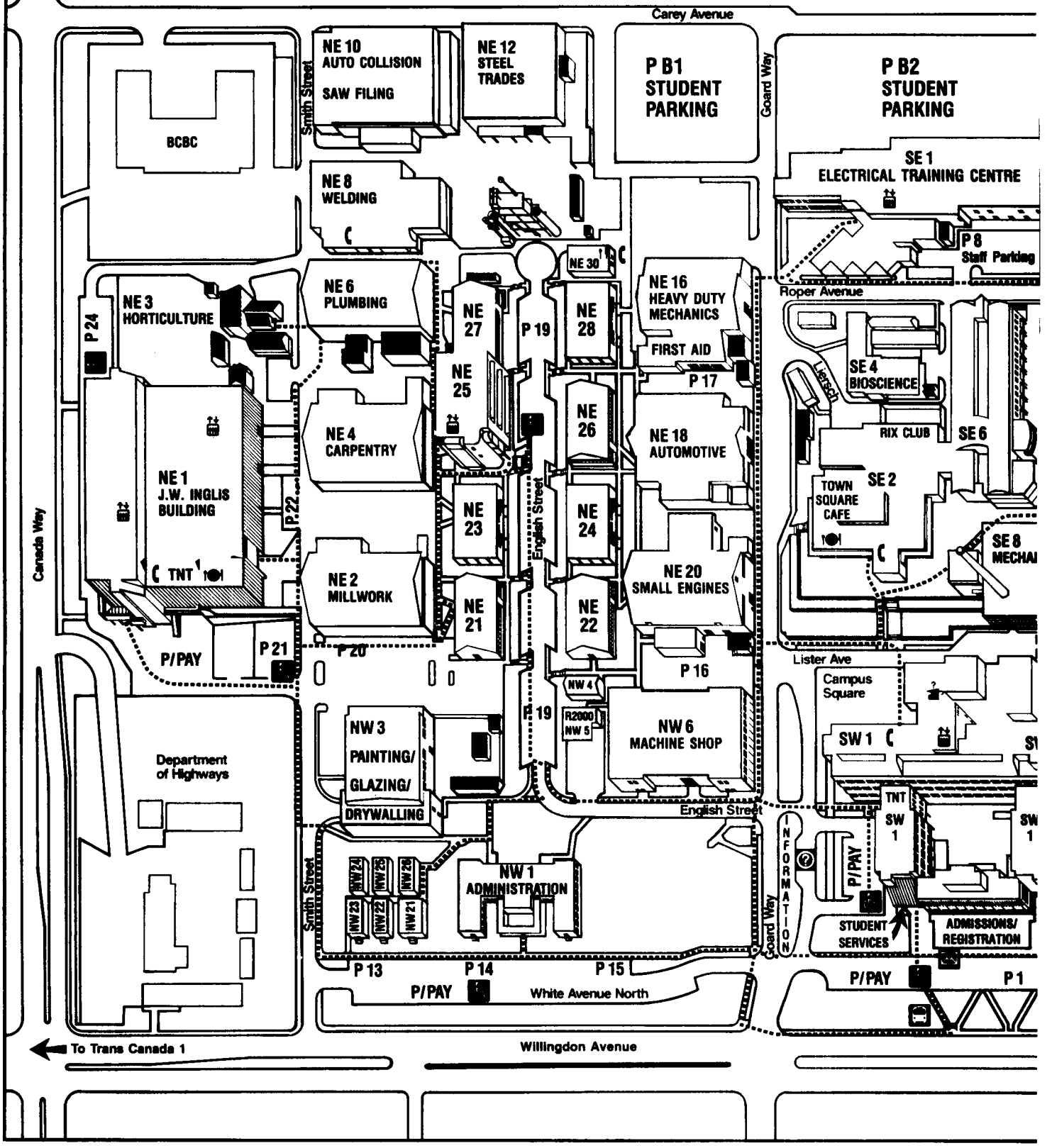
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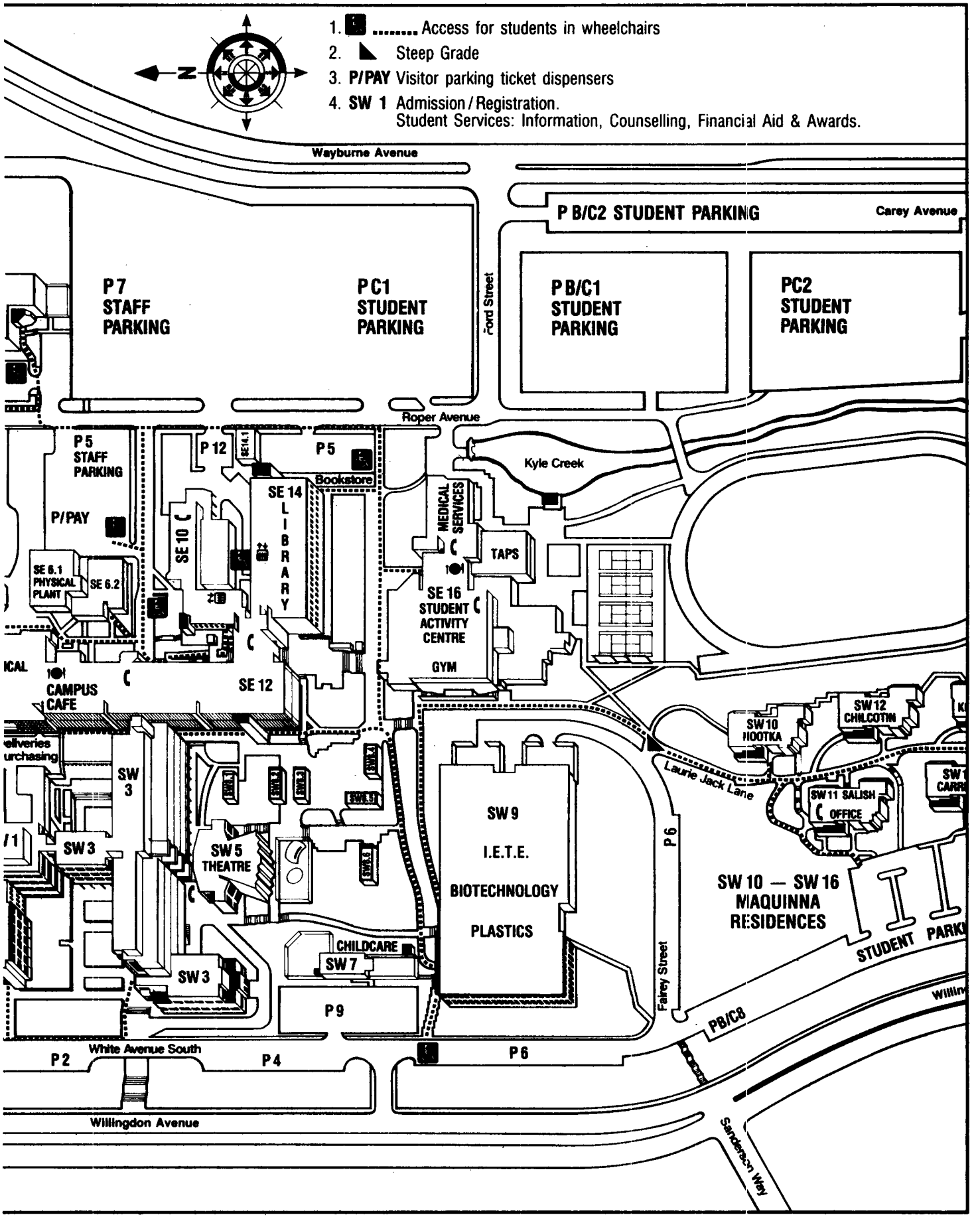
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3700 Willingdon Avenue
Burnaby, B.C. Canada
V5G 3H2

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Carey Avenue
P7 STAFF PARKING
PC1 STUDENT PARKING
Ford Street
PB/C1 STUDENT PARKING
PC2 STUDENT PARKING
Roper Avenue
P5 STAFF PARKING
P/PAY
P 12
SE14.1
P5
Bookstore
SE 14 LIBRARY
SE 10
Kyle Creek
MEDICAL SERVICES
TAPS
SE 6.1 PHYSICAL PLANT
SE 6.2
SE 16 STUDENT ACTIVITY CENTRE
GYM
CAMPUS CAFE
SE 12
SW 10 HOOTKA
SW 12 CHILCOTIN
Laurie Jack Lane
SW 11 SALISH
OFFICE
SW 3
SW 5 THEATRE
SW 9
I.E.T.E.
BIOTECHNOLOGY
PLASTICS
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SW 10 — SW 16 MAQUINNA RESIDENCES
STUDENT PARKI
CHILDCARE
SW 7
SW 3
P9
Fairey Street
PB/C8
P2
White Avenue South
P4
P6
Willingdon Avenue
Sanderson Way

General Information

CLASS LOCATIONS/OFFICE HOURS

1.BURNABY, MAIN CAMPUS /BBY
434-5734
3700 Willingdon Avenue
Burnaby, B.C.
V5G 3H2
Fax: 430-1331

Full-time and part-time courses and programs.
Registration: Part-time 434-1610
Student Records 432-8498
Refunds/Payments ..... 434-5734 (Local 5046)
Admission: Full-time programs 432-8419

OFFICE HOURS
Admission/Registration/General Enquiries

Mid-August to the first week in July the following year:
0830 - 1900, Monday to Thursday
0830 - 1630, Friday
0830 - 1230, Saturday
closed on holiday weekends.

July 13 to August 15:
0830 - 1630, Monday to Friday,
Closed Saturday.

2.DOWNTOWN EDUCATION CENTRE /DEC
687-4666
549 Howe Street, Vancouver, B.C.
V3C 2C6
Fax: 687-2488

Part-time technology courses only.

OFFICE HOURS
When school is in session:
0830 - 1800, Monday to Thursday
0830 - 1630, Friday
Otherwise 0830 - 1730, Monday to Thursday.

3.KASLO CAMPUS
439-4100
2780 East Broadway
Vancouver, B.C.
V5M 1Y8
Fax: 251-2008

Health part-time classroom courses only.

4.SEA ISLAND /SEA, 278-4831
Vancouver International Airport
5301 Airport Road, South
Richmond, B.C.
V7B 1B5

Full-time and part-time Aviation courses and programs only.

THE 24-HOUR CLOCK

0001-12:01 am	1300-1:00 pm
0100-1:00	1400-2:00
0200-2:00	1500-3:00
0300-3:00	1600-4:00
0400-4:00	1700-5:00
0500-5:00	1800-6:00
0600-8:00	1900-7:00
0700-7:00	2000-8:00
0800-8:00	2100-9:00
0900-9:00	2200-10:00
1000-10:00	2300-11:00
1100-11:00	2400-12:00 midnight
1200-12:00 noon	

DIRECTED STUDY/CORRESPONDENCE/ GUIDED LEARNING

If you can't get to any of our classroom sites... BCIT offers career-oriented credit and non-credit correspondence courses.

Guided Learning Courses in Health Sciences theory are offered through self study with telephone tutoring. Clinical courses in Health Sciences are offered in cooperation with hospitals and clinical agencies in various centres in the province.

Some courses travel - that is they are available upon request at centres throughout B.C.
Please call:

Transportation Systems	432-8784
Engineering Technology	432-8521
Health Sciences	439-4100
Business	432-8581
Academic Studies	432-8769
Trades Training	432-8277

PERSONAL DATA

It is the student's responsibility to ensure that 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 in this calendar. Please see refund section on page 27. This information can also be obtained from Registration or the Cashier.

AIDS POLICY

It is the policy of BCIT that there shall be no discrimination against any person at BCIT known or suspected to have AIDS, or to be infected with HIV (AIDS virus). While BCIT's policy does not require mandatory testing for AIDS, it should be recognized that BCIT has no control over the policies of external agencies employing BCIT students and/or graduates.

DISABLED ACCESS

BCIT is committed to providing students with disabilities with equal opportunity to maximize their potential in our educational setting.

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. A student who has been expelled or suspended for misconduct will not be admitted to the Institute grounds or buildings.
2. Acts of cheating, plagiarism and dishonesty are not tolerated; the degree of punitive action may range from a written warning to withdrawal from the program. These penalties may also be applied to students who knowingly contribute to the act of dishonesty, cheating and plagiarism.
3. The Institute is not responsible for debts incurred by student organizations.
4. 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.
5. A student will not be permitted to borrow or remove any apparatus or tools except by written authority of the President or his delegate.
6. General supervision over all forms of entertainment given under the auspices of a student organization comes under the jurisdiction of the President.
7. 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, students may be required to wear uniforms or otherwise dress themselves 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.

Attendance Policy

Regular attendance in lectures, seminars, labs, clinical and shop periods, is seen as critical to student success, and will be monitored by faculty. Excessive absence may result in failure or immediate withdrawal from the course or program.

Student Responsibility

1. In case of illness or other unavoidable cause of absence, students must communicate as soon as possible with their Program Heads or Chief Instructors, indicating the reason for absence.
2. Prolonged illness of three or more consecutive days must have a doctor's certificate sent to the department, substantiating the absence.

The following guidelines give the normal conditions whereby students may be prohibited from completing their programs or courses.

Trade Programs

Students who fail to report absences of three or more days to departments. Students who are absent for any cause, for more the 10% of the course/program.

Technology Programs

Students who are absent for any cause, other than substantiated illness, for more than 10% of the time prescribed for the course/program. In certain programs/ courses, special regulations may apply governing attendance; these will be stated in the course outline.

Appeals

Students may appeal the decision through the normal academic channels.

COMPUTER ETHICS

"Code of Ethics" on Access to Computer Resources at the British Columbia Institute of Technology

In the following statement, a "user" is any person who makes use of any computer owned or operated by BCIT. A "password" is a code word or number which identifies a user to a computer; that is, knowledge of a password which is recognized by a particular computer allows a person to use that computer (just as knowledge of the correct combination allows one to open a safe).

Access to BCIT computer equipment is authorized only for those persons doing work for which that equipment was acquired. Users should be guided by the following:

a) Do not attempt to discover other users' passwords, or to use any password discovered by chance. Take all reasonable precautions to prevent anyone from discovering your password. Report immediately any suspected "leak" of a password so that it may be changed. (Where two or more persons use the same password, which may be necessary on group projects, all those persons share responsibility for that password.)

b) Do not attempt to read or copy any information stored on the computer system unless explicitly authorized to do so. This includes information which has been stored by Computer Resources, by other computer users, by a commercial vendor or by any other party.

c) Do not use institute computer facilities for non-institutional projects, or for personal or commercial purposes, unless written authorization has been received from the Information and Computing committee.

d) Do not move any computing equipment, and be extremely careful to avoid damage.

Users of the computer systems are cautioned that violation of the above rules may disrupt service to themselves and others. Furthermore, it could violate a copyright or other non-disclosure agreement into which BCIT has entered.

Computer Resources staff who have access to information owned by users of the system will treat all such information as strictly confidential.

BOARD OF GOVERNORS

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Vice Chair
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Ray Walton, B.Sc., M.A., P.Eng., Dean
School of Trades Training
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School of EngineeringTechnology
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Enrolment Management Project
Jim Mitchell, Acting Director, Student Services
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International Education
Norman Streat, B.Sc.Eng., Ph.D., Director
Technology Centre
Jacqueline Hurst, B.Sc., M.D., Acting Director
Medical Services
Marilyn Wright, Director of Development

OFFICE OF THE REGISTRAR

The office of the Registrar is located in building SW1 on the first floor, facing Willingdon Avenue.

Mario Mazziotti, Registrar
Jeri Fostvelt, Associate Registrar
Michelle Philippe, Systems Assistant

Admissions/Registration
434-1610 (Part-time Registration)
432-8419(Full-time Admission)

Admissions/Registration receives and processes all applications for full-time programs and part-time courses. Registration for part-time courses can be made over the phone, in person, by FAX or mail. Enquiries for program information and application requests should be directed to Student Services at 434-3304. Enquiries from outside the greater Vancouver area may use the Toll Free Number 1-800-667-0676.

Office hours are:
Mid August to the first week in July the following year:
0830 - 1900, Monday to Thursday
0830 - 1630, Friday
0830 - 1230, Saturday
Closed on holiday weekends

First week in July to mid August
0830 - 1630, Monday to Friday
Closed Saturday
Please see our advertising supplements (flyers) for specific dates.

Lois Nightingale, Supervisor
General enquiries: 434-1610
Application requests: 434-3304

Student Records
432-8498

The following services are provided by the Student Records Department:
1. Transcript requests
2. Verification of attendance
3. Course credit evaluation
4. Graduation eligibility
5. Certificate/Diploma processing

Office hours are 0830 - 1630, Monday to Friday.

Susan Morphet, Supervisor
Rosa Kajic, Part-time Studies Marks Assistant: 432-8276
General enquiries: 432-8498

Timetabling
432-8450

The Timetabling Department produces the Institute's master timetables for all full-time and part-time programs and full-time technology examinations.

George Brown, Supervisor
General enquiries: 432:8451




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

Admission Policy

Prompt and equitable attention will be given to all applications. In those programs where the number of applications exceeds available seats, BCIT will select those applicants deemed to have the best opportunity for success. Applicants to Trades Training programs will be wait-listed as of the date their application is considered complete.

BCIT's primary purpose is to provide high-quality, post-secondary technological and technical education and training to the residents of British Columbia and Canada. National Diplomas and Certificates are offered in more than 132 full-time programs.

Applicant priority is given first to B.C. residents who are Canadian citizens and landed immigrants and who have lived in B.C. for the immediate 12 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.

All applicants must provide official proof that they meet Institute and Program prerequisites. Applicants lacking specific prerequisite courses or required grades will be referred for upgrading. All application documents must be supplied in the English Language. Translations into English are at the Applicant's expense. Application documents will not be returned to applicants.

Final acceptance or non-acceptance by BCIT is the decision of the Registrar. BCIT reserves the right to accept only those applicants who appear to have the greatest capability to succeed in their chosen programs.

Academic Requirements for Admission

Guidelines are established for admission to promote student success in programs. Most programs require grade 12 graduation with specific Grade 11 and Grade 12 subjects. Grade 10 is the minimum entrance requirement for some programs, however, employers may require Grade 12 graduation as a condition of employment. BCIT will take appropriate combinations of education and experience into consideration.

Applicants who complete the General Education Development (G.E.D.) or the Basic Training for Skills Development level 4 successfully will be considered to have the equivalent of Grade 12 graduation with English 12 (Pass).

Applicants Currently Attending B.C. High Schools

Many programs require specific grades in the required courses. Confirm the entry requirements for your program and note the following:

1. **Mathematics**
   Where Math 12 is a prerequisite, BCIT WILL NOT accept Survey Math 12.

   Where Math 11 is a prerequisite, BCIT WILL NOT accept Math 11A or Introduction to Math 11 or Trades Math 11.

   Where Math 11A is a prerequisite, BCIT WILL accept Math 11 or Introduction to Math 11.

   Where Grade 10 is a prerequisite, BCIT WILL accept Math 10A or Math 10.

2. **English**
   Academic English 12 is required for all Technology programs. Check program requirements to see if a specific grade is required for entry to your program.

   Where English 12 is a prerequisite, BCIT WILL NOT accept Communications 12 or English 12 (M.E.).

   Grade 12 graduation is prerequisite to most Trades Training programs. If no specific reference is made to an English 12 requirement, BCIT will accept Communications 12 or English 12 (M.E.).

   Where Grade 10 graduation is prerequisite, English 10 will be required for entrance.

English Language Proficiency

Since all BCIT students must possess an acceptable level of English language skill, applicants whose first language is not English and who have not graduated from B.C. Senior Secondary School will be required to demonstrate their competence in one of the following ways:

1. By scoring a minimum of 550 on the Test of English as a Foreign Language (TOEFL) and 4.5 on the Test of Written English (TWE).

   To obtain the information bulletin which outlines world-wide test locations and application procedures, write to: Test of English as a Foreign Language, CN 6151, Princeton, New Jersey, U.S.A., 08541-6151; or

2. By successfully completing the Vancouver Community College English Language Assessment Test. Scores required to satisfy various prerequisites are:

English 12	: 145 minimum
English 11	: 135
Communications 12	: 135
English 10	: 125 minimum

3. By successful completion of an approved, equivalent English or Communications course at another institution, with the entry grade required for the program you have applied for. Please contact BCIT Student Services, Tel. 434-3304, to determine the approved equivalents; or
4. By successful completion of BCIT Communication 003 or 004 with the entry grade for the program you have applied for. For programs requiring an entry grade of English 12 with C+, you must achieve a mark of 75% or better in COMM 003/004. For programs requiring an entry grade of English 12 with a P, you must achieve a mark of 65% or better in COMM 003/004; or
5. Some Trades Training programs allow applicants to write a pre-test to determine their English language ability and eligibility for entrance. Please note: Not all programs offer this option. Check the program prerequisites to see if a pre-test is offered; or
6. Individual assessment by the BCIT Communications department. This is only allowed when none of the other options are available to the applicant, on the recommendation of the Admissions department.

Mature Students

An applicant who has not graduated from a Senior Secondary School may be considered for admission as a "Mature Student." Mature students will be considered on the basis of their relevant experience. They must meet the Institute's English language requirements and any prerequisites specified by the Program. Applicants must supply academic documents and/or proof of relevant experience to support their applications. Once these requirements have been met, the Program Associate Dean in consultation with the Registrar and Subject Associate Deans will make the final decision. Applicants applying in this category must be at least 19 years of age at the time of application.

Transfer from Regional Colleges/Direct Entry

BCIT offers transfer of various programs from recognized regional colleges in B.C. All requests to transfer to BCIT should be submitted in writing, together with an application form and supporting documentation to the Admissions department. For more information, contact Admissions, 432-8419.

Direct entry is the terminology that defines entry of students to any level of a program where advanced standing is given and standard course requirements are recognized as being completed elsewhere or by other means. Direct Entry may apply to any level in the program beyond level one, but could also apply to combinations of courses in multiple levels. Sometimes, a student's program of study is customized based on the individual student background. Applicants who are interested in Direct Entry Admission should apply and submit all relevant documentation to Admissions.

Credit for Completion of Career Preparation Programs in Secondary Schools

Memorandums of Understanding have been signed between the Institute and many school districts. Credit for these programs may be given to students who have completed the secondary school portion of the training thus avoiding duplication of learning. For further information, please refer to the Industrial Education/Technology department of your school or the Student Services department at BCIT. Tel. 434-3304.

Admission: How to Apply

The Application for Admission form and all **official** supporting documentation should be submitted as early as possible to the Admissions Department, because spaces are limited in most programs. Application forms and information are available from BCIT Student Services, Tel. 434-3304. The application fee of $15 is required at the time of application. Applications received without the $15 fee will be held but not processed. Applicants are considered for only one program at a time. Technology applicants may indicate a 1st, 2nd and 3rd choice in order of preference.

Admission: When to Apply

Applications for admission to full-time programs are accepted at any time. However, processing and assessment for Technology programs occurs from the dates shown below and up to 14 days after classes commence.

Technology Programs	**Processing Date**
Term start: January 1993	
• General Nursing	June 1, 1992
• Electronics	June 1, 1992
• Engineering Technology Entry Program	June 1, 1992
Term start: May 1993	
• Engineering Technology Entry Program	September 1, 1992
Term start: August/September 1993	January 1, 1993
Term start: January 1994	
• Medical Radiography	January 1, 1993
• General Nursing	June 1, 1993
• Electronics	June 1, 1993
• Engineering Technology Entry Program	June 1, 1993

Trades Training Programs

Applications for admission to Trades Training programs are received and processed on an on-going basis and, once completed, are held until a seat becomes available.

Admission: Document Requirements

The following official documents must accompany the Application for Admission form. Photocopies, unless certified, are not acceptable.

1. Senior secondary school transcript showing graduation. For Trades Training programs, the transcript must show that the grade level required for entry(eg. Grade 10) has been completed.

   Applicants who are presently attending high school must submit a statement of marks for Grade 11 subjects and first semester Grade 12 subjects from the principal's office and a statement showing courses presently being undertaken.

   All marks must be substantiated by a final, official, secondary school transcript incorporating the school and provincial exam results. The official transcript from your secondary school must be received in a sealed envelope. Do not open the envelope. It must come to BCIT in its original, unopened, sealed state.

2. If applicable, all official post-secondary school transcripts.

3. Applicants who are not Canadian citizens must submit official government documents indicating Landed Immigrant status or Student Authorization designated for BCIT. International applicants must submit original official transcripts.

   BCIT Admissions understands the nature and importance of these documents and every effort will be made to ensure that the documents are returned. Where transcripts and other official documentation are not in English, the original documents must be accompanied by English translations and notarized at the applicant's expense.

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

5. Students who have been selected for admission must have medical insurance prior to registration. Non-Canadian students must apply in person to BCIT Medical Services for an "Application for Student Medical and Hospital Plan" prior to attending BCIT. Payment for this insurance must be made at this time, by cheque or money order, to the insurance company.

6. Applicants who withdrew voluntarily or were withdrawn from another post-secondary institution may be asked by the program department to provide a written explanation for their withdrawal or for written authorization to request a report from the previous institution. This report may be used to determine acceptance to the BCIT program.

Note: Academic documents are not returned. Applications and documents are not retained by the Institute for those applicants who are accepted but are unable to enroll or for those who are not accepted. If reapplying to BCIT, a new application must be completed and all supporting documentation resubmitted.

How to Make up Course Deficiencies

Preparatory programs are available for those students who lack specific prerequisites or desire refresher courses. For information, contact Student Services at 434-3304 or Academic Studies at 432-8515.

Engineering Technology Entry (ETE) Program

This 15-week program is designed to provide academic upgrading to students wishing to enroll in a BCIT Engineering Technology. The ETE program will provide courses in chemistry, communications, mathematics, physics and introduction to computers, which meet the School of Engineering Technology prerequisites. Subject to successful completion, students enrolled in the ETE program may be provisionally accepted into an Engineering Technology program. For further information refer to Academic Studies on page 106.

Trades Training Pre-entry Test

Many Trades Training programs allow applicants to challenge admission requirements by completing entrance examination(s). Exams are written every Tuesday and Thursday morning throughout the year, from 9 am to 12 noon, in Room 334 Building NE1 (J.W. Inglis). Applicants are not required to pre-register but must arrive on time as no one is admitted once the exam is in progress. Applicants currently attending High School who live outside the Lower Mainland, may arrange to write the exam at their High School. Tel. 432-8524 for more information.

Readmission

Students may interrupt their studies after the completion of any term/level. Students must officially withdraw if they wish to interrupt their studies. Contact Student Records for further details. To request readmission to the Institute, an application form must be completed and submitted to the Registrar's Office.

Part-time Day Course-by-Course Registration

Students may register in courses offered in full-time programs subject to the approval of the Registrar and Program Head, space being available, with official proof that prerequisites have been met.

A student making application for part-time day classes must obtain the signature of the program head and instructor of each course using the form "Daytime Course-by-Course Registration" available at the Student Records Office. Completed forms must be returned to the Student Records Office; registration will be permitted upon acceptance. Tuition fees are due and payable at time of registration. First-time applicants to part-time day courses must meet the Institute's general admission requirements of English 12 and citizenship. Applications must be submitted no later than 10 days into the term otherwise late payment reinstatement charges will apply.

Applicant Status Categories

Candidates making application will be informed of their status in writing according to the following guidelines:

Acceptance - Applicants who meet the requirements of the Institute and the program may be fully accepted.

Provisional Acceptance - A decision to accept provisionally in Technology programs is based upon the initial information submitted by the applicant. Full acceptance is dependent on final data submitted and applicability to criteria. Provisions must be cleared through the Admissions Office before an applicant is fully accepted. Only fully accepted applicants will be permitted to register and attend full-time classes. A provisional acceptance policy for Trades Training programs is presently under review.

Wait Lists - When all seats in a Technology program are filled, a wait list of qualified applicants is generated. If a space becomes available, an applicant on the wait list will be offered the seat. Wait lists are not transferred to subsequent intakes. Applicants to Trades Training programs are wait listed as of the date their application is complete.

Non-acceptance - The applicant does not meet the requirements of the Institute and/or the program is full and closed, (seats full, and wait list full).

PROGRAM PREREQUISITES

SCHOOL OF BUSINESS

Administrative Studies Degree Completion Program
BCIT Diploma of Technology in one of: Human Resource Systems, Management Systems, Financial Management, Marketing Management, Operations Management, International Trade, Transportation Logistics, **and** business experience.

Note: The Bachelor of Administrative Studies degree is offered by the **Open Learning Agency** in collaboration with BCIT.

Advanced Diploma in Business
BCIT Diploma of Technology in one of: Human Resource Systems, Management Systems, Financial Management, Marketing Management, Operations Management, International Trade, Transportation Logistics, **and** business experience.

Broadcast Communications
High School graduation with English 12 **plus** short essay (500 words) on career aspirations and reasons for entering Broadcasting. 25 wpm typing speed.

Business Administration
Diploma of Technology in Health or Engineering, College/ University graduation or equivalent.

Financial Management
High School graduation with Math 11 and English 12, both with C+. Preference given to applicants with better than C+ in Grade 12 and to those with at least 2 years working experience.

Human Resource Management
Diploma of Technology, College/University graduation, **plus** FMGT 101 and 201 and proficiency in microcomputer spreadsheet programs.

Human Resource Systems
High School graduation with Math 11 and English 12, both with C+.

International Trade
High School graduation with Math 11 and English 12, both with C+.

Management of Advanced Technology
BCIT Diploma of Technology in one of: Human Resource Systems, Management Systems, Financial Management, Marketing Management, Operations Management, International Trade, Transportation Logistics **and** business experience.

Management Systems
High School graduation with Math 11 and English 12, both with C+.

Marketing Management
High School graduation with Math 11 and English 12, both with C+. Grade 11 and 12 Science courses beneficial.

Operations Management
High School graduation with Math 11 and English 12, both with C+. Physics 11 desirable.

Contd. -->

Operations Management Certificate for Tradespersons
Journeyed certification. 3-5 years experience in trade. Math 11 and English 12, both with C+, or equivalent.

Transportation Logistics
High School graduation with Math 11 and English 12, both with C+.

Note: Please refer to page 13, if you wish to be considered under the Mature Student category.

See program description pages for other program prerequisites.

SCHOOL OF ENGINEERING TECHNOLOGY

Advanced Manufacturing
Diploma of technology equivalent to BCIT, or permission of the Associate Dean.

Bachelor of Technology
Diploma of Technology in Computer Systems or computer related discipline or degree. Interview.

Note: The Bachelor Of Technology degree is offered by the **Open Learning Agency** in collaboration with BCIT.

Biological Sciences
See **Biotechnology** and **Food Technology.**

Biotechnology
High School graduation with English 12, Math 12 and Chemistry 11.

Building
High School graduation with English 12, Math 12 and Physics 11, all with C.

CAD/CAM
First year entry: High School graduation with English 12, Math 12, Physics 11.

Second year entry: Diploma of Technology (BCIT or equivalent), departmental approval and CDCM 201 (or equivalent).

CAD Programming
Diploma of Technology equivalent to BCIT, or permission of the Associate Dean.

Chemical Sciences
High School graduation with English 12, Math 12 and Chemistry 11. Physics 11 and Chemistry 12 recommended.

Civil and Structural
High School graduation with English 12, Math 12 and Physics 11, all with C.

Computer Systems
Applications are invited from interested persons regardless of formal prerequisites. The following prerequisites usually ensure acceptance if space is available.

First year entry: High School graduation with at least six Grade 11 or 12 Arts & Sciences courses including English 12 and Math 11 both with C+; an overall C+ average in Grade 12; Computer Science 11 or 12 with C+.

Second year entry: The equivalent to first year **plus** Math 12 is recommended for Decision Systems.

Electronics
High School graduation with Math 12 and Physics 11, both with C+, and English 12 with C. Preference will be given to applicants with Physics 12.

Fish, Wildlife and Recreation
High School graduation with Math 11 with C+; Biology 11 and one Science 11, or Science or Math 12, and English 12.

Food Technology
High School graduation with Math 12, English 12 and Chemistry 11.

Forestry
High School graduation with Math 11 with C+ and English 12, plus two Science 11s, or one Science or Math 12.

Geographic Information Systems
Diploma of Technology or approval by the Associate Dean.

Industrial Design and Engineering Analysis
Diploma of Technology or University/College degree.

Industrial Education Teacher Education
Trade/Technology training or experience preferred.

Machine Vision Systems
Diploma of Technology equivalent to BCIT or permission of the Associate Dean.

Mechanical
High School graduation with English 12, Math 12 and Physics 11.

Mechanical Systems
High School graduation with English 12, Math 12 and Physics 11.

Mining
High School graduation with English 12, Math 12, Physics 11 or Chemistry 11.

Nondestructive Testing
Math 11 and English 12 plus trades training/ experience. Suitable trades include Welding, Pipefitting, Ironworking, Boilermaking, Aeronautical Trades, Millwright, Machinist, previous NDT.

Petroleum and Natural Gas
High School graduation with English 12, Math 12, Chemistry 11 or Physics 11

Plastics
High School graduation with English 12, Math 12, Chemistry 11 or Physics 11.

Quality Assurance and Nondestructive Testing
BCIT Diploma of Technology in Engineering or Operations Management **or** 2-year College Diploma in Science **or** a minimum of two years University Science/ Engineering courses.

Renewable Resources
See **Fish, Wildlife and Recreation** and **Forestry.**

Robotics and Automation
High School graduation with Math 12 and Physics 11, both with C+, and English 12. All completed within the last three years.

Software Development
Diploma of Technology in Computer Systems or computer related discipline/degree. Interview.

Surveying and Mapping
High School graduation with English 12, Math 12 and Physics 11.

Surveying Technician
High School graduation with English 12, Math 12 and Physics 11.

Wood Products Manufacturing
High School graduation with English 12, Math 12 and one Science 11: Physics (preferred) or Chemistry or Biology.

Note: Please refer to page 13 if you wish to be considered under the Mature Student category.

See program description pages for other program prerequisites.

SCHOOL OF HEALTH SCIENCES

Bachelor of Health Science
a) Diploma in Nursing or a Health Technology;
b) BCIT Advanced Diploma;
c) 30 credits from the Open University.

Note: The Bachelor of Health Science is offered by the **Open Learning Agency** in collaboration with BCIT.

Biomedical Engineering
High School graduation with Math 12, Physics 11, Chemistry 11, all with C+, and English 12. All completed within the last 5 years. Interview.

Cardiology
High School graduation with Math 12, Physics 11, Chemistry 11, Biology 11, English 12, all with C+. Biology 12 preferred. Interview.

Cardiovascular Technology
Academic and clinical performance in the Cardiology program.

Cytogenetics Laboratory Technology
B.Sc. in Cell Biology with emphasis on genetics and medical genetics, or current CSLT certification (R.T) in Medical Laboratory with academic prerequisites for 4th year university courses in medical/molecular genetics.

Diagnostic Medical Sonography
Diploma of Technology in Radiography, Nuclear Medicine or Registered Nursing, or B. Sc.in appropriate health related field. Interview.

Electrophysiology
High School graduation with Math 12, Physics 11, Chemistry 11, all with C+, and English 12. Interview.

Environmental Health
High School graduation with English 12, Math 12, Physics 11, Biology 11, Chemistry 12.

Medical Laboratory Technology
A. For the present 2-year program
1st year University courses or Community College equivalents:

Biology	-	UBC 101 or 102
Chemistry	-	UBC 110 or 120
Physics	-	UBC 110 or 120
English	-	UBC 100 (6 credits)
Mathematics	-	UBC 100 (6 credits)

All completed within the last 5 years. Interview.

B. For the proposed 3-year program
English 12, Biology 12, Chemistry 12, Math 12, Physics 11, all with C+. All completed within the last 5 years. Interview.

Medical Radiography
High School graduation with English 12, Physics 11 and 12, Biology 11 and 12, all with C+, all completed within the last 5 years. Basic Life Support (Level C). Basic typing skills. Basic computer course. Volunteer work (candy striping, etc.). Interview.

Nuclear Medicine
High School graduation with English 12, Math 12, Chemistry 11 and 12, Physics 11. Preference is given to applicants who have a C+ in these subjects. Interview .

Nursing, General (R.N.)
A. High School Graduates
Chemistry 11, Biology 12 (preferred) or Chemistry 12, English 12, all with C+; Math 11 with C; valid first aid certificate. Interview.

B. G.E.D. or B.T.S.D. Level 4 Graduates
Chemistry 11, Biology 12 (preferred) or Chemistry 12, English 12, all with C+, Math 11 with C. 30 hours patient contact in a medical facility. References. Interview.

Occupational Health and Safety
High School graduation with English 12, Math 12, Chemistry 11, Physics 11. Interview.

Prosthetics and Orthotics
High School graduation with English 12, Math 12, Physics 11. Woodworking/Mechanical courses in metalwork and woodwork recommended.

Note: Program intake is every other year. The next intake will be September 1994.

Please refer to page 13 if you wish to be considered under the Mature Student category.

See program description pages for other program prerequisites.

SCHOOL OF TRADES TRAINING

Aircraft Maintenance Engineer: Category M
Grade 12 with Math 11 and Physics 11. Good color vision essential. Mechanical background recommended.

Aircraft Structures
Grade 12 with Math 11A or Aviation Trade Math 11 or pre-test. Good color vision essential. Drafting recommended.

Auto Collision Repair/Refinishing
Grade 12 or successful pre-test in Math and Reading Skills. Valid B.C. Driver's Licence. Good physical condition. Not allergic to paints, thinners, etc. Free from respiratory problems.

Automated Business Equipment Technician
Successful completion of Electronics Technician Common Core Program.

Automotive Electronics Technician
Journeyed or T.Q. status (must provide licence number); or apprentice with minimum 2 years in trade;or successful completion of Automotive Mechanic; or pre-test.

Automotive Mechanic
Grade 12 or pre-test.

Automotive Service Technician
Grade 12 with English 12 with C and Math 11 with a C+ or pre-test. Interview.

Avionics: Category E
Electronics Technician Core Program or equivalent, plus Grade 12 with Math 11 with C or better, Math 12 preferred. Good color vision essential.

Benchwork and Joinery
Grade 10 or pre-test.

Boilermaking
Grade 10 or pre-test. Interview.

Carpentry
Grade 10 or pre-test.

Commercial Transport Mechanic
Grade 12 or pre-test.

Computer Numerical Control (CNC) Machinist: Basic
Machinist entry level trades training, trade certificate or journeyed status.

CNC Programmer 1 :Intermediate
CNC Machinist Basic level or CNC experience or interview.

CNC Programmer 2: Advanced
CNC Programmer 1 : Intermediate level or interview.

Diesel Engine Mechanic
Grade 12 or pre-test.

Drafting: Civil and Municipal
Grade 12 with Math 11 or pre-test. Good hand/eye coordination. Technical aptitude.

Drafting: Mechanical
As above.

Drafting: Structural
As above.

Drafting: Architectural Design - Technical and Graphical Communication
Grade 12 graduation with Math 11. Preference will be given to those who have C+ in Math 12 and English12. Applicants will attend a personal interview where they will submit the following:

1. A portfolio demonstrating their creativity in the manipulation of 3-dimensional form;
2. A short essay (500 words) detailing their reasons for choosing this program;
3. An aptitude test.

Electricity and Industrial Electronics
Grade 12 with Math 11 with C or pre-test.

Electronics Technician Common Core
Grade 12 with Math 11 with C. Math 12 preferred.

Gas Turbine Technician
Grade 12 with Math 11. Physics 11 recommended. Communications 12 accepted in place of English 12. Interview may be required.

Heavy Duty Mechanic
Grade 12 or pre-test.

Inboard/Outboard Mechanic
Grade 12 or pre-test.

Industrial Maintenance Mechanic
Grade 12 with mechanical electives or pre-test or assessment by department.

Ironworking
Grade 10 or pre-test. Interview.

Machinist
Grade 12 or pre-test.

Millwright
Grade 12 or pre-test.

Motorcycle Mechanic
Grade 12 or pre-test.

Painting and Decorating
Grade 10 (Grade 12 preferred) or pre-test.

Plumbing
Grade 10 or pre-test.

Power Engineering: General Program
Grade 12 or pre-test.

Power Engineering: Technical Program
Grade 12 with Math 12 or Survey Math 12 and Physics 11 or pre-test.

Power and Process Engineering
Valid 4th Class Power Engineering Certificate and successful completion of the Power Engineering Technical program; or successful completion of the first year of engineering-related, first-year, university or technical institute program; or individual assessment by the department.

Security Alarm Installer
Grade 12 with Math 11 with C (minimum) or pre-test. Security Clearance from the office of the B.C. Attorney General.

Sheet Metal Working
Grade 10 or pre-test.

Steel Fabricating
Grade 10 or pre-test.

Telecommunications Technician
Electronics Technician Common Core program or equivalent plus Math 11 with C. Math 12 preferred.

Tool and Die Technician
Grade 12 with mechanical electives and pre-test, and assessment by department.

Welding: Level C
Grade 10 recommended but an appropriate combination of work experience and education will be considered.

Welding: Level B
Registered "C" welder status. Completion of Level B modules plus appropriate work experience will qualify you to become a registered B welder in British Columbia.

Welding: Level A
Registered "B" welder status.

See program description pages for other prerequisites.

APPRENTICESHIP TRAINING

Apprenticeship is a combination of on-the-job and technical training that leads to certification as a qualified journeyperson. The apprenticeship program is administered by the Job Training Division of the Ministry of Advanced Education and Job Training.

Earning While Learning

Apprenticeship involves learning a trade through observation, practice, study and attending short technical courses at a college or technical institute. As an apprentice you work under the supervision of a qualified tradesperson to become familiar with the principles, skills, tools and materials of the trade.

Depending upon the trade, the term of apprenticeship varies in length from 2 to 5 periods (approximately 2 to 5 years). During this time you are indentured (bound by contract) to an employer who has agreed to provide the opportunity for you to work and gain experience in the trade. Your obligation as an apprentice is to perform the job to the best of your ability. For most trades, you must supply your own tools.

As an apprentice you are an employee. You are usually paid an hourly wage, which increases according to your experience in the trade and the current journeyed rate of pay. Depending upon the trade and the period of apprenticeship, wages range from 50% to 90% of the current journeyed wages.

Technical Training

Apprentices are required to attend technical training courses of 4 to 8 weeks in length in each period of apprenticeship. No tuition fees are charged for these courses; however, you must purchase course supplies and pay Student Activity Fees.

Income support for apprentices attending technical training courses is provided by the Canada Employment and Immigration Commission.

The Red Seal Program

In certain trades it is possible for graduate apprentices to qualify for the Interprovincial Red Seal which means their trade qualifications are recognized throughout Canada. The Interprovincial Red Seal is awarded when a person has successfully completed apprenticeship and has obtained a passing mark of 70% on an approved interprovincial examination.

Apprenticeship Programs

Apprentice training is provided by BCIT for students who are employed as apprentices. For information on sponsorship in Apprenticeship training, contact the Ministry of Advanced Education and Job Training at 4946 Canada Way, Burnaby, B.C. V5G 4J6. Tel. (604) 660-7100.

BCIT offers Apprenticeship training in the following programs:

Automotive Mechanic
Benchwork and Joinery (Cabinetmaker)
Boilermaking
Carpentry
Commercial Transport Mechanic
Drywall-Wall and Ceiling Installer
Drywall-Finisher
Electrical Motor Winder
Electrical Work
Electronics
Gas Fitter
Glazier
Heavy Duty Mechanic
Inboard/Outboard Mechanic
Industrial Instrumentation
Insulation (Heat and Frost)
Ironworking
L.M.I. Benchman
L.M.I. Circular Saw Filer
L.M.I. Saw Fitter
Machinist
Millwright
Motorcycle Repair
Plumbing
Refrigeration and Air Conditioning
Sheet Metal
Steamfitting and Pipe fitting
Steel Fabrication
Welding

COOPERATIVE EDUCATION (COOP)

Cooperative programs integrate paid work experience related to the program with academic instruction. In addition to helping you finance your education, they allow you to explore your career in a structured and purposeful manner, to test your skills, to adjust to the working environment; to acquire relevant work experience and first-class training, and to make valuable contact with potential employers.

BCIT currently offers coop programs in the following areas:

Trades Training
- Automotive Collision Repair/Refinishing
- Automotive Service Technician
- Industrial Maintenance Mechanic
- Tool and Die Technician

Technologies
- Electronics
- Robotics and Automation

For more information on Cooperative Education programs please contact the department at 432-8753.

COURSE CREDIT

A credit is defined as approximately one classroom hour per week over a 15-week term. Therefore, a course taught for 3 hours per week for 15 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 from Full-time Studies to Part-time Studies

A student transferring to part-time studies from a full-time diploma program may be granted credit exemption for courses completed successfully. A student who discontinues in the full-time program is encouraged to consider part-time studies programs.

Contact Student Services, Program Advising to arrange an appointment with an advisor for part-time studies.

Advanced Placement Categories

A maximum of 50% of the total credits in a program can be transferred into any one program.

1. Course Exemption

Where the individual course completed at BCIT is equivalent in course content and assessment to the same or another BCIT course that is required within the program from which certification is sought.

2. Course Credit

Where the individual course(s) and/or experience is equivalent in content and assessment to a BCIT course that is required within the program from which certification is sought, for:

a. course(s) completed at another recognized post-secondary institution;

b. approved course(s) that have been completed within or sponsored by a company, government body, or organization;

c. documentated experiential learning validating mastery in a course based on approved academic evaluation criteria.

3. Unassigned Credit

Where a course-to-course equivalency cannot be established, but the subject matter is credit-worthy toward the program for which certification is sought. This credit may be used as an elective credit (where applicable). Unassigned credit may be either in a subject area, eg. Economics - 3 credits, or in a program area, eg. Civil & Structural - 3 credits. Unassigned credit totals may not exceed the elective totals in a program of studies.

4. Challenge Credit

Where approval has been granted to challenge a course by the Associate Dean a formal evaluation procedure takes place. Students' abilities will be assessed through written and/or oral examination, research paper, or other means. As recommended by the Technology, Challenge Credit will only be recorded after the student has completed a specified number of BCIT credits, and only a specified number of Challenge Credits will be allowed for each program. The challenge privilege is not extended to all courses.

Challenge Credit is not considered as work completed at BCIT, but when a course is successfully challenged the number of credits required to complete a program is reduced.

5. Block Credit

Consideration for granting block credit is determined by individual programs, however, block credit is generally limited to first-year equivalency in an approved 2-year Diploma program, or 50% towards any program. Block credit is not transferable from program to program. Block credit is only recorded after the student has enrolled in the program in which block credit is recognized.

Block credit may be granted for:

a. Diploma of Technology graduates from a recognized post-secondary institution who are pursuing a second diploma in an approved program;

b. Baccalaureate graduates from a recognized post-secondary institution who are pursuing their first diploma in an approved program;

c. Students from a recognized post-secondary institution who are transferring to BCIT to complete an approved program.

Guidelines

Applications for credit may be made for each term or for each academic year. Applications for the next term will be processed approximately halfway through the current term. Student course credit application forms can be obtained from Student Records.

a. Two-year diploma and one-year diploma students may apply for credit only after they have been fully accepted and have paid their commitment/term fees;

b. Students transferring into second year at BCIT may apply for credit upon receiving full acceptance; second-year courses must be applied for individually;

c. Students who are presently enrolled at BCIT may apply for credit at any time within the academic year.

Credit is granted or denied by the Registrar upon recommendation of the Technology Associate Dean.

Specified Course Load Requirements

Students with credit(s) who need to enroll in substitute courses in order to meet load requirements for the following purposes, must have their substitute course(s) approved by the Associate Dean prior to the term start date.

1. B.C. & Canada Student Loans: 60% each term.
2. Graduating Awards: 100 % in each of the last two academic terms in the program.
3. Scholarships: 100% in each of the two academic terms being considered in the program.
4. Honors Standing: 75% of the total courses (in part-time or full-time) taken from an approved second-year program of studies.

Applications for credit must be submitted to the Office of the Registrar no later than 14 calendar days after the commencement of classes for each level. Late applications will only be accepted if prior written authorization has been received by the Registrar from the Technology Associate Dean.

Change of Program

After the commencement of classes, a request for program transfer requires the completion of a Program Change form by the student. Forms are available in Student Records. It is the responsibility of the student to obtain approval and signatures from the appropriate Associate Dean, Dean and Registrar. Permission must be granted by the Registrar before a change in program can be effected. Program change is subject to space availability and prerequisites being met. Wait-listed applicants are given priority placement before students who transfer once enrolled.

EXAMINATIONS, GRADING AND MARKS

Formal examinations are written at the end of each term or at the conclusion of a course. Students are required to take the examinations for each course at the time set by the Institute.

For full-time students, mid-term examination papers may be returned. Only those examinations designated as "restricted exams" by the Dean will not be returned.

Grading for each Trades Training program will depend on the method of training, learning outcomes and, in some cases, standards established jointly with industry and Apprenticeship training. The grading which will be used for individual programs will be given to students during orientation, at the beginning of training, or in course outlines.

Determination of Standing

Final standing is determined based on term progress and examination results.

80 - 100% First Class Standing
65 - 79% Second Class Standing
50 - 64% Pass Standing
0 - 49% Failure

Failure:%

%F • less than 50% except some course(s)/program(s) may have a fail grade greater than 50% as outlined in course descriptions.

F • formal withdrawal after official term deadline.

OF • unofficial/unapproved withdrawal, (course abandonment).

Withdrawal:

W • approved official withdrawal from a course/ program within withdrawal deadline.

Satisfactory:

S • course requirements fulfilled, no % mark assigned.

Unsatisfactory:

U • course requirements not fulfilled, no % mark assigned.

Course Credit:

C • recognition of approved equivalent studies outside BCIT.

• successful Challenge Exam.

Course Exemption:

EC • recognition of previous course exemption completion at BCIT (used only when course numbers differ and/or program goal changes).

Aegrotat:

%A • pass standing granted to a student who has a good term record but has an incomplete evaluation due to illness or other extenuating circumstances.

Adjudicated Pass:

AP • course standing raised to pass level based upon overall performance, permitting the student to continue in the program or to graduate.

Provisional Pass:

%PP • standing granted on the basis that the student will reach a pass standing in a continuing relevant subject area; will be changed to (P)ass or (%F)ail depending on success in the relevant continuing subject area.

Provisional Pass Fulfilled:

P • provisional pass conditions achieved.

Not complete:

N • course requirements not complete.

Audit:

AU • attended course, no credit given. Student is not formally evaluated and does not write examinations.

Attended Non-examined Course:

X • no examination or grade given.

Outside Source Grade:

R • refer to outside source for student achievement, eg: Apprenticeship Board - apprenticeship programs. Grade not calculated in weighted or cumulative term averages as not being taken as part of a full-time program.

Withdrawal from Program/Courses

Students withdrawing from one or more courses after the deadline will receive an "F" on their transcripts. Withdrawal with permission from the Associate Dean 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.

Students withdrawing officially 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.

All course attempts remain permanently on a student's record.

Distribution of Marks

The Statement of Marks is mailed to students at the end of each term by the Registrar's Office. In addition, graduating students will receive one free official transcript indicating certification granted.

Students who fail the term and are not permitted to continue in the program will be advised by telegram, if the break between terms is two weeks or less. A letter indicating student status and Statement of Marks follows the telegram.

Marks will not be released over the telephone.

Transcripts

A fee of $5 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. All requests must be submitted in writing to Student Records.

Withholding Statement of Marks

No Statement of Marks, transcript, diploma or certificate will be issued until the student has resolved 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 directed by the Board of Governors.

Marks Reassessments

The following policy is under review and is subject to change. Contact the Registrar's Office for further information.

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 awarded is cautioned that the grade has been reviewed carefully and aside from clerical error, reassessment seldom results in a higher mark.

Students wishing reassessment of their academic standing must first discuss the matter with the instructor responsible for the initial assessment and, if dissatisfied with the result of the discussion, with the program Associate Dean.

Failing a resolution at that level, students may 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.**

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

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

A formal request for reassessment will not be accepted for term projects, essays, lab work, quizzes or mid-term exams. It is the student's responsibility to discuss any dispute about individual course work with the instructor immediately upon receiving the assigned grade.

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 $50 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 Educational 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.

Attendance

See Conduct and Attendance, page 7.

Failures and Repetition

Students who fail more than one subject in a term may be permitted to repeat the term only at the discretion of the Dean and the Registrar (see Readmission procedure under Admission). It is the responsibility of students who have failed one or more subjects, but are permitted to continue with their programs of studies, to present evidence of successful completion of the failed subjects(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. Marks Review Guidelines within each School apply.

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.

CREDENTIALS

Credentials are awarded to graduates of the British Columbia Institute of Technology. The various levels of certification are described in the diagram shown below and include a wide range of programs offered within each category.

Most programs prescribe a balance of applied theory and skills necessary for employment in technical, technological or para-professional occupations including some curriculum which draws from advanced professional courses.

Advanced credentials are designed to provide practising technicians or technologists with advanced knowledge, skills and attitudes necessary for professional competence, advanced technical, technological, clinical or management roles, or for individual growth.

In some program areas, Advanced Diplomas provide a direct path for degree completion at another post-secondary institution. BCIT and The Open Learning Agency through its Open University have entered into collaborative degree arrangements in Business, Health Sciences and Engineering Technology.

Students are required to complete at least 50% of the program course work in order to earn the credential offered in that program. Students requiring less than 50% must have their individual program approved by the Dean of the School and the Registrar. All course substitutions must be approved by the program Associate Dean and Registrar in advance of each term start.

Convocation exercises are held each year in January and June. Technology and some Trades Training graduates will have their credentials conferred at the ceremonies. Graduates unable to attend the convocation exercises will receive their credentials by registered mail.

Honors Diploma/Advanced 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. This criterion also applies to one-year Diploma and Advanced Diploma programs.

Students who receive credit/exemption in one or more course(s) must register in acceptable substitute course(s) in order to maintain a 75% course load within the program term structure. Courses for this purpose must be pre-approved in advance of term start by the Associate Dean.

Issuing of Advanced Diplomas, Diplomas and Certificates

Upon successful completion of the requirements for certification, a graduating student must apply to the Registrar to be granted an Advanced Diploma, Diploma or Certificate of Technology. Trades Training graduates do not have to apply for certification. The Registrar is responsible for ensuring that all requirements for the program have been fulfilled before issuing such documents.

<table>
<tr><th>Levels of Certification</th><th>School of Business</th><th>School of Engineering Technology</th><th>School of Health Sciences</th><th>School of Trades Training</th></tr>
<tr><td>Advanced Diploma</td><td>Advanced Diploma in Business</td><td>Advanced Diploma in Engineering Technology</td><td>Advanced Diploma in Health Science</td><td rowspan="2">Diploma of Trades Training
Minimum 1900 hrs</td></tr>
<tr><td>Advanced Certification</td><td></td><td></td><td>Advanced Specialty Certificate</td></tr>
<tr><td rowspan="2">Diploma</td><td rowspan="2">Diploma of Technology</td><td>Industrial Education Dip.</td><td rowspan="2">Diploma of Technology</td><td>Advanced Certificate of Trades Training
Minimum 400 hrs</td></tr>
<tr><td>Diploma of Technology</td><td>Certificate of Trades Training
Minimum 600 hrs</td></tr>
<tr><td rowspan="2">Certification Level 3</td><td rowspan="2">Senior Management Certificate</td><td>Industrial Education Cert.</td><td rowspan="2">Certificate of Technology</td><td rowspan="3"></td></tr>
<tr><td>Certificate of Technology</td></tr>
<tr><td>Certification Level 2</td><td>Management Certificate</td><td>Intermediate Certificate of Technology</td><td>Certificate & Health Care Mgmt Level 2</td></tr>
<tr><td>Certification Level 1</td><td>Associate Certificate</td><td>Associate Certificate</td><td>Health Care Mgmt Certification Level 1 & Associate Certificate</td></tr>
<tr><td colspan="4">Statement of Completion & Attendance</td><td></td></tr>
</table>

All credentials, with the exception of Statements, shall be signed by the Registrar, the Dean of the School and the President and shall be imprinted with the seal of the Institute.

Only one certification document will be issued to each graduate. Replacements for lost diplomas may be issued, at cost, at the discretion of the Registrar.

Application for Certification and Graduation

Students **must apply** to receive their Advanced Diploma, Diploma or Certificate of Technology by completing the Application to Graduate form available in Student Records, SW1, 1585. This applies to all students who are currently enrolled in their final course(s). Applications **MUST BE** received by Student Records by the 10th week of the final term or course(s), eg: June Graduates must apply by March which is 10 weeks into the final term. For further information, please contact the Graduation Eligibility Officer in Student Records at 432-8733.

FEES AND EXPENSES: FULL-TIME TECHNOLOGY PROGRAMS

Tuition Fee Policy for Academic Year 1993/94 (subject to change)

Tuition fees are reviewed annually and have been established by the Board of Governors of BCIT and approved by the Ministry of Education for the academic year 1992/93 and are subject to change each academic year.

1. A non-refundable commitment fee of $75 is due upon the applicant's acceptance into first level, including one-year, post-diploma programs. This fee is applied towards the tuition fee and is not transferable to part-time courses, or acceptances into another Term.
2. An accepted applicant whose commitment fee has not been paid immediately upon acceptance or provisional acceptance, will forfeit the seat which has been reserved.
3. An accepted or provisionally accepted applicant is required to pay the remainder of first-level and fifth-level fees 60 days before classes commence. **(See Calendar of Events on Page 28)**
4. An applicant accepted or provisionally accepted after the specific deadline dates outlined in the Calendar of Events is required to pay full tuition fees upon acceptance or provisional acceptance.
5. One-year post-diploma program students pay according to two-level programs.
6. Students who have not paid their fees by the specified deadline dates outlined in the Calendar of Events will be levied a $50 late fee. This fee increases to $150 after 30 calendar days. Students will be subject to withdrawal for non-payment of fees and their registration cancelled until full payment has been received by the Institute.
7. Course-by-Course day school fees are assessed at $65 per credit to maximum tuition fee of $854 per level.

Payments can be made by Cash, Visa or Mastercard. Cheques or Money Orders should be made payable to the British Columbia Institute of Technology. Please ensure that your correct **Social Insurance Number** is included with your payment.

Note: There is a $15 charge levied for returned cheques.

International Students : Trades and Technology Programs

Tuition fees for International Students will be based on a cost recovery formula taking into account the direct and indirect costs of instruction. Except where reciprocal agreements or contracts exist, individual international students enrolled in standard programs will pay according to the current International Student Fee Structure.

Annual Fees

Tuition fees and all related policies are under review for the 1993/94 year by the BCIT Board of Governors and may be subject to change. Current 1992/93 fees are as follows:

	1st Year	2nd & 3rd Year
General Tuition	$1708	$1708
Student activity (annual)	100	100
Graduation (mandatory)	-	15
Total	**$1808**	**$1823**

First-year Students - Subject to change for 1993/94

All first-year students must pay their fees according to the deadline dates specified in the Calendar of Events. See page 28.

First Level	
General tuition (includes $75 non-refundable commitment fee)	$ 854
Student activity	50
Total	**$ 904**

Second Level	
General tuition	$ 854
Student activity	50
Total	**$ 904**

Second and third-year students - Subject to change for 1993/94

All second and third-year students must pay their fees according to the deadline dates specified in the Calendar of Events. See page 28.

Third Level	
General Tuition	$ 854
Student activity	50
Total	**$ 904**

Fees and Expenses Contd. -->

Fourth Level

General Tuition	$ 854
Student activity	50
Graduation (mandatory)	15
Total	**$ 919**

School of Business

All students must pay according to the fee schedule previously stated for the Technology Programs. Specific dates are outlined in the Calendar of Events page 28.

School of Engineering Technology

All students must pay according to the fee schedule previously stated for the Technology Programs. Specific dates are outlined in the Calendar of Events page 29.

Coop Fees - Electronics & Robotics **only.**

Note: Coop Program specific dates are outlined in the Calendar of Events see page 29.

General tuition	$ 427
Student activity fee	25
Total	**$ 452**

School of Health Sciences

All students must pay according to the fee schedule previously stated for the Technology Programs. Specific dates are outlined in the Calendar of Events. See page 28.

Note: General Nursing only - fifth level must pay $15 graduation fee.

One-Year Post-Diploma Programs

Fifth Level - due 60 days prior to the commencement of classes:

General tuition	$ 854
(includes $75 non-refundable commitment fee)	
Student activity fee	50
Total	**$ 904**

Sixth Level - due by the end of the first week of classes:

General tuition	$ 854
Student activity fee	50
Graduation (mandatory)	15
Total	**$ 919**

Course-by-Course Day School Registrants

All part-time day students are required to pay their full tuition fees at the time of registration and approval of their courses. Course-by-course fees are assessed at $65 per credit to a tuition maximum of $854 per level. These fees are subject to change for 1992/93. An additional $50 late fee will be assessed if fees are not paid by the due date. Students will be subject to withdrawal for non-payment of fees. This fee increases to $150 after 30 calendar days from the commencement of classes.

Advanced Studies in Business Registrants

All students must pay according to the specified dates outlined in the Calendar of Events. Course-by-course fees are assessed at $84 per credit to a tuition fee maximum of $854 per term/level. These fees are subject to change for 1993/94. Students will be subject to withdrawal for non-payment of fees. The same late fee policies also apply to this program.

Provisionally Accepted Applicants

All provisionally accepted applicants whose commitment fee has not been paid immediately will forfeit the seat which has been reserved. Students accepted after the specific deadline dates outlined in the Calendar of Events are required to pay full tuition fees upon provisional acceptance.

FEES AND EXPENSES: FULL-TIME TRADES PROGRAMS

Tuition Fee Policy for Academic Year 1993/94 (subject to change)

Tuition fees are reviewed annually and have been established by the Board of Governors of BCIT and approved by the Ministry of Education for the academic year 1992/93 and are subject to change to each academic year.

1. A non-refundable commitment fee of $75 is due upon the applicant's acceptance into first term (term structured programs) and all other fixed-duration training programs.
2. An accepted applicant whose commitment fee has not been paid immediately upon acceptance or provisional acceptance, will forfeit the seat which has been reserved.
3. An accepted applicant or provisionally accepted applicant is required to pay the remainder of the fees 2 weeks prior to the intake start date.
4. Students who have not paid their fees by the end of the first week of classes will be levied a $50 late fee. This fee increases to $150 after 30 calendar days. Students will be subject to withdrawal for non-payment of fees and their registration cancelled until full payment has been received by the Institute.

Annual Fees (subject to change for 1993/94)

Tuition fees and all related policies are under review for the 1993/94 year by the BCIT Board of Governors and may be subject to change. Tuition fees for fixed-duration training vary according to the length of the program. The 1992/93 tuition fee rate is $25 per week or $100 per month for most programs.

The Student Activity fee for fixed-duration training programs varies according to the length of the program. The 1992/93 Student Activity Fee rate is $2 per week or $8 per month. Students are required to pay the Student Activity Fee at the time of registration - including all Apprenticeship students.

MISCELLANEOUS FEES (SUBJECT TO CHANGE FOR 1993/94)

Duplicate ID Card	$ 10	
Replacement Diploma/Certificate	$ 50	
Trades ELTT Programs	$150	Learning Materials
Duplicate Welding Log Books	$ 10	
Duplicate Tax Receipt-T2202A	$ 10	
NSF Cheques	$ 15	
Transcript of Marks	$ 5	for first copy and
	$ 1	for each additional copy
Challenge Exam Fee		Cost of Course
Late Fee	$ 50	after 1st week of classes
	$150	after 30 calendar days
Application Fee	$ 15	
Reassessment of Marks	$ 25	per course
Appeal of Reassessment	$ 25	per course
Materials Fee Assessed to		
Electronic Core Program only:	$ 50	effective Sept/92
Increases to:	$ 75	effective Sept/93
Increases to:	$100	effective Sept/94
Parking:Technology Students	$ 40	Sept - Dec
	$ 50	January - May
Parking: Trades Students	$ 10	monthly
	$ 4	weekly
Other Student Parking Rates	$ 3	daily
	$ 6	per month
	$ 5	motorcycle

WITHDRAWAL AND REFUND PROCEDURE (SUBJECT TO CHANGE FOR 1993/94)

How to Withdraw

Students (excluding Apprentices) who wish to withdraw officially from their full program must begin the process by first reporting to Student Services.

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.

Refund Policy:
Full-Time Technology Students

Refund of fees for all full-time and part-time day students who withdraw up to 14 days after the commencement of classes:

General Tuition: Complete refund less $75
Student Activity: Complete refund

Refund of fees for students who withdraw after 14 days from commencement of classes:

General Tuition: No refund
Student Activity: Appropriate Student Activity Fee refunds will be issued by the Institute up to the designated "last day to withdraw to receive a refund."

Refund Policy:
Full-Time Trades Students

Students registered in Trade programs of up to and including 20 weeks duration have 14 calendar days after the start of class to withdraw to receive a full refund less $75.

Students registered in Trade programs of 21 weeks or more in duration have 28 calendar days after the start of class to withdraw to receive a full refund less $75.

No refunds are given after these dates. This also applies to students who are involuntarily withdrawn by the department due to poor performance or conduct. After these dates, any request for Student Activity Fee refund must be submitted in writing to the BCIT Student Association Office and the BCIT Library card must be turned in. Withdrawal verification will be made by the BCIT Student Association before processing the refund request.

IN ALL CASES, THE $75 COMMITMENT FEE IS NON-REFUNDABLE.

TUITION/T2202A TAX RECEIPTS

An official income tax receipt will be mailed by Financial Services on or before February 28. To allow for normal mail delivery, students should wait until March 31 before contacting Financial Services if their tuition fee tax receipt has not been received. A charge of $10 will be levied for a duplicate receipt.

Note: To ensure that your receipts are mailed to the correct address, students should notify the Student Records Office immediately if there has been a change of address. The receipts are mailed to the "mailing address" and not to the "permanent address."

FINANCIAL OBLIGATION TO THE INSTITUTE

No statement of marks, transcripts, diplomas or certificates will be issued until the student has cleared up all financial obligations to the Institute, such as tuition fees, Library fines, rent and NSF cheques.

CANCELLATIONS

The Institute will make every effort to offer all programs 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.

CALENDAR OF EVENTS 1993/94

BCIT is not open on statutory holidays.

See subsequent pages for Electronics Technology, Cytogenetics Laboratory Technology, Diagnostic Medical Sonography, Medical Laboratory Technology, Medical Radiography, General Nursing.

Due to unforeseeable future events, some dates may require adjustment. The Calendar of Events is correct at the time of going to press.

1993

Tue-Fri	**Jun 22-25**	AWARDS CEREMONIES
Wed-Fri	**Jun 23-25**	SPRING CONVOCATION
Thr	**Jul 1**	CANADA DAY- BCIT CLOSED.
Fri	**Jul 9**	Level 1: Fee deadline for September 7 term start.
Mon	**Aug 2**	B.C. DAY - BCIT CLOSED.
Mon	**Sep 6**	LABOUR DAY - BCIT CLOSED.
Tue	**Sep 7**	Levels 1, 3 & 5: Registration.
Wed	**Sep 8**	Classes begin.
Fri	**Sep 10**	Level 3: Fee deadline for September 7 term start.
Wed	**Sep 15**	SHINERAMA
Mon	**Sep 20**	Last day to withdraw to receive a full refund (less $75).
Mon	**Sep 20**	Last day to apply for course credit/ exemption and to apply to audit same course(s).
Mon	**Oct 11**	THANKSGIVING - BCIT CLOSED.
Fri	**Nov 5**	Level 1: Fee deadline for programs registering January 4/94.
Fri	**Nov 12**	Last day to withdraw in order to receive "W" on transcript for September 7 term start.
Thr	**Nov 11**	REMEMBRANCE DAY - BCIT CLOSED.
Mon-Fri	**Dec 13-17**	Examinations (most technologies).
Mon	**Dec 20**	Start of Christmas break for technology students.
Fri	**Dec 24**	CHRISTMAS EVE - BCIT CLOSED.
Sat	**Dec 25**	CHRISTMAS DAY - BCIT CLOSED.
Sun	**Dec 26**	BOXING DAY - BCIT CLOSED.
Mon	**Dec 27**	IN LIEU OF CHRISTMAS DAY - BCIT CLOSED.
Tue	**Dec 28**	IN LIEU OF BOXING DAY - BCIT CLOSED.
Fri	**Dec 31**	NEW YEAR'S EVE - BCIT CLOSED.

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Sat	**Jan 1**	NEW YEAR'S DAY - BCIT CLOSED.
Mon	**Jan 3**	IN LIEU OF NEW YEAR'S DAY - BCIT CLOSED.
Tue	**Jan 4**	Trades and Technology classes begin.
Fri	**Jan 7**	Fee deadline for January 4 term start.
Mon	**Jan 17**	Last day to withdraw to receive full refund (less $75).
Mon	**Jan 17**	Last to apply for course credit/ exemption and to apply to audit same course(s).
Fri	**Jan 28**	WINTER CONVOCATION
Mon-Fri	**Mar 14-18**	SPRING BREAK (except Electronics Technology and Robotics).
Fri	**Apr 1**	GOOD FRIDAY - BCIT CLOSED.
Mon	**Apr 4**	EASTER MONDAY - BCIT CLOSED.
Fri	**Apr 8**	Last day to withdraw to receive "W" on transcript.
Mon	**May 23**	VICTORIA DAY HOLIDAY - BCIT CLOSED.
Tue-Fri	**May 24-27**	Examinations - All Levels.
Tue-Fri	**Jun 21-24**	AWARDS CEREMONIES
Wed-Fri	**Jun 22-24**	SPRING CONVOCATION
Fri	**Jul 1**	CANADA DAY - BCIT CLOSED.

ELECTRONICS TECHNOLOGY

1993

Thr	Jul 1	CANADA DAY - BCIT CLOSED.
Fri	Jul 9	Term 1: Fee deadline for September 3 term start.
TBA		Application deadline for students on modified program.
Mon	Aug 2	B.C. DAY - BCIT CLOSED.
TBA		Timetabling.
TBA		In-person registration.
Mon	Sep 6	LABOUR DAY - BCIT CLOSED.
Tue	Sep 7	All levels: Registration; Co-op 1 and 2 begin.
Wed	Sep 8	Classes begin.
Fri	Sep 10	Terms 3, 4 and Co-op 1 & 2: Fees due.
Fri	Sep 10	Last day to change sections.
Wed	Sep 15	SHINERAMA
Mon	Sep 20	Last day to withdraw to receive full refund (less $75).
Mon	Sep 20	Last day to apply for course credit/ exemption and to apply to audit same courses.
Mon	Oct 11	THANKSGIVING - BCIT CLOSED
TBA		Start of term "B" courses.
Thr	Nov 11	REMEMBRANCE DAY - BCIT CLOSED.
Fri	Nov 12	Last day to withdraw in order to receive "W" on transcript for September 7 term start.
Fri	Nov 26	Term 1: Fee deadline for January 31, 1994 term start.
TBA		Last date to withdraw to receive "W" for Term "B" courses.
Fri	Dec 17	Last day of classes
Fri	Dec 24	CHRISTMAS EVE - BCIT CLOSED.
Sat	Dec 25	CHRISTMAS DAY - BCIT CLOSED.
Sun	Dec 26	BOXING DAY - BCIT CLOSED.
Mon	Dec 27	IN LIEU OF CHRISTMAS DAY - BCIT CLOSED.
Tue	Dec 28	IN LIEU OF BOXING DAY - BCIT CLOSED.
Fri	Dec 31	NEW YEAR'S EVE - BCIT CLOSED.

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Sat	Jan 1	NEW YEAR'S DAY - BCIT CLOSED.
Mon	Jan 3	IN LIEU OF NEW YEAR'S DAY - BCIT CLOSED.
Tue	Jan 4	Classes resume.
M-F	Jan 10-14	Exams: All levels.
TBA		Timetabling.
TBA		In-person registration.
Fri	Jan 28	WINTER CONVOCATION
Mon	Jan 31	Term 1: Registration. Classes begin.
Fri	Feb 4	Last day to change sections.
Fri	Feb 4	Fee deadline - all Levels.
Mon	Feb 14	Last day to withdraw to receive full refund (less $75).
Mon	Feb 14	Last day to apply for course credit/ exemption and to apply to audit same course(s).
TBA		Start of Term "B" courses
Fri	Apr 1	GOOD FRIDAY - BCIT CLOSED.
Mon	Apr 4	EASTER MONDAY - BCIT CLOSED.
Fri	Apr 15	Last day to withdraw to receive "W" on transcript.
TBA		Last day to withdraw to receive "W" for Term "B" courses.
Mon	May 23	VICTORIA DAY HOLIDAY - BCIT CLOSED.
Tue-Fri	May 24-27	Examinations all levels.
Tue-Fri	Jun 21-24	AWARDS CEREMONIES
Wed-Fri	Jun 22-24	SPRING CONVOCATION

CYTOGENETICS LABORATORY TECHNOLOGY

1993

Fri	**Jun 4**	Level 5: Fee deadline for term starting August 3, 1993.
Thr	**Jul 1**	CANADA DAY - BCIT CLOSED.
Mon	**Aug 2**	B.C. DAY - BCIT CLOSED.
Tue	**Aug 3**	Level 5: Registration. Classes begin.
Mon	**Aug 16**	Last day to apply for course credit/ exemption.
Mon	**Aug 16**	Last day to withdraw to receive full refund (less $75).
Mon	**Sep 6**	LABOUR DAY - BCIT CLOSED.
Wed	**Sep 15**	SHINERAMA
Mon	**Oct 11**	THANKSGIVING DAY - BCIT CLOSED.
Fri	**Nov 5**	Last day to withdraw to receive "W" on transcript.
Thr	**Nov 11**	REMEMBRANCE DAY - BCIT CLOSED.
Mon-Fri	**Dec 13-17**	Examinations.
Mon	**Dec 20**	Start of Christmas Break.
Fri	**Dec 24**	CHRISTMAS EVE - BCIT CLOSED.
Sat	**Dec 25**	CHRISTMAS DAY - BCIT CLOSED.
Sun	**Dec 26**	BOXING DAY - BCIT CLOSED.
Mon	**Dec 27**	IN LIEU OF CHRISTMAS DAY - BCIT CLOSED.
Tue	**Dec 28**	IN LIEU OF BOXING DAY - BCIT CLOSED.
Fri	**Dec 31**	NEW YEAR'S EVE - BCIT CLOSED.

1994

Sat	**Jan 1**	NEW YEAR'S DAY - BCIT CLOSED.
Mon	**Jan 3**	IN LIEU OF NEW YEAR'S DAY - BCIT CLOSED.
Tue	**Jan 4**	Level 6: Classes begin.
Fri	**Jan 7**	Level 6: Term fee deadline.
Mon	**Jan 17**	Last day to apply for course credit/ exemption and to apply to audit same course(s).
Mon	**Jan 17**	Last day to withdraw to receive full refund (less $75).
TBA		Last week term 6A. Exams.
Mon-Fri	**Mar 14-18**	SPRING BREAK
TBA		Clinical orientation phase begins.
TBA		Last day to withdraw to receive "W" on transcript.
Fri	**Apr 1**	GOOD FRIDAY - BCIT CLOSED.
Mon	**Apr 4**	EASTER MONDAY - BCIT CLOSED.
TBA		Clinical phase begins.
Mon	**May 23**	VICTORIA DAY HOLIDAY - BCIT CLOSED.
Tue-Fri	**Jun 21-24**	AWARDS CEREMONIES
Wed-Fri	**Jun 22-24**	SPRING CONVOCATION
Fri	**Jul 1**	CANADA DAY - BCIT CLOSED.
Mon	**Aug 1**	B.C. DAY - BCIT CLOSED.
TBA		Last clinical day.

Note: There is no summer break for this program.

DIAGNOSTIC MEDICAL SONOGRAPHY

1993

Thr	**Jul 1**	CANADA DAY - BCIT CLOSED.
Fri	**Jul 9**	Level 5: Fee deadline for term starting September 7, 1993.
Mon	**Aug 2**	B.C. DAY - BCIT CLOSED.
Mon	**Sep 6**	LABOUR DAY - BCIT CLOSED.
Tue	**Sep 7**	Level 5: Registration.
Wed	**Sep 8**	Level 5: Classes begin.
Wed	**Sep 15**	SHINERAMA
Mon	**Sep 20**	Last day to apply for course credit exemption and to apply to audit same course(s).
Mon	**Sep 20**	Last day to withdraw to receive full refund (less $75).

Mon	Oct 11	THANKSGIVING - BCIT CLOSED.
Fri	Nov 12	Last day to withdraw to receive "W" on transcript.
Thr	Nov 11	REMEMBRANCE DAY - BCIT CLOSED.
Mon-Fri	Dec 13-17	Examinations.
Mon	Dec 20	Start of Christmas Break.
Fri	Dec 24	CHRISTMAS EVE - BCIT CLOSED.
Sat	Dec 25	CHRISTMAS DAY - BCIT CLOSED.
Sun	Dec 26	BOXING DAY - BCIT CLOSED.
Mon	Dec 27	IN LIEU OF CHRISTMAS DAY - BCIT CLOSED.
Tue	Dec 28	IN LIEU OF BOXING DAY - BCIT CLOSED.
Fri	Dec 31	NEW YEAR'S EVE - BCIT CLOSED.

1994

Sat	Jan 1	NEW YEAR'S DAY - BCIT CLOSED.
Mon	Jan 3	IN LIEU OF NEW YEAR'S DAY - BCIT CLOSED.
Tue	Jan 4	Level 6A: Clinical begins.
Fri	Jan 7	Level 6: Term fee deadline.
Mon	Jan 17	Last day to apply for course credit/ exemption and to apply to audit same course(s).
Mon	Jan 17	Last day to withdraw to receive full refund (less $75).
Mon-Fri	Mar 14-18	SPRING BREAK
Fri	Apr 1	GOOD FRIDAY - BCIT CLOSED.
Mon	Apr 4	EASTER MONDAY - BCIT CLOSED.
TBA		Last week of Term 6A & exams.
TBA		Term 6B begins.
Mon	May 23	VICTORIA DAY HOLIDAY - BCIT CLOSED.
Tue-Fri	Jun 21-24	AWARDS CEREMONIES
Wed-Fri	Jun 22-24	SPRING CONVOCATION
Fri	Jul 1	CANADA DAY - BCIT CLOSED.
Mon	Aug 2	B.C. DAY - BCIT CLOSED.
TBA		Last week of Term 6B.

MEDICAL LABORATORY TECHNOLOGY

1993

Fri	Jun 4	Level 1: Fee deadline for term starting August 3.
Thr	Jul 1	CANADA DAY - BCIT CLOSED.
Mon	Aug 2	B.C. DAY - BCIT CLOSED.
Tue	Aug 3	Level 1: Registration. Classes begin.
Tue	Aug 17	Last day to withdraw to receive a full refund (less $75).
Tue	Aug 17	Last day to apply for course credit/ exemption and to apply to audit same course(s).
Mon	Sep 6	LABOUR DAY - BCIT CLOSED.
Wed	Sep 15	SHINERAMA
Mon	Oct 11	THANKSGIVING - BCIT CLOSED.
Fri	Nov 5	Last day to withdraw to receive "W" on transcript.
Thr	Nov 11	REMEMBRANCE DAY - BCIT CLOSED.
TBA		EXAMINATIONS
Mon	Dec 20	Start of Christmas Break.
Fri	Dec 24	CHRISTMAS EVE - BCIT CLOSED.
Sat	Dec 25	CHRISTMAS DAY - BCIT CLOSED.
Sun	Dec 26	BOXING DAY - BCIT CLOSED.
Mon	Dec 27	IN LIEU OF CHRISTMAS DAY - BCIT CLOSED.
Tue	Dec 28	IN LIEU OF BOXING DAY - BCIT CLOSED.
Fri	Dec 31	NEW YEAR'S EVE - BCIT CLOSED.

1994

Sat	Jan 1	NEW YEAR'S DAY - BCIT CLOSED.
Mon	Jan 3	IN LIEU OF NEW YEAR'S DAY - BCIT CLOSED.

Tue	**Jan 4**	Level 2: Classes begin.
Fri	**Jan 7**	Level 2: Fee deadline.
Mon	**Jan 17**	Last day to withdraw to receive a full refund (less $75).
Mon	**Jan 17**	Last day to apply for course credit/ exemption and to apply to audit same course(s).
Mon-Fri	**Mar 14-18**	SPRING BREAK
Fri	**Apr 1**	GOOD FRIDAY - BCIT CLOSED.
Mon	**Apr 4**	EASTER MONDAY - BCIT CLOSED.
Fri	**Apr 8**	Last day to withdraw to receive "W" on transcript.
Mon	**May 23**	VICTORIA DAY HOLIDAY - BCIT CLOSED.
TBA		Examinations.
Tue-Fri	**Jun 21-24**	AWARDS CEREMONIES
Wed-Fri	**Jun 22-24**	SPRING CONVOCATION

MEDICAL RADIOGRAPHY

1993

Mon	**Nov 1**	Full fees due for Level 1 commencing January 4.
Fri	**Dec 24**	CHRISTMAS EVE - BCIT CLOSED.
Sat	**Dec 25**	CHRISTMAS DAY - BCIT CLOSED.
Sun	**Dec 26**	BOXING DAY - BCIT CLOSED.
Mon	**Dec 27**	IN LIEU OF CHRISTMAS DAY - BCIT CLOSED.
Tue	**Dec 28**	IN LIEU OF BOXING DAY - BCIT CLOSED.
Fri	**Dec 31**	NEW YEAR'S EVE - BCIT CLOSED.

1994

Sat	**Jan 1**	NEW YEAR'S DAY - BCIT CLOSED.
Mon	**Jan 3**	IN LIEU OF NEW YEAR'S DAY - BCIT CLOSED.
Tue	**Jan 4**	Level 3: Classes start.
Tue	**Jan 4**	Level 1: Student orientation.
Fri	**Jan 7**	Level 3: Term fee deadline.
Mon	**Jan 17**	Last day to withdraw to receive full refund (less $75).
Mon	**Jan 17**	Last day to apply for course/credit exemption and to apply to audit same course(s).
Mon-Fri	**Mar 14-18**	SPRING BREAK
Fri	**Mar 18**	Last day to withdraw to receive "W" on transcript.
Fri	**Apr 1**	GOOD FRIDAY - BCIT CLOSED.
Mon	**Apr 4**	EASTER MONDAY - BCIT CLOSED.
Mon-Fri	**Apr 25-29**	Level 3: Examinations.
Mon	**May 2**	Level 4: Commences.
Mon	**May 2**	Level 1: Practicum commences.
Mon	**May 23**	VICTORIA DAY HOLIDAY - BCIT CLOSED.
Tue-Fri	**May 24-27**	Level 1: Examinations.
Fri	**May 27**	Level 1: Practicum ends.
Tue-Fri	**Jun 21-24**	AWARDS CEREMONIES
Wed-Fri	**Jun 22-24**	SPRING CONVOCATION
Mon	**Sep 5**	LABOUR DAY - BCIT CLOSED.
Tue	**Sep 6**	Level 2: Commences.
Fri	**Sep 9**	Level 2: Fee deadline.
Wed	**Sep 14**	SHINERAMA
Mon	**Sep 19**	Last day to withdraw and receive full refund (less $75).
Mon	**Sep 19**	Last day to apply for course credit/ exemption and apply to audit same course(s).
Mon	**Oct 10**	THANKSGIVING - BCIT CLOSED.
Wed	**Nov 2**	Last day to withdraw in order to receive a "W" on transcript.
Fri	**Nov 11**	REMEMBRANCE DAY - BCIT CLOSED.
TBA		Level 2: Exam week.

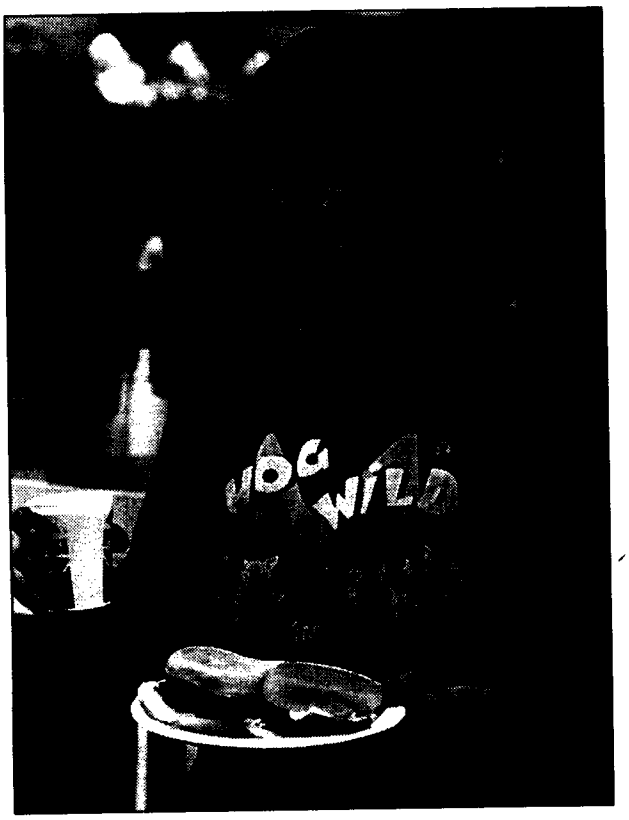
GENERAL NURSING

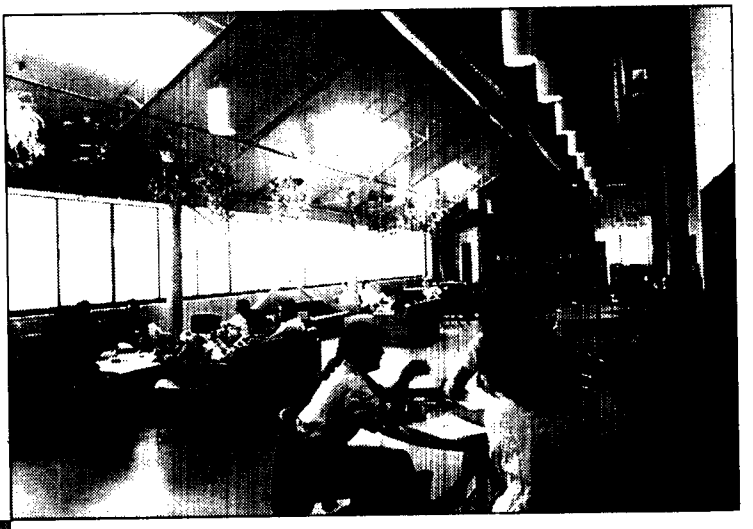
1993

Fri	**Jun 18**	Level 1: Fee deadline for term starting August 16.
Tue-Fri	**Jun 22-25**	AWARDS CEREMONIES
Wed-Fri	**Jun 23-25**	SPRING CONVOCATION
Thr	**Jul 1**	CANADA DAY - BCIT CLOSED.
Mon	**Aug 2**	B.C. DAY - BCIT CLOSED.
Mon-Fri	**Aug 16-20**	Level 1: Registration and orientation.
Fri	**Aug 20**	Fee deadline for classes starting Aug 16.
Mon	**Aug 30**	Last day to withdraw to receive full refund (less $75).
Mon	**Aug 30**	Last day to apply for course credit/ exemption and to apply to audit same course(s).
Mon	**Sep 6**	LABOUR DAY - BCIT CLOSED.
Wed	**Sep 15**	SHINERAMA
Mon	**Oct 11**	THANKSGIVING - BCIT CLOSED.
Fri	**Oct 22**	Last day to withdraw to receive "W" on transcript.
Mon	**Nov 1**	Level 1: Fee deadline for January 4/ 94 term start.
Thr	**Nov 11**	REMEMBRANCE DAY - BCIT CLOSED.
Mon-Fri	**Dec 13-17**	Examinations all levels.
Mon	**Dec 20**	Start of Christmas break.
Fri	**Dec 24**	CHRISTMAS EVE - BCIT CLOSED.
Sat	**Dec 25**	CHRISTMAS DAY - BCIT CLOSED.
Sun	**Dec 26**	BOXING DAY - BCIT CLOSED.
Mon	**Dec 27**	IN LIEU OF CHRISTMAS DAY - BCIT CLOSED.
Tue	**Dec 28**	IN LIEU OF BOXING DAY - BCIT CLOSED.
Fri	**Dec 31**	NEW YEAR'S EVE - BCIT CLOSED.

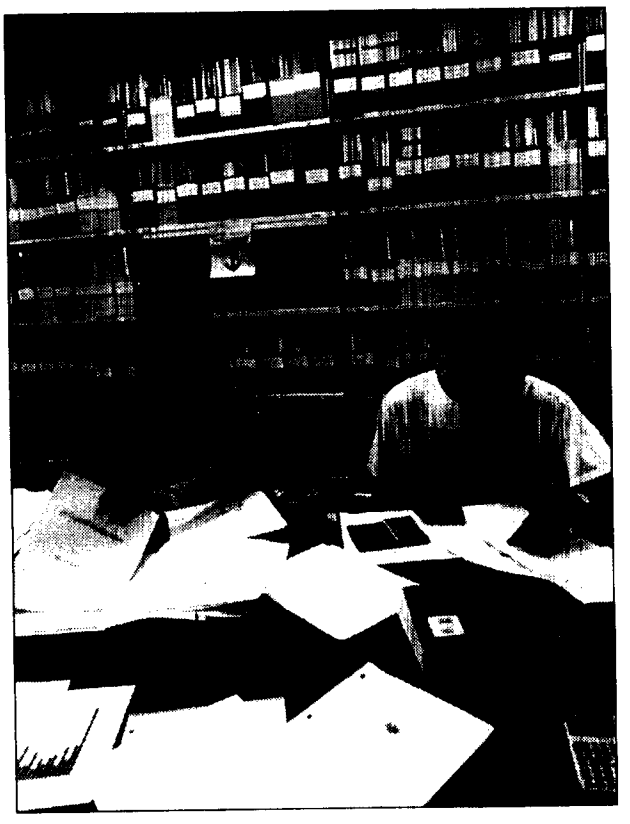
1994

Sat	**Jan 1**	NEW YEAR'S DAY - BCIT CLOSED.
Mon	**Jan 3**	IN LIEU OF NEW YEAR'S DAY - BCIT CLOSED.
Mon-Fri	**Jan 4-8**	All Levels: Registration and Orientation.
Fri	**Jan 7**	Levels 2, 3, 4 & 5: Fee deadline.
Mon	**Jan 17**	Last day to withdraw to receive refund (less $75).
Mon	**Jan 17**	Last day to apply for course credit/ exemption and to apply to audit same course(s).
Fri	**Jan 28**	WINTER CONVOCATION
Mon-Fri	**Mar 14-18**	SPRING BREAK
Fri	**Apr 1**	GOOD FRIDAY - BCIT CLOSED.
Mon	**Apr 4**	EASTER MONDAY - BCIT CLOSED.
Fri	**Apr 8**	Last day to withdraw to receive "W" on transcript.
TBA		Examinations - All levels.
Mon	**May 23**	VICTORIA DAY HOLIDAY - BCIT CLOSED.
Tue-Fri	**Jun 21-24**	AWARDS CEREMONIES
Wed-Fri	**Jun 22-24**	SPRING CONVOCATION


HOG WILD







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STUDENT SERVICES

The Student Services reception area for Program Advising, Counselling and Financial Aid and Awards is located at the northwest corner, 2nd floor, Building SW1. Hours of operation are 0830 - 1630 Monday - Friday, however, evening services are available at various times of the year. Phone 434-3304 for information.

Staff

Val Karpinsky, B.A. (Hons.)
Director, Enrolment Management Project
Jim Mitchell, Acting Director, Student Services
Sandie Mooney, Office Administrator
Jan Wadsworth, Clerical Supervisor
Mariana Aussem, Clerical Support
Joyce Davidson, Admin Assistant
Services for Students with Disabilities
Lisa Graham, Clerical Support
Lisa Lawley, Clerical Support
Lisa Pedersen, Clerical Support
Muriel Shaw, Clerical Support

PROGRAM ADVISING

Program Advisors provide information through an interview process about programs, learning and career opportunities for full and part-time students.
We assist students with program selection and provide information about skill requirements and occupations. Students with undefined goals are referred by Program Advisors to Counsellors for career planning. Program Advisors acquaint prospective students with institute/campus services and facilities and also participate in Secondary School visits throughout the province. We look forward to hearing from you. Our phone number is 434-3304. Students outside the Lower Mainland may reach us by using the Program Advising Toll-Free Line: **1-800-667-0676.**

Program Advisors

Raelene Christie, B.A., Coordinator
Linda Becerra
Chikako Fong, B.A.
Midge Mason, B.A., B.Ed.
Pat McCall, B.A.

Program Advisors - Part-time Studies

Sandra Arnott, Business
Chris Lloyd, Dipl.T., Business
Ann McNaughton, Cert., Engineering Technology and Trades

COUNSELLING

Counselling Services offer free, confidential career, educational and personal counselling to current and prospective BCIT students.

Appointments may be made through Student Services reception or by telephone: 434-3304. Drop-in sessions provide half-hour appointments for on-campus students who need to deal with concerns as promptly as possible. These appointments are available between 1030 and 1430, Monday to Friday.

Group information sessions are held weekly for prospective students interested in learning about BCIT full-time Technology programs. Daytime and evening sessions are available. Register with Student Services reception at 434-3304.

Free, noon-hour group counselling workshops for on-campus students are conducted during the Fall and Winter terms, on topics such as study skills, time management, stress management, job search strategies, etc. Counselling provides assistance with the following:

Careers:
Career planning/selecting a course or program
Interests/aptitudes
Decision-making/goal setting
Career change
Career planning - after graduation
Job search strategies

Education:
Returning to school
Achievement/progress/grades
Time management and study habits
Facing and doing tests/test anxiety
Concentration/motivation/interest
Student rights and responsibilities
Relationship with instructors
Withdrawal from subject/program
Consultation with instructors
Support services for students with disabilities

Personal Concerns:
Coping with life change
Communication skills
Self-confidence/esteem/assertiveness
Stress, tension and anxiety
Relationships with family/friends/peers
Referrals to agencies
Grief/loss/loneliness.

Career Search Workshop (ADMIN 916)

This course is offered through Part-time Studies for individuals wanting to explore career goals. To register, contact 434-1610 or 687-4666. This 12-hour course covers:

- Interest testing
- Aptitude testing
- Values clarification
- Decision making
- Goal setting and implementation

For more information, contact Counselling at 434-3304.

Career Resource Centre

The Career Resource Centre provides career planning, occupational and student life information, videos, brochures, as well as career profiles on BCIT programs.

Services for Students with Disabilities

Any student requiring classroom accommodations or any other support service, please contact Shirley Coomber, Rhonda Margolis or Linda Alexander at 434-3304. Services include career, educational and personal counselling, agency liaison, interpreting services (classroom), tutoring, note-taking, taped books/exams, large print photocopying, proof readers and exam support, etc.

It is recommended that as much lead time as possible be given to guarantee support services. This is particularly important for taped books and visual language interpreting services.

Hearing impaired students can arrange an interpreter for counselling appointments through the Western Institute for the Deaf at 736-4381.

A current assessment from students with learning disabilities is helpful in determining learning strengths and in identifying appropriate support services.

In order to qualify for support services, students require documentation of their disability from an appropriate professional.

There are five full-time, two part-time counsellors and a learning specialist to serve you. Each counsellor maintains liaison duties with an academic school as outlined below. To book an appointment please call 434-3304.

Counselling Staff

Linda Alexander, M.A.
Counsellor/Services for Students with Disabilities.
Shirley Coomber, B.Ed., M. Ed., A.R.W., Counsellor/
Coordinator, Counselling & Services for Students with Disabilities.
Stu Gibbs, B.A., M.S.Ed., Counsellor, Liaison Trades.
Heather Hyde, B.A., M.A., R.Psych., Counsellor
Liaison Health Sciences.
Rhonda Margolis, B.A., M.A., Counsellor
Services for Students with Disabilities.
Howard Peto, B.S.A., M Ed., Counsellor, Liaison Business.
Derek McLauchlan, Ph.D., Learning Specialist
Services for Students with Disabilities.
Jean Spence, B.A., M.Ed., Counsellor
Engineering Technology

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/supplies costs, single students not living with their parents can expect to spend approximately $850 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.

Entrance Awards

Technology and Trades students entering BCIT immediately after B.C. Grade 12 can apply for President's Entrance Awards valued at one year's tuition. Applications are available from high schools. Students coming to BCIT after taking one or more years since high school for activities such as work or attending another post-secondary institution can apply for BCIT Alumni Entrance Awards. Applications can be obtained from the Alumni Affairs Office at 432-8847.

Up to three Canada Scholarships valued at $8000 each are awarded to students who are entering specified School of Engineering Technology programs and who intend to transfer to a degree program immediately after graduation from BCIT. Eligible programs are: Biotechnology, CAD/CAM, Chemical Sciences, Civil & Structural, Computer Systems, Electronics, Fish, Wildlife & Recreation, Forestry, Mechanical, Mining, Petroleum, Survey. Canada Scholarship applications are available from high schools and also from the BCIT Financial Aid and Awards office.

Information on Entrance Awards for women students entering non-traditional Technology and Trades programs, and special awards for students entering Food Technology, Mining, and Occupational Health & Safety programs can be obtained from Financial Aid & Awards.

B.C. Student Assistance Program

The B.C. Student Assistance Program includes three types of assistance: Canada Student Loans; B.C. Student Loans; and Equalization Payments. The maximum assistance a student is eligible for varies according to program length and whether a student has dependents. Based on 1992/93 guidelines, the maximums are:

PROGRAM LENGTH (WEEKS)	WITHOUT DEPENDENTS	WITH DEPENDENTS
13	$2808	$4303
17	$3672	$5627
22	$4752	$7282
30	$6480	$9930
34	$7344	$11254
39	$8424	$12909
43	$9288	$14233
52	$1123	$17212

Note: "Dependents" = dependent children.

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 with financial needs which 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 BCIT Employment Placement Services beginning in 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.

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 contribution 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. Trades students must also complete an application to be considered for bursaries. The Trades deadline is the 29th of each month.

BCIT Technology 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.

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 432-8555 or visit the Financial Aid Reception in Student Services located in Building SW1, Room 2300. Hours are 0830 to 1630, Monday to Friday.

Staff

Jennifer Orum, B.Ed., M.A., Coordinator
Jim Anderson, B.A., Senior Advisor
Siok Ang, B.A.(Hons.), D.P.M., EXD, Advisor, Technologies
Angie Chan, Dipl.T., Advisor
Cathy Schweers, Advisor
Avalon Tagami, Advisor
Hanne Logan, Senior Financial Aid Assistant
Jennifer Higgins, B.A. (Hons.), Financial Aid Assistant
Lisa Ho, Financial Aid Assistant

GRADUATING AWARDS

Honor Awards

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 December graduates from the Electronics Technology and December graduates from Nursing.

The **Lieutenant Governor's Silver Medals** are awarded for academic excellence and contribution to the Institute and/or the community at large. Two are presented each year, one to a Trades Program graduate and the other to a graduate of a Certificate Program.

The **Board of Governors' Citizenship Award** is presented to a graduating Technology student who has demonstrated outstanding leadership and service to peers, faculty and staff and who has achieved at least second class standing.

The **President's Award** is presented to a graduating Technology student with a first class or high second class standing who has a record of active participation in student activities, including ones that have brought recognition to the Institute.

The **Deans' Awards** are presented to the most outstanding student in each of the four Schools: Business, Engineering Technology, Health Sciences and Trades Training.

ACADEMIC AWARDS

Academic Awards are presented annually to students who achieve the highest academic standing in the final two academic terms of their program of studies. The following awards were presented at the June 1991 Graduating Awards Ceremony.

SCHOOL OF BUSINESS

Administrative Systems
The Human Resource Systems Award
The Management Systems Graduating Award
The Business Administration Double Diploma Award
The Vancouver Transportation Club Award in Transportation-Logistics Management
The Rotary Club of Burnaby - Hastings Award
The International Trade Graduating Award

Broadcast Communications
The British Columbia Association of Broadcasters Award

Financial Management
The Computer Clinic, Great Plains Software, Rosenbaum Systems Award in Microfinancial Systems
The International Financial Centre Vancouver Award in Investment Management
The Chevron Canada Taxation Award
The Institute of Chartered Accountants of B.C. Award in Advanced Accounting
The Society of Management Accountants of British Columbia Award
The Royal Bank Finance Award

Marketing Management
The Real Estate Council of British Columbia Award in Real Estate Studies
Palmer Jarvis Advertising Award in Advertising and Sales Promotion
Right Associates Award in Professional Sales
The Rogers Cablesystems Inc. Award in Technical Sales and Marketing
Federal Business Development Bank Award in Small Business Development
The Ryan Schlyecher Memorial Award in Tourism
The Century 21 Canada Award

SCHOOL OF ENGINEERING TECHNOLOGY

Biological Sciences
The Fisheries Council of B.C. Award in Food Technology
The Biotechnology Graduating Award

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

CAD/CAM
The Vancouver Women's ORT Award

Chemical Sciences
The FMC of Canada Limited, Chemical Products Group Award
Canadian Society for Chemical Technology Award in Environmental and Industrial Chemistry

Civil and Structural
The Sandwell Inc., Colonel W.G. Swan Award

Computer Systems
The Finning Ltd. Award
The IBM Canada Ltd. Award
The Computer Systems Award in Microcomputer Systems
The Computer Systems Award in Expert Systems
The Computer Systems Award in Data Communications

Electronics
The Instrument Society of America Award in Process Automation and Instrumentation
The MacDonald, Dettwiler and Associates Limited Award in Control (Microprocessor)
The Telecommunications Graduating Award
The Power Option Graduating Award

Geographic Information Systems
Urban and Regional Information Systems Association, B.C. Chapter

Industrial Education Teacher Education
The Industrial Education Teacher Education Graduating Awards

Mechanical
The Mechanical Design Graduating Award
The Canadian Manufacturers' Association Award in Manufacturing

Mechanical Systems
The Mechanical Contractors Association of B.C. Award in Mechanical Systems

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

Petroleum
The Westcoast Energy Inc. Award

Plastics
The Plastics Technology Graduating Award

Quality Assurance and Nondestructive Testing
The Canadian Airlines International Award in Quality Assurance and Nondestructive Testing

Renewable Resources
The Council of Forest Industries of B.C. Award in Forestry
The Fish, Wildlife and Recreation Graduating Award
The Natural Resources Management Graduating Award

Robotics and Automation
The Robotics and Automation Technology Graduating Award

Surveying and Mapping
The Corporation of British Columbia Land Surveyors, George New Campass Award

Wood Products Manufacturing
The Council of Forest Industries of B.C. Award in Wood Products Manufacturing

SCHOOL OF HEALTH SCIENCES

Biomedical Engineering
The Biomedical Engineering Technology Graduating Award

Electrophysiology
The Electrophysiology Faculty Book Prize

Environmental Health
The Environmental Health Graduating Award

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

Medical Radiography
The B.C. Radiological Society Award

Nuclear Medicine Technology
The Frosst Radiopharmaceuticals, Ralph Jamieson Award

Occupational Health and Safety
The Occupational Health and Safety Graduating Award

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

ACHIEVEMENT AWARDS

Achievement Awards are presented to students who receive outstanding marks in specific second year courses or who have demonstrated a combination of high academic standing, leadership, service and/or all-round achievement.

SCHOOL OF BUSINESS

Administrative Systems
Joanne Gray Memorial Award of Excellence
The Management Systems Students' Award
The Canadian Association for Production and Inventory Control, Vancouver Chapter Awards
The Canadian Materials Handling & Distribution Society B.C. Chapter Award
The Canadian Society of Industrial Engineers
The Operations Management Achievement Award
Canadian Transportation Education Foundation

Broadcast Communications
The British Columbia Motion Picture Association, Jack Gettles Memorial Award for Creativity in Television
The Rogers Broadcasting Limited Award of Excellence in Broadcast Communications
The Canadian Broadcasting Corporation Award in Television
The Gastown Post and Transfer Award in Television
The Association of Broadcast Communicators, Sales and Promotions Award
The Association of Broadcast Communicators, Eileen Fox Memorial Award

Financial Management
The Certified General Accountants Association of B.C. Awards
The Institute of Chartered Accountants of B.C. Award
The Wolverton Securities Ltd. Award in Finance
The Society of Management Accountants of British Columbia Award
The Canadian Association of Financial Planners, Pacific Chapter Award

Marketing Management
The National Real Estate Service, Carl G. Nielsen Memorial Awards
The Canadian Tire Award in Advertising and Sales Promotion
Interglobe Project Management Inc. Award in Professional Sales
Prime Copy Office Systems Ltd. Award in Technical Sales and Marketing

School Awards
The BCIT Alumni Award

SCHOOL OF ENGINEERING TECHNOLOGY

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

Building
The Clay Brick Association of Canada Award
The P.B. Ford and Company Award
The Quantity Surveyors Society of B.C. Awards
Construction Specifications Canada (Vancouver Chapter) Special Projects Award

Chemical Sciences
The Can Test Limited Award in Environmental and Industrial Chemistry
The Analytical Service Laboratories Limited Award in Environmental and Industrial Chemistry

Civil and Structural
The Charles J. Duncan Memorial Award Sponsored by the Dominion Company and The Duncan Family
Canada Scaffold Supply Co. Ltd. Formwork Design Prize
The Associated Engineering (B.C.) Ltd. Award
Bogdonov Pao Associates Ltd. Formwork Design Prize

Computer Systems
The Fluor Daniel Wright Award
The MPR Teltech Ltd. Achievement Award

Electronics
The Western Canada Telecommunications Council, R.C. Eldridge Award in Technical Writing
The Norpac Controls Ltd. Award in Process Automation and Instrumentation
Galvanic Analytical Systems Ltd. Award in Process Automation and Instrumentation

Mechanical
The Institution of Mechanical Engineers, Western Canada Branch, Commander S.M. Terry Memorial Award
The Wright Engineers Ltd. Award

Mechanical Systems
American Society of Heating, Refrigeration and Air Conditioning Engineers, B.C. Chapter Award

Petroleum
The Fluor Daniel Wright Award

Plastics
Society of the Plastics Industry of Canada, B.C. Chapter Award

Renewable Resources
The Canadian Institute of Forestry, Vancouver Section Award

Surveying and Mapping
The Canadian Institute of Surveying and Mapping Membership Award

Wood Products Manufacturing
C.W. Clasen Recruiting Services Awards
The Phillip A. Tindle Achievement Award

School Awards
The BCIT Alumni Award
BCIT Mathematics Department Book Prize
The Applied Science Technologists and Technicians of British Columbia, President's Award of Excellence

SCHOOL OF HEALTH SCIENCES

Biomedical Engineering
The Canadian Medical and Biological Engineering Society,B.C. Chapter Award

Electrophysiology
The Morton D. Low Medal of Excellence

Environmental Health
The Environmental Health Achievement Award
The Herbison Award

General Nursing
The Associate Dean's Award for Proficiency in Bedside Nursing
The Registered Nurses Association of B.C. Student Professional Award
Care Concepts Graduating Achievement Award
C.V. Mosby Company Ltd. Book Award
The Addison-Wesley Publishers Limited Book Award

Medical Laboratory Technology
The Coulter Electronics of Canada Award in Haematology
The Metro-McNair Clinical Laboratories Ltd. Award in Clinical Chemistry
The Metro-McNair Clinical Laboratories Ltd. Award in Clinical Microbiology
The Ortho Diagnostic Award in Immunohaematology
The Analytab Products Paraplast Award in Histotechnology
The Medical Laboratory General Proficiency Award
Organon Teknika Award in General Proficiency

Medical Radiography
B.C. Association of Medical Radiation Technologists Foundation Award

Nuclear Medicine Technology
The Metro-McNair Clinical Laboratories Ltd. Award for Clinical Excellence
The Vancouver General Hospital Medical Advisory Committee Awards for General Proficiency

School Awards
The BCIT Alumni Award
School of Health Sciences Prize

INTERNATIONAL EDUCATION

The International Education Department develops and implements training projects, contract education training and related activities in countries around the world. Clients include Canadian and international governments, business and industry, and other non-government organizations. Department activities often provide opportunities for BCIT faculty, staff and students overseas, resulting in long-term international relationships which promote BCIT's competitiveness in technical training for the new global economy.

The International Education Department also brings to BCIT increasing numbers of international students studying in full-time programs. Their presence on campus provides excellent opportunities for inter-cultural experiences among domestic and international staff and students.

The International Education Department coordinates international activities with industry, government agencies and other agencies in Canada and abroad. The department is involved in international development projects, contract educational training and related activities. Tel. (604) 432-8816. The office is located in the J.W. Inglis Building 1, 2nd floor.

Staff

Henry Arthur, Director
Tel. (604) 432-8622
Rhett Wade, Training Specialist
Tel. (604) 432-8816
Donna Hooker, Coordinator, International Student Projects
Tel. (604) 432-8842
Mary-Ann Moysiuk, Administrative Assistant
Tel. (604) 432-8816

COOPERATIVE EDUCATION

Cooperative Education integrates paid work experience with academic studies. The name reflects the cooperative relationship between BCIT, students and employers. The employment relates to the student's field of study.

BCIT currently offers cooperative education to Technology students in Electronics and Robotics and Automation, to Trades Training students in Auto Collision Repair/Refinishing, Industrial Maintenance Mechanic, and Tool and Die Technician. Programs in other technologies and trades are being considered. For more information contact the Coop office.

Many students take jobs to finance their education but often the job is no more than a means to that end. In addition to helping students finance their education, cooperative education allows them to explore career choices in a structured and purposeful manner; to test skills and knowledge learned on campus; to adjust to the world of work; to acquire relevant experience as well as an education.

Operation of the Plan

Responsibility for the operation of the plan rests with the Cooperative Education Coordinators. They meet employers to establish and maintain jobs and determine future requirements for students. They counsel students, deal with any problems which may arise, and liaise with faculty members from the academic departments who visit students on the job and evaluate the reports submitted at the end of work semesters.

Admission to the Cooperative Program

Cooperative education at BCIT is selective based upon academic performance and an interview. At the interview such factors as motivation, interpersonal and communication skills are checked. To enter and to continue in a cooperative program a student must have met criteria specific to the program. Students in technologies should make application for admission to the Cooperative Program at the beginning of their second study level. Transfer students, especially those transferring from other cooperative programs, should consult the Coop Education office.

Note: Foreign students are eligible to enter a cooperative education program under Canada Employment and Immigration regulations. Students authorized under this program may work on campus at BCIT and/or "education related" jobs for up to one year.
For more information, please contact the Cooperative Education office at 432-8753.

Staff

Gina Simeoni, M. Ed., Coordinator, Tel. 432-8291
Ernst Wilmink, Coordinator, Tel. 432-8499
General Enquiries Tel. 432-8753

LIBRARY SERVICES

The library plays a leading role in the educational process by providing the BCIT community with access to current materials using the latest information technology, assistance in retrieving information and instruction in research methods. Library holdings include approximately 500 thousand books, periodicals, pamphlets, and non-print media. Major strengths are found in the collections of technical reports, standards, Statistics Canada documents, topographical and land use maps, legal and legislative materials, microcomputer software. There is a large microcomputer lab in the basement of the library and equipment for viewing video and film on the main floor. The library is wheelchair accessible and a print-to-voice machine is available for the visually impaired.

Librarians give instruction in library research skills through the use of DOBIS, the online catalog of the library's holdings, periodical indexes in print format and on CD-ROM, and other specialized sources of information. As well as individual and group instruction, there are printed guides to various information sources, facilities and services.

Library Hours

September to May (subject to change)
Main Library

Monday - Thursday	0730 - 2230
Friday	0730 - 1700
Saturday and Sunday	0900 - 1700

Summer hours vary - check for times.

For loans, overdue and hold information Tel. 432-8370.
For library hours Tel. 432-8557.
For reference service Tel. 432-8371.

Overdues, Fines, and Replacement Policies

The purpose of fines is to protect the rights of all library patrons and provide an incentive to return books promptly. Overdue notices are mailed out. Overdue loans result in the blocking of further loan transactions. A non-refundable fee covers the purchase and processing of a replacement copy. No statement of marks, diploma or certificate will be issued until the student settles all financial obligations. Overdue fines are 50¢ per day; 30¢ per hour for reserve material.

Faculty and Staff

Paula Pick, B.A., M.L.S., Institute Librarian
Margot Allingham, B.A., B.L.S., M.L.S.
Reference Librarian - Engineering
Yu-Mei Choi, B.S.Sc., M.L.S., Head Cataloguer
Ana Ferrinho, B.A., M.L.S., Reference Librarian - Health
Anthony Kelly, B.A., M.L.S., Reference Librarian - Trades
Frank Knor, Dipl.T., B.Ed., B.L.S., M.L.S., Reference Librarian - Electronics/Current Awareness Coordinator
Merilee MacKinnon, B.A., M.L.S., DOBIS Systems Librarian
Robert A. Roy, B.A., M.A., B.L.S.
Public/Tech Services Coordinator
Gerry Weeks, B.A., B.L.S., M.L.S., Reference Librarian - Business/Reference Services Coordinator

MEDICAL SERVICES

A two-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, physiotherapist and dermatologist are also available. All visits are strictly confidential.

All patients who wish to see a doctor must have valid medical coverage and should bring their medical or insurance number with them on their first visit. Information and application forms regarding the Medical Services Plan of B.C. and private medical insurance coverage are available in Medical Services, together with information about premium assistance (reduced rates) for eligible, low income students. 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: Full-time

Jacqueline Hurst, B.Sc., M.D., Director-Physician
Ralph Wyatt, B.A., B.S.R., Physiotherapist
Janis Poersch, R.N., Nurse
Lynda Gravel, Secretary
Carol Braden, Medical Office Assistant

Staff: Part-time

David Mullard, M.B., B.S., Physician
Carolyn Montgomery, M.B., B.Ch., B.A.O., Physician
David Fung, M.B., B.Ch., F.R.C.P(C)., Psychiatrist
Beth Brydon, R.N., Nurse
Mahara Greymac, R.N., Nurse

FIRST AID

First aid attendants are on call as follows:

Monday - Friday	0600-2200
Saturday	0830-1530

Attendants are located in Building #22
Emergency: local 8820
Non-emergency: local 8872
Voice pager: 667-2052

When first aid attendants are on duty:

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.

If patient is mobile, escort to first aid attendant in Bldg. #22.

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.

Sea Island Campus

Monday - Friday 0800-1600

CHILDCARE

The BCIT Childcare Centre opened September 1990. The centre houses 25 children, ages 3-5, with the majority of seats being allocated to students' children.

The centre has been designed by Mineo Tanaka Architects using a premanufactured building, and is located between the 3A and the SW1 buildings.

Plans are in the works for additional facilities to include two play spaces, an observation building for Early Childhood Educators, and a main care building to house 1-3 year olds and infants. Plans also include a drop-in program for children whose parents are at night school.

The Institute and the Student Association are very pleased that this important service is now available to our students. For more information on the Childcare Centre, please call Marilyn Robbins at 432-8919.

HOUSING

The BCIT Housing Office, located on the Burnaby Campus, is available to assist students in finding suitable accommodation in the greater Vancouver area.

Maquinna Residence

When you are accepted into a full-time BCIT program of four months duration or longer, you are eligible to live at Maquinna Residence.

The Residence is situated on campus, a short walk from classes, the Student Centre, recreational facilities and medical services. It accommodates 336 residents in seven low-rise, split level buildings. The buildings consist of town-house style units where 12 students live together sharing kitchen and cooking facilities, living/dining rooms, washrooms and laundry facilities. Residents may choose all female, all male or co-ed units.

Each house has a Residence Advisor who is there to help with counselling and advice, in case of emergency and to facilitate social events.

Each resident has a private bedroom, fully carpeted and comfortably furnished with a bed, desk, dresser, mirror, two chairs and a desk lamp. Ample closet space is provided.

Cost

The cost of a room at Maquinna Residence in 1992/93 is $328 per month. This does not include meals, as students do their own cooking. Cost is subject to change.

How to Apply

When you are advised of your academic acceptance by BCIT, you will also receive an application form for Maquinna Residence. Residence accommodation is limited and you should return your completed Maquinna Residence application to the Housing Office as soon as possible.

Off-Campus Housing

Since residence accommodation is limited, many BCIT students live off campus. The Housing Office provides a free listing service of local short term and long term accommodation to BCIT students. General information, area maps and a telephone are available to students seeking accommodation.

Costs for off-campus accommodation vary according to the type and location you select. Average monthly costs in 1992 were approximately:

Room and Board	$470
Sleeping Room	$275
Room with Cooking Facilities	$325
Basement Suites	$425
Apartments	$525
Shared accommodation	$350

The off-campus housing service is available year round. Weekend and evening service is available at certain times of the year. To check Housing Office hours of operation call 432-8677. Due to the high turnover of off-campus accommodation, listings cannot be mailed out. Such lists would be out of date by the time you received them. Landlords and tenants also prefer to meet each other before entering into an agreement.

The Housing Office staff also assists students unable to find accommodation before arriving in the Lower Mainland by referring them to short term accommodation in the area. Please contact the Housing Office for further information. You may also wish to enlist the help of a friend or relative living in the Lower Mainland for assistance in securing temporary accommodation.

Married Student Accommodation

BCIT does not have residence accommodation for married students or students with dependents. The off-campus housing service includes listings appropriate for families.

Office Hours: Monday to Friday
0830 - 2200 (September-May)
0830 - 1630 (June- August)

Address 4200 Willingdon Avenue
Burnaby, B.C.
V5G 4J3

Location Southwest corner of Burnaby Campus
Building 3C, Salish House
Maquinna Residence

Telephone 432-8677

FOOD SERVICES

Campus Cafe

Monday - Thursday	0700 - 2100
Friday	0700 - 1700
Saturday	0800 - 1430

Town Square Café

Monday - Thursday	0700 - 2100
Friday	0700 - 1530
Saturday	CLOSED

E.T.C.Building

Monday-Thursday	0700 - 2100
Friday	0700 - 1530
Saturday	CLOSED

Road Runner, Building SW1

Monday - Thursday	0700 - 2100
Friday	0700 - 1530
Saturday	CLOSED

J.W. Inglis Building

Monday - Thursday	0700 - 2100
Friday	0700 - 1530
Saturday	0800 - 1300

Gourmet coffee, deli sandwiches, salads made to order and many other specialties are available in The Town Square Café and the J.W. Inglis cafeteria.

PARKING

All vehicles parking on campus, day or night, must display a valid Institute parking permit. Paid parking is in effect 24 hours a day, year round. Parking and traffic is administered and controlled by the Safety and Security Department, Building 2T, phone 432-8719. Parking Office hours are 0700-1600, 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 from the cashier in the registration area in Building SW1.

Parking for Disabled Students

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.

SECURITY

The security office is located in 2N-135 (off the Central Stores loading dock). Security can be contacted at local 8878 - if no response, call voice pager 735-5201 - wait for tone and leave message.

TRANSIT

The BCIT campus has frequent daily bus service providing direct access to the campus. In addition, the Sky Train rapid transit service is a short bus ride from the campus. The cost of monthly transit passes varies according to zones travelled; passes are available from "This 'n That" stores on campus and from the Student Association in the SAC.

For information about bus routes, fares and schedules within the Vancouver Regional Transit System, call the **Metro Transit Information line at 261-5100.** You can also pick up bus schedules for Greater Vancouver in the Maquinna Residence.

EMPLOYMENT PLACEMENT SERVICES (EPS)

SW1 Building Room 2160
Tel. 432-8666
Open 0930-1500 Monday to Friday

EPS offers employment services to both Trades and Technology students and alumni. Students must register with the EPS office before they may access the computerized Job Information Centre (JIC). The office is open year-round, and posts Technology and Trade related job opportunities for full-time, temporary and summer employment. Part-time positions suitable for students are posted daily outside the EPS office. Resume and letter writing assistance is available by appointment.

Staff

Amanda Hill, B.A., Senior Employment Officer
Phillipa Dermott, Employment Placement Officer

BOOKSTORE

The BCIT bookstore is located at the southeast end of the campus on the ground floor of Building 2D. It sells required textbooks, software and educational material for BCIT courses. Textbook lists may be consulted in the bookstore. In addition to textbooks, a large selection of school, drafting, and engineering supplies as well as computer reference books is available. Special orders may be placed for books.

The bookstore is open from 0800-1600 hours Monday through Friday throughout the year. 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. This outlet is open at the start of the fall, winter and spring terms. Tel. 432-8379 or 432-8477 for hours of operation.

Used Textbooks

The bookstore stocks a large quantity of used textbooks at the beginning of each term. Used book buy-back dates are posted around campus a few weeks prior to the event.

RECREATION AND ATHLETICS

BCIT offers a variety of indoor and outdoor recreational facilities designed to appeal to most students. These include four racquetball/handball courts which now accommodate the new sport wallyball, 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 super circuit, weight training, cardio area which includes bikes, step machines and more. Four tennis courts, two sports fields, a fitness trail 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	0900-1700
Sunday	0900-1700

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

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 to 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 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 tennis courts

Tennis courts can be booked for a small fee or you may play on a first-come, first-served basis, with no charge for court time. You must check in and pay prior to playing if you have booked a court.

How to book squash and racquetball courts

Book seven full days in advance 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. 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

We are 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 432-8287.

Intramurals

Leagues for volleyball, indoor soccer, ice hockey, non-contact floor hockey, wallyball, flag football, are organized for school breaks, evenings and early mornings. For further information, pick up one of our Fall or Winter Program Guides.

Instructional programs

Courses in relaxation, massage, squash, racquetball, ballroom dancing, golf, etc., are on-going during the school year. For further information, pick up one of our program guides.

Aerobic fitness classes

A variety of classes is offered each term, mornings and afternoon. You can pay a per term fee or drop in at very reasonable rates.

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: $8 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. AIR BCIT is a popular fall event and SKI BCIT is our major winter event. We can assist you to schedule non-competitive tournaments within your technology or trade. If you have any interests that you feel may attract other students or staff, drop in or call the Recreation and Athletic Services Office at 432-8287.

Swimming pool tickets

The Recreation and Athletic Services Department makes available pool tickets for the following pools:

Canada Games Pool (New Westminister)
10 tickets/$23.00.
Both Burnaby Pools, Bonsor and C.G. Brown
10 tickets/$15.00.

Prices subject to change.

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 eagues 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. (September and January).

Intercollegiate athletics programs

- Volleyball Men and Women
- Soccer Men and Women

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

Recreation and Athletic Services (Program Office)
Tel. 432-8287 or 432-8282.
Equipment Office and Attendants (Racquet Court Bookings)
Tel. 432-8612.

STUDENT ASSOCIATION

The Student Association is the independent student union at BCIT. It provides most of the non-academic services, social activities 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 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 and social complex organized and financed by the SA. Phase one, containing squash and racquetball courts, is now complete. Fundraising is under way for the next phase.

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 This 'n That was opened. The SA pub, "Taps," first opened its doors in 1976. 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.

New ventures of the SA include Duke's Cookie and Coffee bar (in the SAC), a White Spot restaurant in "Taps" and Scholastic Insurance, an insurance company able to supply all your needs from car insurance (ICBC), renters/household insurance to full financial services. In addition, the SA now operates all vending copier machines on campus; copies can also be obtained in the SAC. B.C.I. Travel, located in the SAC, offers inexpensive travel for staff and students. As well, check out "ACCESS" the student owned computer and word processing centre located in the library foyer. ACCESS offers the best guarantee and service package insuring problem-free computing. For relaxation, try our video games room.

BCIT's SA deserves its reputation as "the best organized student union in western Canada". Both day school parking permits and bus passes can be purchased in the SAC; from "Sure Copy" and the S.A. office respectively.

There are three "This 'n That" stores on campus. The main store, 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, etc. The Building SW1 store, located in the north foyer of Building SW1 has nearly everything listed above plus coffee, ice cream and popcorn. The Inglis store, located in the north campus' Inglis Building, features the same items as above.

Food

The Student Association offers a **White Spot "Legendary Grill"** outlet at the SAC which serves a variety of hot foods. Vending machines are located at several points around campus. TNT stores offer coffee and munchies, candy, etc. These services are available from September to the end of June.

Elections

The SA holds elections each March to choose nine 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, Trades Training Chairperson. 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 students to all levels of institutional, municipal and provincial government. 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 operation is entrusted to a full-time professional staff of approximately 35. The Director is Stephen Miller; the managers for the various operations are: Heather Boles - TNT Stores; Janice Eden - Office; Ken Jack - Accounting; Les Merson - Access Computers and Word Processing/Link, and a Program Coordinator.

Activities

The SA funds the intramural athletics and clubs program, which provides lunch hour and after class recreation for several hundred BCIT students. Extramurals have returned to BCIT this year.

The student newspaper, "Link", is published every Wednesday during the 9-month school year and monthly during the summer.

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; in 1991 students raised $33,000 in one day! Watch out for the Second Annual Needy Student fundraising drive in the spring. Over a quarter of a million dollars have been donated to charities in Vancouver by BCIT students.

BANKING

The Canadian Imperial Bank of Commerce provides an Instant Teller Machine with Interac Network, at the entrance to Building SW1.

LOST AND FOUND

Please refer enquiries to Safety and Security at 432-8878. The Lost and Found is located in Building SW1, Room 130. Hours are 0800-0900 and 1200-1300, Monday to Friday.

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.

ALUMNI ASSOCIATION

1992/1993 Alumni Association Executive
President: Robert B. Wells (Administrative Management '73)
Vice President: Kurt Louie (Marketing Management '70)
Secretary: Jamie Mason (Computer Systems '88)
Treasurer: Jo-Ann Johnston (Financial Management '78)

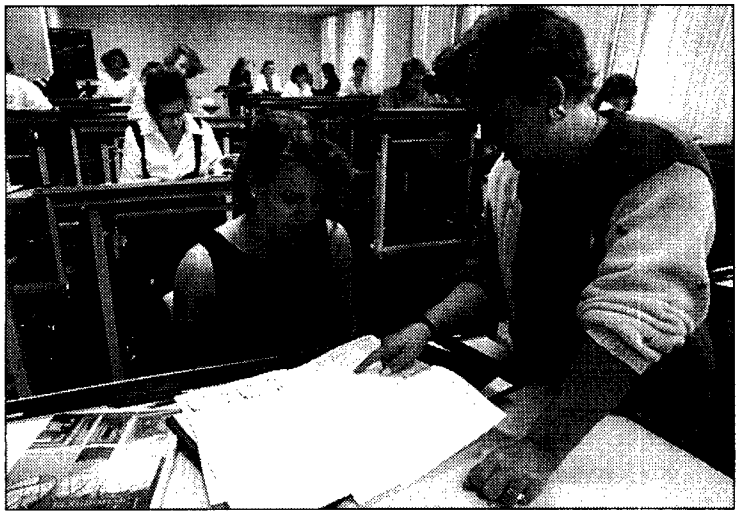
The BCIT Alumni Association provides a vital communication link between graduates and the Institute. Graduates receive the Alumni News, published three times a year. The Association organizes reunions and offers a group insurance policy.

The Association has extended membership to include Trades/Vocational graduates who have completed programs of at least 6 months duration, holders of Part-time Studies Certificates as well as graduates of two-year Diploma of Technology programs. Membership requires registration and is free of charge.

The Willingdon Club is available to all BCIT graduates. A three- year membership costs $30 and entitles you to a variety of benefits including: library borrowing privileges, student rates for racquetball and squash courts on campus, and discounts on all merchandise sold by the Alumni Association. Club members can continue to use many student services after graduation that are not available to the general public. Graduates, or about to graduate students, may purchase Willingdon Club memberships in the Alumni Office.

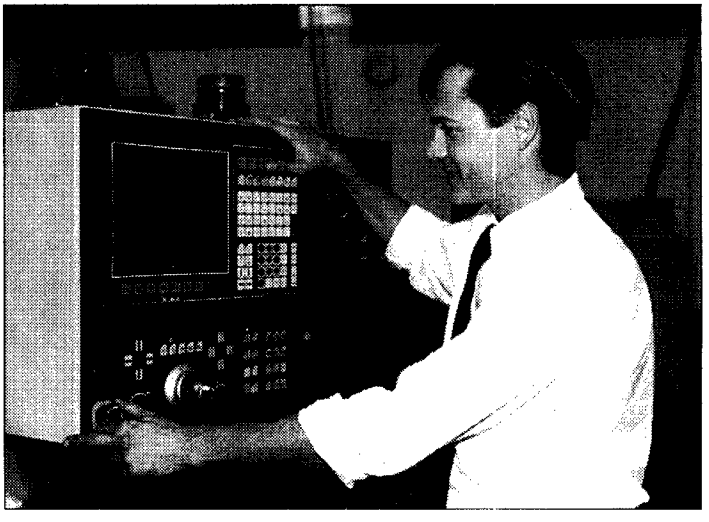
Priorities for the Alumni Association include involvement in the Campus Centre Campaign and the Alumni Fundraising Campaign; the presentation of eleven Regional Entrance Awards to first-year full-time students; promoting professional recognition for BCIT graduates; conducting a membership survey.

The Alumni Office is located on the second floor of the J.W. Inglis Building (NE1). The direct line phone number is 432-8847.









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ADMINISTRATION

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Operations Management
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Marketing Management
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Advertising and Sales Promotion
Real Estate Studies
Tourism Management
Advanced Technical Marketing
Professional Sales
Small Business Development

ADVANCED STUDIES IN BUSINESS

Advanced Diploma Program
Degree Completion Program

The aim of this program is to provide BCIT's specialized Business Diploma graduates with further education to meet the needs of B.C. business, government, industry and professions:

1) for more highly trained management generalists, through a program leading to a Bachelor's degree in business.
2) for more highly trained specialists, through a program leading to an Advanced Diploma in Business.

There are thus two distinct but interrelated parts to the Advanced Studies in Business program: the degree completion track (for the business generalist) and the advanced diploma track (for the management specialist).

Purpose and Benefits

To provide advanced business training to Diploma of Technology graduates (or equivalent) to:

- prepare them for increased responsibilities;
- obtain an Advanced Diploma in Business;
- obtain a designation granted by a professional society;
- complete a bachelor's degree in Business at the Open Learning Agency through its Open University, or other university; and from there,
- enter more advanced studies, such as a Master of Business Administration.

The Program

This new program, together with all School of Business programs, is currently under development. It forms an important element in BCIT's mandate which will "..focus on those initiatives that increase the level of entrepreneurial activity within the province."

Advanced Studies in Business is the second module of an educational and work experience built upon BCIT's well-respected base: the Diploma of Technology in Business. The objective is to develop graduates with enhanced job-ready skills equipping them for more responsible positions in business, industry, government and the professions.

The first Advanced Studies in Business courses were offered full-time and part-time in September 1990. Ongoing liaison will be maintained with the Open University, the Professional Associations and industry to continuously articulate and monitor course requirements.

ADVANCED DIPLOMA

Diploma Program

While the degree completion track is designed for the business generalist who wishes to obtain a bachelor's degree in Administrative Studies, BCIT recognizes that many of its Diploma graduates already have a degree or, for other reasons, wish to increase their knowledge in their specialized field.

For them, BCIT offers an Advanced Diploma in Advanced Technology Management to meet needs identified by the Science Council of B.C. as important to the development of high-technology business in the province.

This Diploma will provide a program of theoretical and practical education in the current skills required to integrate all business functions, in order to effectively manage an advanced technology enterprise at the strategic level.

The Diploma requires four foundation courses:
ADMN 710 Business and Society
ADMN 720 Management of Change
ADMN 790 Strategic Management
OPMT 740 Integrated MIS

The Diploma will be completed by seven specialist courses:
FMGT 731 Financial Planning for Technology
MKTG 720 Marketing Technological Products and Services
OPMT 710 Total Quality
OPMT 730 Manufacturing Excellence
OPMT 750 High-Technology Processes
OPMT 761 Evaluating Technology
OPMT 762 Implementing Technology

The Student will then carry out supervised individual work in course Directed Studies (OPMT 799),

Other specialized Advanced Diploma options are under development.

Students interested in the Advanced Diploma should contact the Dean's office at 432-8581 for details on the program.

Admission Requirements

The minimum entrance requirements will be:
1. average grade standing of not less than 65%;
2. letter of recommendation;
3. statement of interest in the program;
4. evidence of computer fluency;
5. resume showing experience relevant to the program;
6. successful personal interview.

Prerequisites

BCIT Diploma of Technology in Human Resource Systems, Management Systems, Financial, Marketing and Operations Management, Transportation/Logistics or International Trade. Previous business experience is preferable, but only mandatory for those entering the Advanced Diploma program.

BACHELOR OF ADMINISTRATIVE STUDIES

Degree Completion

The **Open Learning Agency** through its **Open University** grants most BCIT Business Diploma graduates in Administrative Systems, Financial, Marketing and Operations Management, block transfer of up to 72 credits towards a Bachelor of Administrative Studies. BCIT graduates need at least 48 additional credits at BCIT and other institutions to meet the Open University requirement of 120 credits for a degree. For additional information on credit transfer for these and other diploma programs contact Student Services at 434-3304.

BCIT Business Diploma: up to	72 credits
Open University & BCIT courses: at least	48 credits
Bachelor of Administrative Studies	120 credits

The 48 credits required may be earned through five arts and science elective courses approved by the Open University and taken through accredited universities and colleges, and seven advanced business courses taken at BCIT selected from the following list:

ADMN 705 Intermediate Macroeconomic Analysis
ADMN 710 Business and Society
ADMN 720 Management of Change
ADMN 790 Strategic Management
ADMN 750 Managerial Economics
OPMT 740 Integrated Management Information Systems
OPMT 751 Mathematical Models in Business

BCIT Admission and Registration Procedures for the Open University Bachelor of Administrative Studies Degree offered in collaboration with BCIT.

These procedures apply to BCIT Business Diploma graduates who wish to embark on the Open University Administrative Studies Degree Completion Program offered in collaboration with BCIT. Please refer to the Open Learning Agency for their admission procedures as they are an integral part of your admission and registration into this program. OLA admission information can be obtained from BCIT Student Services at 434-3304 or from Access Services at the OLA at 431-3300.

1. You must first establish your Program Plan with Open University

Open University is responsible for reviewing your academic record from BCIT and any other post-secondary institution you may have attended, to determine the amount of credit you will be awarded towards your degree. This critical first step tells you what courses you require to earn your degree.

2. Apply to BCIT
To apply, submit a full-time Application for Admission together with a copy of your Open University approved Program Plan as soon as possible. You must state your intent to complete the program on a Full-time or Part-time Studies basis on your application. You are not required to submit transcripts from other post-secondary institutions with your application. Admission is based on the following:

a. academic performance in your BCIT Diploma program
b. a 500-word statement indicating your reasons for choosing the program
c. evidence of computer fluency since graduation, eg: familiarity with microcomputers and software.

You will receive confirmation by letter that your Admission has been approved.

3. Course Registration
Once your admission has been confirmed, you can register for Advanced Studies in Business Degree Completion courses offered at the BCIT Burnaby campus. Check the current Part-time Studies flyer to determine which courses are available. Courses are normally offered in the Fall, Winter and Spring/Summer Terms.

The required credits may be earned through arts and sciences elective courses approved by the Open University and delivered at BCIT or through other accredited universities and colleges. The Advanced Business courses are offered at BCIT. Additional courses can usually be taken at BCIT to meet the requirements established in your Program Plan.

Advanced Business courses include:
ADMN 705 Intermediate Macroeconomic Analysis
ADMN 710 Business and Society
ADMN 720 Management of Change
ADMN 750 Managerial Economics
ADMN 790 Strategic Management
OPMT 740 Integrated Management Information Systems
OPMT 751 Mathematical Models for Business

BROADCAST COMMUNICATIONS

Diploma Program

The Broadcast Communications programs were initiated through the combined efforts of the British Columbia Association of Broadcasters and the Canadian Broadcasting Corporation in this province. The need for trained personnel continues to grow in radio and television operations, broadcast journalism, and related areas. Those interested in entering fields other than mass communications through broadcasting, audio and video production, public relations, cablecasting, etc., will find much of the basic technical background included in these programs.

The educational emphasis is upon **versatility** so that a graduate may find employment in a variety of occupations within broadcasting and associated industries. Students will enrol in **one** of **three** programs: **Broadcast Journalism, Radio or Television.**

Employment Opportunities.

Graduates are employed throughout British Columbia and in all parts of the world, wherever radio, television, cable facilities, audio and video production operations exist. Entry level jobs for our graduates include disc jockeys, camera operators, news reporters, commercial copy writers, production assistants, sales-marketing-promotion, video tape editors and ENG & EFP camera operators.

BROADCAST JOURNALISM
This program prepares students for careers as news reporters, newscasters and editors in radio and television. Training includes basic news broadcasting skills and academic courses. News writing, audio and video editing, research, reporting and announcing are combined with a substantial background in politics, economics and other necessary topics. Regular newsroom and field reporting operations develop students' experience in news judgement, reporting and presentation. **Students must have a valid drivers licence and access to a motor vehicle in Levels 2 through 4.**

RADIO
This program provides detailed training in **AM** and **FM** radio operations. Extensive instruction is given in announcing, on-air operations, interviewing, commercial copywriting and production, feature and program production, as well as other operational areas including sales and management and news. Students also receive a great deal of **practical** experience via structured simulations in first year and operation of the campus radio station **CFML 104.5 cable FM** in second year.

TELEVISION

This program 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 and video productions is provided, so that students may work their way through a variety of positions in television and video operations.

General Information

Applicants must pass appropriate audition and general knowledge/English tests, and must be able to type 25 correct words per minute to qualify for entrance into Broadcast Communications Programs. Normally, only **qualified** applicants will be interviewed.

In each of the programs, students are graded against industry and professional standards and must achieve such standards within their period of study in order to graduate.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Prerequisites

Graduation from senior secondary school and proof of typing speed of 25 wpm is a general prerequisite. Applicants should apply early and ensure that their application is complete with all documentation in order to be considered.

All applicants must include in their applications a short essay (approximately 500 words) detailing their reasons for choosing broadcasting as a career and their career goals and aspirations. This essay must accompany the application, together with all pertinent documents, letters of reference, recommendations, school and university/college transcripts, etc. Include details on related experience.

Information meetings are held on the last Monday of August and the first Monday of each month during the school year (September to June) at 1730 in the Broadcast Centre, Building 2D. (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 Associate Dean and an interview in the field may be arranged.

All applications may be enhanced by enrolling in night school courses, volunteering at cable operations, university and community radio stations, etc.

The prospective applicant is expected to have a thorough knowledge of English. Previous studies in the areas of political science, history, psychology, business, law, computer science, and other humanities, as well as an up-to-date awareness of current events will prove valuable.

Program: BROADCAST JOURNALISM

Level 1

ADMN 101 Economic Issues
BCOM 101 Communication for Broadcasters
BCST 100 Industry Organization
BCST 130 Introduction to News Reporting
BCST 131 Introduction to Announcing
BCST 132 Introduction to Radio
BCST 134 News Writing
BCST 135 Municipal Government
BCST 137 Visual Fundamentals for Journalists

Level 2

BCOM 201 Communication for Broadcasters
BCST 209 Practicum
BCST 230 News Reporting
BCST 231 Announcing for Journalists
BCST 232 Radio News
BCST 233 Television News
BCST 331 Media Law
COMP 112 Computers in Broadcasting

Level 3

BCST 235 Government and Politics
BCST 332 Radio News
BCST 333 Television News
BCST 431 Labour and Business

Level 4

BCST 336 Advanced News Writing
BCST 409 Practicum
BCST 430 Investigative Reporting
BCST 432 Radio News
BCST 433 Television News

Program: RADIO

Level 1

ADMN 320 Interpersonal Relationships
BCOM 101 Communication for Broadcasters
BCST 100 Industry Organization
BCST 101 Technical Introduction
BCST 103 Copywriting
BCST 110 Radio Operations
BCST 111 Radio Announcing
BCST 112 Contemporary Issues
BCST 113 Introduction to Broadcast Journalism

Level 2

ADMN 381 Broadcast Law
BCOM 201 Communication for Broadcasters
BCST 203 Copywriting
BCST 209 Practicum
BCST 210 Radio Operations
BCST 211 Radio Announcing
BCST 212 Contemporary Issues
COMP 112 Computers in Broadcasting

Level 3
ADMN 101 Economic Issues
BCOM 301 Advanced Communication for Broadcasters
BCST 310 Radio Operations
BCST 312 Radio Sales and Management
BCST 313 News and Contemporary Issues
BCST 314 Music and Programming
BCST 315 Feature Program Production
BCST 316 Audio Production
OPMT 319 Statistics for Broadcasters

Level 4
BCOM 401 Business Communication for Broadcasters
BCST 409 Practicum
BCST 412 Radio Operations
BCST 415 Feature Program Production

Program: TELEVISION

Level 1
ADMN 101 Economic Issues
ADMN 320 Interpersonal Relationships
BCOM 101 Communication for Broadcasters
BCST 100 Industry Organization
BCST 101 Technical Introduction
BCST 103 Copywriting
BCST 120 Television Introduction
BCST 223 Television Production Planning

Level 2
ADMN 381 Broadcast Law
BCOM 201 Communication for Broadcasters
BCST 203 Copywriting
BCST 209 Practicum
BCST 220 Television Introduction
BCST 221 Visual Fundamentals for Television
BCST 222 Theory of Color Television Systems

Level 3
BCOM 301 Advanced Communication for Broadcasters
BCST 320 Television Production
BCST 322 Television News
BCST 325 ENG Production
COMP 112 Computers in Broadcasting

Level 4
BCOM 401 Business Communication for Broadcasters
BCST 409 Practicum
BCST 420 Television Production
BCST 425 ENG Production

Alterations in course offerings and hours may occur because of adaptation to changing industry conditions and demands. Some classes and practica operate around-the-clock and on weekends to emulate industry situations.

COURSE DESCRIPTIONS

ADMN 101 Economic Issues - Exposes students to the application of various economic principles to the study of particular problems. Broadcast Communications students receive customized course material designed to make them aware of a variety of economic issues that relate to broadcasting operations and practices.

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 methods for achieving them.

ADMN 381 Broadcast Law - This introduction to the Canadian legal system emphasizes contracts, torts (including defamation and privacy), criminal law, court procedure and contempt, secured transactions, government agencies, employment law, forms of doing business, negotiable instruments, and other topics applicable to broadcast business.

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 radio and 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 Advanced 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 effective reading, time management and advanced research techniques. Prerequisite: BCOM 201.

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. Prerequisite: BCOM 101, 201 and 301.

BCST 100 Industry Organization - The content of this course is under review.

BCST 101 Technical Introduction - Students are introduced to the fundamentals of electricity, magnetism, light and sound. These principles are then used to explain the technical operation of equipment used in the broadcasting industry.

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 broadcasting are related. Commercials are studied in detail. Special emphasis is placed on developing the student's ability to work in groups. 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 to operate this equipment.

BCST 111 Radio Announcing - An introduction to effective oral communication for radio using lectures, exercises and practical application of the techniques of various specialized forms. Individual and classroom critiques are employed; auditions and assignments measure progress. Broadcast regulations and program scheduling are also included in the announcer-related areas of practical responsibilities.

BCST 112 Contemporary Issues - 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 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 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.

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 students a grounding in the systems, issues, and policies of the broadcast news industry and will prepare them 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 students are introduced to radio broadcasting equipment and production techniques. The course is designed to give the student a basic understanding of the operational side of radio broadcasting. Practical work complements classroom instruction.

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 critique their own work, and that of others. Guest lecturers from 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.

BCST 137 Visual Fundamentals for Journalists - Students examine the language of pictures and their use to convey information. Topics include the history of pictorial communication, social context, the relationship between picture making technologies, picture communication 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 203 Copywriting - see BCST 103. Prerequisite: BCST 103.

BCST 209 Practicum - This is a four-week practical exercise to complete first year. Radio students operate campus radio station CFML, twenty-four hours per day, during this period. Television students produce a series of program segments, most involving Electronic News Gathering techniques. Broadcast Journalism students work both with Radio students in providing news coverage on CFML and with Television students in covering television news stories. Television crews shoot and produce news for 4 weeks.

BCST 210 Radio Operations - A continuation of BCST 110, the major emphasis is 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, 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 Contemporary Issues - 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 is stressed. Prerequisite: BCST 112.

BCST 220 Television Introduction - See BCST 120. Prerequisite: BCST 120.

BCST 221 Visual Fundamentals for Television - Designed for TV students, the course concentrates on visual techniques that will form the basis for shooting in studio and in the field.

BCST 222 Theory of Color Television Systems - Begins with the psychophysics of human vision and explains how the eye perceives and adapts to color. This theory is applied to the NTSC system. The color TV signal path, from the camera through production and measuring equipment to final display, is explained. Prerequisite: BCST 101.

BCST 223 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 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 labour, business, and politics. Prerequisite: BCST 130.

BCST 231 Announcing for Journalists - 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 in 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 130.

BCST 233 Television News - Students learn the process by which a story idea is transformed into a television news story, how 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 130.

BCST 235 Government and Politics - Since a broadcast journalist frequently deals with political issues, this course acquaints the student with the structure of the Canadian Federal and Provincial governments. It also provides an opportunity to research political issues and interact with other students on current issues.

BCST 310 Radio Operations - Having gained basic competence in radio broadcasting techniques, students now apply their knowledge to regular practical work through daily operation of the campus radio station CFML, available on cable FM throughout the lower mainland. All work must be done to industry standards and individual and group performance is evaluated and critiqued. In lectures, students receive training in station systems and operations. In practice, students perform all the roles normally found in industry. The course is demanding and stimulating. Prerequisite: BCST 110, 210, 111 and 211.

BCST 312 Radio Sales and Management - Detailed studies cover a number of topics that develop student broadcasters' attitudes toward the industry and their abilities to perform within it. Major emphasis is placed on broadcast sales and promotion. Prerequisite: BCST 110, 111, 210, and 211.

BCST 313 News and Contemporary Issues - Introduces current regional, national and international issues appearing in the news media. Discussions focus on issues behind the issues, origins of issues, handling of news, writing style, line-ups, etc. Prerequisite: BCST 113.

BCST 314 Music and Programming - The music portion of this course focuses on the development and promotion of artists and their music, and the relationship of the music industry to the broadcast industry. The programming portion examines radio station formats and their implementation. Prerequisite: BCST 210.

BCST 315 Feature Program Production - This is an assignment-oriented course which focuses on the production of CFML's one-hour musical documentary program "AudioFile." Research, writing and production skills are applied throughout the course. Prerequisite: BCST 210.

BCST 316 Audio Production - This is an assignment-oriented course which looks at the many facets of audio production including multi-track recording, commercial production, documentary production, audiovisual production and music recording and production. Prerequisite: 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, 220.

BCST 322 Television News - Students learn more sophisticated visual techniques which are put to use in the daily preparation of Electronic News Gathering stories. Lectures are interspersed with weekly newscasts throughout the term. Prerequisite: BCST 221.

BCST 325 ENG Production - This course is designed to further acquaint television students with the electronic news gathering skills learned in first year TV Practicum. Students will gain a wide range of experience both as camera persons and news editors. News stories will be produced in conjunction with TV reporters. Professionalism and the ability to work as a team are essential for success in this course.

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 familiarizes students with Canadian criminal law and the laws of libel and slander. Prerequisite: BCST 232 or 233.

BCST 332 Radio News - Students now begin 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 performance critiques. 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 studio and graphic facilities. Stories are incorporated into news programs that are produced in conjunction with the television production option. Prerequisite: BCST 233.

BCST 336 Advanced News Writing - Teaches students to develop and write stories incorporating the creative and factual aspects of news. Students learn how to look for story elements which hold the interest of an audience, and to relate those elements with maximum clarity and impact.

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 final preparation for assuming paid positions as a start to broadcast careers. Prerequisite: Successful completion of ALL Level 1, 2, 3 and 4A courses.

BCST 412 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 cooperative 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 415 Feature Program Production - See BCST 315. Prerequisite: BCST 315.

BCST 420 Television Production - see BCST 320. Prerequisite: BCST 320.

BCST 425 ENG Production - This course fine-tunes the electronic news gathering skills gained in BCST 323.

BCST 430 Investigative Reporting - Even though all reporting involves the investigative process, this course prepares the student for specialized reporting on public affairs and consumer research. The student is taught specific research and interviewing techniques and is expected to complete a major investigative project. Prerequisite: BCST 235.

BCST 431 Labour and Business - As students approach graduation, it is important that they have a good understanding of labour unions and the management structure. This course explains the structure of unions as well as the labour 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. Students continue to practice the skills of reporting, writing and announcing, and 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 students 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.

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 areas of broadcasting including program logs, record library, computer graphics and word processing.

OPMT 319 Statistics for Broadcasters - A customized statistics course, designed to introduce broadcasting students to the world of collecting, summarizing and treating data to facilitate its use and comprehension. Forecasting techniques are discussed, along with measurement procedures employed in opinion polling and broadcast ratings systems.

Faculty and Staff

B. Antonson, Dipl.T., Associate Dean
B. Amos, B.A.
J.W. Ansell, Dipl. T., Program Head, Radio
Y. Eamor, Program Head, Broadcast Journalism
T. Handel, Dipl. T., Dipl. Adult Ed., Television
J.R. Jonasson
J.J. Kemp
R. Leipert
K.J. Mitchell
R.H.B. Nason, B.A., M.P.S.
B. O'Neill, Senior Maintenance Engineer
G. Orr, Dipl.T.
M.K. Purkis, Dipl.T.
R. Riskin, Dipl. T., Program Head, Television
R. Taylor

Advisory Committee: Broadcast Journalism

Ed McKenzie, News Director, C-Fax 1070
Tom Mark, News Director, CHRX/JR Country
Steve Wyatt, Managing Editor, U News
Tony Parsons, News Director, BCTV
Mike Bothwell, CKVU
Gordon Vizzutti, News Director, CHBC Television
Richard Dettman, News Director, CFVR
Wayne Williams, Reporter, CBC TV
Karl Johnston, News Director, Kootenay Broadcasting
Mike Woodworth, News Director, CKPG Radio - TV

Advisory Committee: Radio

John Ansell, BCIT
John Beaudoin, Program Director, CHRX/CJJR
Dale Buote, Program Director, CKKS - FM Radio
Jan Evanski, Creative Director, CKNW
Nick Frost, President & General Manager
SILK Broadcasting Ltd.
Jim Johnston, Program Director, CFOX FM Radio
Ken Kilcullen, Program Director, CKPG
Gary Milne, Radio Station CKWX
Erin Petrie, General Manager, S.R.N.
Peter Schell, Manager, Technical Services, CBC Radio
Wayne Stafford, Radio Station CFUN
Shirley Stocker, Radio Station CKNW'98
B.C. Enterprise Centre
Dave Twanow, Radio Station CISL

Advisory Committee: Television

Vito Dunford, Production Manager, CHEK Television
Len Kowalewich/John Sparks, "THE EYES,"
Multimedia Productions Inc.
Stan Blackwood, Operations Manager, BCTV
Tom Locke, President & C.E.O., Gastown Post & Transfer
Dave Sherwood, Creative Director, CKPG
Peter Davison, Program Director, Western 4
Terry L. Mahoney, Operations Manager, CHBC
Ron Harrington, Manager, Operations, K.N.O.W.
Ron Petrescue, Manager of TV Technical Services
CBC British Columbia
John Thomas, Vice President & General Manager
Delta Cable
Martin Truax, Program Director - Vancouver, Cable 4
Chris Wilson, Creative Service Specialist
Media Resources, B.C. Telephone Co.
Oliver Eichel, ON - AIR Assistant Manager, CKVU

BUSINESS ADMINISTRATION

Post-diploma Program

Following some experience in the work force, graduates of other programs may wish to 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 fulfil this training need, BCIT has developed a full-time Post-Diploma Program in Business Administration for graduates of non-business management technologies or their equivalent.

The Program

This nine-month program includes such basic business subjects as management accounting, economics, marketing, law, personnel administration, data processing and microcomputer software applications. These courses will give students a thorough understanding of current business practice enabling 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.

Program Length

Nine months full-time beginning in September each year.

Tuition Fees (subject to change)

$1,823 for the 9-month program (1992/93).

Prerequisites

Diploma of Technology in Health or Engineering; College or University graduation, or equivalent. Applicants should be interested in supervisory and managerial positions, or operating their own businesses. Previous business experience is preferable, but not mandatory.

Post-graduation

Degree transfer opportunities are possible on completion of the diploma.

Graduates may earn advanced credit towards designation as a Chartered Accountant, a Certified General Accountant, or a Certified Management Accountant. Advanced credit is also given by the Institute of Chartered Secretaries and Administrators.

Program: BUSINESS ADMINISTRATION

Level 1

ADMN 100 Microeconomics
ADMN 361 Microcomputer Software Systems
ADMN 511 Management Science
ADMN 620 Organizational Behavior
BCOM 302 Advanced Communication for Business Administration
FMGT 519 Financial Management 1
OPMT 510 Business Mathematics

Level 2

ADMN 200 Macroeconomics
ADMN 342 Human Resource/Industrial Relations Management
ADMN 385 Business Law
ADMN 461 Microcomputer Software Applications
ADMN 611 Management Science
COMP 213 Computers and Information Systems
FMGT 619 Financial Management 2
MKTG 113 Introduction to Marketing

COURSE DESCRIPTIONS

ADMN 100 Microeconomics - 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 Macroeconomics - 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 342 Human Resource/Industrial Relations 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. The course develops an understanding of the skills required for selection interviews, performance appraisals, compensation reviews, labour contract negotiations, training and development programs, grievance and collective agreement administration. It also reviews relevant employment law.

ADMN 361 Microcomputer Software Systems - An introduction to the use of applications software on the microcomputer. Topics currently focus on business graphics and spreadsheets, using 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 461 Microcomputer Software Applications - A continuation of ADMN 361, with emphasis on the solution of practical problems. Students will become familiar with database and other programs on the IBM-PC system enabling students to use them in other course areas. Prerequisite: ADMN 361.

ADMN 511 Management Science - Emphasizes the use of decision-making models in business. Trains students in the use of quantitative methods in the choice of alternatives in the decision-making process. Microcomputers will be used to solve problems.

ADMN 611 Management Science - 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.

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 decision-making; and micro or individual factors such as attitudes, perception and motivation.

BCOM 302 Advanced Communication for Business Administration - As future managers, students learn to retrieve, extract and report information efficiently. Building on skills acquired in previous communication courses, this course emphasizes persuasive writing and speaking skills, especially proposal writing.

COMP 213 Computers and Information Systems - Basic data processing principles; flow-charting, analyzing information requirements, report analysis and design. Computer hardware and software; main frames, minis, micros and peripheral devices. Operating systems hardware and software requirements for various operations. Course content is linked to topics developed in ADMN 361 and 461.

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 113 Introduction to Marketing - 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 and industrial goods.

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.

Faculty and Staff

See listing under Management Systems

FINANCIAL MANAGEMENT

Diploma Program

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. The advent of microcomputers has meant increased sophistication in financial management techniques. In the first year, students will receive a good grounding in core business subjects. In second year, the program becomes increasingly specialized, and students will be required to select one of the six programs listed above.

Job Opportunities

The **Professional Accounting** program leads to middle management positions in financial accounting, cost accounting, internal audit and budget preparation. Graduates of this program will usually go on to obtain a professional designation as a C.G.A. or C.M.A.

A limited number of students will be accepted into the **Advanced Accounting** program. Most graduates of this program will find employment with professional accounting firms and will go on to obtain the C.A., C.G.A. or C.M.A. designation.

The **Taxation** program will be of interest to those who would like to work for government or in a professional accounting firm where added tax knowledge would be beneficial. Again, graduates will usually go on to obtain a professional accounting designation.

The **Microfinancial Systems** program will enable a select group of students to obtain greater expertise in the use of microcomputer hardware and software applications related to financial management. There is a big demand for graduates with knowledge both of accounting and of microcomputers.

The **Finance** program prepares a student for employment in the finance department of a small or intermediate sized business. As well, with the background obtained in this program, graduates have secured employment in banking, brokerage, trust and insurance industries.

The **Investment Management** program prepares a student for employment in banking, international finance, brokerage firms and the finance departments of large companies.

Beginning Salaries

Successful graduates who complete additional training can expect, with significant varied experience, to achieve middle to senior management positions earning annual salaries in excess of $60,000. To achieve this level of success means starting in entry-level positions in financial accounting, cost accounting, internal audit, budget preparation, brokerage, banking, trust and insurance with starting salaries as high as $2,550 per month.

The Programs

In the first year, all Financial Management students complete the same course of studies in core business subjects. Many of the second year courses are also common. Specialized courses in each of the six programs are:

- Professional Accounting - Auditing, Security Fundamentals and Projects in Industry;
- Advanced Accounting - Advanced Accounting and Auditing;
- Taxation - Selected Topics in Tax, Auditing and Security Fundamentals;
- Microfinancial Systems - Advanced Microcomputer Applications, Auditing and Security Fundamentals;
- Finance - Enterprise Finance, Security Analysis and Money and Banking;
- Investment Management - Investment Banking, Security Analysis and Money and Banking.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Direct Entry to Second Year

Applicants who already possess a university degree, associate of arts certificate or a diploma of technology, may be eligible for direct entry to the second year of any Financial Management program. Applicants who have completed the equivalent of the first-year program at BCIT may also be eligible for direct entry to second year. Please note that FMGT 201 (or its equivalent) is a prerequisite for nearly all second-year courses. All applicants are encouraged to contact the department directly to clarify their opportunities.

Prerequisites

High school graduation with Math 11 and English 12 both with C+ are the minimum 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. Preference is given to applicants with an average of better than C+ in grade 12 courses and to applicants with at least two years of full-time work experience. Candidates who do not meet these requirements 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. A preadmission interview may be conducted by members of the Financial Management Technology to assess applicants' suitability for the field, including written and oral communication skills.

Advanced Training/Degree Transfer and Completion

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 in Financial Management will receive up to 72 credits toward the Bachelor of Administrative Studies degree from the Open Learning Agency through its Open University (120 credits are required for a degree).

Many of our graduates successfully achieve a university degree from Lakehead University (Ontario) with only 1 year of additional studies. A block credit arrangement is in effect with Simon Fraser University.

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, and our graduates are able to achieve a professional designation within two years, after receiving their BCIT Diploma.

Technology: FINANCIAL MANAGEMENT

Level 1
ADMN 100 Microeconomics
ADMN 102 Management
BCOM 100 Business Communication
COMP 108 Introduction to Computers
FMGT 101 Accounting 1
MKTG 102 Essentials of Marketing
OPMT 110 Business Mathematics

Level 2
ADMN 200 Macroeconomics
ADMN 226 Organizational Behavior
BCOM 200 Business Communication
COMP 120 Computers in Business
FMGT 201 Accounting 2
FMGT 291 Finance Reports
FMGT 292 Computerized Accounting
FMGT 293 Working Capital Management
OPMT 130 Business Statistics

Program: PROFESSIONAL ACCOUNTING

Level 3
ADMN 385 Business Law
FMGT 301 Cost and Managerial Accounting 1
FMGT 302 Financial Accounting 1
FMGT 307 Finance 1
FMGT 310 Auditing 1
FMGT 313 Taxation 1
FMGT 318 Microcomputer Systems

Level 4
FMGT 401 Cost and Managerial Accounting 2
FMGT 402 Financial Accounting 2
FMGT 404 Finance 2
FMGT 406 Auditing 2
FMGT 407 Microcomputer Applications
FMGT 409 Taxation 2
FMGT 411 Projects in Industry
FMGT 412 Security Fundamentals

Program: ADVANCED ACCOUNTING

Level 3
ADMN 385 Business Law
FMGT 301 Cost and Managerial Accounting 1
FMGT 302 Financial Accounting 1
FMGT 307 Finance 1
FMGT 310 Auditing 1
FMGT 313 Taxation 1
FMGT 318 Microcomputer Systems

Level 4
FMGT 401 Cost and Managerial Accounting 2
FMGT 402 Financial Accounting 2
FMGT 404 Finance 2
FMGT 406 Auditing 2
FMGT 407 Microcomputer Applications
FMGT 409 Taxation 2
FMGT 415 Advanced Accounting

Program: TAXATION

Level 3
ADMN 385 Business Law
FMGT 301 Cost and Managerial Accounting 1
FMGT 302 Financial Accounting 1
FMGT 307 Finance 1
FMGT 310 Auditing 1
FMGT 313 Taxation 1
FMGT 318 Microcomputer Systems

Level 4
FMGT 401 Cost and Managerial Accounting 2
FMGT 402 Financial Accounting 2
FMGT 404 Finance 2
FMGT 406 Auditing 2
FMGT 407 Microcomputer Applications
FMGT 409 Taxation 2
FMGT 412 Security Fundamentals
FMGT 429 Selected Topics in Tax

Program: MICROFINANCIAL SYSTEMS

Level 3
ADMN 385 Business Law
FMGT 301 Cost and Managerial Accounting 1
FMGT 302 Financial Accounting 1
FMGT 307 Finance 1
FMGT 310 Auditing 1
FMGT 313 Taxation 1
FMGT 323 Advanced Microcomputer Applications 1

Level 4
FMGT 401 Cost and Managerial Accounting 2
FMGT 402 Financial Accounting 2
FMGT 404 Finance 2
FMGT 406 Auditing 2
FMGT 409 Taxation 2
FMGT 411 Projects in Industry
FMGT 412 Security Fundamentals
FMGT 423 Advanced Microcomputer Applications 2

Program: FINANCE

Level 3
ADMN 385 Business Law
FMGT 301 Cost and Managerial Accounting 1
FMGT 302 Financial Accounting 1
FMGT 307 Finance 1
FMGT 308 Security Analysis 1
FMGT 313 Taxation 1
FMGT 318 Microcomputer Systems

Level 4
FMGT 401 Cost and Managerial Accounting 2
FMGT 402 Financial Accounting 2
FMGT 404 Finance 2
FMGT 405 Security Analysis 2
FMGT 407 Microcomputer Applications
FMGT 409 Taxation 2
FMGT 414 Enterprise Finance
FMGT 430 Money and Banking

Program: INVESTMENT MANAGEMENT

Level 3
ADMN 385 Business Law
FMGT 301 Cost and Managerial Accounting 1
FMGT 302 Financial Accounting 1
FMGT 307 Finance 1
FMGT 308 Security Analysis 1
FMGT 313 Taxation 1
FMGT 318 Microcomputer Systems

Level 4
FMGT 401 Cost and Managerial Accounting 2
FMGT 402 Financial Accounting 2
FMGT 404 Finance 2
FMGT 407 Microcomputer Applications
FMGT 409 Taxation 2
FMGT 430 Money and Banking
FMGT 445 Investment Banking

COURSE DESCRIPTIONS

ADMN 100 Microeconomics - 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 102 Management - A study of the management functions of planning, organizing, staffing and controlling. Included are such topics as forms of business ownership, tactical and strategic planning, decision-making, structuring the organization and providing human resources, and controlling operations. Students are given the opportunity to develop analytical and communication skills by analyzing and presenting solutions to typical business problems.

ADMN 200 Macroeconomics - 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 226 Organizational Behavior - The study of the main factors that either influence or are influenced by people at work. The course will focus first on micro or individual factors such as values, attitudes, perception and motivation. This is followed by a look at such macro or group factors as leadership, communication, supervision, power, conflict and change.

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 100 Business Communication - Communicating on the job is a complex process which includes gathering and evaluating data, collaborating with co-workers, reporting to superiors, and presenting information and ideas. This introductory business communication course is designed to give students basic listening, writing, and speaking skills which will allow them to prepare written and oral reports for BCIT courses and to proceed to more advanced communication courses.

BCOM 200 Business Communication - This course gives further instruction and practice in the principles taught in BCOM 100. It 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 processing. Prerequisite: BCOM 100.

COMP 108 Introduction to Computing - Lectures and practical exercises are used to present topics on computer terminology, hardware, software, DOS (Disc Operating System), and a word processing package.

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 specific technologies. Prerequisite: COMP 108.

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 an introduction to accounting theory; income measurement; traditional record-keeping procedures; the accounting cycle; special journals; cash; merchandising operations; inventory estimation and costing.

FMGT 201 Accounting 2 - The follow-up to FMGT 101. Topics include notes and accounts receivable, long-lived assets, liabilities, partnerships and corporations, cash-flow, manufacturing accounting, management accounting, consolidated statements and analysis of financial statements. Prerequisite: FMGT 101.

FMGT 291 Finance Reports - The purpose of this course is to provide Financial Management students with skills in formal reporting. They will have the opportunity to analyze an organization first-hand, talk to key personnel and investigate that firm's financial and organizational make-up. Operating as part of a small syndicate, students will make a formal oral presentation to a large group in a theatre setting, using audiovisual techniques and equipment.

FMGT 292 Computerized Accounting - Enables the student with an introductory financial accounting background to utilize this knowledge in a computerized setting. Students progress through a microcomputer accounting package that will provide them with the flexibility to adapt to many accounting packages that are currently available in the market place. The emphasis of this course is to upgrade students' ability to handle modern accounting software packages on the microcomputer. Prerequisite: FMGT 101.

FMGT 293 Working Capital Management - This course will enable students to understand the relationships between current assets and current liabilities in different types of organizations, to appreciate the trade-offs inherent in a firm's working capital policy, and to carry out a basic analysis of a firm's working capital management in comparison to others.

FMGT 301 Cost and Managerial Accounting 1 - Emphasizes the role of the management accountant, cost concepts and terminology, CVP analysis, cost flows, job costing, budgeting and control, standard costs and variances, and variable costing. 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 and critical standpoint; the income statement and balance sheet; statement of changes in financial position (cash basis); cost, valuation, presentation and income measurement problems associated with current assets and current liabilities. Prerequisite: FMGT 201 or 215.

FMGT 307 Finance 1 - The two major aims of corporate finance are (1) the efficient allocation of funds within the enterprise and (2) the raising of funds on as favourable terms as possible. This course focuses on the following topics related to these overall aims: corporate organization and taxation, determining the cost of capital, allocation of funds through financial markets, valuation of financial instruments and financial statement analysis. Prerequisite: FMGT 201 or 215.

FMGT 308 Security Analysis 1 - This is an introductory level course in investments. Topics include the nature of common shares and the markets in which they trade; the impact of fluctuations in the business cycle on security prices; the analysis of securities from a fundamental and technical perspective. 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 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 409 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 or 215.

FMGT 318 Microcomputer Systems - Students will have the opportunity to develop expertise in the AccPac accounting software package. They will learn how to use a spreadsheet package for financial modelling and analysis. Prerequisite: COMP 120 or 125.

FMGT 323 Advanced Microcomputer Applications 1 - The course will build upon a basic knowledge of DOS and spreadsheet packages with more sophisticated techniques and applications. Hard disk management, file recovery and transfer techniques will also be covered. Prerequisite: COMP 120 or 125.

FMGT 401 Cost and Managerial Accounting 2 - Emphasizes relevant costing for decision-making, cost behaviour, cost allocation, joint and by-products, process costing, linear programming, and mix and yield variances. 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 changes in financial position (cash-flow), statements from incomplete data, accounting changes, errors, accounting for leases. Prerequisite: FMGT 302.

FMGT 404 Finance 2 - This course continues where FMGT 307 left off and focuses on: sources of short, medium and long-term financing; capital budgeting techniques (IRR and NPV), working capital management, dividend policy, financial leverage and capital structure, equity sources of funds, common, preferred, rights, warrants and convertibles, to close with an analysis of mergers and take-overs. Prerequisite: FMGT 307.

FMGT 405 Security Analysis 2 - This course is an examination of financial assets exclusive of common shares. Topics include the nature, markets, and the valuation process of fixed income securities, convertible securities, warrants and options. As well, alternative forms of investments such as mutual funds will be discussed. 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 students will develop a level of familiarity with software programs and applications such that they will use them in their 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 and assessment (including returns, appeals, reassessment and payment). 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: Completion of Level 3.

FMGT 412 Security Fundamentals - An introduction to the fundamentals of investing including market mechanics, the investment setting, technical and fundamental analysis of common stock, preferred stock and corporate bonds. Prerequisite: FMGT 201 or 215.

FMGT 414 Enterprise Finance - Familiarizes the student with the fundamentals of raising funds. Emphasis is placed on various sources of funds with particular focus on the types, their benefits and costs. Topics will include bank financing, government funding and venture capital. Prerequisite: FMGT 307.

FMGT 415 Advanced Accounting - The student will review GAAP and objectives of financial reporting as these relate to the main objectives of this course. A closer examination of corporate combinations will be undertaken including consolidations for wholly-owned and non-wholly-owned subsidiaries (both in the year of acquisition and in subsequent years) and pooling of interests. Consolidations will be examined for up to two subsidiaries. Accounting for foreign currency transactions will also be studied, along with fund accounting. Prerequisite: FMGT 302.

FMGT 423 Advanced Microcomputer Applications 2 - The course will include database techniques, communication and other specialty packages and system selection and installation. Prerequisite: FMGT 323.

FMGT 429 Selected Topics in Tax - This course will cover topics in taxation which are either not covered in Taxation 1 and 2 or not covered in depth, such as the Goods and Services Tax, corporate reorganizations, real estate taxation and other similar special topics.

FMGT 430 Money and Banking - Examines central banking and monetary control, financial assets and financial markets, objectives and techniques of monetary policy, money and the international economy. Prerequisite: ADMN 100 and 200.

FMGT 445 Investment Banking - Major topic areas are corporate evaluation, asset and liability management, financial intermediaries, and money market instruments. The focus of all four areas will be international as well as domestic investment banking. Prerequisite: FMGT 307, 308.

MKTG 102 Essentials of Marketing - An introductory course designed to provide the student with an overview of the marketing concept and how it can be applied to any type of organization or service. Material includes the controllable and uncontrollable elements of marketing, strategy planning, market characteristics, marketing research techniques, market segmentation and target market selection.

OPMT 110 Business Mathematics - Review of basic mathematics applicable to business and industry, consumer and commercial credit. 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 field of financial management.

OPMT 132 Business Statistics - 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 and standard distributions. Elementary sampling theory, estimation and confidence intervals, hypothesis testing, linear regression, correlation, index numbers and time series. Emphasis is on practical applications in the field of Financial Management.

Faculty and Staff

G.H. Farrell, Dipl. T., M.B.A., F.C.M.A., Associate Dean
R.C. Bell, B.A. (Econ.), C.G.A.
C.M. Briscall, B.Com., M.B.A., F.C.M.A., Program Head
D.K. Chan, B.Comm., M.B.A., C.A.
R.A. Cradock, B.Comm., M.B.A., F.C.M.A.
J.R.H. Curtis, B.Com., M.B.A., A.M.B.I.M.
R.J. Dolan, B.B.A., M.B.A., Program Head
J.V. Gibson, C.M.A.
K.M. Hamm, B.Com., C.M.A.
S.M. Hatten, Dipl.T., R.T., C.G.A.
J.L. Johnston, Dipl.T., C.G.A.
H.M.J. Lawson, B.Sc. (Econ.), M.B.A.
R.B. McCallum, B.Eng., M.B.A., C.M.A., Program Head
R.C. Nichols, B.Com., C.M.A., Program Head
J.F. Porteous, C.M.A., Senior Instructor
C. Priester, B.Comm., M.A., F.C.B.A.
C.J. Trunkfield, B.A., M.B.A., F.C.G.A.
P.J. Woolley, B.A., M.A., F.C.A.
H.B. Yackness, B.Com., M.B.A., C.A., Program Head

Advisory Committee Members

R. Williamson, Chevron Canada, Chair
A. J. Barnard, Government of B.C.
P. Bower, The Certified General Accountants Association of British Columbia
D. G. A. Carter, The Institute of Chartered Accountants of British Columbia
V. Cinnamon, Cinnamon, Jang, Willoughby & Co.
R. Clark, V-Speck Cable
G. Coombe, B.C. Telephone Company
J. A. Gardiner, Price Waterhouse Chartered Accountants
W. E. Gibson, Vancouver Financial Planning Consultants Inc.
D. Hincks, McDonald's Restaurants of Canada Ltd.
H. Johnston, Metrovan Capital Corp.
S. King, Deloitte & Touche (Advisory Committee Vice Chairperson)
K. G. Lohn, Lohn Caulder Chartered Accountants
C. MacKenzie, B.C. Telephone Company
J. McCormack, Snowsell Jennens & Carter (Kelowna, B.C.)
H. A. (Bert) Miles, Burnaby Lake Greenhouses Ltd.
T. Northup, Laurentian Pacific Insurance Company
P. Norwood, The Society of Management Accountants of British Columbia
F. Schiffner, B.C. Welding Supplies Ltd.
W. H. Symons, Thorne Little Chartered Accountants
A. D. Vichert, International Financial Centre Vancouver
P. Wright, Laurentian Pacific

HUMAN RESOURCE MANAGEMENT

Post-diploma Program

One of the most important skills for future supervisors and managers to obtain is the ability to motivate others so that the productivity of the enterprise is enhanced.

This program is designed for those who are interested in developing these specialized abilities who wish to make a career in human resource management and line management.

Students will be exposed to the latest developments in human resource management. They will develop interviewing and selection, interpersonal, training and development skills; and the use of computers in human resource management and collective bargaining.

College, institute, or university graduates, or people with equivalent qualifications who are interested in human resource management specialization should consider this program.

The Program

The program consists of 9 months of study with emphasis on human resource management and industrial relations; it also includes general management subject areas. Depending on previous courses taken, a student may be asked to substitute other courses for some of those shown below. Lectures are supplemented with case studies and group discussions throughout the program.

Applicants for the Human Resource Management program should have a particular interest in this field of specialization.

Program Length

Nine months full-time beginning in September each year.

Tuition Fees (subject to change)

$1,823 for the 9-month program (1992/93).

Prerequisites

Diploma of Technology, College or University degree; plus FMGT 101, 201 and proficiency in microcomputer spreadsheet program operations or equivalent.

Program:
HUMAN RESOURCE MANAGEMENT

Level 1

ADMN 321 Interpersonal Skills Development
ADMN 330 Industrial Relations
ADMN 341 Human Resource Management Systems 1
ADMN 346 Compensation Management
ADMN 360 Microcomputer Applications 2 (Databases)
ADMN 385 Business Law
FMGT 307 Finance 1
OPMT 510 Business Mathematics

Level 2

ADMN 200 Macroeconomics
ADMN 430 Collective Bargaining
ADMN 441 Interviewing Skills*
ADMN 442 Training and Development*
ADMN 445 Human Resource Management Systems 2
ADMN 446 Human Resource Planning*
ADMN 447 Benefits Administration*
ADMN 490 Directed Studies
FMGT 404 Finance 2
OH&S 433 Occupational Health and Safety*

* Half term courses

COURSE DESCRIPTIONS

ADMN 200 Macroeconomics - 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 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. Prerequisite: ADMN 226.

ADMN 330 Industrial Relations - A detailed analysis of selected labour/management problem areas with emphasis on the solution of practical problems in industrial relations.

ADMN 341 Human Resource Management Systems 1 - An introduction to systems and procedures associated with human resource information collection, storage and use for strategic and organizational human resource planning purposes. Course presents an overview of management functions, H.R. information systems, and applied H.R.

research techniques. Two hours a week of microcomputer laboratory time are included for preparation of course assignments that use computer applications. Prerequisite: ADMN 160 (or equivalent), 226.

ADMN 346 Compensation Management - An introduction to wage and salary administration techniques including job analysis evaluation, compensation surveys, and pay-for-performance systems. Contemporary issues such as pay compression, pay equity and confidentiality are addressed.

ADMN 360 Microcomputer Applications 2 (Databases) - Covers the process of building databases and applications with a commercial database package. Much of the course is generic in nature and many of the techniques, functions and procedures are applicable to database packages currently used in business. Prerequisite: ADMN 160 or equivalent.

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.

ADMN 430 Collective Bargaining - An introductory analysis of the fundamental issues and facts of labour-management relations. Special emphasis is given to collective agreement content and interpretation, bargaining and basic labour economics. Prerequisite: ADMN 330.

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. Prerequisite: ADMN 321.

ADMN 442 Training and Development - Develops ability to design and implement a training program with emphasis on practical problems of training in industry. Prerequisite: ADMN 321, 341.

ADMN 445 Human Resource Management Systems 2 - A continuation of ADMN 341 covering practical performance management systems and advanced HRIS systems management considerations. Current human resource management policy issues such as employment equity, affirmative action programming, employment testing and business ethics are also addressed. Two hours a week of microcomputer laboratory time are included for preparation of course assignments that use computer applications. Prerequisite: ADMN 341.

ADMN 446 Human Resource Planning - Presents the techniques for utilizing people potential within organizations. Topics include human resource demand and supply, analysis, future projections, sources of supply, identifying training needs, related strategic management objectives, budgeting and costing. Prerequisite: ADMN 341.

ADMN 447 Benefits Administration - Benefits planning from a total compensation perspective. A review of various benefit plans including health and insurance, pension, stock/share purchase, RRSP's, paid time off, workers compensation, and contemporary issues such as pension reform, mandatory retirement and employee assistance programming. Prerequisite: ADMN 346.

ADMN 490 Directed Studies - Designed to give students practical application of concepts learned in major program areas by engaging in problem-solving projects in business or government. Prerequisite: All courses in Levels 1 and 2 or permission of the Program Head.

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 and cash-planning, the cost of capital and working capital management. Prerequisite: FMGT 201 or 215.

FMGT 404 Finance 2 - Instructs students in raising capital to finance a firm. Topics include capital budgeting; short, medium and long-term financing; leasing; security analysis; the Canadian capital and money markets as they affect business decisions of Canadian firms. Prerequisite: FMGT 307.

OH&S 433 Occupational Health and Safety - Provides a basic understanding of Occupational Health and Safety. The course covers loss control principles, workers' compensation, claims management, WHMIS, safety program implementation, measurement, evaluation, accident investigation principles, inspection techniques and risk management.

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.

Faculty and Staff

M. Baxter, Dipl.T., B.B.A.
C. Clark, B.A., M.A.
C.L.R. Jaques, B.A., M.A.
T. Juzkow. B.A.Sc., M.B.A., P. Eng.
F. Mandl, B.Sc., M.B.A.
G. Storey, B.A., M. Sc., Program Head
R.A. Yates, LLB., M.B.A.
B. van der Woerd, B.A.
L. Jones, B.Sc., M.Sc.

HUMAN RESOURCE SYSTEMS

Diploma Program

One of the most important skills for future supervisors and managers to obtain is the ability to motivate others so that the productivity of the enterprise is enhanced.

This program is designed for those who are interested in developing these specialized abilities who wish to make a career in human resource management and line management.

Students will be exposed to the latest developments in human resource management. They will develop interviewing and selection skills, interpersonal skills, training and development skills; and the use of computers in human resource management and collective bargaining.

Job Opportunities

Graduates of this program will be involved in selection and placement, training and development, human resource systems management, labour/management relations, job evaluation, benefit administration and organization renewal and development. As well, graduates qualify for management training programs offered by various organizations.

The Program

Students complete the same Level 1 and Level 2 courses as in the Management Systems program. **They then apply for acceptance into the Human Resource Systems program which begins with Level 3 (see also Direct Entry to Second Year).**

Students who enter the Human Resource Systems program will generally follow the course of studies shown as Levels 1 through 4, with some changes in the offerings and order of courses as the department revises and updates the program to reflect changes in business and industry.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Prerequisites

High school graduation with Math 11 and English 12, both with C+, are required for this program. Enrolment is limited. Applicants should apply early, stating full details of work experience and 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.

Specific Prerequisites

Applicants will be selected to enter the Human Resource Systems program after completion of all Level 1 and Level 2 courses, based on academic achievement, communication skills, maturity and relevant work experience.

Direct Entry for College, Institute or University Graduates

Direct entry into the second year of the Human Resource Systems program is possible for those who have previously graduated from a College or Institute Business Program or who have a university degree, or equivalent. As part of the selection process for direct entry, an interview may be required to review the applicant's academic record and work experience. This review may identify courses to be completed prior to admission into the program. For details see Human Resource Management - Post-diploma Program.

Degree Completion/Advanced Studies

Degree Completion and Advanced Diploma opportunities are possible on completion of the diploma.

Program: HUMAN RESOURCE SYSTEMS

Level 1

ADMN 100 Microeconomics
ADMN 102 Management
BCOM 100 Business Communication
COMP 108 Introduction to Computing
FMGT 101 Accounting 1
MKTG 102 Essentials of Marketing
OPMT 110 Business Mathematics

Level 2

ADMN 160 Microcomputer Applications 1 (Spreadsheets)
ADMN 200 Macroeconomics
ADMN 214 Entrepreneurial Management
ADMN 226 Organizational Behavior
ADMN 227 Organizational Behavior Workshop
ADMN 228 International Business
BCOM 200 Business Communication
FMGT 201 Accounting 2
OPMT 130 Business Statistics

Level 3

ADMN 310 Management Science
ADMN 321 Interpersonal Skills Development
ADMN 330 Industrial Relations
ADMN 341 Human Resource Management Systems 1
ADMN 346 Compensation Management
ADMN 360 Microcomputer Applications 2 (Databases)
ADMN 385 Business Law
FMGT 307 Finance 1

Level 4

ADMN 410 Management Policy
ADMN 430 Collective Bargaining
ADMN 441 Interviewing Skills
ADMN 442 Training and Development
ADMN 445 Human Resource Management Systems 2
ADMN 446 Human Resource Planning
ADMN 447 Benefits Administration
ADMN 490 Directed Studies
FMGT 404 Finance 2
OH&S 433 Occupational Health and Safety

COURSE DESCRIPTIONS

ADMN 100 Microeconomics - 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 102 Management - A study of the management functions of planning, organizing, staffing and controlling. Included are such topics as forms of business ownership, tactical and strategic planning, decision-making, structuring the organization, providing human resources and controlling operations. Students are given the opportunity to develop analytical and communication skills by analyzing and presenting solutions to typical business problems.

ADMN 160 Microcomputer Applications 1 (Spreadsheets) - An introduction to microcomputers and software. Students become familiar with software programs to be used in other program areas. Prerequisite or Corequisite: COMP 108 & COMP 113.

ADMN 200 Macroeconomics - 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 214 Entrepreneurial Management - Students will investigate all factors involved in starting a business venture. Topics include: analyzing the market opportunity, developing a market strategy and marketing plan, financing the company, and dealing with legal implications. Students will develop a comprehensive business plan for a new business venture. Prerequisite: ADMN 102, FMGT 101.

ADMN 226 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 group dynamics, leadership, conflict and decision-making; and micro or individual factors such as attitudes, perception and motivation.

ADMN 227 Organizational Behavior Workshop - This workshop will be used for more intensive instruction in interpersonal skills to complement ADMN 226. Prerequisite or Co-requisite: ADMN 226.

ADMN 228 International Business - Students will complete a report covering various aspects of marketing and trade between British Columbia and one other country. They will present the results of their investigations to class members so that each student gains knowledge of trading with countries which represent Canada's major global markets. Prerequisite or Co-requisite: MKTG 102.

ADMN 310 Management Science - Emphasizes the use of decision-making models in business. Trains students in the use of quantitative methods in the choice of alternatives in the decision-making process. Prerequisite: OPMT 110, 130.

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. Prerequisite: ADMN 226.

ADMN 330 Industrial Relations - A detailed analysis of selected labour/management problem areas with emphasis on the solution of practical problems in industrial relations.

ADMN 341 Human Resource Management Systems 1 - An introduction to systems and procedures associated with human resource information collection, storage and use for strategic and organizational human resource planning purposes. Course presents an overview of human resource management functions, H.R. information systems, and applied H.R. research techniques. Two hours a week of microcomputer laboratory time are included for preparation of course assignments that use computer applications. Prerequisite: ADMN 160, 226.

ADMN 346 Compensation Management - An introduction to wage and salary administration techniques including job analysis, job evaluation, compensation surveys and pay-for-performance systems. Contemporary issues such as pay compression, pay equity, and confidentiality are addressed.

ADMN 360 Microcomputer Applications 2 (Databases) - Covers the process of building databases and applications with a commercial database package. Much of the course is generic in nature and many of the techniques, functions and procedures are applicable to database packages currently used in business. Prerequisite: ADMN 160.

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.

ADMN 410 Management Policy - An analysis of business policy formulation designed to give the student practice, experience and confidence in handling complex business situations 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 acquaints the student with the role of top management and the interrelationships between these fields. Prerequisite: All Level 1, 2 and 3 courses, or permission of Program Head.

ADMN 446 Human Resource Planning - Presents the techniques for utilizing people potential within organizations. Topics include human resource demand and supply. Analysis, future projections, sources of supply, identifying training needs, related strategic management objectives, budgeting and costing. Prerequisite: ADMN 341.

ADMN 430 Collective Bargaining - An introductory analysis of the fundamental issues and facts of labour-management relations. Special emphasis is given to collective agreement content and interpretation, bargaining and basic labour economics. Prerequisite: ADMN 330.

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. Prerequisite: ADMN 321, 341.

ADMN 442 Training and Development - Develops ability to design and implement a training program with emphasis on practical problems of training in industry. Prerequisite: ADMN 321/341.

ADMN 445 Human Resource Management Systems 2 - A continuation of ADMN 341 covering practical performance management systems and advanced HRIS systems management considerations. Current human resource management policy issues such as employment equity, affirmative action programming, employment testing, and business ethics are also addressed. Two hours a week of microcomputer laboratory time are included for preparation of course assignments that use computer applications. Prerequisite: ADMN 341.

ADMN 447 Benefits Administration - Benefits planning from a total compensation perspective. A review of various benefit plans including health and insurance, pension, stock/share purchase, RRSP's, paid time off, workers compensation; and contemporary issues such as pension reform, mandatory retirement and employee assistance programming. Prerequisite: ADMN 346.

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. Prerequisite: All courses in Levels 1, 2 and 3, or permission of the Program Head.

BCOM 100 Business Communication - Communicating on the job is a complex process which includes gathering and evaluating data, collaborating with co-workers, reporting to superiors, and presenting information and ideas. This introductory business course is designed to give students basic listening, writing and speaking skills which will allow them to prepare written and oral reports for BCIT courses and to proceed to more advanced communication courses.

BCOM 200 Business Communication - This course gives further instruction and practice in the principles taught in BCOM 100. It 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 processing. Prerequisite: BCOM 100.

COMP 108 Introduction to Computing - Lectures and practical exercises are used to present topics on computer terminology, hardware, software, DOS (Disc Operating System), and a word processing package.

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, an introduction to accounting theory; income measurement; traditional record-keeping procedures; the accounting cycle; special journals; cash; merchandising operations; inventory estimation and costing.

FMGT 201 Accounting 2 - The follow-up to FMGT 101. Topics include notes and accounts receivable, long-lived assets, liabilities, partnerships and corporations, cash-flow, manufacturing accounting, management accounting, consolidated statements and analysis of financial statements. Prerequisite: FMGT 101.

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 and cash-planning, the cost of capital and working capital management. Prerequisite: FMGT 201 or 215.

FMGT 404 Finance 2 - Instructs students in raising capital to finance a firm. Topics include capital budgeting; short, medium and long-term financing; leasing; security analysis; the Canadian capital and money markets as they affect business decisions of Canadian firms. Prerequisite: FMGT 307.

MKTG 102 Essentials of Marketing - An introductory course designed to provide the student with an overview of the marketing concept and how it can be applied to any type of organization or service. Material covered includes the controllable and uncontrollable elements of marketing, strategy planning, market characteristics, marketing research techniques, market segmentation and target market selection.

OH&S 433 Occupational Health and Safety - Provides a basic understanding of Occupational Health and Safety. The course covers loss control principles, workers' compensation, claims management, WHMIS, safety program implementation, measurement, evaluation, accident investigation principles, inspection techniques and risk management.

OPMT 110 Business Mathematics - Review of the basic mathematics applicable to business and industry. Mathematics of finance including retail operations, simple and compound interest, discounts, annuities, financial papers and depreciation methods. Emphasizes 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 of inferential statistics is provided through selected topics such as sampling, confidence limits of the mean, hypotheses testing and simple linear regression.

Prerequisite Guide

Level 1 Acceptance into the program

Level 2
ADMN 160 COMP 108
ADMN 200 None
ADMN 214 FMGT 101/MKTG 102
ADMN 226 None

Prerequisite Guide Level 2 Contd.
ADMN 227 ADMN 226 (or Co-requisite)
ADMN 228 MKTG 102 (or Co-requisite)
BCOM 200/208 BCOM 100/108
FMGT 201 FMGT 101
OPMT 130 None

Level 3
ADMN 310 OPMT 110 & OPMT 130
ADMN 321 ADMN 226
ADMN 330 None
ADMN 340 ADMN 226
ADMN 341 ADMN 226, 160
ADMN 360 ADMN 160
ADMN 385 None

Level 4
ADMN 410 All Level 1 through 3 courses or permission of the program head
ADMN 430 ADMN 330
ADMN 440 ADMN 341
ADMN 441 ADMN 321 & 341
ADMN 442 ADMN 321 & 341
ADMN 447 ADMN 346
ADMN 490 All Level 1 through 3 courses or permission of the program head
FMGT 404 FMGT 307
OH&S 433 None
ADMN 404 ADMN 340/341

Faculty and Staff

See listing under Management Systems

Advisory Committee

Doug Alley, B.C. Packers Limited
John Allanson, Weldwood of Canada Limited
Cliff Andstein, BCGEU
Debbie Bennett, Pacific Press Limited
Suzanne Bolton, Human Resource Consultant
Laurier Bourassa, Human Resources
Joe Breau, Vancouver General Hospital
Bob Clendenan, Chemetics International Company
Hugh Finlayson, School District No. 34 (Abbotsford)
David Gardner, Scott Paper Limited
Dwight Guy, Canadian Aircraft Products
David Harvey, BCIT Personnel/Employee Relations
John Hatchett, Prism Systems Inc.
Tim Hovis, B.C. Telephone Company
Brent Larsen, B.C. Hydro
Bill Mathieson, H.A. Simons Ltd.
Carolyn McDonald, St. Paul's Hospital
John Neilson, Insurance Corp. of B.C.
Sue Peterson, Surrey Memorial Hospital
Sarah Stanger, Pan Pacific Vancouver Hotel
Eileen Stewart, City of Vancouver
D'Arcy Warner, B.C. Gas Inc.

INTERNATIONAL TRADE

Diploma Program

International Trade is vital to the survival of Canada as one of the six most important trading nations in the world. Canada needs trained people to ensure continued growth and prosperity. Graduates of the International Trade program receive a broad training in the importing and exporting of goods and services. Importing and exporting depend upon market planning, market research and the ability to understand the different markets from a political, social and cultural perspective.

Job Opportunities

With the versatility of the International Trade program, graduates find employment in a wide range of differing industries and in a wide range of differing well paid careers. The International Trade program is ideal for those graduates seeking to establish themselves as entrepreneurs in exporting and importing. Other career opportunities occur in trading houses, customs brokers, freight forwarders and large companies having international and trans-provincial markets.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Prerequisites

High school graduation with Math 11 and English 12 both with C+. 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: INTERNATIONAL TRADE

Level 1

ADMN 100 Microeconomics
ADMN 102 Management
BCOM 100 Business Communication
COMP 108 Introduction to Computing
FMGT 101 Accounting 1
MKTG 102 Essentials of Marketing
OPMT 110 Business Mathematics
TDMT 101 Geography of Trading
TDMT 150 Distribution 1 (CITT)

Level 2

ADMN 200 Macroeconomics
ADMN 384 Business and International Law
BCOM 200 Business Communication
FMGT 201 Accounting 2
OPMT 121 Business Statistics
OPMT 148 Industrial Engineering 1
OPMT 209 Computer Applications 1
TDMT 203 Transportation Economics
MKTG 243 Sales Skills
TDMT 250 Distribution 2 (CITT)

Level 3

TDMT 204 Integrated Purchasing
MKTG 301 Quantitative Methods/Computer Applications in Marketing
MKTG 309 Marketing Research 1
OPMT 350 Microcomputer Applications: Database
TDMT 301 Logistics 1
TDMT 305 International Trade
TDMT 309 Marine Shipping and Insurance
TDMT 310 Introduction to Political Science
FMGT 342 Cost and Managerial Accounting

Level 4

ADMN 347 Human Resources/Industrial Relations Management
TDMT 402 Introduction to Projects
FMGT 442 Domestic and International Corporate Finance
MKTG 401 Marketing Planning
MKTG 409 Marketing Research 2
OPMT 446 Quality Assurance (International)
TDMT 409 Harmonized System and FTA
TDMT 401 Logistics 2
TDMT 411 Industry Project

Note: Program curriculum under review and subject to change.

COURSE DESCRIPTIONS

ADMN 100 Microeconomics - 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 102 Management - A study of the management functions of planning, organizing, staffing and controlling. Included are such topics as forms of business ownership, tactical and strategic planning, decision-making, structuring the organization and providing human resources, and controlling operations. Students are given the opportunity to develop analytical and communication skills by analyzing and presenting solutions to typical business problems.

ADMN 200 Macroeconomics - 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 347 Human Resources/Industrial Relations Management -

BCOM 100 Business Communication - Communicating on the job is a complex process which includes gathering and evaluating data, collaborating with co-workers, reporting to superiors, and presenting information and ideas. This introductory business course is designed to give students basic listening, writing and speaking skills which will allow them to prepare written and oral reports for BCIT courses and to proceed to more advanced communication courses.

BCOM 200 Business Communication - This course gives further instruction and practice in the principles taught in BCOM 100. It 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 processing. Prerequisite: BCOM 100.

COMP 108 Introduction to Computing - Lectures and practical exercises are used to present topics on computer terminology, hardware, software, DOS (Disc Operating System), and a word processing package and spreadsheets.

FMGT 101 Accounting 1 - 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 - 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 101.

FMGT 342/442 Domestic and International Corporate Finance/Managerial Accounting - 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. Prerequisite: FMGT 101, FMGT 201.

MKTG 102 Essentials of Marketing - An introductory course designed to provide the student with an overview of the marketing concept and how it can be applied to any type of organization or service. Material includes the controllable and uncontrollable elements of marketing, strategy planning, market characteristics, marketing research techniques, market segmentation and target market selection.

MKTG 301 Quantitative Methods/Computer Applications in Marketing - An examination of decision support systems utilizing mathematical modelling methods, data bank access, and computer-based information.

MKTG 309 Marketing Research 1 - Examines the basic approaches to marketing research. 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.

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.

MKTG 409 Marketing Research 2 - See MKTG 309. Prerequisite: MKTG 309.

OPMT 110 Business Mathematics - Review of the 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 121 Business Statistics - Covers fundamental statistics used in business and industry. Topics include descriptive statistics, probability theory and major distributions, sampling, estimation, tests of hypotheses, correlation and linear regression.

OPMT 148 Industrial Engineering 1 - A basic productivity improvement course. Course covers productivity and competitiveness the importance to International Trade. A framework for improvement is given together with several continuous improvement tools.

OPMT 209 Computer Applications 1 - An introduction to microcomputers and software. Students become familiar with software programs for use in other program areas. Prerequisite: COMP 108, OPMT 110.

OPMT 350 Microcomputer Applications Database - An examination of the need for automating an information storage and retrieval system. A case study is analyzed and a menu-driven system is developed using a standard relational database package. Topics include database creation, editing, querying; building custom reports, custom screens and labels; indexing, building multiple file relations; fundamentals of structured programming. Prerequisite: OPMT 250, COMP 108.

OPMT 446 Quality Assurance (International) - The impact of quality assurance on business activity in the international market. Topics include: QA fundamentals; North American, European and Japanese standards for quality programs; international product certification; national-level planning for quality control in Pacific Rim Countries; ISO standards for quality management systems and their effect on international procurement, cooperation and competition.

TDMT 101 Geography of Trading - 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 150 Distribution 1 (CITT) - Provides the student with a complete overview of Canadian transportation regulations and modes including water, rail, highway, air, and pipelines; intermediate transportation agencies; domestic and international transport rates, tolls and tariffs.

TDMT 203 Transportation Economics - Covers a variety of transportation services and 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 204 Integrated Purchasing - Acquaints the student with purchasing principles and methods using computerized techniques. Methods of buying transportation services are covered. Emphasis is on computer-assisted analysis of PARETO's law including vendor evaluation and contracting methods for A, B, C items categories. Course also includes advanced application of the EOQ formulae taking turnover into consideration on three levels; vendor-firm-customer, geographic-freight-consolidation, and cost-saving-results. Elements of material management, customer services, performance standards and computerized measures emphasize goods-in-transit manipulation to avoid stockouts. The basic components of cost trade-offs through special quantitative case studies are also covered.

TDMT 250 Distribution 2 (CITT) - Provides the student with an overview of contracts; principles of marine insurance on cargo; warehousing; Canada Customs; damage prevention and claims, hazardous materials; materials handling; unitization devices; physical distribution; computer applications for transportation industries. Prerequisite: TDMT 150.

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.

TDMT 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 310 Introduction to Political Science - Through lectures and individual research students will learn some of the social, cultural and political considerations when dealing with B.C.'s major export markets. Students prepare a research report on a country of their choice, identifying the primary political, social and cultural aspects of trading with that country.

TDMT 402 Introduction to Projects - Prepares students for their role when undertaking specific industry projects at the client's place of business.

TDMT 409 Harmonized System and FTA - This course introduces the student to the new Harmonized System. The EEC, USA, and most OECD countries are on the same system of documentation and valuation for customs purposes. The course will also familiarize students with the Canada - USA Free Trade Agreement (FTA) regulations. Prerequisite: TDMT 305.

TDMT 301/402 Logistics 1 and 2 - An overview of the total distribution concept. Adding to previous 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, customer service and complete distribution audit. Prerequisite: TDMT 204.

TDMT 411 Industry Project - The course is an opportunity to apply the knowledge from the program to a specific industry project for a sponsoring company. Prerequisite: Successful completion of all Level 1, 2, 3 and 4A courses.

Faculty and Staff

See listing under Operations Management

Advisory Committee

Mike Palmer, Martin-Brower Canada Limited
Bruce Dewar, Pareto Trading House Limited
Eric Anderson, Casco Terminals Limited
Wayne Buchanan, Pacific Coast Shipping & Agency Co. Ltd.
Frauken Danmeyer, B.C. Trade Development Corp.
Ross Hodges, Casco Terminals
Kim Kendall, Lee & Drummond, Ltd.
Su Ann Lim, B.C. Telephone Co.
Bill Hammond, Reed Stenhouse Limited
Kevin Ouellette, Johnston International Services
Dorothee Schenkel, Magnacargo
Cheryl Wheaton

MANAGEMENT SYSTEMS

Diploma Program

This program is designed to develop comprehensive business knowledge and the skills necessary to deal with the continually changing needs of business. The student is provided with a solid core of instruction in management, finance, marketing and business problem-solving, together with courses which will develop managers who can implement and use microcomputer-based planning and control systems. Graduates of the program will be effective in both larger business firms and in small business and entrepreneurial activity.

Job Opportunities

Graduates are ready to apply skills they have learned from accounting, operations management, marketing, mathematics, communications, business law, economics, organizational behaviour, human resource management and computer applications directly to supervisory and management positions.

Graduates follow careers in a range of areas such as marketing and sales, banking and insurance. Other opportunities are to continue on to complete a university degree program or a professional accounting program, or to start your own business.

The Program

After the first year of core business courses, students will continue in the Management Systems Program or may apply for the Human Resource Systems Program. The optional courses within the second year of Management Systems are shown under the headings:

Option A - Management Systems and
Option B - Microcomputers in Business.

Students will generally follow the course of studies shown as Levels 1 through 4, with some changes in the offerings and order of courses as the program is revised and updated to reflect changes in business and industry.

Students in courses such as ADMN 160 and ADMN 360 will find it beneficial to have access to a microcomputer outside the Institute. Those who have outside access to microcomputers should so advise their instructors.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Prerequisites

High school graduation with Math 11 and English 12, both with C+, are required for this program. Enrolment is limited. Applicants should apply early, stating full details of work experience and outlining extra-curricular activities. Appropriate business experience and/or other successful post-secondary education will strengthen applications. Applicants should be good communicators and people oriented, with a willingness to work effectively with fellow workers and the public.

Direct Entry

Entry into Level 2 or Level 3 courses of the program is possible when space is available, provided students have entrance prerequisites and have prerequisite courses for the level of entry.

Degree Completion/Advanced Studies

The Advanced Studies in Business program provides degree completion opportunities and an advanced diploma track.

Professional Certification

Graduates may earn advanced credit towards designation as a Chartered Accountant, a Certified General Accountant, or a Certified Management Accountant. Advanced credit is also given by the Institute of Chartered Secretaries and Administrators.

Program: MANAGEMENT SYSTEMS

Level 1

ADMN 100 Microeconomics
ADMN 102 Management
BCOM 100 Business Communication
COMP 108 Introduction to Computing
FMGT 101 Accounting 1
MKTG 102 Essentials of Marketing
OPMT 110 Business Mathematics

Level 2

ADMN 160 Microcomputer Applications 1 (Spreadsheets)
ADMN 200 Macroeconomics
ADMN 214 Entrepreneurial Management
ADMN 226 Organizational Behavior
ADMN 227 Organizational Behavior Workshop
ADMN 228 International Business
BCOM 200 Business Communication
FMGT 201 Accounting 2
OPMT 130 Business Statistics

Second-Year Options

Students will be asked their preference between OPTIONS A and B toward the end of Level 2. If resources or scheduling limit the space in OPTION B, student selection will be based on performance in previous microcomputer courses.

Courses which provide differing content between OPTIONS A and B are shown by *.

ADMN 340 is taken by both OPTIONS A and B, but in different levels.

OPTION A: Management Systems

Level 3

ADMN 310 Management Science
ADMN 330 Industrial Relations
ADMN 340 Human Resource Management
ADMN 360 Microcomputer Applications 2 (Databases)
ADMN 385 Business Law
FMGT 304 Management Accounting
FMGT 307 Finance 1
MKTG 334 Applied Marketing and Selling

Level 4

ADMN 410 Management Policy
*ADMN421 Electronic Communications
*ADMN462 Microcomputer Applications
ADMN 490 Directed Studies
FMGT 404 Finance 2
FMGT 418 Microcomputer Accounting Systems
*OPMT170 Management Engineering
TDMT 352 Transportation

OPTION B: Microcomputers in Business

Level 3

ADMN 310 Management Science
ADMN 330 Industrial Relations
ADMN 360 Microcomputer Applications 2 (Databases)
ADMN 385 Business Law
FMGT 304 Management Accounting
FMGT 307 Finance 1
MKTG 334 Applied Marketing and Selling
*OPMT 173 Management Engineering

Level 4

ADMN 340 Human Resource Management
ADMN 410 Management Policy
*ADMN460 Microcomputer Applications 3
ADMN 490 Directed Studies
FMGT 404 Finance 2
FMGT 418 Microcomputer Accounting Systems
*OPMT171 Management Engineering for Micro Systems
TDMT 352 Transportation

COURSE DESCRIPTIONS

ADMN 100 Microeconomics - 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 102 Management - A study of the management functions of planning, organizing, staffing and controlling. Included are such topics as forms of business ownership, tactical and strategic planning, decision-making, structuring the organization, providing human resources and controlling operations. Students are given the opportunity to develop analytical and communication skills by analyzing and presenting solutions to typical business problems.

ADMN 160 Microcomputer Applications 1 (Spreadsheets) - A managerial approach to microcomputers and software. Students become familiar with the appropriate use of a spreadsheet as a decision support and modelling tool. Prerequisite: COMP 108.

ADMN 200 Macroeconomics - 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 214 Entrepreneurial Management - Students will investigate all factors involved in starting a business venture. Topics include: analyzing the market opportunity, developing a market strategy and marketing plan, financing the company, and dealing with legal implications. Students will develop a comprehensive business plan for a new business venture. Prerequisite: ADMN 102, FMGT 101.

ADMN 226 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 group dynamics, leadership, conflict, change and decision-making; and micro or individual factors such as personality, attitudes, perception and motivation.

ADMN 227 Organizational Behavior Workshop - This workshop will be used for more intensive instruction in interpersonal skills to complement ADMN 226. Prerequisite or Corequisite: ADMN 226.

ADMN 228 International Business - Global competition, modes of entry, market planning, and cross-cultural factors in international business. Prerequisites or co-requisite: MKTG 102.

ADMN 310 Management Science - Emphasizes the use of decision-making models in business. Trains students in the use of quantitative methods when selecting alternatives in the decision-making process. Prerequisite: OPMT 110, 130.

ADMN 330 Industrial Relations - A detailed analysis of selected labour/management problem areas with emphasis on the solution of practical problems in industrial relations.

ADMN 340 Human Resource Management - 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. Prerequisite: ADMN 226.

ADMN 360 Microcomputer Applications 2 (Databases) - This course covers the process of building databases and database applications with a commercial database package. Much of the course is generic in nature and many of the techniques, functions and procedures are applicable to many database packages currently used by businesses. Prerequisite: ADMN 160.

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.

ADMN 410 Management Policy - An analysis of business policy formulation designed to give the student practice, experience and confidence in handling complex business situations 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 acquaints the student with the role of top management and the interrelationships between these fields. Prerequisite: All Level 1, 2 and 3 courses, or permission of Program Head.

ADMN 421 Electronic Communications - Provides awareness and understanding of current developments and applications in electronic communications technology. Emphasis is on administrative issues - the effect of new communications technology on management practices and how to conduct a cost/benefit applications analysis. Examples are facsimile reproduction, cellular phones, microcomputer networking, and private satellite networks. Prerequisite: ADMN 360.

ADMN 460 Microcomputer Applications 3 - Topics vary but may include one or more of the following: advanced dBASE applications; micro to mainframe links; micro to micro links; telecommunication topics. Students may also conduct a detailed review of selected hardware/software. Prerequisite: ADMN 360, FMGT 201, OPMT 110.

ADMN 462 Microcomputer Applications - Shorter version of ADMN 460. See ADMN 460. Prerequisite: ADMN 360.

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. Prerequisite: All courses in Levels 1, 2 and 3, or permission of the Program Head.

BCOM 100 Business Communication - Communicating on the job is a complex process which includes gathering and evaluating data, collaborating with co-workers, reporting to superiors, and presenting information and ideas. This introductory business course is designed to give students basic listening, writing and speaking skills which will allow them to prepare written and oral reports for BCIT courses and to proceed to more advanced communication courses.

BCOM 200 Business Communication - This course gives further instruction and practice in the principles taught in BCOM 100. It 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 processing. Prerequisite: BCOM 100.

COMP 108 Introduction to Computing - Lectures and practical exercises are used to present topics on computer terminology, hardware, software, DOS (Disc Operating System), and a word processing package.

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 for product costing, cost allocations, performance measurement and decision-making models. 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 and cash-planning, the cost of capital and working capital management. Prerequisite: FMGT 201 or 215.

FMGT 404 Finance 2 - How to raise capital to finance a firm. Topics include capital budgeting; short, medium and long-term financing; leasing; security analysis, Canadian capital and money markets as they affect business decisions of Canadian firms. Prerequisite: FMGT 307.

FMGT 418 Microcomputer Accounting Systems - Requires the student to convert an existing business from a manual to a computer accounting system. The Bedford integrated accounting package will be used. Transactions will be recorded and financial statements produced. Prerequisite: FMGT 201.

MKTG 102 Essentials of Marketing - An introductory course designed to provide the student with an overview of the marketing concept and how it can be applied to any type of organization or service. Topics include the controllable and uncontrollable elements of marketing, strategy planning, market characteristics, marketing research techniques, market segmentation and target market selection.

MKTG 334 Applied Marketing and Selling - The focus is on applying the marketing concepts from the introductory marketing course. Emphasizes the development of personal selling skills. Students will develop a comprehensive plan for marketing and selling a product or service. Prerequisite: MKTG 102.

OPMT 110 Business Mathematics - Review of basic mathematics applicable to business and industry. Consumer and commercial credit, simple and compound interest, financial instruments and discounting, annuities, mortgages, loans, sinking funds, leases. Depreciation methods, capitalized costs. Cash-flow analysis, NPV, IRR. Emphasis is on maximum use of pre-programmed calculator, and practical applications from the field of Financial Management.

OPMT 130 Business Statistics - 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.

OPMT 170 Management Engineering - An industrial engineering approach to problem-solving with particular application to administrative management problems. Includes method study, quality, work measurement, facility layout, and capacity planning. Prerequisite: OPMT 110.

OPMT 171 Management Engineering for Micro Systems - The tools, procedures and philosophies that are used to plan, schedule and control manufacturing activities. Topics include inventory concepts, independent demand inventory systems, product planning, capacity planning, production and staffing plans, master production scheduling, material requirements planning and operations scheduling. M.R.P. II and Just-in-time/Total Quality Control are introduced. Prerequisite: OPMT 110.

OPMT 173 Management Engineering for Micro Systems - Same as OPMT 170/171 except that problems are structured for microcomputer analysis. Prerequisite: OPMT 110.

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. Prerequisite: OPMT 110, ADMN 385.

Prerequisite Guide

Level 1 Acceptance into the program

Level 2

ADMN 160	COMP 108
ADMN 214	ADMN 102/FMGT 101
ADMN 226	None
ADMN 227	ADMN 226 (or Co-requisite)
ADMN 228	MKTG 102 (or Co-requisite)
BCOM 200	BCOM 100
FMGT 201	FMGT 101
OPMT 130	None

Level 3

ADMN 310	OPMT 110 & OPMT 130
ADMN 330	None
ADMN 340	ADMN 226
ADMN 360	ADMN 160
ADMN 385	None
FMGT 304	FMGT 201
FMGT 307	FMGT 201
MKTG 334	MKTG 102

Level 4

ADMN 410	All Level 1 through 3 courses or permission of the program head
ADMN 421	ADMN 360
ADMN 460	ADMN 360, FMGT 201, OPMT 110
ADMN 462	ADMN 360
ADMN 490	All Level 1 through 3 courses or permission of the program head
FMGT 404	FMGT 307
FMGT 418	FMGT 101
OPMT 170	OPMT 110
OPMT 171/ 173	OPMT 110
TDMT 352	OPMT 110 & ADMN 385

Faculty and Staff

M. Baxter, B.B.A., Dipl.Tech., CPHI(C)
C. Clark, B.A., M.A.
D. Davis, B.A., M.A., LL.B.
C.J. Dickhoff, B.A., M.A., (Econ.), M.A. (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.B.A., M.B.A., Program Head
L. Jones, B.Sc., M.Sc.
T.P. Juzkow, B.A.Sc., M.B.A., P. Eng.
F. Mandl, B.Sc., M.B.A.
D. Pepper, B.A., M.Sc., Ph.D.
R.M. Sharp, B.A.Sc., M.B.A., P.Eng.
G. Storey, B.A., M.Sc., Program Head
N.E. Stromgren, C.D., B.A., M.Ed. (Admin.), Program Head
B. van der Woerd, B.A.
F.C. Williams, B.A. (Hons), M.A.
R.A. Yates, LL.B., M.B.A.

Advisory Committee

H. Allan Dilworth, Chambers Phillips & Co.
Jack Arnold, Chambers Phillips & Co.
Lynda Barkley, Westar Timber
Cindy Chapman, The Bay Surrey
Ron Einblau, Ron Einblau & Associates
John Hatchett, Prism Systems Inc.
Susan King, Touche Ross & Co.
Joe Lindsey, Western Reproducers Limited
Marcel Lowndes, Sauder Distribution
R.C. Miller, Pacemaker Homes
Ray Stone, The Dominion company
Duncan Watt

MARKETING MANAGEMENT

Diploma Program

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 and promotion or they may find their jobs require the broad skills of all these areas.

The Marketing Management Technology is designed to equip graduates with a solid generalist background, and allows students 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, the business communications industry, and tourism firms and services.

Job Opportunities

Advertising and Sales Promotion graduates are employed in advertising and public relations firms, broadcasting and publishing firms and in-house marketing and promotion operations, and production companies.

The **Real Estate Studies** program prepares the graduate for sales, agent, mortgage brokerage, appraisal, property management, investment analyst positions. Graduates may choose to pursue either licensed or non-licensed positions within the Real Estate industry.

The **Tourism Management** program prepares graduates for both private and public sector jobs in firms or organizations engaged in developing new tourism products and services or expanding the existing demand for these services.

The **Advanced Technical Marketing** option leads to career positions in manufacturing, wholesale and retailing firms, with emphasis on those that are exploiting new or rapidly changing technologies.

The **Professional Sales** option prepares individuals for positions in distribution companies that sell their products and services to commercial buyers and purchasing agents.

The **Small Business Development** option is ideally suited to individuals planning to start their own businesses or becoming general managers in an established small firm.

Beginning Salaries

Beginning salaries for Marketing Management entry positions vary from $24,000 to $30,000 /annum for the majority of graduates. Those with extensive experience or additional educational qualifications command higher salaries. Profit sharing or performance bonus options are common.

The Program

In the first year, all Marketing Management students complete the same course of studies covering general business and economic principles. The second year offers specialization. **Advertising and Sales Promotion** courses develop creative communication skills and campaign planning. **Real Estate Studies** addresses residential and commercial property sales and investment analysis skills. **Tourism Management** focuses on the operational and marketing aspects of a wide variety of tourism facilities and services. **Professional Sales** emphasizes sales skills, new product development and entrepreneurship. **Small Business Development** addresses the startup and growth planning needs of entrepreneurial firms.

School of Business programs are currently under review and modifications may be in effect for September, 1993.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Expenses

Students in some programs, eg: Tourism Management, incur additional expenses for field trips.

Direct Entry to Second Year

Direct entry into the second year of the program is possible when space is available, provided students have prerequisite first year courses and other suitable education or experience.

Advanced Training/Degree Transfer and Completion

Marketing Management graduates can obtain transfer credit toward Business degree programs at a number of universities both within and outside the Province. As well, graduates may pursue Degree completion through the Open University Bachelor of Administrative Studies program.

Accreditation

The Real Estate Option of the Marketing Management Program affords the opportunity to obtain Professional accreditation with both the British Columbia and Canadian Professional Real Estate bodies upon completion of their Licensing and industry experience requirements.

Prerequisites

High school graduation with Math 11 and English 12 both with C+ are entry requirements for this technology. Completion of grade 11 and 12 science courses enhance chances for success in the program.

A personal interview with the program faculty may be required to obtain final acceptance.

Candidates **must** state program preference when applying for admission to the first year of the Marketing Management Technology. Applications must be accompanied by a letter explaining your reason for taking the program, and a resume. Applicants to the Advertising and Sales Promotion program must also submit two letters of reference. 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, are willing to complete pre-entry preparatory programs, and have acquired prerequisite work experience. Upon completion of the first year, candidates will be screened for appropriate second year option placement.

Technology: MARKETING

Level 1 (All Students)
ADMN 100 Microeconomics
ADMN 102 Management
BCOM 100 Business Communication
COMP 108 Introduction to Computing
FMGT 101 Accounting 1
MKTG 102 Essentials of Marketing
OPMT 110 Business Mathematics

Level 2 (All Students)
ADMN 200 Macroeconomics
ADMN 226 Organizational Behavior
BCOM 200 Business Communication
COMP 210 Microcomputer Applications
FMGT 201 Accounting 2
MKTG 202 Principles of Promotional Marketing
MKTG 243 Sales Skills
OPMT 130 Business Statistics
TOUR 260 Issues In Tourism (Tourism Program only)

Program: ADVERTISING AND SALES PROMOTION

Level 3
ADMN 385 Business Law
FMGT 303 Marketing Management Accounting
MKTG 301 Quantitative Methods/Computer Applications in Marketing
MKTG 309 Marketing Research 1
MKTG 317 Sales Promotion Management
MKTG 339 Public Relations Management
MKTG 417 Design Production

Level 4
MKTG 318 Media Planning
MKTG 401 Marketing Planning
MKTG 409 Marketing Research 2
MKTG 415 Promotion Strategy and Planning
MKTG 416 Advertising Internship

Program: REAL ESTATE STUDIES

Level 3
FMGT 329 Managerial Accounting for Real Estate and Small Business
MKTG 309 Marketing Research 1
MKTG 311 Real Estate Principles 1
MKTG 312 Economics of Real Estate Markets
MKTG 313 Introduction to Real Estate Finance
MKTG 331 Real Estate Marketing and Management

Level 4
ADMN 387 Law for Real Estate Marketing
MKTG 330 Real Estate Practice
MKTG 409 Marketing Research 2
MKTG 411 Real Estate Management 2
MKTG 412 Intro to Real Estate Appraisal and Investment Analysis
MKTG 413 Mortgage Finance
MKTG 418 Directed Studies

Program: TOURISM MANAGEMENT

Level 3
FMGT 303 Marketing Management Accounting
MKTG 306 Principles of Small Business Management
MKTG 309 Marketing Research 1
TOUR 300 Regional Tourism Field Study (Practicum)
TOUR 310 Passenger Transportation 1
TOUR 325 Tourism Product Development
TOUR 330 Community Tourism and Planning Attractions
TOUR 344 Planning for Tourism Markets
TOUR 900 Regional Tourism Field Practicum

Level 4
ADMN 385 Business Law
MKTG 409 Marketing Research 2
TOUR 410 Passenger Transportation 2
TOUR 418 Directed Studies
TOUR 420 Organizational and Consumer Behaviour
TOUR 430 Convention Conference and Group Services
TOUR 444 Destinations: World Geography

Program: ADVANCED TECHNICAL MARKETING

Level 3
FMGT 303 Marketing Management Accounting
MKTG 301 Quantitative Methods/Computer Applications in Marketing
MKTG 302 Business-to-Business Marketing
MKTG 304 Marketing Strategies
MKTG 309 Marketing Research 1
MKTG 343 Sales Management

Level 4

ADMN 385	Business Law
MKTG 305	International Marketing
MKTG 401	Marketing Planning
MKTG 404B	Information Systems Practicum
MKTG 406A	Product Development
MKTG 409	Marketing Research 2
MKTG 418	Directed Studies
MKTG 430	Distributive Systems

Program: PROFESSIONAL SALES

Level 3

FMGT 303	Marketing Management Accounting
MKTG 343	Sales Management
MKTG 301	Quantitative Methods/Computer Applications in Marketing
MKTG 302	Business-to-Business Marketing
MKTG 338	New Product Development
MKTG 309	Marketing Research 1

Level 4

ADMN 385	Business Law
MKTG 305	International Marketing
MKTG 401	Marketing Planning
MKTG 402A	Case Studies/Entrepreneurship
MKTG 403B	Business Planning Practicum
MKTG 409	Marketing Research 2
MKTG 418	Directed Studies
MKTG 430	Distributive Systems

Program: SMALL BUSINESS DEVELOPMENT

Level 3

FMGT 329	Managerial Accounting for Real Estate and Small Business
MKTG 301	Quantitative Methods/Computers Applications in Marketing
MKTG 302	Business-to-Business Marketing
MKTG 306	Principles of Small Business Management
MKTG 309	Marketing Research 1
MKTG 343	Sales Management

Level 4

ADMN 385	Business Law
MKTG 305	International Marketing
MKTG 401	Marketing Planning
MKTG 407A	Case Studies/Entrepreneurship
MKTG 408B	Business Planning Practicum
MKTG 409	Marketing Research 2
MKTG 418	Directed Studies
MKTG 430	Distributive Systems

Note: Program curriculum under review and subject to change.

COURSE DESCRIPTIONS

ADMN 100 Microeconomics - 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 102 Management - A study of the management functions of planning, organizing, staffing and controlling. Included are such topics as forms of business ownership, tactical and strategic planning, decision-making, structuring the organization and providing human resources, and controlling operations. Students are given the opportunity to develop analytical and communication skills by analyzing and presenting solutions to typical business problems.

ADMN 200 Macroeconomics - 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 226 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 group dynamics, leadership, conflict, change and decision-making; and micro or individual factors such as personality, attitudes, perception and motivation.

ADMN 385 Business Law - A one-term course. It 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 387 Law for Real Estate Marketing - A nine-week course which covers the case law and legislation relevant to real property: interest in land, B.C. land registration system, agency, mortgages, tenancies, condominiums, real estate agents and land use planning. Prerequisite: ADMN 385.

BCOM 100 Business Communication - Communicating on the job is a complex process which includes gathering and evaluating data, collaborating with co-workers, reporting to superiors, and presenting information and ideas. This introductory business course is designed to give students basic listening, writing and speaking skills which will allow them to prepare written and oral reports for BCIT courses and to proceed to more advanced communication courses.

BCOM 200 Business Communication - This course gives further instruction and practice in the principles taught in BCOM 100. It 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 processing. Prerequisite: BCOM 100.

COMP 108 Introduction to Computing - Lectures and practical exercises are used to present topics on computer terminology, hardware, software, DOS (Disc Operating System), and a word processing package.

COMP 210 Microcomputer Applications - An introduction to microcomputer applications using a database and spreadsheet package, the IBM mainframe and electronic mail.

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 an introduction to accounting theory; income measurement; traditional record-keeping procedures; the accounting cycle; special journals; cash; merchandising operations; inventory estimation and costing.

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 (FMGT 215) may be taken in either May or September. For a description of the course content see FMGT 101/201.

FMGT 201 Accounting 2 - The follow-up to FMGT 101, topics include notes and accounts receivable, long-lived assets, liabilities, partnerships and corporations, cash-flow, manufacturing accounting, management accounting, consolidated statements and analysis of financial statements. 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 303 Marketing 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 for product costing, cost allocations, performance measurement and decision-making models. Prerequisite: FMGT 201 or 215.

FMGT 329 Managerial Accounting for Real Estate and Small Business - A management accounting course that analyzes the accounting and financial aspects of various real estate and small business decision areas. Topics include commission sales, rental income, condominium management, financial statement analysis, property purchase and management, limited partnerships and real estate syndication. Traditional management accounting topics such as cost behaviour, product pricing and relevant costs, as well as cost planning and control, are covered. Prerequisite: FMGT 201 or 215.

MKTG 102 Essentials of Marketing - An introductory course designed to provide the student with an overview of the marketing concept and how it can be applied to any type of organization or service. Material includes the controllable and uncontrollable elements of marketing, strategy planning, market characteristics, marketing research techniques, market segmentation and target market selection.

MKTG 202 Principles of Promotional Marketing - Presents an overview of promotional strategies; advertising, sales promotion and public relations. It is intended for those students pursuing the concentrated marketing program. The course examines campaign planning, message design and media characteristics as they apply to product and service suppliers in both profit and non-profit sectors. The course also reviews the significance of marketing research, target marketing and market segmentation. Prerequisite: MKTG 102.

MKTG 243 Sales Skills - A course designed to cover the mechanics of salesmanship and the salespersons role in the firm.

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 102.

MKTG 302 Business-to-Business 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 diversity of firms in British Columbia. Prerequisite: MKTG 102 and 202.

MKTG 304 Market Strategies - The development of strategies suited to high technology products and services to achieve productivity improvement. Prerequisite: MKTG 102 and 202.

MKTG 305 International Marketing - An examination of import/export procedures, particularly in relation to sophisticated technology products and services. Trading patterns and forecasts are thoroughly covered. Prerequisite: MKTG 102 and 202.

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 102 and 202.

MKTG 309 Marketing Research 1 - 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 102.

MKTG 311 Real Estate Principles 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 graduates of the program entering the real estate brokerage business from the salesman's pre-licensing course. Prerequisite: Successful completion of all Level 2 courses.

MKTG 312 Economics of Real Estate Markets - Covers the basic principles and concepts relating to urban land economics and provides the tools for analyzing the impact of economics on real estate markets. Prerequisite: Successful completion of all Level 2 courses.

MKTG 313 Introduction to Real Estate Finance - 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: Successful completion of all Level 2 courses.

MKTG 317 Sales Promotion Management - A study of all promotional support activities such as trade shows, publicity, special events, direct response marketing and promotional specialties. Emphasis is on when and how to use them. Prerequisite: MKTG 102 and 202.

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 in advertising agencies. Prerequisite: MKTG 102 and 202.

MKTG 330 Real Estate Practice - Designed to apply the principles learned in MKTG 311 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: Successful completion of all Level 2 courses.

MKTG 333 Real Estate Marketing and Management - Reviews, reinforces and expands the more important marketing concepts and theories which were taught in the introductory marketing course and examines how these concepts and theories can be applied to the real estate industry in a wide variety of areas. Particular emphasis will be placed on the development of real estate selling, negotiation and communication skills, and the development of real estate marketing programs and strategies. Prerequisite: Successful completion of all Level 2 courses.

MKTG 338 New 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 102 and 202.

MKTG 339 Public Relations Management - A study of planning and executing a public relations program including communication techniques, media relations, special events and lobbying, and budget development and management. Prerequisite: MKTG 102 and 202.

MKTG 343 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. Prerequisite: MKTG 102.

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 301.

MKTG 402A Advanced Sales Techniques - Professional selling skills utilizing buyer behaviour, product knowledge, time management and sales call planning tools. Prerequisite: MKTG 243.

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 402.

MKTG 404B Information Systems Practicum - Field work experience with a sponsoring firm involved in a high tech business. Prerequisite: 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 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 preparation of a business prospectus. The student is required to demonstrate the legal markets and financial feasibility of a selected new venture. Prerequisite: MKTG 306 and 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 - Prerequisite: MKTG 311.

MKTG 412 Introduction to Real Estate Appraisal and Investment Analysis - Designed for use by appraisers, real estate brokers, lenders, builders, investors 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 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, feasibility studies including investment analysis and the various indices used to measure a 'return.' For students seeking credit in recognized programs of professional appraising societies. Prerequisite: MKTG 311, 312 and 313.

MKTG 413 Mortgage Finance - Will enable students to demonstrate a knowledge of the macroeconomic aspects of Canada's mortgage market; structure and analyze both residential and commercial mortgage loan applications and be familiar with loan management, contemporary repayment arrangements, development financing, participation loans, leasehold financing and appraisal for mortgage lending. Prerequisite: MKTG 311, 312 and 313.

MKTG 415 Promotion Strategy and Planning - A capstone course in which students work in teams of five or six to develop and present to a client a comprehensive promotion campaign with real world constraints. Students incorporate theoretical concepts of marketing and promotions into practical applications in developing their client's campaign. Students practice "pitching" the account in competition with other teams. Prerequisite: MKTG 318.

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 415.

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.

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 309.

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 302.

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.

TOUR 160 Foundations in B.C. Tourism - An overview of the tourism industry structure and impact. Course topics examine the industry sectors; common industry terminology; sector inter-relationships; B.C. tourism regions; markets and economic impact from domestic and global perspectives; an understanding of time zones and world currencies and their impact on travel; travel industry liability, legal/contractual relationships; industry associations, facilities, infrastructure and resources. The course is accented to local B.C. development, and provides students with a broad view of the total industry and its opportunities.

TOUR 161 Tourism Fundamentals - Students will discover the basics of marketing tourism in communities. Sector divisions, regional characteristics and basic terminology will be included.

TOUR 260 Issues in Tourism - Examines the evolution, function and direction of tourism at the macro level. Group discussion, case histories, brainstorming, and lecture formats. Topics covered include historical influences on tourism; basic ingredients of community tourism; satisfying/ acknowledging minority interests; basic B.C. geography; government, associations and travel industry conflicts; psychology of travel including allo-psycho segmentation, demographics of travel and acculturation; tourism legacies; destination determination; festivals, arts, film industry and recreational influences on tourism; group and incentive travel; training and educational issues for industry and the public.

TOUR 261 Tourism Issues - Examines the evolution, function and direction of tourism. Topics will include historical influences, basic ingredients of community tourism, B.C. geography, government, association and travel industry conflicts and recreational influences. Prerequisite: TOUR 161.

TOUR 310 Passenger Transportation 1 - Introduces the concepts of marketing in a regulated environment. Air travel, including both schedule and charter carriers, plays a major role in the development of tourism and the flow of business and vacation travellers. The impact of deregulation in the USA is a model for the industry in Canada, route awards, subsidies and promotional activities such as frequent flyer programs. Pricing includes fare structures, yields and prorates. The wave of mergers has altered the competitive environment. Bilateral air agreements dictate the level of international air service. Regulation of third level, feeder and commuter carriers in B.C. is also included. Prerequisite: MKTG 102, TOUR 260,

TOUR 325 Tourism Product Development - Designed to familiarize the student with tourism product development. Examines general demand factors, travel motivation, market segmentation, travel advertising, sales support, public relations, marketing risks and problems, statistical applications and analysis, tourism research, tour packaging and its various elements, etc. Prerequisite: MKTG 102, TOUR 260.

TOUR 330 Community Tourism and Planning Attractions - Designed as a "how to" study in generating positive economic and social impacts on BC communities from the growth of tourism business. Case history approach, supplemented with lectures, group discussion and practical, community-related projects will lay a good foundation for graduates to identify and develop economic benefits in a variety of venues and business sectors. The course is oriented toward rural, smaller B.C. communities. Major topics include: tourism and community ("It's not for everyone"); the nature of attractions; developing a planning strategy; economic and business considerations; environment and recreational factors; social, cultural and communications issues. Prerequisite: MKTG 102, TOUR 260.

TOUR 344 Planning for Tourism Markets - This course is a regional approach to tourism marketing with three accents: B.C. regions; nearest competing regions; domestic (North America) tourism in general. On completion of the course students will: 1) apply marketing principles to an appreciation of B.C.'s unique tourism and economic regions; 2) examine potential cooperative marketing strategies with B.C.'s neighbouring tourism regions (Washington, Idaho, Alaska, Alberta, Yukon and Northwest Territories); 3) develop basic research material on Canada's provinces and the United States as competing tourism regions for domestic and offshore markets. Prerequisite: MKTG 102, TOUR 260.

TOUR 410 Passenger Transportation 2 - Introduces operational characteristics of surface modes as means of access to tourist areas. Transportation economics and regulations include passenger rail, sightseeing and tour coaches, harbour ferries, fishing charters, river rafting, car rentals and recreational vehicles, house boating and ski lifts, that are examined as part of the tourism product. Impact of the provincial highways system including ferry services on the B.C. coast and inland lakes. Examines cruise ship facilities and the Alaska route. Prerequisite: TOUR 310.

TOUR 420 Organizational and Consumer Behaviour - Examines personnel issues involved in all aspects of the Tourism Industry. The two major themes are human resource management and organizational behaviour. Topics for discussion and practise include human resource recruitment, selection, induction, orientation and training; role of government and unions; management and labour negotiation skills; counselling, discipline and documentation; human resource problem-solving and decision-making; leadership, motivation and team building; conflict resolution; communication and interpersonal skills; human rights, employment standards, employment equity and sexual harassment issues; stress and time management; health, safety and environment issues. Prerequisite: TOUR 320.

TOUR 430 Convention, Conference and Group Services - This course examines the detail involved in developing and hosting group business, and program planning requisites. While marketing is covered briefly, major emphasis is on satisfying physical needs of groups, ingredients in program planning, and details unique to group travel business. Lectures, discussion, seminars and practical exercises include accommodation and hospitality, transportation planning, audiovisual and staffing needs, contracts, stages of program development, communication systems, packaging and pricing for "win-win" conferences, speaker and spousal programs, group activities, attractions for benefitting the broader community. Prerequisite: MKTG 102, TOUR 260.

TOUR 444 Destinations: World Geography - Develops an appreciation of world tourism markets, competitive factors and diverse cultural heritages. The course provides an understanding of the backgrounds of touring publics as they are encountered in local business, and insights to share with the outbound travelling public. Begins with British Columbia, then Canada, the United States, and then continents and island groups of the world. Particular emphasis is placed on Pacific Rim countries and peoples. Discussion will cover locational and physical geography, historical, cultural, language, social and political distinctions, as well as significant tourism features of nations and regions. Prerequisite: TOUR 260.

TOUR 900 Regional Tourism Field Practicum - This one-week field exercise will require students to visit one region or series of communities within B.C. to discover the tourism potential of the area, inventory current tourism products and services, assess resident awareness and attitudes toward the tourism industry, and evaluate the infrastructure and superstructure (plant) within the communities. A different routing and region will be visited each year. Interaction with Chambers of Commerce and municipal/regional elected and volunteer representatives, as well as tourism entrepreneurs and business/labour/interest groups will be involved. Field assignments and a term report on the exercise, as well as in-field participation with instructors, will form the evaluation on course completion. A supplementary fee (obtained through general payment by the student or through fundraising) in addition to general tuition, will be payable for this course. Participating students are excluded from all other classes during this week. Course not required for graduation.

Faculty and Staff

R.W. Vandermark, B.A., Associate Dean
R.A. Brett, C.T.M., Dipl. T., I.D.P., Program Head, Tourism
M. Gerber, B.A., M.B.A.
G.T. Jacobs, B.A. (Hist. & Econ.), B.A., (Bus. Admin.) M.B.A., Ph.D.
C.G. Nelson, B.A., M.B.A., Program Head, Advertising and Sales Promotion
M.D. Powley, B.Ed., M.B.A.
L. Rapchuk, B.Comm.
G.S. Rees, M.B.A.
M.I. Shacker, B.B.A.G.
G. Urbshadt, B.Comm., Program Head, Technical Sales/Marketing
R.A. Venne, B.Comm., (Hons. Econ.), M.B.A.
W.A.E. Walley, B.A.
C.D. Westcott, B.Sc., R.I. (B.C.)
T. Winder, B.A., M.B.A.
D. Smith, B.A., M.B.A.

Advisory Committee: Advertising and Sales Promotion

Della Smith, PJS Communications
Margot Brown, Baker-Lovick Advertising
Joff Grohne, Karo Design Resources
John Gattens, Western Broadcast Sales Limited
Lloyd Warnes, Sage Resource Group
Richard Hill, Western Broadcast Sales
Richard Hadden, Cossette Communication-Marketing
Terry Dinsmore, BBM Bureau of Measurement
Don Atkins, Benwell Atkins Ltd.
Ed Leclaire, Leclaire Hamilton
Bruce Davie, Journal of Commerce
Carroll Nelson, Seaboard Advertising
Alice Gur-Arie, BCIT
Lynne DeCew, BCIT
Michael Harrison, BCIT
Randy Vandermark, BCIT

Advisory Committee: Real Estate Studies

Bob Laurie, IntraWest
Nicole Clark, Royal LePage
Robert Fawcett, Real Estate Council of B.C.
Ben Minuk, Colliers, Macaulay Nicolls
Larry Ferster, Royal LePage Real Estate Services Ltd.
Bill Dupuis, Peachland Realty
Robert Laing, UBC.
Brad Haw, CB Commercial Real Estate Group Canada Inc.
Murray DeGirolamo, CB Commercial Real Estate Group Canada Inc.
Bill Phillips, Royal LePage
Gary Nakagawa, Cumberland Consulting Corp.
Al Saunders, Edgecombe Properties Ltd.
Joe Pearson, National Real Estate Service
Brian Woolley, Bentall Property Management Inc.
Michael Harrison, BCIT
David Westcott, BCIT
Randy Vandermark, BCIT
Gary Bailey, BCIT
Kelly Everett, BCIT
Hakil Kim, BCIT

Advisory Committee: Technical Sales and Marketing

Bruce Gillespie, Right Associates
Vera Piccini, Rogers Cable
Annette O'Shea-Roche, First Target Marketing
Dean Bertran, Prime Copy Products Ltd
Newton Hockey
Noulan W. Bowker
Marcus Esmitz, B.C. Trade Development Corp.
Jim Ellis, ARTEC Equipment Co. Ltd.
David Bryn-Jones, OSTOP Osteoporosis Society of BC
Paul Guiton, Brenda Farrell & Associates
Ruth Andermatt, Rogers Cantel Inc.
Susan O'Connor
Anne Marie Neilson
Ross Erikson, Emerson Radio Canada Ltd.
Michael Harrison, BCIT
Glenna Urbshadt, BCIT
Morie Shacker, BCIT
Randy Vandermark, BCIT

Advisory Committee: Tourism

Rick Antonson, Great Canadian Railtour Company
Michael Horsey, Sierra Misco Environment
Frank Addison, Addison Travel Marketing
Robert Tuss, Bentley Pacific Ventures
Sheldon Eggen, Charter Bus Lines Inc.
Ray Lord, Science World - Administration
David Hughes, Peat Marwick Stevenson & Kellogg
John Williams, Pan Pacific Hotel
Tom McDonald, Graylin of Vancouver
Ted George, B.C. Chamber of Commerce
Betty Fata, Venue West Conference Management
Peter Henderson, Southex Exhibitions
Paul Vallee, Tourism Vancouver
Trudy Lancelyn, Vancouver Board of Trade
Virginia Greene, Go-Direct Marketing
Betty Chessa, Air B.C.
Phil Heard, B.C. Pavilion Corporation
James MacGregor, Fenco Lavalin Corporation
Glyn Edwards, Destination Planners Inc.
Stuart Henderson, Sage Resource Group
Michael Kaile, Waterfront Center Hotel
Richard Lemon, Ministry of Tourism
Peter Williams, Simon Fraser University
Malcolm Ashford, Pacific Rim Institute of Tourism
Peter Murphy, University of Victoria
Geoff Bird, Ministry of Advanced Education, Training and Technology
Bob Brett, BCIT
Randy Vandermark, BCIT
Michael Harrison, BCIT

OPERATIONS MANAGEMENT

Diploma Program

Operations Managers administer people, materials, equipment and facilities in order to produce and distribute the goods and services that we buy and use every day. This can take place in a manufacturing environment on the factory floor, or in a service organization such as an insurance company, a government office, a bank, an airline or a hospital.

International competition is forcing changes in the way companies do business. The pressures have reached such critical levels that in order to survive, companies must re-engineer their processes to make the company respond faster, be more flexible and produce products and services at a lower cost.

As a student in Operations Management, you will develop new personal strengths and learn how to apply them in a constructive way to change business systems. You will become a total system thinker and learn how to take more personal responsibility for organizational change. You will also learn how to function as an effective team member. As a graduate of Operations Management you will have the technical and managerial skills required to assist organizations in minimizing response times, reducing inventory, and increasing the quality of goods, services and work life.

The program stresses business process improvement and thus people skills, communication skills, creativity, innovation, and problem solving are focal points of the curriculum. These skills are supported by a mix of **business** and **engineering** courses such as industrial engineering, Total Quality Management, materials management, accounting, computer applications, systems analysis, quantitative methods and industrial relations.

Throughout the two-year program, students work in teams to solve industrial problems. Typical projects might be:

- To improve the work flow, methods and forms design in a bank.
- To develop an effective inventory control system for a distributor of electronic products or a building supply outlet.
- To recommend quality improvement procedures for manufacturing and service environments.
- To design a production scheduling and control system for a vinyl window manufacturer.
- To design a new material handling system for a distributor.
- To develop a plant or departmental layout for an office chair manufacturer.
- To recommend and cost justify microcomputer hardware and software for a small company, a business department or a government agency.
- To develop new methods and standards for assembling an architectural lighting fixture.
- To improve the response time of a business process.

Job Opportunities

Graduates have found career opportunities in a variety of industries including manufacturing, service, distribution and government. Typical entry-level positions include: assistant purchasing manager, assistant plant manager, business analyst, buyer, industrial engineering technologist, inventory analyst, maintenance coordinator, management engineer, management trainee, material planner/scheduler, methods analyst, purchaser, product analyst, production supervisor, project coordinator, quality assurance technologist, shipping/receiving supervisor, systems analyst, systems troubleshooter, warehouse supervisor.

With related experience, Operations Management graduates may achieve positions as: computer sales representative, director of operations, general manager, inventory manager, management information systems manager, materials manager, operations manager, owner/operator, plan manager, president/CEO, production manager, project manager, quality manager, vice president operations.

Professional Membership

Operations Management students are excellent candidates to pursue professional membership in:

The Institute of Industrial Engineers
Canadian Association for Production & Inventory Control
American Society for Quality Control
Project Management Institute
International Facilities Management Association
Data Processing Management Association

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two year program (1992/93).

Degree Completion/Advanced Studies

The BCIT Advanced Studies in Business program provides degree completion opportunities and an advanced diploma track. It is possible for graduates to complete a Bachelors degree in Administration offered by Lakehead University in one year, if they have the necessary prerequisites. The Open Learning Agency through its Open University also grants significant credit towards their Bachelor of Administrative Studies degree.

Prerequisites

High school graduation with Math 11 and English 12 both with C+ (Physics 11 is desirable). If your mathematical skills are in doubt, it is recommended that you take Preparatory Business Math OPMT 099.

Program: OPERATIONS MANAGEMENT

Level 1

ADMN 100 Microeconomics
ADMN 102 Management
BCOM 100 Business Communications
CHSC 122 Properties of Materials
COMP 108 Introduction to Computing
FGMT 101 Accounting 1
MECH 102 Drawing Interpretation
OPMT 108 Applied Mathematics
OPMT 137 Industrial Engineering 1

Level 2

ADMN 200 Macroeconomics
BCOM 200 Business Communications 2
FMGT 201 Accounting 2
OPMT 207 Manufacturing Processes
OPMT 208 Applied Statistics
OPMT 209 Computer Applications 1
OPMT 237 Industrial Engineering 2
OPMT 258 Production and Inventory Management
OPMT 261 Information Systems 1
PHYS 217 Basic Science for Operations Management

Level 3

ADMN 220 Organizational Behavior
CDCM 323 CAD for Operations Management
FMGT 306 Cost Accounting for Operations Management
OPMT 341 Quality Management
OPMT 308 Quantitative Methods 1
OPMT 337 Industrial Engineering 3
OPMT 340 Industrial Automation
OPMT 358 Production and Inventory Management 2
OPMT 361 Information Systems 2

Level 4

ADMN 343 Supervisory Skills
ADMN 330 Industrial Relations
MKTG xxx Introduction to Marketing & Small Business
OH&S 441 Industrial Health and Safety
OPMT 405 Purchasing
OPMT 408 Quantitative Methods 2
OPMT 437 Industrial Engineering 4
OPMT 458 Production and Inventory Management 3
OPMT 461 Information Systems 3

COURSE DESCRIPTIONS

ADMN 100 Microeconomics - 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 102 Management - A study of the management functions of planning, organizing, staffing and controlling included are such topics as forms of business ownership, tactical and strategic planning, decision-making, structuring the organization and providing human resources, and controlling operations. Students are given the opportunity to develop analytical and communication skills by analyzing and presenting solutions to typical business problems.

ADMN 200 Macroeconomics - 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 220 Organizational Behavior - 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 behaviour affects the achievement of the organization's purposes. Concepts of leadership, communications, power, authority, change, job design, intergroup dynamics and conflict will be examined.

ADMN 330 Industrial Relations - A detailed analysis of selected labour/management problem areas with emphasis on the solution of practical problems in industrial relations.

ADMN 343 Supervisory Skills - Integrates materials covered in other ADMN courses and provides the student with the skills required to survive as a supervisor. Topics include the selection process, interviewing, job evaluation/ compensation, performance appraisal, training and typical supervisor problems. Prerequisite ADMN 220.

BCOM 100 Business Communication - Communicating on the job is a complex process which includes gathering and evaluating data, collaborating with co-workers, reporting to superiors, and presenting information and ideas. This introductory business communication course is designed to give students basic listening, writing and speaking skills which will allow them to prepare written and oral reports for BCIT courses and to proceed to more advanced communication courses.

BCOM 200 Business Communication - This course gives further instruction and practice in the principles taught in BCOM 100. It 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 processing. Prerequisite: BCOM 100.

CDCM 323 CAD for Operations Management - Rudiments of computer-aided drafting. Machine log-on procedures. Simple 2-D drawings, orthographic projection, dimensioning and annotations.

CHSC 122 Properties of Materials - 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 108 Introduction to Computing - Lectures and practical exercises are used to present topics on computer terminology, hardware, software, DOS (Disc Operating System), spreadsheets, and a word processing package.

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, an introduction to accounting theory; income measurement; traditional record-keeping procedures; the accounting cycles; special journals; cash; merchandising operations; inventory estimation and costing.

FMGT 201 Accounting 2 - The follow-up to FMGT 101, topics include notes and accounts receivable, long-lived assets, liabilities, partnerships and corporations, cash-flow, manufacturing accounting, management accounting, consolidated statements and analysis of financial statements. Prerequisite: FMGT 101.

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. Period, cash and capital budgeting are reviewed and supported by PC simulation software applications. Prerequisite: FMGT 101 or 201.

MECH 102 Drawing Interpretation - 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.

MKTG XXX Introduction to Marketing and Small Business - An introductory course that provides an overview of the marketing concept and an examination of the planning stages involved in starting a new business including market, financial and legal feasibility requirements.

OH&S 441 Industrial Health and Safety - Introduction to industrial health and safety. Introduction to safety and accident prevention, accident report writing, safety in the workplace.

OPMT 108 Applied Mathematics - Covers basic mathematics applied to industry and commerce. Topics include basic algebra, break-even analysis, simple and compound interest, annuities and methods of evaluating alternatives in industrial investments.

OPMT 137 Industrial Engineering 1 - This course presents a systematic approach to method study and productivity improvement. Under the general philosophy of cooperative learning, through lectures, case studies and classroom exercises, the student will learn the six step process to:

- select opportunity for improvement
- record the data of the present situation
- examine the present method
- develop a new method
- install the new method
- maintain the new method

Various industrial engineering techniques covered in the course are: Pareto's Law, activity sampling, multiple activity charting, time study, critical examination and the multiple criteria evaluation matrix. Basic principles of materials handling and basic consulting skills will be introduced.

OPMT 207 Manufacturing Processes - This course is divided into two major sections. Section 1 deals with common manufacturing processes encountered by Operations Management graduates in the metal, plastic, wood product, cement/concrete, composite and textile industries. Section 2 focuses on the terminology, common components and manufacturing processes in electronic manufacturing plants. Prerequisite: CHSC 122.

OPMT 208 Applied Statistics - 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 209 Computer Applications 1 - The student is introduced to advanced Lotus commands and applications. Time is devoted to Advanced DOS topics. The student is also given an overview of programming languages, the programming cycle and the advantages of custom programming. This is primarily a "hands on" course using the computer to work through several tutorials and case studies. Emphasis is on material which is relevant to the program of studies. Prerequisite: COMP 108.

OPMT 237 Industrial Engineering 2 - This course builds on OPMT 137 to provide the student with a comprehensive knowledge of industrial engineering techniques to solve problems in an industrial setting. Topics include: feasibility studies, layout, workplace design, material handling, motion economy, costing and standard times. Prerequisite: OPMT 137.

OPMT 258 Production and Inventory Management 1 - As global competition becomes increasingly fierce, manufacturers and distributors are looking for faster and more cost effective ways to make products and control their inventories. This is the first of three courses on production and inventory management in the Operations Management program. Together, these courses cover techniques, philosophies and tools used by industry to improve their competitive advantage. This course introduces the major topics to be covered throughout the three courses and features essential inventory management skills.

OPMT 261 Information Systems 1 - An introduction to a variety of techniques for analyzing and improving administrative and support systems within organizations. Topics include: organizing for process improvement, flowcharting process characteristics, streamlining the process, measurements, feedback and action. Continuous improvement in the business process environment will be introduced. Prerequisite: OPMT 137.

OPMT 308 Quantitative Methods 1 - Applications of mathematical and computer modelling to decision-making in business and industry. Topics include model building, breakeven analysis, decisions theory, decision support systems, linear programming, queuing theory, simulation models, demand analysis, forecasting methods and computer applications. Prerequisite: OPMT 208.

OPMT 337 Industrial Engineering 3 - A continuation of OPMT 237. This is an integrated course featuring the following subject areas: performance management, project planning and scheduling, value analysis, implementation of change, material handling and distribution. Students will be assigned to problem solving teams to solve problems involving two or more of the above subject areas. Prerequisite: OPMT 237, OPMT 208.

OPMT 340 Industrial Automation - Enables the student to understand the role of manufacturing automation in the productivity improvement process including CAM and robots. The concepts of flexible manufacturing systems, groups technology and computer integrated manufacturing are explored. Prerequisite: OPMT 207, 237.

OPMT 341 Quality Management - Modern concepts of quality management for the manufacturing industries. Topics include inspection, quality control and quality assurance; organization; quality system functions and documentation requirements; supplier quality assurance; product reliability; Canadian national standards for quality program. Prerequisite: OPMT 208.

OPMT 358 Production and Inventory Management 2 - A continuation of OPMT 258. This course covers production planning and scheduling techniques. The students will develop a production plan, a master schedule, a material requirements plan and a detailed shop floor schedule for a product group. Manufacturing Resource Planning (MRP II) and finite capacity scheduling will be covered. Prerequisite: OPMT 258.

OPMT 361 Information Systems 2 - An examination of the need for automating an information storage and retrieval system. A case study is analyzed and a menu-driven system is developed using a standard relational database package. Topics include database creation, editing, querying, building custom reports, custom screens and labels, indexing, building multiple file relations, fundamentals of structured programming. Prerequisite: OPMT 209, OPMT 261.

OPMT 405 Purchasing - This course examines the fundamental principles and practices of procurement. Topics include procurement objectives, information systems, specifications, supplier selection, pricing, negotiations and disposal.

OPMT 408 Quantitative Methods 2 - A continuation of OPMT 308. Prerequisite: OPMT 308.

OPMT 437 Industrial Engineering 4 - This course is a continuation of OPMT 337. It is presented in two sections. The first section continues with the presentation of materials first introduced in OPMT 337 and prepares the student for a major project assignment in section two.

In the second section of the course students conduct a problem-solving study in an organization external to BCIT. Students must select and define a management problem to be solved in conjunction with staff advisors and management contacts. Within the bounds of management/student drafted and agreed-to terms of reference, students must demonstrate their ability to apply learned skills to successfully conclude a practical problem-solving laboratory. At the end of the study period, students are required to supply management and BCIT staff with a formal technical report containing firm recommendations, and an oral presentation outlining the study findings and recommendations. Prerequisite: Successful completion of all Level 1, 2 and 3 courses.

OPMT 458 Production and Inventory Management 3 - A confirmation of OPMT 258 and OPMT 358. Together these three courses provide a unified treatment of Production and Inventory Management. They cover the tools, procedures and philosophies that are used to plan, schedule and control manufacturing activities. OPMT 458 topics include: Just-in-Time/Total Quality Control and Synchronized Manufacturing. Prerequisite: OPMT 358, OPMT 245.

OPMT 461 Information Systems 3 - The microcomputer system cycle (preliminary investigation, detailed investigation, software selection and design, implementation, and maintenance) will be examined with emphasis on the packaged software approach. Related topics (industry trends, relevant technology, leading edge software, etc.) will be presented as time permits. This course builds on material covered in several lower level courses. Prerequisite: OPMT 361.

PHYS 217 Basic Science for Operations Management - This is an introductory course dealing with basic science concepts and techniques, especially in physics (mechanics and thermodynamics). Applications to industrial processes are emphasized. Problem-solving skills and data gathering techniques are stressed in lectures and labs. Data analysis software is introduced in the labs. Major topics include: Quantitative fundamentals, kinematics, statics, work, energy, power, simple machines, optics, thermodynamics, electricity, sound. Prerequisite: OPMT 108.

Faculty and Staff

C. Chan, M.B.A.
B. Curtis, M.B.A.
S. E. Dudra, B.Comm., M.B.A., G.P.I.M.
F.L. Gruen, B. Mgt. Eng., M.A. Sc.
K.C. Hartley, B.A. Sc., P. Eng., C.P.I.M., Program Head
A. S. Lee, B. Eng., P. Eng., M.Ed.
J. E. Lloyd, M.Ed., P. Eng., Chief Instructor
D.W. Malcolm, B.Sc., A.Sc.T.T.
D.J. Mallory, B.A.Sc., M.A., Ph.D., Chief Instructor
J.A.I. Millette, B.A., M.Ed.
G.W. Murray, Dipl.T., Chief Instructor
J. Ribic, B.I.E., C.E. Coordinator
G. Sagar, B.A.Sc., M.B.A.
W.J. Sheriff, B.A., B.Sc.
C.V. Spong, Dipl.T., Chief Instructor
J. Young, B.Sc., M.B.A., P.Eng
W. Ratzburg, B.Sc., Dip Ed., M.B.A.
Sylvia Corning, Dip.T.
Ron Wlock, B.A. Sc., P.Eng.

Advisory Committee

Mr. Pat Schooley, Beaver Lumber
Brian Driesse, Stork Craft
Greg Fleck, Roland D.G. Canada Incorp.
Mats Gerschman, Glenayre Electronics
Brian Holmes, Columbia Plastic Ltd.
Mike Hughes, Weiser Inc.
Diana MacKay, Vancouver General Hospital
Iain McLean, Ballard Power Systems Inc.
Bruce Marsh, Coopers & Lybrand Consulting Group
Graham Parkes, Discovery Innovation Centre
Jim Rae, BTE
Dave Roberts
Merv Stanley, B.C. Tel
Glen Thorne, Weatherhaven Resources Ltd.
Pat Turner, Kirkland & Rose Ltd.

OPERATIONS MANAGEMENT SENIOR CERTIFICATE PROGRAM FOR TRADESPERSONS

Certificate Program

Stagnating in your job? Need a change in your work life? Tired of management's indecision? Frustrated with your ideas going nowhere? Want to implement positive changes in the workplace?

Join Operations Management and make your career more rewarding!

We offer **THE** opportunity for you to combine your years as a qualified tradesperson with practical management skills training enabling you to advance to a decision-making role within the industry of our choice.

Job Opportunities

Graduates from this program will be qualified to enter a new industry or re-enter their present industry with the possibility of becoming a:

Project Manager
Maintenance Superintendent
Production Planner
Warehouse Manager
Operations Managers
Materials Administrator
Inventory Administrator
Technical Salesperson
Buyer

You will acquire many valuable job ready skills and learn how to incorporate them into a Business Plan. This could assist you to successfully start-up and operate your own business.

Possible Sponsorships

You may qualify for financial support while enroled in this program. The specific funding programs that could assist you are:

- Workers' Compensation Board Rehabilitation Program, and
- Unemployment Insurance Retraining Program

Your eligibility for either of these programs can be verified at your local Canada employment Centre or by contacting your WCB advisory.

The Program

The **Senior Certificate** is designed to provide essential skills in the areas of:

- Human Resource Management
- Productivity Improvement Management
- Materials Management
- Production Management and
- Computer literacy

You will have the opportunity to examine different management styles, operating practices and decision-making techniques from a sampling of diverse B.C. businesses. This will be accomplished through a combination of readings, case studies, plant visitations and on-site industry research. The application of all techniques examined will be readily transferable to virtually any sector in the B.C. economy.

The Ideal Candidate

This program is most attractive to those persons who have a Journeyman Certification (or equivalent), with three to five years past certificate trade work experience. In addition, each applicant will have completed a Math 11 and English 12 course with a c+ or equivalent. All interested candidates should update their resumes and phone the Program Head for an interview.

Program Length

Nine months full-time beginning in September each year.

Tuition Fees (subject to change)

$1,823 for the nine-month program.

Prerequisites

High School Graduation, Journeyed Certification. 3 to 5 years work experience in trades. Math 11 and English 12 both with C+, or equivalent.

Program:
CERTIFICATE FOR TRADESPERSONS

Level 1 September- December (15 weeks)
ADMN 107 Management
COMM 100 Communication for Senior Technicians
COMP 198 Introduction to Computing
FMGT 104 Accounting Essentials for Your Small Business
OPMT 104 Master Learner
OPMT 110 Business Mathematics
OPMT 146 Industrial Engineering
OPMT 147 Production and Inventory Management 1

Level 2A January - March (10 weeks)
ADMN 226 Organizational Behavior
ADMN 232 Industrial Relations
COMM 200 Business Communication
MKTG 114 Basic Marketing Principles
OPMT 202 Introduction to Quantitative Methods
OPMT 240 Applied Industrial Engineering 1
OPMT 247 Production and Inventory Management 2
OPMT 253 Microcomputer Applications
OPMT 441 Industrial Health and Safety

Level 2B (March - May (10 weeks)
ADMN 214 Entrepreneurial Management
COMM 200 Communication for Senior Technicians
CDCM 323 CAD for Operations Management
OPMT 177 Project Planning and Scheduling
OPMT 201 Principles of Supervision
OPMT 202 Introduction to Quantitative Methods
OPMT 240 Applied Industrial Engineering 1
OPMT 245 Quality Assurance (Manufacturing)
OPMT 253 Microcomputer Applications
OPMT 442 Materials Handling and Distribution

Note: Program curriculum under review and subject to change.

COURSE DESCRIPTIONS

ADMN 107 Management - A study of the management functions of planning, organizing, staffing and controlling. Included are such topics as forms of business ownership, tactical and strategic planning, decision-making, structuring the organization and providing human resources, and controlling operations. Students are given the opportunity to develop analytical and communication skills by analyzing and presenting solutions to typical business problems.

ADMN 214 Entrepreneurial Management - Students will investigate all factors involved in starting a business venture. Topics include analyzing the market opportunity, developing a market strategy, financing the company or activity, and dealing with legal implications. Students will develop a comprehensive business plan for a domestic business. Prerequisite: ADMN 102, FMGT 101.

ADMN 226 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 group dynamics, leadership, conflict and decision-making; and micro or individual factors such as attitudes, perception and motivation.

ADMN 232 Industrial Relations - A detailed analysis of selected labour/management problem areas with emphasis on the solution of practical problems in industrial relations.

COMM 100 Communication Senior Technicians -

COMM 200 Business Communication Senior Technicians -

CDCM 323 CAD for Operations Management - Rudiments of computer- aided drafting. Machine log-on procedures. Simple 2-D drawings, orthographic projection, dimensioning and annotations.

COMP 198 Introduction to Computing - Lectures and practical exercises are used to present topics on computer terminology, hardware, software, DOS (Disc Operating System), and a word processing package.

FMGT 104 Accounting Essentials for Your Small Business - Covers the minimum accounting procedures with which the proprietor of a business should be familiar. Topics include recordkeeping, budgeting and cash flow, financial statements, funding mechanisms and legal requirements.

MKTG 114 Basic Marketing Principles - An introductory course designed to provide the student with an overview of the marketing concept and how it can be applied to any type of organization or service. Topics include the controllable and uncontrollable elements of marketing, strategy planning, market characteristics, marketing research techniques, market segmentation and target market selection.

OPMT 104 Master Learner - This course is designed to help the students make the personal transition from worker to student. It will assist the students to relearn note taking and study skills.

OPMT 110 Business Mathematics - Review of the basic mathematics applicable to business and industry. Mathematics of finance including retail operations, simple and compound interest, discounts, annuities, financial papers and depreciation methods. Emphasizes practical applications to business administration.

OPMT 146 Industrial Engineering - This introductory course in industrial engineering presents a six-step systematic approach to methods improvement. The student will learn specific industrial engineering techniques.

OPMT 147 Production and Inventory Management 1 - The emphasis of this course and the continuing course is on practical material which can be used with little modification in production or operating environments. The course presents much of the material contained in two of the five exams leading to the professional certification of CPIM (Certificate in Production and Inventory Management). The two exams are Inventory Management and Master Planning. Project planning and scheduling are also covered.

OPMT 177 Project Planning and Scheduling - Provides the fundamentals of project planning, scheduling and control as applied to project management. The course includes network analysis, time logic diagrams, resource allocation, time cost analysis and the role of the computer in scheduling.

OPMT 201 Principles of Supervision - Integrates the prerequisite courses and provides the student with the skills required to survive the initial period as a first-line supervisor. Topics include the role of the supervisor, authority relationships, how to lead, delegate, discipline and evaluate. On the job training and time management will also be covered. Prerequisite: ADMN 102, 226, 232.

OPMT 202 Introduction to Quantitative Methods - Offers students the basics of descriptive statistics and explores the application of a relevant microcomputer package to quality control in an industrial setting.

OPMT 240 Applied Industrial Engineering 1 - Builds on OPMT 146 to provide the student with a comprehensive knowledge of industrial engineering techniques to solve problems in an industrial setting. Topics include applied method study, feasibility studies, systematic layout planning and computerized layout planning. Prerequisite: OPMT 146.

OPMT 245 Quality Assurance (Manufacturing) - Modern concepts of quality management for the manufacturing industries. Topics include inspections, quality control and quality assurance; organization; quality system functions and documentation requirements; supplier quality assurance; product reliability; Canadian national standards for quality programs.

OPMT 247 Production and Inventory Management 2 - A continuation of Production and Inventory Management 1. Presents much of the material contained in the three exams. (Material requirements planning, capacity requirements planning and production activity control) which lead to the professional designation CPIM (Certificate in Production and Inventory Management). Prerequisite: OPMT 147.

OPMT 253 Microcomputer Applications - Through lectures, labs and project work, this course will deal with spreadsheet and database software as applied in an industrial setting. Prerequisite: COMP 108, OPMT 110, FMGT 104.

OPMT 441 Industrial Health and Safety - Introduction to industrial health and safety, accident prevention, accident report writing, safety in the workplace.

OPMT 442 Materials Handling and Distribution - Introduction to materials handling. Basic uses and applications of conveyors, trucks and cranes.

Faculty and Staff

See listing under Operations Management.

TRANSPORTATION LOGISTICS

Diploma Program

Transportation is the vital link between supplier and customer both within and outside Canada's borders. Employees must be flexible and well equipped with the skills necessary to participate in the shrinking world market. The Transportation Logistics program enables graduates to contribute towards the effective movement of goods, people and services between supplier and customer. All modes of transportation are studied together with the rules and regulations governing inter-provincial and international transportation.

Job Opportunities

Transportation Logistics graduates are employed in the organizing, buying and selling of transportation services. Graduates can choose from a variety of dynamic, well paid careers in marine shipping, airlines, railroads, trading, customers brokering, freight forwarding, poolcar operations, manufacturing and warehouse and distribution centres.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Prerequisites

High school graduation with Math 11 and English 12 both with C+. 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 computers.

Program: TRANSPORTATION LOGISTICS

Level 1

ADMN 100 Microeconomics
ADMN 102 Introduction to Business
BCOM 100 Business Communication
COMP 108 Introduction to Computing
FMGT 101 Accounting 1
MKTG 102 Essentials of Marketing
OPMT 110 Business Mathematics
TDMT 101 Geography of Trading
TDMT 150 Distribution 1 (CITT)

Level 2

ADMN 200 Macroeconomics
ADMN 384 Business and International Law
BCOM 200 Business Communication
FMGT 201 Accounting 2
OPMT 121 Business Statistics
OPMT 148 Industrial Engineering I
OPMT 209 Computer Applications 1
TDMT 203 Transportation Economics
TDMT 250 Distribution 1 (CITT)

Level 3

FMGT 342 Cost and Managerial Accounting
MKTG 309 Marketing Research I
OPMT 301 Quantitative Methods/Computer Applications
OPMT 353 Microcomputer Applications: Database
TDMT 204 Integrated Purchasing
TDMT 301 Logistics 1
TDMT 305 International Trading
TDMT 309 Marine Shipping and Insurance

Level 4

ADMN 347 Human Resources Management
FMGT 442 Domestic and International Corporate Finance
OPMT 403 Warehousing
OPMT 445 Quality Assurance (Services)
TDMT 306 Transportation Marketing TDMT 401 Logistics 2
TDMT 402 Introduction to Projects
TDMT 403 Quantitative Methods for Logistics
TDMT 409 Harmonized System and FTA
TDMT 411 Industry Project

Note: Program curriculum under review and subject to change.

COURSE DESCRIPTIONS

ADMN 100 Microeconomics - 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 102 Management - A study of the management functions of planning, organizing, staffing and controlling. Included are such topics as forms of business ownership, tactical and strategic planning, decision-making, structuring the organization and providing human resources, and controlling operations. Students are given the opportunity to develop analytical and communication skills by analyzing and presenting solutions to typical business problems.

ADMN 200 Macroeconomics - 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 347 Human Resources Management - Using the workshop approach, issues relating day-to-day management issues are explored. Specific topics include organizational behaviour, industrial relations, interviewing skills, job evaluation and the introduction of change.

ADMN 384 Business and International Law - Is a combination Business and International Law course. An overview of the central legal issues which arise when conducting business across international boundaries. International sale of goods contracts, international arbitration are two of the topics covered. A basic understanding of the Canadian legal system, contracts, torts, sale of goods and consumer protection is provided.

BCOM 100 Business Communication - Communicating on the job is a complex process which includes gathering and evaluating data, collaborating with co-workers, reporting to superiors, and presenting information and ideas. This introductory business course is designed to give students basic listening, writing and speaking skills which will allow them to prepare written and oral reports for BCIT courses and to proceed to more advanced communication courses.

BCOM 200 Business Communication - This course gives further instruction and practice in the principles taught in BCOM 100. It 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 processing. Prerequisite: BCOM 100.

COMP 108 Introduction to Computing - Lectures and practical exercises are used to present topics on computer terminology, hardware, software, DOS (Disc Operating System), a word processing package and spreadsheets.

FMGT 101 Accounting 1 - 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 201, topics include notes and accounts receivable, long-lived assets, liabilities, partnerships and corporations, cash-flow, manufacturing accounting, management accounting, consolidated statements and analysis of financial statements. Prerequisite: FMGT 101.

FMGT 347/442 Domestic, International Corporate Finance and Managerial Accounting - 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 engaged in international trade. Prerequisite: FMGT 101, FMGT 201.

MKTG 102 Essentials of Marketing - An introductory course designed to provide the student with an overview of the marketing concept and how it can be applied to any type of organization or service. Material includes the controllable and uncontrollable elements of marketing, strategy planning, market characteristics, marketing research techniques, market segmentation and target market selection.

MKTG 243 Sales Skills - A course designed to cover the mechanics of salesmanship and the salespersons role in the firm.

MKTG 309 Marketing Research 1 - Examines the basic approaches to marketing research and relates those 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 102.

OPMT 110 Business Mathematics - Review of the basic mathematics applicable to business and industry. Mathematics of finance including retail operations, simple and compound interest, discounts, annuities, financial papers and depreciation methods. Emphasizes practical applications to business administration.

OPMT 121 Business Statistics - Covers fundamental statistics used in business and industry. Topics include descriptive statistics, probability theory and major distributions, sampling, estimation, tests of hypotheses, correlation and linear regression.

OPMT 148 Industrial Engineering - A basic productivity engineering course for transportation and distribution students. Course covers the basic industrial engineering approach to productivity improvement.

OPMT 209 Microcomputer Applications: Programming and Spreadsheets - An introduction to microcomputers and software. Students become familiar with software programs to be used in other program areas. Prerequisite: COMP 108.

OPMT 301 Quantitative Methods - 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. 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 waiting line analysis. The major emphasis is on interpretation of results and preparation of management oriented reports.

OPMT 350 Microcomputer Applications: Database - An examination of the need for automating an information storage and retrieval system. A case study is analyzed and a menu-driven system is developed using a standard relational database package. Topics include database creation, editing, querying; building custom reports, custom screens and labels; indexing, building multiple file relations; fundamentals of structured programming. Prerequisite: OPMT 209, COMP 108.

OPMT 403 Warehousing (Logistics only) - Introduces students to the management and organization of distribution centres. Emphasis is on organization for competitiveness so includes layout planning, productivity improvement, storage systems, inventory management, types of replenishment systems and material handling equipment.

OPMT 445 Quality Assurance (Services) - Quality Assurance related to transportation and distribution services. Topics include: QA fundamentals for service industries; quality control planning for operating equipment and goods in transit; measurement of service quality; QA support for procurement and the evaluation of suppliers; quality management programs and their effect on business performance and trading opportunities.

TDMT 101 Geography of Trading - Transportation is the basis of all economic systems including agricultural production and industrial location. 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 150 Distribution 1 (CITT) - Provides the student with a complete overview of Canadian transportation regulations and modes including water, rail, highway, air and pipelines; intermediate transportation agencies; domestic and international transport rates, tolls and tariffs.

TDMT 203 Transportation Economics - Covers a variety of transportation services and 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 204 Integrated Purchasing - Acquaints the student with purchasing principles and methods using computerized techniques. Methods of buying transportation services are covered. Emphasis is on computer-assisted analysis of PARETO's law including vendor evaluation and contracting methods for A, B, C items categories. Course also includes advanced application of the EOQ formulae taking turnover into consideration on three levels; vendor-firm-customer, geographic-freight-consolidation, and cost-saving-results. Elements of material management, customer services, performance standards and computerized measures emphasize goods-in-transit manipulation to avoid stockouts. The basic components of cost trade-offs through special quantitative case studies are also covered.

TDMT 250 Distribution 2 (CITT) - Provides students with an overview of contracts; principles of marine insurance on cargo; warehousing; Canada Customs; damage prevention and claims; hazardous materials, materials handling; unitization devices; physical distribution; computer applications for transportation industries. Prerequisite: TDMT 151.

TDMT 301/401 Logistics - An overview of the total distribution concept. Adding to previous 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 transportation, customer service and complete distribution audits. Prerequisite: TDMT 204.

TDMT 305 International Trading Strategies - 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 advantages and disadvantages 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.

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 analyze the competitive position of his carrier (employer), with emphasis on the current deregulated and competitive environment.

TDMT 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 402 Introduction to Projects - In preparation for their fourth term projects (TDMT 411) students are required to conduct a management level project, on campus, within BCIT. Students are required to demonstrate learned skills within set Terms of Reference that are mutually developed between the students and BCIT staff. Prerequisites: Successful completion of all Level 1, 2 and 3 courses.

TDMT 403 Quantitative Methods for Logistics (Logistics only) - Applies a practical, quantitative approach to solving transportation logistics problems. Topics include forecasting, scheduling, transportation models and queuing theory.

TDMT 409 Harmonized System and FTA - Introduces students to the harmonized system of exporting/importing. The EEC, USA, and most OECD countries use the same documentation and valuation system for customs purposes. The course also familiarizes students with Canada - USA Free Trade Agreement (FTA) regulations.

TDMT 411 Industry Project - The course is an opportunity to apply the knowledge from the program to a specific industry project for a sponsoring company. Prerequisite: Successful completion of all Level 1, 2, 3 and 4A courses.

Faculty and Staff

See Listing Under Operations Management









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ADMINISTRATION

Office of the Dean
D.K.N. Chowdhury, B.Sc. (Hons.), D.I.C., M.A., M.B.A. Ph.D., Dean
Terry Suen, Administrative Officer
Shameem Hameer, Administrative Assistant

Academic Studies
Kent Yakel, B.Sc. (Hons.), M.Sc., Associate Dean

Biological Sciences
Mark Angelo, B.S.F., M.F., Associate Dean

Biotechnology
Food Technology

Civil Technologies
Doug Deans, B.A., Associate Dean

Building
Civil and Structural
Geographic Information Systems
Surveying and Mapping

Computer Systems Technology
Ken Takagaki, B.A. (Hons.), C.M.A., C.D.P., Ph.D. Associate Dean

Electronics Technology
Michael Jervis, B.Sc., Associate Dean

Mechanical Design and Manufacturing Technologies
Trevor Williams, B.Sc., M.Sc. (Mech. Eng.), P.Eng. Associate Dean

CAD/CAM
Industrial Education (Technology Education) Teacher Education
Mechanical Advanced Diplomas
Mechanical Systems
Mechanical Technology
Plastics
Robotics and Automation

Process Technologies
J.T.Neilson, B.A.Sc., P.Eng., Associate Dean

Chemical Sciences
Mining
Nondestructive Testing
Petroleum and Natural Gas
Quality Assurance and Nondestructive Testing
Wood Products Manufacturing

Renewable Resources Technology
Mark Angelo, B.S.F., M.F., Associate Dean

Fish, Wildlife and Recreation
Forestry

ACADEMIC STUDIES

The Academic Studies Division offers Communication, Chemistry, Mathematics and Physics courses 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 review, or to students who do not have the necessary prerequisites for entrance into BCIT programs.

In addition the Division offers Refresher Mathematics and Refresher Physics specifically for students who need a brief review in these subjects. These refresher courses provide such a review but are not acceptable substitute prerequisites for mathematics or physics.

The Division also offers the **Engineering Technology Entry (ETE)** program. This 15-week day school program provides academic upgrading to students who wish to enroll in Engineering Technology programs.

Academic studies courses are offered throughout the year in many forms:

- as part-time evening classes
- as part of full-time program requirements
- as part-time, day-time classes (usually in the summer term)
- as integrated 15-week packages through the Engineering Technology Entry program, in September, January and May. Interested students are encouraged to call 434-1610 for further information.

How to Make Up Course Deficiencies

Preparatory programs are available for those students who lack specific prerequisites or desire refresher courses. For information, contact Student Services at 434-3304.

Special In-House Communication Courses

All BCIT Communication courses can be delivered in-house for interested groups in 3-day, week-long, or other flexible formats. These are practical courses designed to help you write effectively on the job. Special courses can also be designed to meet your company's communication requirements. Instructors will conduct needs assessments in your company and design relevant course materials. Please call the Communication Department at 432-8387 for more information.

English Language Proficiency

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 a full-time workload by reviewing the academic prerequisites.

Provisional Acceptance

A student who is lacking one or more prerequisites may still apply to be provisionally accepted into his/her desired technology program and enroll in the appropriate pre-entry course(s). Upon satisfactory completion of the necessary pre-entry course(s), the student will be fully accepted into the technology program. Pre-entry courses are offered in each of the BCIT terms: September, January, May, and throughout the summer months. Check the Part-time Studies flyer for dates, or phone 434-1610. The following Pre-entry courses are offered to those who need prerequisites or who wish to improve their existing grades:

Technical Mathematics: Introduction - For the School of Health Sciences and the School of Engineering Technology.

Effective Writing and **Independent Learning Skills** - Preparation courses for every Technology.

Comprehensive Reading, Writing and Learning Skills - Preparation courses for every technology and BCIT equivalent of English 12 for every Technology.

Technical English as a Second Language - Equivalent to BCIT's English Language requirement for second language students.

Chemistry - Chemistry 11.

Physics - Physics 11.

PRE-ENTRY COURSE DESCRIPTIONS AND CREDITS

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 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; titrations. Lab work consists of qualitative and quantitative analysis. This course meets the Chemistry 12 entrance requirement for BCIT. Prerequisite: Chemistry 11 or CHEM 001. **6 credits**

Communication

COMM 001 Effective Writing (24 hours) - Prepares students for writing requirements in full-time programs at BCIT. Especially useful for students who need to develop their basic skills in business and technical writing. Concentrates on paragraph development, organization and effective sentences in letter and memo writing. **non credit**

COMM 002 Independent Learning Skills (24 hours) - Learn how to read efficiently, cope with assignments, use computer-managed learning packages, study independently, take exams successfully, manage your time and get the most from new instruction techniques. Includes methods for reading textbooks and learning from objectives. **non credit**

COMM 003 Comprehensive Reading, Writing and Learning Skills (80 hours) - This course is designed for students whose first language is English and who have not completed Grade 12 High School English. It emphasizes the reading, writing and study skills needed for BCIT full-time programs. The course includes efficient reading, library research skills, reading comprehension, grammar, writing fundamentals and speaking skills.

A grade of 65% or higher in this course meets the prerequisite (a "P" in English 12 or equivalent) for many technologies.

A grade of 70% equals a "C" in English 12.

A grade of 75% or better meets the prerequisite for selected technologies (a C+ in English 12).

Prerequisite: Applicants will write an English Proficiency Test to determine their eligibility for enrolment. Students for whom English is a second language should enroll in COMM 004. **non credit**

COMM 004 Technical English for Second Language Students (80 hours) - If your first language is not English and you have good writing skills, this course is for you. It includes the reading, writing, speaking and listening skills needed for BCIT full-time programs. Sentence and paragraph development, reading comprehension, vocabulary expansion, speaking skills, and library skills are emphasized. Grammatical skills are taught in conjunction with writing assignments. You'll also practice proofreading for major errors in sentence structure, grammar and vocabulary.

A grade of 65% in this course meets the prerequisite (a "P" in English 12 or equivalent) for many technologies.

A grade of 70% equals a "C" in English 12.

A grade of 75% or better meets the prerequisite (a C+ in English 12) for selected technologies.

Prerequisite: Applicants will write an English Proficiency Test to determine their eligibility for enrolment. If your language skills need upgrading, you will be required to complete COMM 005 before enrolling in COMM 004. **non credit**

COMM 005 Technical English as a Second Language (80 hours) - If your language skills need upgrading before you can enroll in COMM 004, this course is for you. It includes the speaking, listening, reading and writing skills needed to carry out the writing and speaking tasks in COMM 004. This course includes intensive work on strategies for learning a language, speaking skills, error identification, sentence structure, guided writing, and paragraph writing.

A grade of 65% in this course will allow you to enroll in COMM 004. You will have to write an English Proficiency Test to determine your eligibility to enroll in COMM 005.

Mathematics

MATH 001 Technical Mathematics Introduction - An upgrading 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 Math 12 entrance requirements at BCIT. Students intending to enter a technology which requires a Math 12 grade of C+ or better, must achieve a final mark of 65% or higher in MATH 001. Prerequisite: C or better in Math 11 or approved equivalent math course. **non credit**

MATH 002 Technical Mathematics Introduction (Correspondence) - Flexible entry correspondence course that satisfies the Math 12 entrance requirement for BCIT. Students intending to enter a BCIT technology which requires a Math 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 Math 11 or an approved equivalent mathematics course. **non credit**

Physics

PHYS 009 Pre-entry Physics - This course is designed for students who lack the physics prerequisite to enter their chosen technologies or anticipate difficulty in passing the physics course associated with their technology. The course offers an introduction to the basic principles and common applications of physics. Approximately two-thirds of the course deals with mechanics, the remainder with heat and geometric optics. Problem-solving techniques are emphasized. A grade of 65 % meets the C+ Physics requirement. Prerequisite: You are advised to have completed any necessary mathematics upgrading courses BEFORE taking PHYS 009. **non credit**

Refresher Courses

MATH 004 Refresher Mathematics - A review of mathematical techniques essential for success in basic technical math and calculus courses in BCIT Technology programs. Topics include common algebraic methods for solving equations, simplifying expressions, manipulating formulas, etc.; basic trigonometry; graphing properties of common geometric figures; techniques for solving problems. Emphasis will be placed on developing practical skills and systematic approaches to solving problems and verifying the solutions. This course is for students who have met the mathematics prerequisite for their programs, but have not used basic mathematical techniques for several years and would like to strengthen them. Prerequisite: Math 12 or equivalent. **non credit**

PHYS 004 Refresher Physics - This course provides a review of the basic Physics 11 concepts which are important for success in most first-year physics courses in BCIT technology programs. Topics include kinematics, dynamics, mechanical energy, electricity and optics. There will be some lab exercises, and problem-solving skills will be emphasized. This course is recommended for students who have taken Physics 11 more than one year ago, who have not applied the concepts and need to refresh their skills. Prerequisite: Physics 11 or equivalent. **non credit**

ENGINEERING TECHNOLOGY ENTRY PROGRAM

This 15-week day school program provides academic upgrading to students wishing to enroll in an Engineering Technology program at BCIT. The ETE program provides courses in chemistry, communication, mathematics and physics which meet the School of Engineering Technology prerequisites in these areas.

The program also includes an introductory course in computer applications and a general interest seminar course. This program is one term, 15 weeks in duration. The program will be offered three times per year, with intakes in September, January and May.

Students enrolled in the ETE program could be provisionally accepted (at the time of enrolment) into an Engineering Technology program in the subsequent term, subject to satisfactory completion of the ETE program. Prerequisite: English 11 and Mathematics 11 or equivalent.

ETE Courses			Clrm hrs/wk
CHEM	010	Introductory Applied Chemistry	6.0
COMM	010	Introductory Communication	6.0
COMP	001	Computer Literacy	2.0
MATH	005	Introductory Technical Mathematics	7.0
NTRY	001	Technology Entry Seminar	1.0
PHYS	010	Introductory Applied Physics	7.0

Students will normally take either chemistry or physics, depending on which subject is not a prerequisite for the Engineering Technology program for which they have applied for provisional acceptance. Core courses, Computer Literacy, Math, Communication and the ETE seminar are essential in order to maintain status as an ETE student.

For further information on the Engineering Technology Entry Program, please call Student Services at (604)434-3304, or toll-free at 1-800-667-0676.

COURSE DESCRIPTIONS AND CREDITS

CHEM 010 Introductory Applied Chemistry - Covers those chemistry topics which are essential for success in BCIT programs with Grade 11 Chemistry as a prerequisite. Topics include basic atomic structure, elements and compounds, chemistry reactions, solutions, acids and bases, and oxidation reduction reactions. This course meets the Chemistry 11 entrance requirement for BCIT programs. **non credit**

COMM 010 Introductory Communication - Emphasizes reading, writing and study skills needed for BCIT programs. Develops basic skills in technical writing, including paragraph development, organization and effective sentences in letter and memo writing. Also includes word processing, efficient reading, library research skills, reading comprehension and study skills. A grade of 65% or higher meets the English 12 "P" entrance requirement of many BCIT technologies. A grade of 75% meets the English 12 C+ entrance requirement of some technologies. Prerequisite: English 11 or equivalent. **non credit**

COMP 001 Computer Literacy - This computer lab course introduces students to DOS fundamentals, word processing and spreadsheets, including graphical applications. DOS topics include computer terminology and common file commands. Word processing topics include basic text entry and editing, formatting, block commands and file commands. Spreadsheet topics include data entry, functions, graphics, file commands and simple macros. **non credit**

MATH 005 Introductory Technical Mathematics - Covers those topics in technical mathematics which are important for success in BCIT programs with Mathematics 12 as a prerequisite. Topics include algebraic operations, simple equations, ratios, basic geometry, quadratic equations, logarithms, graphs, linear equations and trigonometry. This course meets the Mathematics 12 entrance requirement for BCIT programs, with a grade of 65% or better required for programs specifying C+ in Mathematics 12. Prerequisite: Math 11 or Algebra 11 or Program Head approval. **non credit**

NTRY 001 Technology Entry Seminar - Includes a variety of topics of interest to ETE students involving relationships with fellow students, the ETE program, BCIT stress management, financial management, institute resources, career opportunities and ethics. Other topics will be decided through instructor-student discussions.

PHYS 010 Introductory Applied Physics - Covers those topics in applied physics which are important for success in BCIT programs with Physics 11 as a prerequisite. Topics include kinematics, dynamics, equilibrium, energy, fluids, heat, electrostatics and direct current circuits. Emphasis is placed on problem-solving. There is a laboratory component to the course. This course meets the Physics 11 entrance requirement for BCIT programs, with a grade of 65% or better required for programs specifying C+ in Physics 11. Prerequisite: Mathematics 11. **non credit**

Faculty and Staff

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Pam Curtis, Secretary

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Eileen Stephens, B.A., M.A.
Dave Thom, B.Sc.

BIOLOGICAL SCIENCES

Diploma Programs

Two programs are offered in Biological Sciences Technology: **Biotechnology** and **Food Technology**. Both of them offer secure and worthwhile career possibilities in a variety of settings.

Biotechnology, an important and challenging twentieth century breakthrough, makes use of such modern tools as gene splicing, protein engineering and cell fusion. **Food Technology** is recession proof, and offers stable employment even during unsettled economic conditions, since this industry is tied to population growth.

Job Opportunities

Biotechnology graduates will be employed by biological research laboratories, food and alcoholic beverage fermentation industries, pharmaceutical manufacturers, mining laboratories, and forest nurseries involved in the cloning of plants.

Graduates are employed as Scientific Research Technicians by B.C. Research, Helix Biotechnology, Quadra Logic Technologies, the Biomedical Research Centre, UBC and the B.C. Cancer Agency. As Technical Marketing representatives, graduates market scientific equipment and supplies for companies such as Barter Corporation. As Laboratory Technicians, graduates perform biochemical/ microbiological testing for employers such as GVRD and Environment Canada. Salaries range from $24,000 to $30,000/annum for a Technical Marketer and $24,000 to $27,000/annum for a Laboratory/Research Technician.

Graduates from the **Food Technology Program** will be employed in the food manufacturing industry where they may do chemical, physical and microbiological tests on food during preservation, examine packaging materials, or supervise process operations within the food plant. Other career opportunities are found in government laboratories and inspection services.

Graduates are employed by large companies such as Nabob Foods, Labatt's and Molson's, Sun-Rype and Lucerne Foods, Fraser Vale and Dairyland. Beginning salaries vary according to the company. You can get a good idea of current salaries and job requirements from the classified sections of the major newspapers in your area. In B.C., employers often specify a BCIT Diploma or a science degree in their job requirements.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Degree Transfer/Completion

Simon Fraser University grants up to two years credit towards a B.Sc. in Biological Sciences. BCIT graduates wanting a degree in Food Science from the University of British Columbia are assessed on an individual basis by UBC.

Prerequisites

High school graduation with English 12, Math 12 and Chemistry 11 are course requirements for the Biological Sciences programs.

Program: BIOTECHNOLOGY

Level 1			Clrm hrs/wk
BISC	102	Introductory Microbiology	6.0
BISC	103	Biology	5.0
BISC	131	Introductory Biotechnology	4.0
CHEM	103	Applied Chemical Principles 1	6.0
MATH	144	Basic Technical Mathematics	6.0
PHYS	102	Physics for Biological Sciences	5.0

Level 2			
BISC	230	Microbiology for Biotechnology	6.0
BISC	231	Laboratory Operation	3.0
CHEM	203	Applied Chemical Principles 2	6.0
MATH	244	Statistics 1 and 2 for Biological Sciences	5.0
OPMT	243	Operations Management	2.0
PHYS	202	Physics for Biological Sciences	5.0
TCOM	119	Communication for Biotechnology	3.0

Level 3			
BISC	330	Industrial Microbiology	6.0
BISC	332	Molecular Genetics 1	6.0
BISC	333	Plant Physiology and Cell Biology	7.0
BISC	334	Biochemistry 1	6.0
CHEM	311	Instrumental Analytical Methods	5.0

Level 4			
BISC	432	Molecular Genetics 2	6.0
BISC	433	Animal Cell Biology	6.0
BISC	434	Biochemistry 2	6.0
BISC	436	Process Systems for Biotechnology	6.0
BISC	438	Directed Studies	4.0
TCOM	219	Advanced Communication for Biotechnology	2.0

Program: FOOD TECHNOLOGY

Level 1			
BISC	102	Introductory Microbiology	6.0
BISC	103	Biology	5.0
CHEM	103	Applied Chemical Principles 1	6.0
MATH	144	Basic Technical Mathematics	6.0
PHYS	102	Physics	5.0
TCOM	101	Introduction to Technical Communication	3.0

Level 2			
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 for Biological Sciences	5.0
PHYS	202	Physics for Biological Sciences	5.0
TCOM	205	Technical Communication	3.0

Level 3			
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	Engineering Principles for Bioscience	4.0
CHEM	311	Instrumental Analytical Methods	5.0
OPMT	162	Management Engineering 1 for Biological Sciences	3.0

Level 4			
ADMN	103	Fundamentals of Management	4.0
BISC	401	Food Processing	5.0
BISC	402	Process Systems for Bioscience	5.0
BISC	403	Quality Control	4.0
BISC	404	Food Analysis	5.0
BISC	406	Sanitation	4.0
ELEC	253	Instrumentation for Biological Science	6.0
MATH	444	Introduction to Computing for Biological Sciences	4.0

COURSE DESCRIPTIONS

BISC 102 Introductory Microbiology - The course is designed to train students in the basic microbiological procedures employed in a laboratory; the use and care of the microscope; aseptic techniques; methods for sampling, enumeration and identification of important 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 131 Introductory Biotechnology - A survey of all aspects of biotechnology including the ethical implications of this technology. Topics include: fermentation, single cell protein, recombinant DNA, monoclonal antibodies, cell culture, and enzymes.

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 food packaging. Experimental portions of food will be preserved by various methods during lab periods. Prerequisite: BISC 102, CHEM 103. Corequisite: CHEM 203.

BISC 202 Microbiology for Food Processing - Microorganisms of concern to the food industry are studied: microorganisms involved in food spoilage, food toxicology, and in the processing of food. Assessment and reporting of microbiological test results to management is stressed. Prerequisite: BISC 102. Corequisite: BISC 201.

BISC 230 Microbiology for Biotechnology - The application of microbiology to biotechnology. Topics include taxonomy, microbial physiology, microbial genetics, and their applications in biotechnology. Prerequisite: BISC 102.

BISC 231 Laboratory Operation - Lecture material will cover laboratory safety procedures for handling hazardous chemical and biological material; laboratory management, including purchasing and inventory control as well as laboratory equipment and services.

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. Corequisite: BISC 303.

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: BISC 201, CHEM 103, 203. Corequisite: BISC 301.

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 tri-stimulus colorimetry and measurement of color in foods. Prerequisite: BISC 201, 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 biological materials. An introduction to carbohydrate and protein chemistry with selected analyses, using the best equipment available. Prerequisite: CHEM 103, 203. Corequisite: CHEM 311.

BISC 305 Engineering Principles for Bioscience - The acquisition and handling of materials for food processing is discussed. Operations which are part of food processing systems such as heat transfer, product separation are studied. Prerequisite: PHYS 202.

BISC 330 Industrial Microbiology - The use of microorganisms to produce marketable products or services. Topics include fermentation systems for alcohol, organic chemicals, and pharmaceuticals; waste management and microbial sewage treatment; single cell protein; food microbiology; and the control of microbial bio-deterioration. Prerequisite: BISC 230.

BISC 332 Molecular Genetics 1 - An introduction to genetics viewed from the molecular level. Topics include Mendel's laws, gene replication, gene regulation and recombinant DNA. Prerequisite: BISC 230.

BISC 333 Plant Physiology and Cell Biology - Plant processes and their manipulation by environmental factors. Plant physiology. Application of plant propagation and in-vitro culture techniques with reference to representative crops. Prerequisite: BISC 103.

BISC 334 Biochemistry 1 - This course deals with the aspects of biochemistry relevant to biotechnology. The structure and properties of molecules (proteins, lipids, hormones, etc.) will be examined as well as their role in metabolism. Principles learned will be applied to problems in biotechnology.

BISC 401 Food Processing - See BISC 301. Prerequisite: BISC 301. Corequisite: BISC 402.

BISC 402 Process Systems for Bioscience - Dehydration, packaging, fluid and solids handling systems used in food processing plants are discussed. Processing plant design is studied with respect to utilities and safety. Waste management techniques and systems are analyzed. Prerequisite: 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; 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 406 Sanitation - Good manufacturing practices and HACCP systems relating to the sanitation of food plants including personal hygiene are stressed. Properties of appropriate cleaners and sanitizers are studied together with the proper use of equipment for cleaning. Sanitary design of food processing plants and equipment is discussed. Prerequisite: BISC 102, 202.

BISC 432 Molecular Genetics 2 - The application of molecular genetics to human health care, agriculture, forestry, veterinary medicine, microbiology, and aquaculture. Prerequisite: BISC 332.

BISC 433 Animal Cell Biology - Cell biology is the search for structure/function relationships at the sub-cellular level. This course examines the inner workings of the animal cell and the application of this knowledge to biotechnology. Topics include in-vitro cell culture and manipulation, immunology, and the production of monoclonal antibodies. Prerequisite: BISC 332, 334.

BISC 434 Biochemistry 2 - A continuation of BISC 324. This course covers the applications of biochemistry to biotechnology. Protein purification and characterization, enzyme kinetics and analysis, and enzyme probes, etc. Prerequisite: BISC 334.

BISC 436 Process Systems for Biotechnology - This course covers fermentation technology and downstream processing of biotechnology products. The operation of equipment such as fermenters, freeze-driers, filtration systems and industrial centrifuges is discussed. Instrumentation for process control and product analysis is covered. The application of biotechnology systems to waste management is stressed. Prerequisite: BISC 231, 330.

BISC 438 Directed Studies - Students will select projects and prepare a formal report on some aspect of biotechnology. Projects may have a laboratory component in which students perform experiments toward their projects under the supervision of an industry or faculty sponsor.

CHEM 103 Applied Chemical Principles 1 - An introductory course on 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 biotechnology are discussed in detail. Laboratory exercises consist of quantitative and qualitative analysis and organic separations. Prerequisite: CHEM 103.

CHEM 311 Instrumental Analytical Methods - Instrumentation used for chemical analysis. The theory, construction, application and operation of instrumentation is discussed. Instruments include: spectrophotometry (visible, UV, NIR and infra-red, emission, absorption), flame photometry, chromatography (gas, liquid, high pressure liquid). Laboratory exercises involve use of these instruments. Prerequisite: CHEM 203.

ELEC 253 Instrumentation for Biological Science - 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 for Biological Sciences - 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 for Biological Sciences - Applications of microcomputers in spreadsheet, database and graphics. Use of integrated programs. Prerequisite: Math 144.

OPMT 162 Management Engineering 1 for Biological Sciences - The techniques of management problem-solving and work simplification with particular application to engineering and industrial organization. Includes method study, some measurement techniques, layout, planning and scheduling. The course emphasizes practical applications to the field of biological sciences.

OPMT 243 Operations Management - These sessions will cover the use of computers with database, word processing and spreadsheet programs. The interfacing of computers with laboratory equipment for data acquisition and control will also be covered.

OPMT 343 Operations Management for Food Technology - This course covers the principles of Total Quality Management (TQM) and how they relate to business requirements for modern quality management systems in the food processing industry. In addition to regulations for the industry, global trading customers are demanding the implementation of quality management systems equivalent to ISO 9000 or CAN3-Z299 series. These create a foundation for company practice which is enhanced by continuous improvement in all operations generated by TQM. Topics include maximizing employee potential, employee empowerment, systematic problem-solving and measurement for total quality.

PHYS 102 Physics - An introductory course which covers a wide range of physical principles, with special relevance to the biological sciences technology. First term topics include kinematics, dynamics, friction, statics, energy, power, circular motion, momentum, properties of solids, fluids and fluid mechanics. Second term topics include temperature, heat, calorimetry, kinetic theory, heat transfer, basic electricity and magnetism, colorimetry, optics and radiation. Measurement, data analysis, experimental techniques and report writing are stressed.

TCOM 101 Introduction to Technical Communication - This course teaches the practical writing, speaking and presentation techniques required by industry. Students learn how to organize information, use graphics, write requests and instructions, describe processes and give an oral presentation of a new development in their technology.

TCOM 119 Communication for Biotechnology - This course teaches the skills necessary for success in the biotechnology industry. Students learn practical writing, speaking and presentation techniques, and the correct formats for short reports, instructions and lab reports. They also research and deliver an oral report on a new development in biotechnology, write a skill-focused career package, take part in a meeting, and give a persuasive oral presentation.

TCOM 205 Technical Communication - In this course, students apply the techniques learned in TCOM 101 to problem-solving reports. They also put together a career package, take part in a meeting and give a persuasive presentation in front of a panel. Prerequisite: TCOM 101.

TCOM 219 Advanced Communication for Biotechnology - This course teaches how to do up-to-the-minute research in biotechnology, critically analyze the results of that research and present the results in a seminar. Students will also prepare a career package of their skills and qualifications. Prerequisite: TCOM 119.

TCOM 303 Advanced Technical Communication - In this course, students research, write and present an industry feasibility study. They also write proposals, produce a company brochure and update their career package. Prerequisite: TCOM 101, 205.

TCOM 437 Current Topics in Biotechnology - This course is a weekly discussion group in which students present and discuss current issues and applications of biotechnology. It is taught in association with Biotechnology Program faculty. Communication and presentation (oral and written) skills are emphasized.

Faculty and Staff

M. A. Angelo, B.S.F., M.F., Associate Dean
P.A. Barran, B.Sc., M.Sc., Ph.D.
Program Head, Biotechnology
K.G. Cummings, Dipl.T.
R.N.E. Hargreaves, Dipl.T., A.Sc.T.
W. Hooge, B.S.A., P.Ag.
A. McCannel, B.Sc., M.Sc.
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J. L. Nichols, B.Sc., M.Sc., Ph.D.
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Advisory Committee Members: Food Technology

A. Gilder, Lucerne Foods Ltd. (Chairperson)
G. Christie, Dairyland Foods
I. Devlin, Fisheries & Oceans Canada
R. Hamm, Island Farms Dairies Co-op Assn.
C. J. Jensen, Nabob Foods Ltd.
B. F. McCrum, Agriculture Canada
D. McGuire, Brookside Foods Ltd.
R. Minchin, Thos. J. Lipton Ltd.
I. Woodrow, B.C. Food Technology Centre

Advisory Committee Members: Biotechnology

Collette Breuil, Paprican
David Christie, Baxter Corp.
L. Kemp, Simon Fraser University
S. Little, Syndel Laboratories Ltd.
W.R. McMaster, University of B.C.
J. Mueller, NRC - IRAP
T. Owen, Helix Biotech Ltd.
P. Logan, Quadra Logic Technologies
Michael Smith, University of B.C.
Smith, Canadian Lysozyme, Inc.
Herman Ziltener, Biomedical Research

BIOTECHNOLOGY

Diploma Program

See **Biological Sciences,** page 110.

BUILDING TECHNOLOGY

Diploma Program

Spiralling advances in technology have increased the public's expectation of their communities and the buildings constructed in 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. These two factors, high public expectations and the dynamic nature of the industry, present both a challenge and an opportunity - attractive criteria for any career.

Job Opportunities

Graduates of Building Technology perform many tasks of a technological nature as part of the interdisciplinary team of professionals and tradesmen involved in the building design, construction and management process. Graduates have the advantage of understanding buildings from several perspectives - the architectural and structural elements; the mechanical, plumbing, drainage, and electrical systems; the feasibility implications and the contractual and managerial processes.

Graduates of Building Technology become senior drafting personnel, job captains, specification writers, estimators or contract managers, building inspectors, officials in property management departments, appraisers and assessors, partners in construction organizations and technical representatives for building suppliers and equipment manufacturers. Many graduates will become estimators with general and sub-trade contractors, preparing bids and checking job costs and progress.

The growing field of Building Technology presents opportunities in consulting offices, assisting in design, specification writing and construction inspecting; with contractors, estimating, making shop drawings and supervising; with suppliers, explaining the capabilities and applications of equipment and systems.

The Program

This Diploma program is designed to give both men and women a sound preparation for rewarding careers in many areas of the construction industry.

All students follow a common two-year program which includes lectures, drafting room practice and field trips. In the second year (subject to departmental approval) students may choose from one of two areas of specialization:

Architectural - primarily intended for those students who plan to work in architectural offices, offer design services, or pursue an architectural degree.

Economics - primarily intended for those students who plan to follow careers in construction and project management.

Students are often able to further their education through summer jobs with architects, engineers, developers and contractors or by doing inspection work for public and private agencies.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Post-graduation

The Canadian Institute of Quantity Surveyors will accept graduates as Probationer Members and gives credit in a similar manner. Information on this professional development possibility is available from the Program Head.

Prerequisites

High School graduation with English 12, Math 12 and Physics 11 are course requirements for this program. Preference will be given to applicants who have a 'C' grade or better in the prerequisites.

The program is currently under review in consultation with the Building Industry's Advisory Committee.

Program: BUILDING

			Clrm hrs/wk
Level 1 (Term 1 15 weeks)			
BLDG	101	Drafting	3.0
BLDG	102	Building Construction 1	6.0
BLDG	104	Construction Site Processes	3.0
BLDG	125	Introduction to Computers	3.0
CIVL	135	Building Structures 1	3.0
MATH	140	Basic Technical Mathematics for Building	5.0
PHYS	125	Physics for Building	4.0
TCOM	102	Technical Communication for Building	4.0
Level 2 (Term 2A 10 weeks)			
BLDG	105	Construction Contracts 1	2.0
BLDG	200	Planning	2.0
BLDG	202	Building Construction 2	6.0
BLDG	209	CADD for Building	3.0
CIVL	236	Building Structures 2	3.0
MATH	240	Calculus and Analytic Geometry for Building	5.0
OPMT	185	Project Management	2.0
PHYS	225	Physics for Building	4.0
TCOM	201	Technical Communication	3.0

Level 2 (Term 2B 10 weeks)			Clrm hrs/wk
BLDG	201	Planning 2	3.0
BLDG	202	Building Construction 2	6.0
BLDG	206	Construction Estimating 1	4.0
BLDG	225	CADD Applications for Building	3.0
CIVL	236	Building Structures 2	3.0
ELEC	150	Illumination	2.0
MATH	240	Calculus and Analytic Geometry for Building	5.0
PHYS	225	Physics for Building	4.0

ARCHITECTURAL OPTION

Level 3 (Term 3A 15 weeks)			
BLDG	302	Building Construction 3	6.0
BLDG	306	Construction Estimating 2	4.0
BLDG	309	Architectural Option 1	6.0
BLDG	313	Codes and Regulations	2.0
CIVL	345	Building Structures 3 (Architectural)	3.0
ELEC	250	Electrical Systems	3.0
MSYS	305	Introduction to Mechanical Systems in Buildings	5.0
OPMT	260	Management Engineering 1	2.0

Level 4 (Term 4A 10 weeks)			
BLDG	305	Construction Specifications	2.0
BLDG	402	Building Construction 4	6.0
BLDG	406	Construction Estimating 3	4.0
BLDG	407	Architectural Option 2	6.0
BLDG	411	Construction Management	3.0
BLDG	419	Building Acoustics	2.0
CIVL	445	Building Structures 4 (Architectural)	3.0
MECH	412	Space Conditioning	2.0
TCOM	301	Advanced Technical Communication	2.0

Level 4 (Term 4B 10 weeks)			
BLDG	205	Construction Contracts 2	2.0
BLDG	305	Construction Specifications	2.0
BLDG	402	Building Construction 4	6.0
BLDG	406	Construction Estimating 3	4.0
BLDG	408	Architectural Option / Projects	10.0
SURV	120	Introduction to Survey for Building	3.0

ECONOMICS OPTION

Level 3 (Term 3A 15 weeks)			
BLDG	302	Building Construction 3	6.0
BLDG	306	Construction Estimating 2	4.0
BLDG	313	Codes and Regulations	3.0
BLDG	316	Economics Option 1	6.0
CIVL	337	Building Structures 3 (Economics)	3.0
ELEC	250	Electrical Systems	3.0
MSYS	305	Introduction to Mechanical Systems in Buildings	5.0
OPMT	260	Management Engineering	2.0

Level 4 (Term 4A 10 weeks)			Clrm hrs/wk
BLDG	305	Construction Specifications	2.0
BLDG	402	Building Construction 4	6.0
BLDG	406	Construction Estimating 3	4.0
BLDG	414	Economics Option 2	6.0
BLDG	419	Building Acoustics	2.0
CIVL	439	Building Structures 4 (Economics)	3.0
MATH	440	Mathematical Methods and Computing for Building	4.0
MECH	412	Space Conditioning	2.0
TCOM	301	Advanced Technical Communication	2.0

Level 4 (Term 4B 10 weeks)			
BLDG	205	Construction Contracts 2	2.0
BLDG	305	Construction Specifications	2.0
BLDG	402	Building Construction 4	6.0
BLDG	406	Construction Estimating 3	4.0
BLDG	415	Economics Option / Projects	10.0
SURV	120	Introduction to Survey for Building	3.0

COURSE DESCRIPTIONS

BLDG 101 Drafting - Architectural drafting techniques and lettering. Drawing development with specific reference to office procedures and related design activities. Building standards for line development and graphics. Drawing process in terms of systemization and computerization.

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 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 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 125 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 200 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 201 Planning 2 - A continuation of BLDG 200. Prerequisite: BLDG 200.

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

BLDG 205 Construction Contracts 2 - Continuation of BLDG 105. Detailed examination 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 102.

BLDG 209 CADD for Building - Microcomputer-based CADD using AutoCAD 2.62 software on AT's. The course includes an introduction to CADD machine components, architectural working drawings, log-on procedures and display. An introduction to autoread functions is included.

BLDG 225 CADD Applications for Building - CAD applications are studied and used to perform tasks associated with construction and architectural drafting. An industry approved CAD program (currently AutoCAD) is used to allow the student to gain hands-on experience. Topics include advanced editing functions, complex entity creation, dimensioning, block transfers and plotting.

BLDG 302 Building Construction 3 - 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 Option 1 - Short history of contemporary architecture and building. Conceptualization and planning, theory, aesthetics and structure as integral parts of design.

BLDG 316 Economics Option 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. Prerequisite: Completion of first year program.

BLDG 323 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.

BLDG 402 Building Construction 4 - Continuation of BLDG 302. 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 306.

BLDG 407 Architectural Option / Projects - 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 408 Architectural Option 3 - Continuation of BLDG 407 with heavy emphasis on a building design project.

BLDG 411 Construction Management - Provides the opportunity to apply problem-solving methodology to typical construction management problems. Emphasis will be on problems associated with large comprehensive housing projects, high-rise construction, and other large construction projects. The course includes project control, task scheduling, motion economy and productivity. Prerequisite: BLDG 104, BLDG 125.

BLDG 414 Economics Option 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 economics and jobsite controls. Techniques of costing, pricing and analysis of economic data. Prerequisite: BLDG 316.

BLDG 415 Economics Option/Projects - Continuation of BLDG 414 with a heavy emphasis on a construction management project.

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 with appropriate acoustical and aesthetic qualities for building. 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 analyze 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 problem-solving tutorial 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 (Economics) - Emphasizes elementary structural design concepts for timber, steel and reinforced concrete structures. Students become familiar with design aids such as handbooks, manuals, catalogs and tables used in the construction industry. Course includes timber, steel and concrete, and concepts such as lateral stability and resistance to wind and earthquake forces. Prerequisite: CIVL 236.

CIVL 345 Building Structures 3 (Architectural) - Basic concepts and principles used to design steel and reinforced concrete structures. Steel connections, welds and bolts, structural systems, design for lateral forces, earthquake resistant design concepts. Prerequisite: CIVL 236.

CIVL 439 Building Structures 4 (Economics) - An introduction to soils engineering including soil classification, strength, compaction, lateral pressure, foundation systems and retaining walls. Optional topics such as prestressed concrete, concrete formwork, etc., may be discussed. Prerequisite: CIVL 337.

CIVL 445 Building Structures 4 (Architectural) - Basic concepts of soil mechanics, including identification and classification of soils, soil strength and settlement. Shallow and deep foundations. Retaining walls. Excavation protection, dewatering, seepage, compaction and consolidation, slope stability. Basic concepts of prestressed concrete, including pre-tensioned and post-tensioned systems. Reinforced masonry as an alternate to reinforced concrete walls, pros and cons. Formwork for concrete. Prerequisite: CIVL 236.

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 minimal operation costs; recognize and avoid building designs that create costly electrical design problems. Prerequisite: ELEC 150.

MATH 140 Basic Technical Mathematics for Building - Radian measure. Trigonometric functions, solution of triangles, and vectors. 3D trigonometry. Irregular areas and volumes. Limits, the derivative, differentiation rules for algebraic functions, curve sketching, implicit differentiation, higher order derivatives, applied maxima/minima, related rates and differentials.

MATH 240 Calculus and Analytic Geometry for Building - Integration: indefinite integral, definite integral, fundamental theorem of calculus, and applications (areas, means, volumes, arc length, centroids, moment of inertia, work, etc.). Analytic geometry: circle, parabola, ellipse, hyperbola, and applications. Logarithmic functions: logarithms, properties of logarithms, common logarithms, scales, and applications.

MATH 440 Mathematical Methods and Computing for Building - Spreadsheet usage including IF and THEN statement and macros, database and graphs. Linkage amongst the above three functions.

MECH 412 Space Conditioning - Examines and analyzes the factors influencing indoor comfort, including solar orientation, evaluation of cooling loads, properties of air, air conditioning processes and methods.

MSYS 305 Introduction to Mechanical Systems in Buildings - Principles of heat transfer and design procedures for heating and ventilating systems in buildings. A study of system components and applications for human comfort. Basic engineering principles and graphic presentations related to sanitary, storm and potable water systems in buildings.

OPMT 185 Project Management - An introduction to the fundamentals of Critical Path Method (CPM) as it applies to project planning, scheduling,control and 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 method study techniques to examine and improve the way in which a job is accomplished; work measurement techniques for estimating, planning, cost control and engineering economics.

PHYS 125 Physics for Building - 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.

PHYS 225 Physics for Building - A general physics course designed to meet the specific needs of the Building Technology. There is a lab component. Topics include: 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 for Building - 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 102 Technical Communication for Building - 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 for Building - In this applied communication course students learn the theory and practice of 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 102.

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 102, 201.

Faculty and Staff

D.C.Deans, B.A., Associate Dean
F.A.A. Alfeld, Dipl.Eng., Instructor
R. Guerin, A.Sc.T., Instructor
D.C. Hale, Dipl.T., Assistant Instructor
G.M. Hardie, M.Ed., F.R.I.C.S.
M. Kuzych, B.Arch., M.R.A.I.C., M.A.I.B.C., Instructor
J.A. McInnes, P.Eng., Instructor
A. Maharajh, B.A., Dipl.T., A.Sc.T., M.C.I.Q.S.
Part-time Studies Coordinator
M. Tanaka, B.Arch., M.R.A.I.C., M.A.I.B.C., Instructor
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Building Technology Advisory Committee

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M. Baker, Retired
K. Chandok, 401 West Georgia Management Ltd.
D. Charbonneau, Public Works Canada
T. Hamilton, E. W. Hamilton Ltd.
D. James, David H. James Ltd.
R. Letkeman, Ray Letkeman Architect, Inc.
D. McComb, Polygon Group Ltd.
D. Roussin, Barnett, Treharne, Yates Ltd.
D. Smith, PCL Constructors Western Inc.
E. Stregger, Costex Management Inc.
K. Wickham, Gauvin Construction Ltd.

CAD/CAM TECHNOLOGY

Diploma Program

Engineering and industrial practices have been and will continue to be transformed by the introduction of computing into the workplace. Engineers and technologists routinely use CAD (Computer Aided Design), CAM (Computer Aided Manufacturing) and CAE (Computer Aided Engineering). A graduate of the CAD/CAM program will be capable of applying engineering principles to the solution of engineering and industrial problems as well as managing computers in an engineering environment.

CAD/CAM technology has important applications in the production, supervision, distribution and storage of the computerized design database. The design database not only conveys the graphical information needed for the design and development of machines, tools, buildings and structures, but also the associated non-graphical information. The exchange of both graphical and non-graphical information between databases allows engineers and technologists to use computers more efficiently for both design and manufacturing.

Job Opportunities

While the primary area of employment for the CAD/CAM technologist is the mechanical design and manufacturing industry, graduates have found work in the many disciplines that use CAD/CAM. These include surveying, civil and structural, mining, forestry, architecture and electronics. Some graduates have worked for software developers, consulting and service companies. Other graduates have successfully started their own companies to supply CAD/CAM services.

The Program

The CAD/CAM, Mechanical Design, Mechanical Manufacturing and Mechanical Systems programs share a common first year allowing students to select the appropriate option following its completion.

The first year provides training in the traditional engineering disciplines and the operation of CAD systems. The second year develops the student's skills in computer applications and processes as well as mechanical design.

Graduated engineering technologists and engineers are offered the opportunity of upgrading their skills through Advanced Diploma programs in CAD Programming, Advanced Manufacturing and Machine Vision Systems.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Prerequisites

For first year applicants: High School graduation with English 12 Math 12 and Physics 11. For second year, direct entry applicants: a diploma of Technology equivalent to BCIT, departmental approval and CDCM 202 (or equivalent).

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

Program: CAD/CAM

		Clrm hrs/wk
Level 1		
CDCM 101	Computer Science 1	3.0
CDCM 102	CAD Graphics 1	4.0
CHSC 105	Engineering Materials	4.0
MATH 149	Basic Technical Mathematics	5.0
MECH 100	Engineering Graphics 1	3.0
MECH 104	Statics	4.0
MECH 107	Introduction to Thermal Processes	3.0
TCOM 109	Technical Communication for CAD/CAM	4.0
Level 2		
CDCM 202	CAD Graphics 2	4.0
CHSC 205	Engineering Materials	4.0
MATH 249	Calculus	4.0
MECH 206	Mechanics of Materials	4.0
MECH 208	Dynamics	4.0
MECH 220	Engineering Graphics 2	3.0
MECH 225	Manufacturing Processes 1	4.0
PHYS 216	Physics	4.0
Level 3		
AICO 504	Data Structures in "C"	6.0
CDCM 305	CAD Customization	4.0
CDCM 311	Microstation	3.0
MATH 349	Numerical Methods for Mechanical	4.0
MECH 301	Machine Design 1	4.0
MECH 320	Fluid Power 1	3.0
ROBT 311	Computer Numerical Control Programming	5.0
Level 4		
AICO 601	File Handling and Database	6.0
CDCM 407	CAD/CAM System Management	3.0
CDCM 408	Advanced CAD Graphics	4.0
CDCM 409	CAD/CAM Projects	5.0
MATH 460	Mathematics for CAD/CAM	4.0
MECH 401	Machine Design 2	5.0
TCOM 210	Advanced Technical Communication for CAD/CAM	4.0

COURSE DESCRIPTIONS

AICO 504 Data Structures In "C" - Introduction to "C". Emphasis will be on the solution of problems solvable in a microcomputer environment; software package design and implementation, and programming techniques. Problems will be selected from polygon processing algorithms. Prerequisite: CDCM 101 or equivalent.

AICO 601 File Handling and Database - Sequential, direct and keyed indexed file handling. Introduction to database systems; hierarchical, network and relational. Stress on micro-based systems and engineering applications. Inventory control, BOM, etc. Discussion of DB and its impact in an integrated DP environment. Prerequisite: AICO 504.

CDCM 101 Computer Science 1 - Introduction to computer science and programming using popular commercially available spreadsheet software. Emphasis will be on engineering problems using structured problem-solving techniques. Introduction to DOS and BASIC programming.

CDCM 102 CAD Graphics 1 - Computer-aided design using commercially available software. Includes an introduction to hardware requirements, operating systems, file handling and CAD concepts. CAD skills include element placement and manipulation, view control, measurement, text, dimensioning and plotting.

CDCM 202 CAD Graphics 2 - Continuation of CAD Graphics 1. Advanced 2D drafting techniques, blocks, attributes, macro commands and menu customization. Introduction to 3D graphics modelling; wireframe, surface and solid models. Relationship of CAD software to other computer programs. Prerequisite: CDCM 102.

CDCM 305 CAD Customization - The productivity and utility of commercially available CAD software is increased by enhancing and tailoring the software for specific disciplines. The use of AutoLISP for applications with AutoCAD. Accessing the CAD database. Prerequisite: CDCM 202.

CDCM 311 Microstation - 2D and 3D graphics using Microstation software.

CDCM 407 CAD/CAM System Management - Issues related to the acquisition, implementation and management of computer systems for CAD/CAM applications. Drawing files management, hardware and software selection, networking, security and maintenance.

CDCM 408 Advanced CAD Graphics - Computer generation of 3D models using wireframe, surface and solids modelling software. The creation and generation of shaded models and animation for engineering applications. Prerequisite: CDCM 202.

CDCM 409 CAD/CAM Projects - Students integrate skills in graphics, programming, databases and engineering technology and apply them to industrial purposes.

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.

MATH 149 Basic Technical Mathematics - 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 strong emphasis on applications to the physical sciences and mechanical engineering.

MATH 249 Calculus - An introduction to the differential and integral calculus of trigonometric, logarithmic and exponential functions and their application; maxima and minima, area 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 - The application of numerical methods to engineering problems is introduced. Using the BASIC language, the algorithms are programmed and used in complex problem-solving. Matrix methods and their application to computer graphics, linear programming and other applied mathematics problems are presented.

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 100 Engineering Graphics 1 - Techniques for 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, with emphasis on orthographic projection, auxiliary views, dimensions and working drawings.

MECH 104 Statics - Vectors, force systems, concurrent and coplanar, non-concurrent 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 107 Introduction to Thermal Processes - 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 208 Dynamics - Kinematics: basic equation of motion, motion diagrams, trajectories. Kinetics: Newton's Laws, inertia, rectilinear and rotational kinetics, systems of bodies. Work, energy, power and efficiency. Prerequisite: MECH 104.

MECH 220 Engineering Graphics 2 - Advanced engineering graphic techniques including sections, isometrics, intersections, developments, single line pipe drawings, structural steel and connections, dimensional limits, tolerances and fits. Course work leads into specific engineering drawing assignments developed according to the student's program. Computerized drafting techniques may be used where appropriate. Prerequisite: MECH 100.

MECH 225 Manufacturing Processes 1 - A basic orientation course providing the student with practice in metal joining using various brazing, soldering, epoxy and welding techniques, and tensile testing methods. The course leads into metal removal processes and their related theory dealing with machine tools, tool materials and selection, material machinability, use of coolants and cutting oils, calculations for power, cutting speeds, estimate of time and productivity along with the technical language required in the industry.

MECH 301 Machine Design 1 - Covers the theory in prerequisite courses plus combined stresses with emphasis on solution by Mohr's circle; theories of failure; stress concentration; fatigue phenomena; welded connections; bolted and riveted connections; spur, helical and worm gear drives; speed reducers; belt and roller chain drives; flexible couplings; shafts; antifriction and journal bearings, brakes and clutches; power screw; helical and leaf springs; introduction to mechanical vibration with emphasis on the critical speeds of rotating assemblies.

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 - The sequel to MECH 301,this course covers couplings, brakes and clutches; anti-friction and journal bearings; helical, bevel and worm gearing; power screws, springs and machine frame components; and an introduction to mechanical vibration, with emphasis on critical speeds of rotating bodies. An introductory treatment of bulk material handling systems is also included. Problems are handled in both SI and Imperial units. Prerequisite: MECH 301.

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

ROBT 311 Computer Numerical Control Programming - The operation and application of computer numerically controlled (CNC) machine tools to manufacturing industries is investigated. Programming of CNC milling machines and lathes using manual and computer-assisted methods is studied. Prerequisite: MECH 225, CDCM 102.

TCOM 109 Technical Communication for CAD/CAM - This course emphasizes clear, correct and concise technical writing for the CAD/CAM industry. Students learn how to organize technical information, illustrate documents, define and describe technical objects and processes, and write routine memos, letters and instructions. They also learn how to prepare content and design visuals, and to deliver a technical briefing.

TCOM 210 Advanced Technical Communication for CAD/CAM - This course emphasizes more advanced technical writing for the CAD/CAM industry. Students write a resume and application letters, and hold interviews for industry employment. They also prepare proposals, progress reports, oral briefings and documentation describing the project designed and produced for CDCM 409. They prepare for and conduct meetings. Students enrolled in this course must be concurrently enrolled in CDCM 409. Prerequisite: TCOM 121.

Faculty and Staff

T. Williams, B.Sc., M.Sc.(Mech Eng.), P.Eng.
Associate Dean
J. Bartz, Dipl. Tech.
P. Dollan, B.Sc.(Tech.)
B. Dunn, B.A.Sc.
G. Johnson, B.A.(Geog.)
D. Mack, Dipl. T.
P. Morrison, Dipl.T., B.Eng., A.Sc.T., Program Head
J. Read, Dipl.T.

CHEMICAL SCIENCES TECHNOLOGY

Diploma Program

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 materials testing specialists.

The Program

This Diploma program offers the student a foundation in general science and technology in the first year of studies, with the opportunity for specialization in the 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 is compulsory throughout while most other courses are chosen on an elective basis, depending on which technology the student wishes to specialize in. The following options are offered: **Environmental and Industrial Chemistry, Metallurgy, Pulp and Paper.**

Program Length

Two years full-time beginning in September each year.

Tuition Fees(subject to change)

$3,631 for the two-year program (1992/93).

Accreditation

The program is accredited by the Applied Science Technologists and Technicians of B.C.

Prerequisites

High School graduation with English 12, Chemistry 11 and Math 12 are course requirements for this program.Physics 11 and Chemistry 12 are strongly recommended.

Program: CHEMICAL SCIENCES

		Clrm hrs/wk
Level 1		
CHEM 101	Applied Chemical Principles	16.0
CHSC 100	Computer Applications for Chemical Sciences	1.0
CHSC 103	Engineering Materials	3.5
CHSC 119	Environmental Science	4.5
MATH 141	Basic Technical Mathematics for Chemical Sciences	5.0
MECH 102	Drawing Interpretation	2.0
PHYS 114	Physics for Chemical	5.0
TCOM 101	Introduction to Technical Communication	3.0
Level 2		
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 230	Calculus for Chemical Sciences	5.0
MATH 231	Statistics 1 for Chemical Sciences	5.0
PHYS 214	Physics for Chemical Sciences	5.0
TCOM 202	Technical Communication for Chemical Sciences	3.0

Option: ENVIRONMENTAL AND INDUSTRIAL CHEMISTRY

Level 3		
CHEM 309	Organic Chemistry for Chemical Sciences 1	6.0
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 and BASIC for Chemical Sciences	5.0
Level 4		
CHEM 409	Organic Chemistry for Chemical Sciences 2	6.0
CHEM 414	Analytical Chemistry 2	6.0
CHSC 420	Unit Project	3.0
CHSC 448	Industrial Chemistry	2.0

Plus 4 Electives from the following option lists:

Environmental Chemistry Option

CHEM 416	Analytical Instrumentation 1	2.0
CHSC 411	Pollution Science and Microbiology	6.0
CHSC 412	Waste Management	3.0
CHSC 413	Environmental Analytical Methods	3.0

Industrial Chemistry Option			Clrm hrs/wk
CHSC	408	Ore Analysis	3.0
CHSC	441	Unit Operations	6.0
ELEC	254	Process Measurement	2.0
PETR	403	Process Dynamics	3.0

Option: METALLURGY

Level 3

CHEM	310	Physical Chemistry	5.0
CHEM	314	Analytical Chemistry 1	6.0
CHSC	301	Physical Metallurgy	3.0
CHSC	307	Extractive Metallurgy	6.0
CHSC	341	Unit Operations	6.0
MATH	341	Numerical Methods and BASIC for Chemical Sciences	5.0

Level 4

CHEM	414	Analytical Chemistry 2	6.0
CHSC	404	Physical Metallurgy	6.0
CHSC	407	Extractive Metallurgy	6.0
CHSC	408	Ore Analysis	3.0
CHSC	441	Unit Operations	6.0
ELEC	254	Process Measurement	2.0
MINE	454	Mining Industry for Extractive Metallurgy	2.0

Option: PULP AND PAPER

Level 3

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
CHSC	346	Pulp and Paper	6.0
MATH	341	Numerical Methods and BASIC for Chemical Sciences	5.0

Level 4

CHEM	414	Analytical Chemistry 2	6.0
CHSC	413	Environmental Analytical Methods	3.0
CHSC	421	Pulp and Paper Project	5.0
CHSC	441	Unit Operations	6.0
CHSC	446	Pulp and Paper	6.0
ELEC	254	Process Measurement	2.0
PETR	403	Process Dynamics	3.0

COURSE DESCRIPTIONS

CHEM 101 Applied Chemical Principles 1 - Topics include: stoichiometry, nomenclature, chemical equilibrium, acid-base titrations, pH, buffer solutions, solubility product, atomic structure and bonding. The application of chemical principles to industrial processes is emphasized. The lab work includes gravimetric, volumetric and qualitative analysis.

CHEM 201 Applied Chemical Principles 2 - A continuation of CHEM 101. Topics include: oxidation-reduction titrations, electrochemical cells, electrolysis, electroplating, properties of solids, liquids and gases, colligative properties and the chemistry of select metallic and non-metallic elements. The industrial application of chemical principles is emphasized. This course also contains a unit on laboratory safety which covers the toxicity, storage and disposal of chemicals. The lab work includes qualitative and quantitative analysis. Prerequisite: CHEM 101.

CHEM 204 Chemical Laboratory Techniques - This course emphasizes the safe analysis of natural samples where interfering elements or substances must be removed before the final analysis, with particular emphasis on safety awareness and application. The student will gain experience in: weighing, moisture and ashing; use of the muffle furnace and Parr Bomb; gravimetric separations and analysis; volumetric separations and analysis including acid-base, redox and complexometric determinations; ion exchange separation and analysis; spectrophotometric analysis; physical methods including viscosity and specific gravity measurements and use of the centrifuge. In addition, various solvent extraction, distillation and similar methods will be studied. The course starts with an introduction to sampling procedures. Prerequisite: CHEM 101.

CHEM 309 Organic Chemistry for Chemical Sciences 1 - 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. Prerequisite: CHEM 201 and CHSC 246.

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 physiochemical measurements. Prerequisite: CHEM 201.

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 ore analysis for iron, chromium, tin, copper, arsenic, zinc, sulphur and silica, as well as fire assaying for gold and silver. Prerequisite: CHEM 201.

CHEM 409 Organic Chemistry for Chemical Sciences 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, infrared, ultraviolet and gas chromatography. Prerequisite: CHEM 309.

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 fluorescence and diffraction methods, chromatographic methods (gas and HPLC), electrochemical methods (pH, specific ion, polarography) and trace analysis (electrothermal atomization, hydride generation, etc.). Prerequisite: CHEM 314.

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 100 Computer Applications for Chemical Sciences - An introduction to microcomputer software packages including electronic spreadsheets, databases and graphical methods, with applications to Chemical Sciences Technology.

CHSC 103 Engineering Materials - Physical testing of materials including metals, plastics, wood and wood products, concrete, ceramics and soils. Nondestructive 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 and other B.C. chemical process industries. Lab sessions involve the testing and control procedures utilized in industrial applications.

CHSC 301 Physical Metallurgy - Physical testing of metal: tensile, hardness and impact testing. Crystal structure of metals, cold working and annealing. Iron and steelmaking processes. Phase diagrams. Basic stress analysis.

CHSC 307 Extractive Metallurgy - Is concerned with the unit operations and processes of nonferrous and precious metals, recovery and upgrading from ores and concentrates. Mineral processing covers particle size analysis and sedimentation theory as well as the unit operations of comminution, classification, flotation, gravity separation, and solid/liquid separation. The fundamental principles and processes of hydrometallurgy, pyrometallurgy and electrometallurgy are also covered. 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 - Fluid flow in piping systems; thermodynamic properties of steam; introduction to entropy; thermodynamic gas processes; compressors; psychrometric properties of air; introduction to cooling towers; flow of heat by conduction, convection and radiation; heat transfer coefficients; heat exchangers. Principles and application of equipment for evaporation, distillation, absorption and liquid-liquid extraction. Application of principles to problem-solving is emphasized throughout the course.

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 - Strain measurements, strain gauge and photoelastic methods. Steel structures and heat treatments. Metallography of ferrous materials. Structure and properties of cast irons. Solidification of metals, casting methods. Metal forming methods. Defects in metals. Failure mechanisms and investigation methods. Welding methods and metallurgy. Prerequisite: CHSC 301.

CHSC 407 Extractive Metallurgy - A continuation of CHSC 307. Prerequisite: CHSC 307, CHEM 310.

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 421 Pulp and Paper Project - A project relating to the pulp and paper industry is chosen by each student with assistance from faculty advisors. The project involves both reading and laboratory research. Regular written progress reports and a final report are required. Prerequisite: CHSC 320, 346.

CHSC 441 Unit Operations - See CHSC 341.

CHSC 446 Pulp and Paper - See CHSC 346.

CHSC 448 Industrial Chemistry - A survey course covering major chemical process industries. Lecture material is selected from the following topics: chlorine and caustic production, metal refining, material and energy balances, mineral processing.

ELEC 254 Process Measurement - 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 230 Calculus for Chemical Science - Delta Process. The derivative. Differentiation rules. Implicit differentiation. Related rates. Applied maximum/minimum and error analysis.

MATH 241 Statistics 1 for Chemical Sciences - Organization and graphical presentation of data. Frequency distributions. Measures of central tendency and variation. Introduction to concepts of probability theory. Random variables. Probability distributions. The normal distribution. Sampling, estimation, and basics of hypothesis testing for means and proportions.

MATH 341 Numerical Methods and 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.

MECH 102 Drawing Interpretation - Introduces students to engineering drawings as a method of communication. Students will learn how to read various types of engineering drawings and how to communicate using drawings. Emphasis is on visualization, dimensioning and freehand sketching.

MINE 454 Mining Industry for Extractive Metallurgy - An introduction to mineral and rock identification, nature of ore bodies, mining methods.

PETR 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 - The first term of this introductory level course covers mechanics and wave motion. Mechanics topics include kinematics, vectors, dynamics, energy and circular motion. Wave motion topics include simple harmonic motion, general waves, sound and light. Mathematical treatment requires the use of algebra and trigonometry. The accompanying lab program stresses measurement, data analysis, experimental technique and report writing.

PHYS 214 Physics for Chemical Sciences - The second term of this introductory level course covers electricity and magnetism, heat, fluid mechanics and nuclear physics. Electricity and magnetism include electrostatics, DC circuits, magnetic fields, magnetic induction, AC circuits and semiconductors. Heat includes heat and temperature, heat transfer, ideal gases and thermodynamics. Fluid mechanics includes hydrostatics and hydrodynamics. Mathematical treatment and lab procedures are continuations from the first term. Prerequisite: PHYS 114.

TCOM 101 Introduction to Technical Communication - This course covers basic writing and speaking skills needed for communicating technical information in industry. Students complete writing assignments which are specially prepared for Chemical Sciences Technology. They learn how to organize messages, illustrate documents, define and describe mechanisms and processes, and write memos, letters, and instructions. They also prepare and deliver oral presentations.

TCOM 202 Technical Communication for Chemical Sciences - Students write a resume and job application letter, and prepare for job interviews. They write several short reports, do primary and secondary research to prepare a proposal, practise effective meeting strategies, and give a persuasive oral presentation. Prerequisite: TCOM 101.

Faculty and Staff

J.T. Neilson, B.A.Sc., P.Eng., Associate Dean
W.R. Irvine, B.A., M.Sc., P.Eng.
S. Berghold
J. Berry, B.Sc., Ph.D., Program Head
R. Drouin, Dipl.T.
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.
A. Wilkes, B.A.Sc., M.Sc., P.Eng.
E. Woo, Dipl.T.

Advisory Committee Members

P. Stoddart, Workers' Compensation Board, Chair
P. Beauchemin, Chem-Security Ltd.
N. Brodie, Powertech Labs. Inc.
W. Deverall, Analytical Service Laboratories
D. Dixon, Quanta Trace Laboratories Inc.
A. Donkelaar, NLK-Celpac
W.I. Hughes, Howe Sound Pulp & Paper Ltd.
P. Mussallem
W. Soper, Westcoast Transmission Co. Ltd.

CIVIL AND STRUCTURAL TECHNOLOGY

Diploma Program

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, test 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 project managers or supervisors in engineering, contracting, surveying or architectural companies, or work in design or analysis.

The Program

This diverse and stimulating Diploma 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 areas of the civil and structural technology. These include Geotechnical/ Highways, Water Resources, Construction and Structures.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Degree Transfer/Completion

Graduates of the Civil and Structural Program with 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 high academic standing also obtain good transfer credits to other Canadian Universities such as the University of Waterloo and the University of Calgary.

Accreditation

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.

Prerequisites

High school graduation with English 12, Math 12 and Physics 11 are course requirements for this program. Preference will be given to applicants who have a 'C' grade or better in the prerequisites.

Exemption from the academic requirements may be made in the case of mature applicants with appropriate practical experience.

Program: CIVIL AND STRUCTURAL

			Clrm hrs/wk
Level 1			
CIVL	101	Statics	6.0
CIVL	103	Hydrology	3.0
CIVL	108	Graphical Communication 1	2.0
CIVL	109	Concrete Technology	3.0
MATH	142	Basic Technical Mathematics for Civil & Structural	5.0
PHYS	107	Physics for Civil & Structural	5.0
SURV	130	Surveying for Civil & Structural	3.0
TCOM	101	Introduction to Technical Communication	3.0
Level 2A (10 weeks)			
CIVL	202	Stress Analysis	6.0
CIVL	207	Hydraulics 1	3.0
CIVL	208	Graphical Communication 2	2.0
CIVL	211	Civil Computer Applications	3.0
MATH	242	Calculus 1 and 2 for Civil & Structural	5.0
PHYS	207	Physics for Civil & Structural	5.0
SURV	230	Surveying for Civil & Structural	3.0
TCOM	203	Technical Communication for Civil & Structural	3.0
Level 2B (10 weeks)			
CIVL	203	Elementary Structural Design	6.0
CIVL	207	Hydraulics 1	3.0
CIVL	208	Graphical Communication 2	2.0
CIVL	211	Civil Computer Applications	3.0
MATH	242	Calculus 1 and 2 for Civil & Structural	5.0
PHYS	207	Physics for Civil & Structural	5.0
SURV	230	Surveying for Civil & Structural	3.0
TCOM	203	Technical Communication for Civil & Structural	3.0

Second Year Program Options

Set A - Geotechnical/Highways
Set C - Water Resources
Set D - Construction
Set E - Structures

Set A: GEOTECHNICAL/HIGHWAYS

			Clrm hrs/wk
Level 3 (15 weeks)			
CIVL	304	Structural Design General	6.0
CIVL	308	Hydraulics 2	3.0
CIVL	325	Soil Mechanics 1	6.0
CIVL	417	Highway Design	6.0
MATH	342	Calculus 2 and Linear Algebra	4.0
SURV	330	Surveying for Civil & Structural	3.0
TCOM	302	Advanced Technical Communication for Civil & Structural	2.0
Level 4A (10 weeks)			
CIVL	314	Urban Street Design	3.0
CIVL	315	Subdivision Planning	3.0
CIVL	383	AutoCAD 1 for Civil Engineering	3.0
CIVL	426	Soil Mechanics 2	6.0
CIVL	435	Civil Engineering Construction	3.0
CIVL	460	Construction Contract Law	1.0
MATH	442	Statistics for Civil & Structural	3.0
OPMT	180	Operations Management Fundamentals for Civil & Structural	3.0
SURV	430	Surveying for Civil & Structural	3.0
TCOM	401	Advanced Technical Communication for Civil & Structural	2.0
Level 4B (10 weeks)			
CIVL	410	Asphalt Technology	3.0
CIVL	412	Municipal Services	6.0
CIVL	427	Soil Mechanics 3	6.0
CIVL	435	Civil Engineering Construction	3.0
CIVL	460	Construction Contract Law	1.0
CIVL	499	Projects	3.0
MATH	442	Statistics for Civil & Structural	3.0
SURV	430	Surveying for Civil & Structural	3.0
TCOM	401	Advanced Technical Communication for Civil & Structural	2.0

Set C: WATER RESOURCES

Level 3 (15 weeks)			Clrm hrs/wk
CIVL	304	Structural Design General	6.0
CIVL	308	Hydraulics 2	3.0
CIVL	325	Soil Mechanics 1	6.0
CIVL	417	Highway Design	6.0
MATH	342	Calculus 2 and Linear Algebra	4.0
SURV	330	Surveying for Civil & Structural	3.0
TCOM	302	Advanced Technical Communication for Civil & Structural	2.0

Level 4A (10 weeks)			
CIVL	314	Urban Street Design	3.0
CIVL	315	Subdivision Planning	3.0
CIVL	416	Water Resources	3.0
CIVL	426	Soil Mechanics 2	6.0
CIVL	435	Civil Engineering Construction	3.0
CIVL	460	Construction Contract Law	1.0
MATH	442	Statistics for Civil & Structural	3.0
OPMT	180	Operations Management Fundamentals for Civil & Structural	3.0
SURV	430	Surveying for Civil & Structural	3.0
TCOM	401	Advanced Technical Communication for Civil & Structural	2.0

Level 4B (10 weeks)			
CIVL	383	AutoCAD 1 for Civil Engineering	3.0
CIVL	410	Asphalt Technology	3.0
CIVL	412	Municipal Services	6.0
CIVL	416	Water Resources	3.0
CIVL	435	Civil Engineering Construction	3.0
CIVL	460	Construction Contract Law	1.0
CIVL	499	Projects	3.0
MATH	442	Statistics for Civil & Structural	3.0
SURV	430	Surveying for Civil & Structural	3.0
TCOM	401	Advanced Technical Communication for Civil & Structural	2.0

Set D: CONSTRUCTION

Level 3 (15 weeks)			
CIVL	304	Structural Design General	6.0
CIVL	308	Hydraulics 2	3.0
CIVL	314	Urban Street Design	3.0
CIVL	315	Subdivision Planning	3.0
CIVL	383	AutoCAD 1 for Civil Engineering	3.0
CIVL	419	Highway Design Basic	3.0
MATH	342	Calculus 2 and Linear Algebra	4.0
SURV	330	Surveying for Civil & Structural	3.0
TCOM	302	Advanced Technical Communication for Civil & Structural	2.0

Level 4A (10 weeks)			Clrm hrs/wk
CIVL	325	Soil Mechanics 1	6.0
CIVL	412	Municipal Services	3.0
CIVL	423	Structures 2	6.0
CIVL	435	Civil Engineering Construction	3.0
CIVL	460	Construction Contract Law	1.0
MATH	442	Statistics for Civil & Structural	3.0
OPMT	180	Operations Management Fundamentals for Civil & Structural	3.0
SURV	430	Surveying for Civil & Structural	3.0
TCOM	401	Advanced Technical Communication for Civil & Structural	2.0

Level 4B (10 weeks)			
CIVL	410	Asphalt Technology	3.0
CIVL	412	Municipal Services	3.0
CIVL	426	Soil Mechanics 2	6.0
CIVL	433	Construction Detailing	3.0
CIVL	435	Civil Engineering Construction	3.0
CIVL	460	Construction Contract Law	1.0
CIVL	499	Projects	3.0
MATH	442	Statistics for Civil & Structural	3.0
SURV	430	Surveying for Civil & Structural	3.0
TCOM	401	Advanced Technical Communication for Civil & Structural	2.0

Set E: STRUCTURES

Level 3 (15 weeks)			
CIVL	308	Hydraulics 2	3.0
CIVL	314	Urban Street Design	3.0
CIVL	315	Subdivision Planning	3.0
CIVL	322	Structures 1	6.0
CIVL	383	AutoCAD 1 for Civil Engineering	3.0
CIVL	419	Highway Design Basic	3.0
MATH	342	Calculus 2 and Linear Algebra	4.0
SURV	330	Surveying for Civil & Structural	3.0
TCOM	302	Advanced Technical Communication for Civil & Structural	2.0

Level 4A (10 weeks)			
CIVL	325	Soil Mechanics 1	6.0
CIVL	423	Structures 2	6.0
CIVL	434	Structural Detailing	3.0
CIVL	435	Civil Engineering Construction	3.0
CIVL	460	Construction Contract Law	1.0
MATH	442	Statistics for Civil & Structural	3.0
OPMT	180	Operations Management Fundamentals for Civil & Structural	3.0
SURV	430	Surveying for Civil & Structural	3.0
TCOM	401	Advanced Technical Communication for Civil & Structural	2.0

Level 4B (10 weeks)			Clrm hrs/wk
CIVL	410	Asphalt Technology	3.0
CIVL	424	Structures 3	6.0
CIVL	426	Soil Mechanics 2	6.0
CIVL	435	Civil Engineering Construction	3.0
CIVL	460	Construction Contract Law	1.0
CIVL	499	Projects	3.0
MATH	442	Statistics for Civil & Structural	3.0
SURV	430	Surveying for Civil & Structural	3.0
TCOM	401	Advanced Technical Communication for Civil & Structural	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 needed for watershed analysis and drainage facility design. The fundamental concepts include rainfall intensity, runoff, catchment area, streamflow, mass balance, snowmelt, flood frequency and the hydrologic cycle. The streamflow estimation procedures presented are the rational method, the unit hydrograph and flood frequency analysis. The course content is reinforced through assigned reading, lectures, and problem-solving. Basic observation and estimation skills are developed through field assignments or a small field project.

CIVL 108 Graphical Communication 1 - Graphical communication requires the ability to sketch and knowledge of civil engineering terminology. This introductory course utilizes common engineering and survey conditions to illustrate its application. The ability to produce freehand sketches is developed without the use of conventional drafting equipment. A brief review of formal drafting equipment and techniques establishes the necessary discipline required for sketching and its interpretation by a draftsperson. Sketching ability is developed both in the classroom and in the field and simulates field conditions as often as possible. Terminology is introduced with each lecture and covers site work, excavations, profiles, cut and fill sections, topographical features, open channel flow, drainage facilities, survey layout and calculations.

CIVL 109 Concrete Technology - Provides 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. Students will 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.

CIVL 202 Stress Analysis - 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, are used as examples. Prerequisite: CIVL 202.

CIVL 207 Hydraulics 1 - Prepares students to analyze and design pipe-pump systems for water distribution and other purposes, and to analyze the hydrostatic forces on fixed or floating structures. Topics include fluid properties, hydrostatic pressure and forces, buoyancy and stability of floating and submerged objects, continuity, Bernoulli's equation, energy and hydraulic grade lines, head losses, pump characteristics and selection, cavitation, and basic cost analysis for pipe-pump systems. Topics are taught using lectures, reading, problems and, if possible, laboratory exercise. Prerequisite: CIVL 101.

CIVL 208 Graphical Communication 2 - Builds on the material in CIVL 108, and continues with architectural and structural drawings and details in timber, steel, concrete and masonry. In term 2A, freehand sketching and industry graphics standards are the methods used to introduce students to graphical communication. Term 2B, emphasizes traditional drafting skills rather than freehand sketching.

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 databases. Highway terminology - horizontal/vertical curves. Introduction to Canadian Standards. Prerequisite: CIVL 101, MATH 142.

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 314 Urban Street Design - Through a review of the urban street classification system, the student will determine the basic requirements of a road right-of-way and its relationship to other utilities. In preparing the design of a major road, it will be necessary to understand both vertical and horizontal design elements and the use of cross-sections to correlate these design controls. The concepts of road drainage, intersection design, sidewalks, channelisation and drawing preparation will be discussed. A review of the design process, extent of field information, legal surveys and the preparation of as-constructed drawings will conclude the course.

CIVL 315 Subdivision Planning - Provides the student with an understanding of the planning concepts and restraints for subdivision development at the municipal/city level. Sections of the Municipal Act and local bylaws are reviewed to establish layout criteria, subdivision procedures and rezoning applications. Consideration will also be given to the engineering requirements and concerns of external approving agencies. In preparing an actual subdivision plan, the student will be evaluated based on the city, developer and engineers view points, complete with a preliminary cost analysis.

CIVL 322 Structures 1 - Structural analysis of statically indeterminate structures is introduced using the method of moment distribution. Later, computer methods of structural analysis are illustrated by using the computer program PFRAME. Reinforced concrete design includes design for flexure, shear, deflection and axial loads. Students prepare a reinforced concrete design project which includes preliminary design, structural analysis, design of beams and columns, preparation of engineering drawings, and detailing of reinforcement. 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 pressure diagrams, effective stress, consolidation, shear strength. Prerequisite: CIVL 101, 207, 308.

CIVL 383 AutoCAD 1 for Civil Engineering - (1) Basic CADD commands for controlling elements, views, drawings and files. (2) Project using this knowledge/skills to produce civil/structural drawing and hard copy thereof. (3) Project to make a modified version of drawing as in (2) with radical changes utilizing power of CADD system. (4) Project to utilize data from above drawing for design and quantities take off. Prerequisite: CIVL 101, 211.

CIVL 410 Asphalt Technology - After successfully completing this introductory course, a student will be able 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.

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 design standards and methods are given as needed. The plan includes the waterworks distribution system, sanitary 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 416 Water Resources - Through lectures, problem sessions and field assignments, the student is introduced to a wide range of water resource problems, methods of analysis and solutions. Topics include drainage, flood control, hydroelectric power generation, well hydraulics, irrigation, water supply, sewage, sewerage and coastal engineering. In addition to basics from the course prerequisites, the fundamentals of sedimentation, detention, engineering economics, hydraulic modelling and numerical solution techniques are reviewed. Prerequisite: CIVL 103, 308.

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 207, 211.

CIVL 419 Highway Design Basic - Students will prepare preliminary drawings and a design brief for an actual project in British Columbia. Students will choose an alignment within a corridor and design spiralled curves and a preliminary alignment. Curves will be suitably superelevated. Students will select an appropriate typical section. Existing ground and proposed alignment data will be input into a computer earthworks program. Input files will be adjusted interactively with this program in order to achieve an earthworks balance. The resulting mass haul diagram will be analyzed. Students will prepare a report or series of short reports at various stages during the course.

CIVL 423 Structures 2 - Through analysis and design projects, students continue to achieve appreciation and understanding of structures. Emphasis is placed on formwork design, prestressed concrete, and reinforced masonry. 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 or CIVL 304.

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 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 connections for structural steel beams, columns, and bracing, and to produce the required drawings for steel fabrication.

CIVL 435 Civil Engineering Construction - The organization, cost, and sequence of construction activities for a typical civil engineering project are all interrelated. This course will examine aspects of overall planning, scheduling and cost estimating. With the use of computer software, the student will simulate the concept of project management through application to a typical construction project.

CIVL 460 Construction Contract Law - This is a preliminary course in the area of contract administration. It will introduce the student to the three major types of construction contracts, their specific applications and the contractual relationships between the various parties. The contents of a typical contract document, bonding and claims will be discussed and illustrated through the use of construction scenarios. Prerequisite: TCOM 203.

CIVL 499 Projects - The objective of this course is to allow students to make contacts with the civil engineering/ construction industry, and in conjunction with a company, develop a project. The project should involve the investigation of a current and relevant problem for the company. Interim progress reports should provide full details of the investigation, conclusions and recommendations. Prerequisite: TCOM 203.

MATH 142 Basic Technical Mathematics for Civil & Structural - Quadratic equations and systems of linear equations. Radian measure. Trigonometric functions, solution of triangles, vectors. Irregular areas and volumes. Exponential/logarithmic theory and transformations, common and natural logarithms, logarithmic/semilogarithmic graphs. Variation, straight line equation, curve fitting. Linear programming.

MATH 242 Calculus 1 and 2 for Civil & 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 Calculus 2 and Linear Algebra - 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 & 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, regression and correlation. Time series analysis. Control chart concepts and application, acceptance sampling.

OPMT 180 Operations Management Fundamentals for Civil & Structural - 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.

PHYS 107 Physics for Civil & 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 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 and nuclear phenomena. The lab program stresses measurements, data analysis and experimental techniques.

PHYS 207 Physics for Civil & Structural - See PHYS 107. Prerequisite: PHYS 107.

SURV 130 Surveying for Civil & 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 for Civil & Structural - See SURV 130.

SURV 330 Surveying for Civil & Structural - See SURV 130.

SURV 430 Surveying for Civil & Structural - See SURV 130.

TCOM 101 Introduction to Technical Communication - This course covers basic writing and speaking skills needed for communicating technical information in industry. Students learn how to organize messages, illustrate documents, define and describe mechanisms and processes, and write memos, letters and instructions. Students also prepare and deliver oral presentations.

TCOM 203 Technical Communication for Civil & Structural - Students will write job application letters and resumes and learn about job interviews. They write short progress, incident, trip and inspection reports common to the Civil and Structural field. They also practice oral reporting. Prerequisite: TCOM 101.

TCOM 302 Advanced Technical Communication for Civil & 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 101, 203.

TCOM 401 Advanced Technical Communication for Civil & Structural - In this course, students continue to practise 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 101, 203, 302.

Faculty and Staff

D.C.Deans, B.A., Associate Dean
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.
B. Butler, M.I.C.E., M.I. Struct E., C.Eng., P. Eng.
P. Cunnington, B.Sc., P. Eng.
M.J. Heinekey, B.Tech., Dipl.T., Dipl. Adult Ed., A.Sc.T.
J. McLean, B.Ed., A.Sc.T.
C. Niwinski, M.A. Sc., P. Eng.
C.A. Payne, B.A.Sc., M.A.Sc., P.Eng.
E. Reid, M.I.C.E., C.Eng., P.Eng.
R.C. Starr, B.Eng., M.A.Sc., P.Eng., Chief Instructor

Civil & Structural Technology Advisory Committee

C. Sinclair, Chair, Corporation of Burnaby
N. Atchison, District of Surrey
A. Black, Associated Engineering Services
R. Chapman, Ministry of Transportation and Highways
B. Conlin, Golder Associates Ltd.
K. Fyvie, Terra Engineering Ltd.
D. Halliday, Coast Steel Fabricators
W. Kyle, District of Surrey
T. Mulder, City of Vancouver
T. Pataky, B.C. Hydro
D. Taylor, Dayross Developments Ltd.
B. Wallace, N.D. Lea Consultants Ltd.

COMPUTER SYSTEMS TECHNOLOGY

Diploma Program

Computers are used to store, manipulate, analyze and display vast quantities of information in unlimited combinations of text, images and sound. Information technology is increasingly used in science, industry, health, business, and the arts as a creative and analytical tool. Large mainframe computers, medium-sized minicomputers, and desktop personal computers are commonly used tools, and increasingly connect with communications networks spanning vast distances. Systems analysts define the problem to be solved and design solutions. Programmers give the computer a detailed set of instructions (called a program) to implement the design. These functions are often combined into one job - the Analyst/Programmer. The human element is critical to the success of any computer application.

Job Opportunities

Many graduates begin their careers as junior programmers or junior analyst/programmers and after some experience are promoted to programmers, systems analysts, programmer/analysts or operating systems programmers. Others seek entrepreneurial roles in the computer world as independent business owners, software authors, consultants, or suppliers of systems and equipment. Career opportunities exist in such areas as management, software and hardware sales, technical writing, training others on computers, consulting, knowledge engineering, software development, and technical support.

Application areas include transaction processing (such as order processing, airline reservations, banking systems), accounting functions, sales analysis, forecasting and simulation, database management, engineering, decision support, and communications.

The Program

The first year of the program is a mix of computer-related and general business courses. The computer-related courses use mainframe and microcomputers to introduce: standard techniques of programming using Pascal, C, and COBOL languages; the use of software packages covering word processing, spreadsheets and databases; systems analysis and design. The general business courses include accounting, economics, mathematics, statistics and communications.

In the second year, students specialize in one of the options listed below. Most options are limited in size to about 20 students. Where the number of applicants exceeds the available seats, students are placed using a weighted average of first-year marks.

Second Year Options

Data Communications Systems: Offers specialized courses in the rapidly expanding data communications and computer networking field. Students design and develop programs to implement protocol drivers, file transfer protocols and LAN applications. The UNIX and MS-DOS operating systems are used in depth. Students are given a working knowledge of UNIX networking tools such as TCP/IP and UUCP. Computer simulation and modelling techniques are used to analyze the throughput performance of networks.

Decision Systems: Specializes in scientific systems and computer modelling to assist in decision making. Topics include: UNIX, computer simulation, expert systems, optimization, computer graphics, GIS, OOPS and C++.

Expert Systems: Specializes in the branch of Artificial Intelligence that develops automated systems to capture the skills of human experts. Students design and implement prototype expert systems on micro and mainframe computers. Students learn LISP, PROLOG, and a variety of expert system shell packages.

Information Systems: Provides a specialization involving system development in the information processing environment, with a special emphasis on management information systems (MIS) and software engineering for medium and large computer systems.

Microcomputer Systems: Specializes in microcomputer technology, microcomputer systems programming, micro-based systems design and micro applications software, including networks and graphical user interface systems.

Program Length

Two years full-time beginning in September each year.

Tuition Fees(subject to change)

$3,631 for the two-year program (1992/93).

Prerequisites

Candidates are evaluated on an individual basis. We encourage applications from all interested persons regardless of their formal qualifications. The following prerequisites normally ensure acceptance into the program, provided space is available.

First-Year Entry

Completion of at least 6 grade 11 or 12 academic courses (Arts and Sciences), a C+ average for Grade 12, C+ in both English 12 and Math 11, and C+ in Computer Studies 11 or Computer Science 12.

Students who graduated from high school more than three (3) years ago may be eligible to apply as Mature Students (see Admissions information). All students must demonstrate competency equivalent to at least English 12 (C+), Math 11 (C+), and Computer Programming (C+).

In certain circumstances, applicants may be required to write a programmer's aptitude test.

A specific requirement is Math 12 for the Decision Systems Option.

Second-Year Direct Entry

Qualified applicants are accepted for direct entry into the second year of the program provided they have completed the equivalent of the first year of the program. First-year equivalency may be obtained through any combination of courses from other post- secondary institutions, BCIT part-time courses, and, in some cases, work experience. Direct Entry applicants should apply well in advance since seat availability is limited, and should consult with the Program Head (C.S.T.) to ensure they meet equivalency standards.

Accreditation

The Computer Systems Technology 2-year Diploma Program has been accredited by the Canadian Information Processing Society (C.I.P.S.) and by the Data Processing Managers Association (D.P.M.A.).

Advanced Diploma/Bachelor of Technology

In addition to the two-year Computer Systems Technology diploma program, an Advanced Diploma in Computer Systems Technology is offered through Part-Time Studies. A Bachelor of Technology (Computer Systems) is also offered by the B.C. Open University in collaboration with BCIT. For details, please contact the Director of Part-Time Studies, School of Engineering Technology.

Additional Information

Applicants should enjoy using a logical and systematic approach in solving problems. Because students spend many hours at computer terminal keyboards, we strongly recommend that they be able to touch type. Ownership of a suitable personal computer (PC) may enhance performance in the program. Consult the department for further details.

The Computer Systems curriculum is under continual review to ensure currency. Current courses may therefore vary from this calendar. New course information may be obtained from the Computer Systems Technology Office or from Student Services.

Program: COMPUTER SYSTEMS

Level 1		Clrm hrs/wk
ADMN 101	Economic Issues	3.0
BCOM 103	Business Communication for Computer Systems	3.0
COMP 153	Programming Methods and Pascal	7.0
COMP 174	Computer Applications Fundamentals	6.0
FMGT 101	Accounting 1	4.0
MKTG 102	Essentials of Marketing	3.0
OPMT 113	Applied Math	4.0

Level 2		
BCOM 203	Business Communication for Computer Systems	4.0
COMP 252	Computer Organization and Architecture	4.0
COMP 257	Programming C	4.0
COMP 258	Programming COBOL	4.0
COMP 270	Systems Analysis and Design	5.0
FMGT 201	Accounting 2	4.0
OPMT 133	Statistics in Industry	4.0

Level 3	Info	Dec	Micro	DCom	Exp
ADMN 220 Organizational Behavior	3	-	-	-	-
COMP 280 Introduction to Decision Systems	3	3	3	3	3
COMP 350 Application Programming COBOL, Assembler	6	-	-	-	-
COMP 351 Microcomputer Systems and Applications 1	-	-	5	-	-
COMP 353 Software Engineering	5	-	-	-	-
COMP 356 Applications Programming: C, PC Assembler	-	6	6	6	6
COMP 357 Introduction to Expert Systems	-	-	-	-	5
COMP 370 Relational Database Systems	4	4	4	4	4
COMP 381 Decision Systems 1	-	8	-	-	-
COMP 386 Data Communications/ Networks	-	-	-	5	-
COMP 392 Computer Projects 1	5	5	5	5	5
COMP 471 Data Communications	3	3	3	3	3
ELEC 261 Introduction to Computer Hardware	-	4	4	4	4

Level 4A (first 10 weeks of the term)

	Info	Dec	Micro	DCom	Exp
ADMN 483 Computers and the Law	3	3	3	3	3
COMP 352 Operating Systems Concepts	5	5	5	5	5
COMP 451 Microcomputer Systems and Applications	2	-	-	8	- -
COMP 453 Selected MIS topics	4	-	-	-	-
COMP 457 Advanced Expert Systems	-	-	-	-	8
COMP 460 Application Programming: PL/I, CICS	4	-	-	-	-
COMP 461 Advanced Topics in Programming	16	6	6	6	6
COMP 481 Decision Systems 2	-	8	-	-	-
COMP 486 Data Communications / Networks 2	-	-	-	4	-
COMP 492 Computer Projects 2	5	5	5	5	5
COMP 493 Practicum	-	-	-	4	-

Level 4B (second 10 weeks of the term)

	Info	Dec	Micro	DCom	Exp
ADMN 483 Computers and the Law	3	3	3	3	3
COMP 451 Microcomputer Systems and Applications 2	-	-	8	-	-
COMP 452 Operating Systems Applications	-	-	4	4	4
COMP 453 Selected MIS topics	4	-	-	-	-
COMP 456 AS/400 Principles of Operation	4	-	-	-	-
COMP 457 Advanced Expert Systems	-	-	-	-	8
COMP 460 Application Programming: PL/I, CICS	4	-	-	-	-
COMP 462 Advanced Topics in Programming 2	-	6	6	6	6
COMP 466 AS/400 Programming (RPG)	6	-	-	-	-
COMP 472 Software Engineering and CASE	4	4	4	4	4
COMP 481 Decision Systems 2	-	8	-	-	-
COMP 486 Data Communications/ Networks 2	-	-	-	4	-
COMP 492 Computer Projects 2	5	5	5	5	5
COMP 493 Practicum	-	-	-	4	-

COURSE DESCRIPTIONS

ADMN 101 Economic Issues - Enables students to critically assess current economic issues and policies in Canada. At the end of the course,students will understand the relationships of the major economic sectors: consumers, investment, government, financial institutions, and exports/ imports in the foreign sector. In particular students will be informed on current events such as the Goods and Services Tax (GST) and Free Trade Agreement (FTA) in general and about the potential data gathering and analyses implicit for some industries because of these events.

ADMN 220 Organizational Behavior - Studies factors that either influence or are influenced by people at work. The course focuses 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 emphasis on understanding how to deal with common legal problems in the computer field.

BCOM 103 Business Communication for Computer Systems - Teaches basic communication theory and the principles of effective business writing. Students apply these principles to informational and persuasive memos and letters. The term includes an informational oral presentation. Assignments are specific to the computer industry.

BCOM 203 Business Communication for Computer Systems - Continues BCOM 103. This course teaches strategies for writing a variety of informational and analytical reports, getting a job, interviewing clients, holding productive meetings, and making persuasive oral presentations. The term includes a 15-hour block on preparing effective and readable manuals for the end-users of computer systems and programs. The major assignment for the term involves an oral and written proposal to clients for a new system. Prerequisite: BCOM 103.

COMP 153 Programming Methods and Pascal - Complements COMP 174 and is a prelude to all future systems and programming courses. The course introduces modern principles of programming methodologies emphasizing structured programming, modularization and the top-down approach to problem-solving. Pascal is used as the language for illustration. Students are taught to write programs that are readable, well structured, and easy to maintain. Standard data structures and algorithms are introduced.

COMP 174 Computer Applications Fundamentals - Addresses computer fundamentals and personal productivity. Opens with a review of computer literacy basics (hardware and software). Addresses basic productivity tools such as MS-DOS, text editing, word processing, spreadsheets, database management, and communications. Covers business information systems, particularly the key operations and standard financial applications. Introduces the student to advanced productivity tools: time management, desktop publishing, and power programming. Includes extensive hands-on lab work on both the PC and the mainframe, related to lecture material.

COMP 252 Computer Organization and Architecture - Examines in detail the workings of PC DOS and the way the system interfaces with users, application languages, and hardware. The components of a microcomputer, including CPU characteristics, memory addressing, and instruction sets are studied. The course also introduces assembly language and debugging issues. Focuses on direct control of microcomputer devices. Prerequisite: COMP 153,174.

COMP 257 Programming C - Studies the philosophy of C as the basis of explaining the apparent power and freedom in C programming. Basic C syntax, input/output, functions and advanced data structures are covered. Pointers are studied in detail. The C environment and the concept of reusable functions are emphasized. Prerequisite: COMP 153,174.

COMP 258 Programming COBOL - Introduces the COBOL language. Uses the structured, modular programming techniques developed in COMP 153 to solve practical business problems. Topics include subroutines, record and file processing, tables, business reports, and data validation. Prerequisite: COMP 153, 174.

COMP 270 Systems Analysis and Design - Continues the material covered in COMP 174. Areas include: systems development life cycle, starting project, 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. Prerequisite: COMP 153, 174; FMGT 101, BCOM 103, OPMT 113.

COMP 280 Introduction to Decision Systems - Gives 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. Prerequisite: OPMT 133.

COMP 350 Application Programming COBOL, Assembler - Continues COMP 258. Completion of COBOL language. Introduces the Assembler programming language, IBM Job Control Language and VSAM files. Students write several programs incorporating a variety of programming techniques. Prerequisite: COMP 258.

COMP 351 Microcomputer Systems and Applications 1 - Provides students with a sound technical knowledge of the IBM PC and it's operating system, and a thorough knowledge of networks, including setup, administration and NetBIOS programming. Students gain significant depth and breadth in a microcomputer software development environment, and develop specific expertise in at least one significant applications package. Prerequisite: COMP 252, 257.

COMP 352 Operating Systems Concepts - Covers topics related to the management of computer resources by an operating system (software) and supporting hardware. Topics include processor management and scheduling, memory management and input/output management. Prerequisite: COMP 252, 257, 258.

COMP 353 Software Engineering - Covers principles and techniques of software engineering, including software life cycle models, productivity measures, planning and project control, software testing methods, specification methods, modularity constraints, design methods, implementation requirements, software maintenance, software portability and reusability. Prerequisite: BCOM 203, COMP 270.

COMP 356 Applications Programming: C, PC Assembler - Builds on previous programming courses. Explores algorithm, file organization, program and system development using the C language. Some emphasis is placed upon developing efficient systems (i.e., making best use of system resources). Examines alternative algorithms, profiling and tuning techniques, and the use of assembly language to improve performance. Prerequisite: COMP 252, 257.

COMP 357 Introduction To Expert Systems - Gives students proficiency in the LISP language for use as an Expert System development tool in COMP 457. Once the basic syntax and features of the language have been covered, the course focuses on LISP application areas, in particular those suitable for Expert Systems work. Prerequisite: Successful completion of First Year or permission of the instructor.

COMP 370 Relational Database Systems - Covers relational database technology, including basic characteristics; relational algebra; entity-relationship charts; data analysis and design; dependencies; anomalies and normalization; query languages (SQL); loading, retrieval and updating; data dictionary; creating and using views; report writer. Students design, load, and update a relational database. Prerequisite: COMP 270.

COMP 381 Decision Systems 1 - The development of computer and non-computer models that 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 C. Prerequisite: Successful completion of first year or permission of the instructor.

COMP 386 Data Communications/Networks 1 - Covers the data communications topics Local Area Networks (theory, installation, administration); basic data communications programming (BIOS, handling serial interrupts, simple protocols); and data communications hardware. This course is required for the Data Communications Option. Prerequisite: Successful completion of first year CST or permission of the instructor.

COMP 392 Computer Projects 1 - Allows students to work on projects of their choice within guidelines specified by faculty. The projects are drawn from a variety of sources, especially from industrial situations, and may require extensive contact with the business community. Students work in teams and seek advice from a faculty member acting as their project supervisor. Some of the projects continue through both terms, whereas others end in COMP 392 and new ones start in COMP 492. Prerequisite: BCOM 203, COMP 252, 257, 258, 270.

COMP 451 Microcomputer Systems and Applications 2 - Addresses software development practices, and advanced software design and development in event-driven graphical user interface (GUI) environments (OS/2 and Windows). Prerequisite: COMP 351, 356.

COMP 452 Operating Systems Applications - Provides hands-on experience at the operating system level, pertinent to the student's option. Depending on the option, topics may include exposure to the AS/400 or to Unix in a workstation environment (Sun). Prerequisite: COMP 352 and permission of the instructor (as topics may change, consult program head).

COMP 453 Selected MIS Topics - Covers current technology in Information Systems including management planning; computer resources; physical and data security; data compression; data encryption; benchmarks; introduction to data analysis and modelling. Students participate in case studies based on articles from current technical journals. Prerequisite: COMP 353.

COMP 456 AS/400 Principles of Operation - Gives an overview of principles of AS/400 operation. Discusses AS/400 tools, utilities and design alternatives. Prerequisite: COMP 352.

COMP 457 Advanced Expert Systems - Stresses Expert Systems project development techniques. The PROLOG language is taught as the course progresses, and students use LISP, PROLOG, or Expert Systems shell packages to develop major projects. Prerequisite: COMP 357.

COMP 460 Application programming: PL/I, CICS - Provides an accelerated PL/I course for students with a strong knowledge of COBOL. Students very quickly progress to writing fairly sophisticated programs involving the use of CICS for on-line programming. The final project in this course involves designing and coding a major on-line system. Prerequisite: COMP 350.

COMP 461 Advanced Topics In Programming: Object-Oriented Programming - Introduces the major principles behind the OOPS paradigm including data abstraction, class hierarchies and inheritance, encapsulation, message passing, polymorphism, etc. Students acquire experience with typical OOPS' such as Smalltalk, Actor, C++ and object-oriented extensions to popular microcomputer-based languages such as Pascal and C. Prerequisite: COMP 350/356

COMP 462 Advanced Topics In Programming 2 - Covers contemporary topics in programming pertinent to the student's option. Depending upon the option, it may cover specialty languages, advanced applications, or advanced topics in programming. Prerequisite: COMP 350/356.

COMP 466 AS/400 Programming (RPG) - Covers AS/400 programming including CL language, RPG/400 batch and on-line programming, screen and file handling. Prerequisite: COMP 350, 356.

COMP 471 Data Communications - Covers basic concepts and terminology related to data communications and computer networking (DC/CN). Includes principles of DC/CN protocols at physical, datalink, and application theory related to data transmission to interconnect PC-based systems via serial and parallel ports, modems, mainframe emulators, and LAN's. Students write simple communications drivers, use available DC packages and evaluate this software. Prerequisite: COMP 252, 257.

COMP 472 Software Engineering and CASE - Features software engineering practices and computer-aided software engineering (CASE). Includes the CASE software development environment; software methodologies; code generation; categories of CASE tools; implementation considerations; CASE software life cycle; software reusability; software re-engineering. Students develop a project using CASE software tools. Prerequisite: COMP 370.

COMP 481 Decision Systems 2 - Covers systems that 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. Prerequisite: COMP 381.

COMP 486 Data Communications / Networks 2 - Covers the topics advanced data communications programming (Advanced Protocols, NetBIOS); network design and performance analysis; and UNIX programming for data communications. This course is required for the Data Communications option. Prerequisite: COMP 386.

COMP 492 Computer Projects 2 - See COMP 392. Prerequisite: BCOM 203, COMP 252, 257, 258, 270.

COMP 493 Practicum - An advanced laboratory course which allows students to work on highly specialized technical projects within guidelines established by faculty. The nature of the practicum may vary depending upon hardware/ software and faculty resources. Projects will be assigned in one or more technical areas such as data communications, graphics, scientific programming, or advanced engineering applications. Within the guidelines established by faculty, students will conceive, design and implement a major software product. Prerequisite: COMP 386.

ELEC 261 Intro to Computer Hardware - This course, which has a prerequisite of one high level language, Basic, C, or Pascal, introduces the computing science student to the world of computer hardware through interface programming. Starting with D-C circuit analysis, Ohms law, Kirchhoff's laws and transistor operation. The course moves through the basic logic building blocks: logic gates, flip-flops, counters, address decoding. Also covered are the analog functions of multiplexing, digital-to-analog conversion and analog-to-digital conversion. Prerequisite: COMP 257.

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 an introduction to accounting theory; income measurement; traditional record-keeping procedures; the accounting cycle; special journals; cash; merchandising operations; inventory estimation and costing.

FMGT 201 Accounting 2 - The follow-up to FMGT 101, topics include notes and accounts receivable, long-lived assets, liabilities, partnerships and corporations, cash-flow, manufacturing accounting, management accounting, consolidated statements, and analysis of financial statements. Prerequisite: FMGT 101.

MKTG 102 Essentials of Marketing - Provides the student with an overview of the marketing concept and how it can be applied to any type of organization or service. Material includes the controllable and uncontrollable elements of marketing, strategy planning, market characteristics, marketing research techniques, market segmentation and target market selection.

OPMT 113 Applied Math - The first portion of the course includes 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 - Provides 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.

Faculty and Staff

K. Takagaki, B.A., Ph.D., C.M.A., C.D.P., Associate Dean
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B. Steele, President and Chief Operating Office,
Westech Information Systems Inc.
E. Will, Managing Director, LGS Group Inc.

ELECTRONICS TECHNOLOGY

Diploma Program

Microcomputers, electrical power transmission and distribution, industrial automation and control, telecommunications and microchips form the base of modern high technology. These disciplines and the related systems and equipment are essential to the factory, electrical power utilities, the industrial process, rapid transit systems, the office, the small business, the hospital and the home.

Job Opportunities

There is a need for people trained in the principles and applications of electronics to take their places in the technical team in design, development, production, installation, sales and technical support, as design assistants with engineering consulting firms such as H.A. Simons or Fransen Engineering; as designers with factory and mill automation control equipment with companies such as Kita Engineering; to provide process automation and DCS systems hardware and software support with companies such as Norpac Controls; as distribution designers or protection and control technologists with utilities such as BC Hydro; as electronics technologists and designers with high tech companies such as Nexus Engineering, Epic Data, and Dynapro Systems; as electronics communication specialists with government agencies such as the RCMP, B.C.Tel, and the Dept. of Communications; as sales and field engineering representatives for companies such as ASEA, General Electric or Westinghouse; or as part of the teaching team in educational institutions. The Technologist graduate of the Electronics Technology program is an essential member of many high tech teams.

The Program

Electronics Technology offers students the flexibility of an equal-term, multiple-intake system, with course-by-course registration, and the option of enrolling in two terms of academic study per year, starting in September and January. All terms run concurrently, thus a student can start a program in September or in January. It takes four terms of academic study to reach graduation, thus a student who starts a program in September of one year can graduate 21 months later. A student who enrolls in the Coop program would take longer. Although students are encouraged to take six courses per term, as listed below, course-by-course registration makes it possible for students with special needs to carry a reduced course load; they would of course then take longer to reach graduation.

The Options

Four options are offered in the Technology: **Computer Control Electronics, Power(Electrical), Process Automation and Instrumentation,** and **Telecommunications.**

The first two levels of the program are common to all four options. Levels 3 and 4 for all four options are oriented towards current industrial practices. Throughout Levels 3 and 4, students spend a good portion of their time in laboratories and workshops carrying out practical, applied assignments.

The Computer Control Electronics Option presents a broad-based electronics program with special emphasis on the hardware and software of computer systems. It is designed to provide the necessary background for entry into a wide variety of areas in the electronics industry. The main topics are: digital electronics; applications software (CAD, etc.); telecommunication principles; troubleshooting and design (hardware and software) of microprocessor and microcontroller systems; inter CPU networking protocols; industrial electronics and PLC's; video fundamentals and applications; programmable logic devices, logic simulation and ASIC design. Offered January - May and September - January.

Students enter the **Power (Electrical) Option** in the 4th term after completing the 3rd term of the Computer Control Electronics option or after graduation from any other option. This final term is concentrated in five main areas: programmable controllers (PLC's), electrical equipment, utility power systems, industrial power systems and industrial electronics. From the basic three-phase power and machine theory learned in Term 3, students advance to the theory and practice of power system analysis and protective relaying. From the electronics theory learned in Term 3, students advance to switching power supplies, thyristor AC and DC power control and variable frequency supplies. Students will apply feedback theory in the design of voltage and motor speed control systems. The Power Option is offered in the January to May term only.

The Process Automation and Instrumentation 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. Programmable logic controllers (PLCs), microprocessor-based configurable controllers, distributed control systems (DCS) and the application of each are included in this study of current automation technology. Offered January-May and September-January.

The Telecommunications Option prepares the student for a career in the telecommunications industry. Building on the knowledge and skills gained in Terms 1 and 2, it covers the principles of telecommunications and from these principles develops complete telecommunications systems. These systems vary all the way from broadcast entertainment radio and TV, through marine and land mobile radio, to high-density, long-haul microwave radio systems. Also included are fiber optic links, digital data transmission systems, satellite communication systems, radio-navigational aids, and digital and computer control of communications equipment and systems. Offered January - May and September to January.

Cooperative Education

Cooperative Education,which provides paid work experience, can be an integral part of the Electronics Technology program. Students who successfully complete a minimum of two and a maximum of three work periods receive a Cooperative Education Endorsement on their Diplomas of Technology. The paid work periods with an employer in the Electronics industry are of three or four months, and are interleaved between terms of academic study after Term 2. The industrial experience gained in the Coop component of the program makes a student more immediately valuable to prospective employers. See page 20 for a full description of the Cooperative Education program.

Program Length

See the program/option descriptions for program length and entry.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Accreditation

The Electronics Technology program is accredited by the Applied Science Technologists and Technicians of British Columbia.

Degree Transfer/Completion

Transfer credits from the Electronics Technology program to British Columbia universities and to Lakehead University in Ontario are possible on an individual basis.

Prerequisites

High school graduation with Math 12 and Physics 11 both with C+ and English 12 with C. Preference will be given to applicants with Physics 12 **or** Engineering Technology Entry Program (6 months). The prerequisites for entry into individual courses are listed with the course descriptions. In addition to these, the student must have completed TCOM 114 before entering any Level 3 or Level 4 course, or before entering the Coop program.

Program: ELECTRONICS

Level 1		Clrm hrs/wk
ELEX 100	Circuit Analysis 1	6.0
ELEX 101	Electronic Manufacturing Processes	5.0
ELEX 102	Digital Techniques 1	5.0
MATH 143	Basic Technical Mathematics for Electronics	7.0
PHYS 106	Physics for Electronics Technology	6.0
TCOM 114	Technical Writing for Electronics	3.0
	Library, Research, Evaluation	3.0
Level 2		
ELEX 200	Circuit Analysis 2	5.0
ELEX 201	PASCAL for Electronics	4.0
ELEX 202	Digital Techniques 2	6.0
ELEX 203	Electronic Circuits 1	7.0
MATH 243	Calculus for Electronics	6.0
PHYS 206	Physics for Electronics Technology	4.0
	Library, Research, Evaluation	3.0
Coop 1		
ELEX 390	Coop 1	

Options: COMPUTER CONTROL ELECTRONICS; POWER (ELECTRICAL)

Level 3		3A	3B
ELEX 302	Microprocessor Systems 1	6.0	6.0
ELEX 303	Electronic Circuits 2	6.0	6.0
ELEX 307	Pulse Techniques	5.0	5.0
ELEX 311	Applications Software	5.0	5.0
ELEX 325	Electrical Equipment	5.0	-
ELEX 334	Telecommunication Principles	-	5.0
MATH 343	Transform Calculus for Electronics	-	4.0
OPMT 149	Small Business Fundamentals	4.0	-
	Library and Research	4.0	4.0
Level 4	**Computer Control Electronics**	**4A**	**4B**
ELEX 406	Data Communication	6.0	6.0
ELEX 411	Programmable Logic Devices	4.0	-
ELEX 416	Microcontroller Systems	-	6.0
ELEX 414	Applied Electronic Circuits	7.0	5.0
ELEX 415	Industrial Electronics and PLC's	7.0	7.0
ELEX 419	Technical Project (Control)	4.0	-
TCOM 214	Technical Writing for Electronics	3.0	3.0
	Library and Research	2.0	4.0
Level 4	**Power (Electrical)**		
ELEX 415	Industrial Electronics and PLC's	7.0	7.0
ELEX 421	Industrial Systems	8.0	6.0
ELEX 424	Power Systems	7.0	6.0
ELEX 425	Electrical Equipment and PLC's	8.0	8.0
ELEX 429	Technical Project (Power)	-	4.0
TCOM 214	Technical Writing for Electronics	3.0	3.0
	Library and Research	1.0	-

Option: PROCESS AUTOMATION AND INSTRUMENTATION

Level 3		Clrm hrs/wk 3A	3B
CHEM 302	Electronic Sensors for Analytic Measurements	4.0	4.0
CHSC 343	Thermodynamics and Fluid Mechanics	4.0	-
ELEX 302	Microprocessor Systems 1	6.0	6.0
ELEX 341	Data Acquisition and Signal Conditioning	6.0	6.0
ELEX 342	Sensors for Measurement and Control	6.0	6.0
ELEX 343	Process Control Devices and Techniques	6.0	6.0
MATH 343	Transform Calculus for Electronics	-	4.0
	Library and Research	3.0	3.0
Level 4		**4A**	**4B**
ELEX 441	Microprocessors for Measurement and Control	6.0	6.0
ELEX 442	Analyzers for Process Automation	5.0	5.0
ELEX 443	Strategies for Industrial Process Control	6.0	6.0
ELEX 444	PLC's and Distributed Control Systems	6.0	6.0
ELEX 445	Industrial Control Projects and Computer Aided Design (CAD)	5.0	5.0
TCOM 214	Technical Writing for Electronics	3.0	3.0
	Library and Research	3.0	3.0

Option: TELECOMMUNICATIONS

Level 3		3A	3B
ELEX 302	Microprocessor Systems 1	6.0	6.0
ELEX 307	Pulse Techniques	5.0	5.0
ELEX 331	Telecommunications Circuits and Systems 1	6.0	6.0
ELEX 332	Antennas and Transmission Lines	5.0	5.0
ELEX 333	Electronic Circuits 2 (Telecom)	5.0	5.0
MATH 343	Transform Calculus for Electronics	4.0	-
OPMT 149	Small Business Fundamentals	-	4.0
	Library and Research	4.0	4.0
Level 4		**4A**	**4B**
ELEX 406	Data Communication	6.0	6.0
ELEX 413	Microcontroller Applications	6.0	-
ELEX 431	Telecommunication Circuits and Systems 2	6.0	6.0
ELEX 436	Switching Networks and Fiber Optics	2.0	5.0
ELEX 437	Microwave Principles and Systems	4.0	4.0
ELEX 438	Radio Frequency Circuit Design	5.0	5.0
ELEX 439	Technical Project (Telecom)	-	3.0
TCOM 214	Technical Writing for Electronics	3.0	3.0
	Library and Research	3.0	3.0

COOP 2
(For all Options after completion of Term 3)
ELEX 490 Coop 2

COOP 3
(For all Options, if desired)
ELEX 495 Coop 3

COURSE DESCRIPTIONS

CHEM 302 Electronic Sensors for Analytic Measurements - Teaches the student the principles and applications of electronics and circuitry used in the process analysis of liquids and gases. Topics include electro-chemical principles and terminology, selection of transducers, electrolytic conductivity, specification 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. Prerequisite: ELEX 200, 203.

CHSC 343 Thermodynamics and Fluid Mechanics - Before suitable measurement and automatic process control strategies can be designed and implemented, a detailed knowledge of the behavior of that process is required. CHSC 343 fills that requirement by introducing the student to the static and dynamic properties of common industrial processes. Topics include transportation of fluids and fluid dynamics as well as an introduction to thermodynamics including heat transfer and energy balance equations. Prerequisite: MATH 243, PHYS 206.

ELEX 100 Circuit Analysis 1 - Teaches the principles and methods of analysis related to DC circuits. Topics include SI units and terminology, voltage, current, work, energy, power and resistance. Series, parallel, and series-parallel circuits are analyzed and designed. Methods of analysis for more complex circuits include mesh, superposition, nodal, Thevenin, and Norton. Transients in RC and RL circuits are analyzed. Average and RMS values for sinewaves and rectangular waves are calculated. Labs are synchronized with lectures so that theory is studied and confirmed by application.

ELEX 101 Electronic Manufacturing Processes - Through the design and manufacture of specific electronic projects, students learn the skills required to do basic soldering, printed circuit repair and rework, high reliability soldering, design and fabrication of single and double-sided printed circuit boards. Upon successful completion, the student will be able to demonstrate a good understanding of the components used in the manufacture of electronic equipment, chassis and metal cabinet design, electronic drafting conventions, tools and techniques used in electronic fabrication, printed circuit design and manufacturing methods, tools used for PWB repair, high reliability soldering requirements, repair of heat and mechanically damaged PC boards, as well as techniques required in the design and manufacture of single and double-sided printed circuit boards.

ELEX 102 Digital Techniques 1 - Begins with a description of the fundamental theory of the decimal and binary number systems, then examines the binary (two states or levels) concept followed by the description of binary variables as related to mechanical switches. Digital logic circuits are discussed and their truth tables and Boolean output equations are generated. Various logic sources are defined and interfaced to combinational logic circuits comprised of electronic logic gates. A TTL data book will be utilized to facilitate combinatorial logic circuit design. Boolean identities and Karnaugh mapping will be used to minimize algebraic expressions. Combinational digital logic will be designed and constructed implementing NAND and NOR GATES using their proper Demorgan's equivalent symbols (Duality of Gates). Encoders and decoders will be introduced. Upon successful completion of this course, the student will be able to correctly use the standard logic symbols and apply proper gating techniques to the analysis and construction of basic logic circuits from word problems or in the laboratory environment.

ELEX 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, analysis of AC circuits with complex algebra; resonance and resonant circuits; highpass and lowpass filters; the application of circuit laws and theorems to single-phase AC circuits; and coupled circuits. The circuit theory is verified using multimeters, sine wave generators, and dual trace oscilloscopes. Prerequisite: ELEX 100, MATH 143.

ELEX 201 PASCAL for Electronics - An introductory course in microcomputer use, DOS operating system, programming languages, compilers and interpreters. The IBM personal computer is used throughout this course for interactive student training. The main part of the course covers PASCAL programs for engineering applications. Students will also learn to document and debug software, and to utilize available software libraries. Prerequisite: ELEX 100* (*may be taken concurrently).

ELEX 202 Digital Techniques 2 - Builds on the knowledge gained in ELEX 102. Studies the utilization of logic gates in larger combinatorial circuits such as magnitude comparators, etc.; digital arithmetic and associated hardware; sequential logic devices such as D, J-K, and T; flip-flops, counters, shift registers and their application in systems such as frequency counters and parallel/serial data manipulation circuits; gathering and comprehension of electrical specifications from data books; noise margins; propagation delay and loading considerations; inter-facing techniques to discrete devices, analog and digital data multiplexing, bus structures and techniques. Successful completion will lead to entry in ELEX 302. Prerequisite: ELEX 102, 203*, TCOM 114 (*may be taken concurrently).

ELEX 203 Electronic Circuits 1 - This course is an introductory electronic circuits course that provides the foundation for subsequent electronics courses in all options. Explains how electronic circuits work, how to analyze, design, modify and combine them to perform complex functions. Laboratory work emphasizes logical circuit layout and wiring and the use of common test equipment to analyze and troubleshoot electronic circuits. Prerequisite: ELEX 200*, MATH 143, PHYS 106 or 108, TCOM 114 (*may be taken concurrently).

ELEX 302 Microprocessor Systems 1 - Applies knowledge gained in ELEX 102/202 to perform a detailed study of a microcomputer system. This includes data bussing and addressing schemes, memory devices, internal architecture of a microprocessor, machine/assembly language programming, an operating system and software development tools, A/D and D/A converters, peripheral and support IC's and interrupts. Throughout the course, a single board microprocessor system is used to facilitate a detailed analysis of microprocessor software and hardware. Prerequisite: ELEX 201, 202, 303* or 333*, or 341* (*may be taken concurrently).

ELEX 303 Electronic Circuits 2 (Control) - A continuation of ELEX 203. Begins with the differential amplifier and its small signal analysis and performance. This material forms an introduction to linear integrated circuits, particularly the operational amplifier and its circuit applications. These include an introduction to active filters, comparators, sine wave oscillators, and simple function generators. Other circuits include digital/analog and analog/digital converters and output stages. Prerequisite: ELEX 200 or 208, 203, MATH 243.

ELEX 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, phase locked loops, and switching power supplies. Both discrete transistors (bipolar and FET) and CMOS integrated circuits are used in building these circuits. Each circuit is analyzed in detail and its practical application is considered. Prerequisite: ELEX 200, 202, 203, MATH 243.

ELEX 311 Applications Software - Introduces various PC-based software packages and their use as development tools. Types of software used include the following general categories: an electronic spreadsheet, printed circuit board layout, logic circuit design and simulation, computer-aided drafting, word processing, and various disk and memory utilities. Throughout the course the student will be encouraged to become self-sufficient at using the software through experimentation, accessing reference manuals, and practical assignments. Prerequisite: ELEX 101, 201, 202.

ELEX 325 Electrical Equipment - Begins with the problem of power factor correction which is solved using techniques learned in circuit analysis. Continues with an introduction to electrical protection, transformers, three-phase power and rotating machinery. Prerequisite: ELEX 200, MATH 243, PHYS 106.

ELEX 331 Telecommunication Circuits and Systems 1 - The most common circuits used in transmitting and receiving apparatus will be studied by close examination of popular circuit configurations. Of special interest will be circuits used for Amplitude, Frequency and Analog Phase modulations. The make-up of an information signal will be discussed. The need for modulation and the types of modulation and their advantages will be fully studied. The principles defined within this course will apply to most communications systems regardless of transmission medium. Prerequisite: ELEX 200 or 208, 202, 333*, MATH 243 (*may be taken concurrently).

ELEX 332 Antennas and Transmission Lines - Examines the methods and devices used for the transmission of radio frequency energy. Topics include the characteristics and limitations of open-wire and coaxial lines; design of matching networks; waveguides; dipole antennas; loop antennas; antenna arrays; microwave antennas; propagation using ground waves, sky waves and space waves. Prerequisite: ELEX 331*, PHYS 206 (*may be taken concurrently).

ELEX 333 Electronic Circuits 2 (Telecom) - Provides further knowledge of electronic circuits with emphasis on their application in telecommunications. Topics include small-signal tuned amplifiers; control of gain; stability of tuned amplifiers; wideband amplifiers; operational amplifiers; active filters; parameter systems and their use in small-signal analysis. A series of lab exercises serves to confirm lecture theory, and to develop practical hands-on skills in the use of relevant test instruments. Prerequisite: ELEX 200 or 208, 203, MATH 243.

ELEX 334 Telecommunication Principles - Introduces students in the Computer Control Electronics Option to the organization and operating principles of transmitters, receivers and basic antenna systems. Topics include frequency generation and RF amplification; the superheterodyne principle; modulation, including AM, FM and SSB; typical transmitters and receivers, their adjustment and performance evaluation; antenna and transmission line fundamentals. Prerequisite: ELEX 200 or 208, 203, MATH 243.

ELEX 341 Data Acquisition and Signal Conditioning - Examines the application and design of precision analog interface and signal conditioning systems. Topics include the specification, design and evaluation of amplifier systems commonly used in transducer interfacing applications; high accuracy and stability signal conditioning design techniques and analog signal transmission with emphasis on the 2-wire current loop. A strong practical approach is ensured by lab exercises and projects. Prerequisite: ELEX 200, 203, MATH 243.

ELEX 342 Sensors for Measurement and Control - Introduces the student to the principles and techniques used in the industrial measurement of pressure, mass, level, density, and temperature. Topics will include pressure and temperature transmitters, humidity transducers and nuclear density gauges. Labs will apply the principles of the above transducers and the latest in smart transmitter technology to various industrial and commercial applications. Prerequisite: ELEX 203, PHYS 206, MATH 243.

ELEX 343 Process Control Devices and Techniques - Examines the principles and practices used in the design and application common industrial process control components and systems. Topics include automatic process control principles using open and closed loop systems; basic feedback design principles of electronic, pneumatic and hydraulic devices that are incorporated into transmitters, signal converters, positioners and power amplifiers; control valve specification and sizing. Lab exercises will analyze the design and performance of manufacturers' control equipment applied to steam and liquid processes. Prerequisite: ELEX 203, 342*, MATH 243, PHYS 206 (*may be taken concurrently).

ELEX 406 Data Communication - Introduces the techniques used to communicate digital data from one point to another. Topics include transmission media, channel characteristics and interface standards (RS 232C, RS 449, current loop). Techniques for modulation (FSK, PSK, QPSK) and data coding (NRZ, RZ, Manchester) are presented. Error detection and correction is covered. Other topics include bandwidth bit rate limitations, character oriented (HDLC) and bit oriented (Bisync) and bit oriented (HDLC) protocols, as well as networking schemes. This course is intended for the electronic technologist involved in hands-on work with Data Communication equipment at the chip level. Prerequisite: ELEX 302, 303 or 333, and 307.

ELEX 411 Programmable Logic Devices - Introduction to user programmable logic devices including PAL's, FPLA's and EPLD's. Lab work will cover basic concepts and applications using design software such as PALASM and logic simulation. Students are encouraged to incorporate PLD design into their level 4 project. Prerequisite: ELEX 302, 311, 412.

ELEX 413 Microcontroller Applications - An introduction to the MC68HC11 single-chip microcontroller. Students will use the on-chip timers, communications ports and A/D converter to solve various problems in telecommunications. Prerequisite: ELEX 406 (may be taken concurrently).

ELEX 414 Applied Electronic Circuits - Introduces practical industrial video applications 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. Data acquisition and display, image storage in RAM, alphanumeric ROM character generators and CRT controllers are all introduced in lectures and lab projects. Assembly language programming is used with the Microprocessor Z80 computer to -create graphics displays and to monitor and control high resolution frame storage. Prerequisite: ELEX 302, 303, 307, 412* (*may be taken concurrently).

ELEX 415 Industrial Electronics and PLC's - The course commences with rectifier transformer RMS current and KVA requirement calculations and moves on to the design of L-C filters for single and three phase diode and thyristor rectifier DC power supplies. Students then study the design and feedback control of series, shunt, inverting, flyback and line voltage switching power supplies. Motor types and their speed control strategies will be discussed. To keep pace with industry's greater use of variable frequency induction motor drives, students will study transistor and thyristor inverter designs. The use of SCRs and TRIACs for power control, SCR chopper circuits for DC motor drives and SCR inverters for DC-AC conversion will also be studied in detail. Thyristor DC motor speed control circuits, their feedback control theory and error and stability control will be studied in detail. BODE phase and gain margin criterion will be used for stability analysis. The final section of the course includes an opportunity to implement industrial control circuits using programmable logic controllers (PLCs). Prerequisite: ELEX 303 or 333 or 342, 307 or 341.

ELEX 416 Microcontroller Systems - This course introduces the single chip microcontroller and its application to the solution of typical problems in industrial measurement and control. Students will analyze in depth the hardware design of a microcontroller system including CPU, memory, peripherals and all necessary interfaces. The course provides the foundation for many of the student projects in ELEX 419. Prerequisite: ELEX 302, 307.

ELEX 419 Technical Project (Control) - In the final term, students are required to research, design, prototype and evaluate a technical project within their fields of interest. Formal documentation in the form of a written report is required. An oral report is also be required. Projects may be undertaken individually or in pairs, or in larger groups if required by nature of the project. Prerequisite: ELEX 325, 334, 406*, 411, 412, 413*, 414*, 415*, TCOM 214* (*may be taken concurrently).

ELEX 421 Industrial Systems - Teaches 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 and system protection and co-ordination together with all appropriate sections of the Canadian Electrical Code. In this course students learn how to apply the Canadian Electrical Code to the design of lighting and power distribution systems for commercial and industrial buildings. Prerequisite: ELEX 325 or permission.

ELEX 424 Power Systems - Commences with an overview of present and future energy sources followed by the circuit analysis of electrical power transmission systems. Topics 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; determination of available short circuit currents; protective relaying. Prerequisite: ELEX 325 or permission.

ELEX 425 Electrical Equipment and PLC's - A continuation of ELEX 325 with a more detailed study of AC and DC motors and their applications. This is followed by a study of electrical protection which begins with review, then expands upon fuses and circuit breakers and the nature of electrical abnormalities. A detailed study is made of electrical protective devices. The final section of the course deals with electrical control and applications including motor starting equipment and relay and programmable control systems. Students will receive hands-on experience with programmable controllers. Prerequisite: ELEX 325 or permission.

ELEX 429 PLC Projects (Power) - Students (working in teams of 2-4) will undertake PLC programming and control projects on a selection of industrial PLCs and variable speed drives. Prerequisite: ELEX 415, 425, TCOM 214 (all may be taken concurrently) or permission.

ELEX 431 Telecommunication Circuits and Systems 2 - A number of circuits of commercially available transmitters and receivers will be examined using the manufacturer's schematic diagrams and with heavy emphasis on the application of circuits studied in level 1 through 3 courses. Specific transmitters and receivers have been selected for use as classroom models because of their complexities in the type of service for which they are designed. The systems studied will not be limited to those used for communications but will include common radio navigation systems. This course also provides an introduction to video transmission of both monochromatic and chromatic. The circuits of video receivers are examined and the techniques used for video recording are studied. Noise and distortion is studied and associated with the various circuits and systems which affect and are affected by them. Prerequisite: ELEX 302, 331, 332, 333, 438* (*may be taken concurrently).

ELEX 436 Switching Networks and Fiber Optics - Introduces the current North American telecommunications network. Topics include evolution of the telephone system; transmission and switching; transmission media; frequency division multiplexing; time division multiplexing, pulse code modulation; electronic switching systems, space division and time division types; associated signalling, power and traffic considerations; cellular telephone systems; fiber optic systems, types of fibers and their propagation characteristics; (light sources, detectors, splices, connectors and couplers), system design considerations. Prerequisite: ELEX 302, 331, 406* (*may be taken concurrently).

ELEX 437 Microwave Principles and Systems - Introduces microwave principles and hardware, and their application in telecommunication, radar, etc., using microwave energy. Topics include sources of microwave energy, attenuating devices, frequency and power measuring devices, modulators, amplifiers, coupling devices and isolators; a study of high-capacity microwave communication links, and an analysis of satellite communication links. Prerequisite: ELEX 332, 431* (*may be taken concurrently).

ELEX 438 Radio Frequency Circuit Design - Teaches how to design HF and VHF circuits. Topics include: impedance matching networks; wideband transformers; synthesis of low pass, high pass, band pass and bandstop Butterworth and Chebychev filters; introduction to microstrip circuits; high frequency modelling of transistors; small-signal amplifier design using Y and S parameters; stability analysis; design of oscillators and RF power amplifiers; use of feedback in design of wide band amplifiers; mixers; noise performance of

amplifiers. Labs require students to design, build and test various circuits applying theoretical knowledge. Prerequisite: ELEX 331, 332, 333.

ELEX 439 Technical Project (Telecom) - In the final term, students are required to research, design, prototype and evaluate a technical project within their fields of interest. Formal documentation in the form of a written report is required. An oral report is also be required. Students may work alone on an individual project or as part of a small R & D team working on a larger project. Prerequisite: ELEX 406, 413, 431, 438, TCOM 214 (all may be taken concurrently).

ELEX 441 Microprocessors for Measurement and Control - Investigates 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. The lab component will provide practical experience in microprocessor circuit design, interfacing of analog and digital I/O and software design. Prerequisite: ELEX 302 and 341.

ELEX 442 Analyzers for Process Automation - This course covers a number of techniques used in the area of industrial process measurement applications. Flow measuring devices such as head devices, turbine and magnetic flowmeters are investigated. Analytical techniques to measure gas composition (including zirconium oxide oxygen analysis and gas chromatography), pH and conductivity are investigated. Techniques to measure pressure and mass using strain gauges are discussed. In the lab, students will analyze and calibrate typical industrial measuring devices. Prerequisite: ELEX 342, CHEM 302.

ELEX 443 Strategies for Industrial Process Control - 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 heat exchangers, boiler systems, evaporators, distillation columns, and pH systems. These processes will be used to demonstrate the application of the most common multiple-loop control strategies: cascade, feedforward, ratio, selective and adaptive systems. Prerequisite: ELEX 343, 442*, CHSC 343 (*may be taken concurrently).

ELEX 444 PLC's and Distributed Control Systems - Examines the application of programmable control devices to industrial automation. Interlock and sequence control systems are designed using ISA and JEDEC symbologies, and implemented using programmable logic controllers (PLC's). Microprocessor-based configurable controllers are applied and programmed for process control systems. Distributed control system architectures are examined with reference to commercially available systems. Networking standards (MAP, PROWAY, IEEE 488) and their application to plantwide automation are also examined. Project work involves the design and implementation of systems using typical industrial programmable control devices. Prerequisite: ELEX 441*, 443* (*may be taken concurrently).

ELEX 445 Industrial Control Projects and Computer-Aided Design (CAD) - Examines process control system design and documentation techniques including computer-aided design. Current ISA, SAMA and ASME symbologies are used in the preparation of control system documents such as process and instrument drawings, loop diagrams, functional diagrams and specification sheets. The role of these documents in the management of instrument projects is also examined and CAD systems are used for their preparation. Hazardous area classification and system design for hazard reduction and intrinsic safety are also examined. Project work involves all aspects of control system design from concept to evaluation. Prerequisite: ELEX 442, 443, 444, TCOM 214 (all may be taken concurrently), CHSC 343.

MATH 143 Basic Technical Mathematics for Electronics - Common and natural logarithms, logarithmic/semilogarithmic graphs, decibels, exponential growth and decay. Systems of linear equations, determinants, application to electronic networks. Trigonometric functions, identities, solution of triangles, graphing and addition of sinusoidal functions. Complex numbers, rectangular/polar transformations, phasor representation of sinusoidal waveforms, application to electronic technology. The derivative, differentiation rules, applied maxima/minima.

MATH 243 Calculus for Electronics - Implicit differentiation, related rates and approximation using differentials with application to electronic technology. Antidifferentiation, the indefinite integral and the definite integral including evaluation of areas, average value and RMS value of a periodic waveform. Differentiation and integration of trigonometric, logarithmic, exponential and damped sinusoidal functions. Integration techniques including change of variables, integration by parts and partial fractions. First and second order differential equations with application to electronics technology. Fourier coefficients and line spectrum. Prerequisite: Math 143.

MATH 343 Transform Calculus for Electronics - Step and impulse functions. Laplace transforms of functions and mathematical operations. Partial fractions. Inverse Laplace transforms. Solutions of differential equations. Solutions of applied problems appropriate to the electronics technology. Prerequisite: Math 243.

OPMT 149 Small Business Fundamentals - The course will be centered around the preparation of a comprehensive, professional business plan for a small business of the student's own choosing, which will be within the student's technological field. Students will work in groups of three. There will be several assignments, all of which will comprise the total business plan for the proposed venture. The final plan will be of a quality to inspire investor and lender support. Topics relevant to the plan will be introduced in the one-hour weekly lecture. The two-hour lab time will see these topics further developed in a seminar format. There will also be a requirement for at least three hours a week from each student, outside class, to work on the major assignment of the business plan. Prerequisite: Successful completion of all courses in Term 2.

PHYS 106 Physics for Electronics Technology - A general course about physical quantities, their properties, relationships and connecting principles. Motion, force, mechanical energy and power, translational and rotational motion; basic electricity, atomic physics, the band theory of solids and their application to semiconductor devices are studied. The lab program emphasizes measurement, data analysis, and experimental techniques while confirming and expanding lecture concepts. Mathematics treatment requires algebra, trigonometry and vectors.

PHYS 206 Physics for Electronics Technology - Topics include magnetism, induced electromotive force, thermal energy, vibrations and waves, with particular reference to sound waves, electromagnetic waves, physical optics and nuclear physics. The accompanying laboratory program emphasizes measurement, data analysis and experimental techniques while confirming and extending the concepts presented during lectures/tutorials. The presentation is mostly non-calculus. Technological applications are identified throughout the course, where appropriate. Prerequisite: PHYS 106.

TCOM 114 Technical Writing for Electronics - This course emphasizes clear, correct, concise technical writing for the electronics field. Students learn basic technical writing techniques including defining purpose and identifying the reader,planning content and presentation using a clear writing style. They also learn how to illustrate written and oral communications. These basic techniques are applied to memos, routine business letters and a formal laboratory report. Students produce an operating manual for an item of electronic equipment. They prepare a resume and application letter for a cooperative education position or a summer job and learn how to prepare and deliver short presentations to small groups.

TCOM 214 Technical Writing for Electronics - Expanding on the principles and techniques learned in TCOM 114, students develop strategies and refine techniques for locating and securing career related employment, write formal and informal work related reports and proposals, and develop oral communication skills in individual and group situations: interviews, meetings, technical briefings and persuasive presentations. Prerequisite: TCOM 114.

Cooperative Education

***ELEX 390 COOP 1: Cooperative Education Workterm 1** - The application of theory and labs from Terms 1 and 2 to the Industrial Electronics setting. This is a paid position acquired through the Cooperative Education office. This position must be a minimum of 12 weeks to qualify for credit, and may be a maximum of 4 months.

***ELEX 490 COOP 2: Cooperative Education Workterm 2** - The continuation of work experience in a paid position within industry/business, acquired through the Cooperative Education office (minimum 12 weeks, maximum 4 months duration). The combination of successful completion of ELEX 390 and ELEX 490 will add the notation COOPERATIVE EDUCATION to the Diploma of Technology offered by the Electronics Technology.

***ELEX 495 COOP 3: Cooperative Education Workterm 3** - This additional workterm is optional and may be taken to complete a project in industry that started during a previous workterm, or to satisfy students' interest in additional work experience, prior to graduation.

*Enrolment in the Cooperative Education component is optional. See page 35 for more details.

Faculty and Staff

M. Jervis, B.Sc., Associate Dean
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(Terms 1 & 2)
E.A. Upward, Dipl.T., A.Sc.T., Co-ordinator, Co-op Education

Advisory Committee: Electronics Technology

W. Tracey (Chair), President, Systek Engineering
G. Aasen, General Manager, Pacific Microelectronics Centre
N. Arnason, Manager, Protection & Control, B.C. Hydro
S. Atkinson, Operations Manager, Customer Service
Rogers Cablesystems
B. Canavan, Manager, Research & Development
Dynapro Systems Inc.
J. Cecic, Employment & Immigration Canada
J. Coburn, Technical Specialist, Canadian
Systems Maintenance
L. Edwards, Business Comm. Manager, B.C. Tel
D. Greenwood, Supervisor, Instrument Module Repair
B.C. Hydro
D. Heywood, Program Manager, Radio & Satellite
MPR Teltech Ltd.
L. Metcalfe, President, Dynamic Control Systems
J. Muir, Manager, Product Applications
Westinghouse Canada Inc.
C. Wang, System Control Engineer, B.C. Hydro

Advisory Committee: Process Automation & Instrumentation

N. Baird (Chair), President, Black & Baird Ltd.
M. Cantor, Manager, Control Systems, Fransen Engineering
K. Carriere, Manager, Electrical, Power & Automation,
Sandwell Swan Wooster Inc.
H. Gauthier, Instrumentation Dept., H.A. Simons
International Ltd.
F. Gottardi, Yarway Canada
J. Kay, Principal, Process Automation Systems Inc.
E. Shimmin, Operations Manager, Energrated Systems
A. Szocs, President, Norpac Controls Ltd.
E. Tornquist, B.C. Gas
J. Turtle, Instrument Supervisor, Greater Vancouver
Water District
K. Wall, Instrument Dept. Manager, Hipp Engineering Ltd.

FISH, WILDLIFE AND RECREATION

Diploma Program

See **Renewable Resources Technology**, page 180.

FOOD TECHNOLOGY

Diploma Program

See **Biological Sciences Technology**, page 110.

FORESTRY

Diploma Program

See **Renewable Resources Technology**, page 180.

GEOGRAPHIC INFORMATION SYSTEMS

Advanced Diploma Program

Geographic Information Systems (GIS) technology is rapidly transforming the way in which we manage and use geographic data, and is increasingly being recognized as an essential tool in such diverse fields as forest management, urban planning, engineering, municipal management and environmental studies.

The Advanced Diploma Program in Geographic Information Systems is designed for students with a background in a relevant discipline or technology. The Program is available in a full-time 9-month program format, through part-time studies, or a combination of these.

The curriculum balances theory and practice and covers GIS principles, training in GIS software, technical issues in GIS, remote sensing, digital mapping, computer programming and management issues in GIS. Each student also undertakes the design and implementation of a major independent GIS project.

Entrance Requirements

Diploma of Technology or University/College Degree in a related field. Students should possess good communication skills, ability to reason in a logical manner, a good disposition towards team work, fundamental computer literacy and computer programming skills.

Applicants should submit a resume and a letter of intent explaining their reasons for taking the program. Applications should indicate clearly whether the program is to be taken on a full-time or part-time basis.

Program of Studies

The general course requirement for graduation from the program is a minimum of 50 credits, but may be greater, depending on academic background. ADP courses are selected from the following categories:

ADP Technology Courses	27
Management	8
Projects	15

Courses in these categories require a suitable background in the following areas: Computer programming (C programming, file and data handling); Mathematics (numerical methods, linear algebra, statistics); Fundamentals of Computer Systems (mathematics for computing, operating systems, hardware and software technology, applications).

Students lacking formal education or proven ability in these areas will be required to complete the following foundation technology courses or their equivalent:

Foundation Technology			**Credits**
AICO	522	Introductory C Programming	3.0
AICO	523	Advanced C Programming	3.0
GIST	721	Applied Mathematics 1	3.0
GIST	730	Technical Topics in Computer Systems	3.0
GIST	732	Fundamentals of Computer Graphics	3.0
GIST	821	Applied Mathematics 2	3.0
GIST	832	File and Data Structures	3.0

Some of these courses may be taken concurrently with ADP Core and Advanced Technology Courses.

ADP Technology (27 credits required)

Core (12 credits)

GIST	700	Fundamentals of GIS	3.0

One of:

GIST	725	PAMAP GIS Level 1	3.0
GIST	726	Terrasoft GIS Level 1	3.0
GIST	728	ARC/INFO GIS Level 1	3.0

One of:

GIST	800	Technical Issues in GIS	3.0
GIST	825	PAMAP GIS Level 2	3.0
GIST	826	Terrasoft GIS Level 2	3.0
GIST	828	ARC/INFO GIS Level 2	3.0

Advanced Technology (15 credits minimum)

GIST	708	Fundamentals of Photogrammetric Mapping	3.0
GIST	718	Remote Sensing	3.0
GIST	733	Relational Database Systems	3.0
GIST	801	Selected Topics in GIS	3.0
GIST	808	Digital Mapping	3.0
GIST	833	Object Oriented Programming with C++	3.0
GIST	834	Data Communications and Networking	3.0

Management (8 credits minimum)

AICO	535	UNIX System Management	3.0
AICO	707	Graphic System Management	2.0
AICO	807	Graphic Information Management	3.0
GIST	810	Management Issues in GIS	3.0
GIST	811	Management of Technological Change	3.0
GIST	812	GIS Seminar for Natural Resource Management	1.0
GIST	813	GIS Seminar for Local Government	1.0

Project (15 credits)

GIST	719	Technology Assessment	3.0
GIST	720	Project Planning	3.0
GIST	820	Project	9.0

COURSE DESCRIPTIONS

AICO 522 Introductory C Programming - Provides an introduction to programming in the C language on microcomputers. Topics include looping, decision-making, functions, arithmetic and string manipulation, pointers. Recommended: GIST 730 or equivalent.

AICO 523 Data Structures In C - A continuation of AICO 522 covering file input and output, bit manipulation, structured programming techniques. Prerequisite: AICO 522 or equivalent.

AICO 535 UNIX System Management - Account management, system backup, startup and shutdown procedures, system accounting, system security. Prerequisite: AICO 530 or equivalent industry experience.

AICO 707 Graphic System Management - Issues related to the acquisition, implementation and management of computer systems for CAD/CAM applications. Drawing files management, hardware and software selection, networking, security and maintenance.

AICO 807 Graphic Information Management - Discusses the engineering database and includes graphics standards (IGES, DXF) and graphics translations. It also includes strategies for the integration of non-graphic and graphic information. Prerequisite: AICO 707.

GIST 700 Fundamentals of Geographic Information Systems - An overview of GIS covering fundamental concepts and terminology, the role of GIS in spatial data management and digital mapping, the multipurpose cadastre and resource GIS, methods of data collection and input, data modelling and representation, storage and retrieval of spatial data, concepts of database systems, manipulation and analysis features of GIS.

GIST 708 Fundamentals of Photogrammetric Mapping - Examines the fundamental operations involved in the process of digital base mapping through analytical photogrammetry.

GIST 718 Remote Sensing - Describes the concepts and foundations of remote sensing; the features of the instrumentation used in remote sensing; defines pattern recognition and examines the key steps in applying remote sensing to earth resources management problems. Prerequisite: GIST 821 (may be taken concurrently).

GIST 719 Technology Assessment - An in-depth look at hardware and software for GIS and related technologies. Includes system comparison and comparative evaluation for project implementation.

GIST 720 Project planning - Students will research project topics, present a project proposal, establish supervisors, identify sources of data and begin data acquisition.

GIST 721 Applied Mathematics 1 - Numerical methods. Floating point computations, matrices, and simultaneous linear equations, interpolation methods, approximation methods, linear algebra, solutions to non-linear equations.

GIST 725 PAMAP GIS Level 1 - Introduction to operational aspects of PAMAP GIS software in a microcomputer environment. Topics include data entry, editing and map design GIS operations using MAPPER, and fundamental GIS operations using ANALYZER. Working problems drawn from resource management.

GIST 726 Terrasoft GIS Level 1 - Introduction to operational aspects of TERRASOFT GIS software in a microcomputer environment. Topics include data entry, editing and map design in TERRASOFT CAD environment, and fundamental GIS operations. Working problems drawn from resource management and urban applications.

GIST 728 ARC/INFO GIS Level 1 - Introduction to operational aspects of GIS software using ARC/INFO GIS in a workstation environment. Topics include data entry and editing in ARCEDIT, map design in ARCPLOT, and fundamental GIS operations. Working problems drawn from resource management and urban applications.

GIST 730 Technical Topics In Computer Systems - Reviews trends in computer system architecture, hardware and software, operating systems, programming languages, and application programs; introduces concepts of data communications and networking, and introductory mathematics for computing.

GIST 732 Fundamentals of Computer Graphics - Graphics systems, devices, software libraries, graphic primitives, attributes, 2D transformations, windowing and clipping, graphics standards. Prerequisite: AICO 522 or equivalent (may be taken concurrently).

GIST 733 Relational Database Systems - The relational database model. Relational algebra. Query languages, data definition language, data dictionaries, normal forms, distributed systems. Prerequisite: GIST 832.

GIST 800 Technical Issues in GIS - Examines a variety of data structures and algorithms used in GIS. Covers such topics as digital elevation modelling, spatial interpolation, generalization, data standards, digital data exchange, and data integration. Prerequisite: GIST 700, 832 (may be taken concurrently).

GIST 801 Selected Topics in Geographic Information Systems - Examines current topics in GIS such as rule- and knowledge-based systems, error in GIS, visualization, three dimensional GIS, object oriented databases and programming, multi-media, cartographic modelling. Prerequisite: GIST 800.

GIST 808 Digital Mapping - How to compile, transform, edit and store data sets in a form equivalent to government standards for this type of information. Prerequisite: GIST 708, 821 (may be taken concurrently).

GIST 810 Management Issues in GIS - GIS project management, GIS integration with external systems, data acquisition and conversion issues, training issues, spatial data management. Prerequisite: GIST 700, 800.

GIST 811 Management of Technological Change - Systems analysis, preparation of functional data and needs requirements, preparation of RFPs, system evaluation, acquisition and implementation strategies. Prerequisite: GIST 700, 800.

GIST 812 GIS Seminar: Natural Resource Management - A two-day seminar session introducing concepts and terminology of geographic information systems. Topics include hardware,software, system acquisition, base mapping issues, data conversion and accuracy, GIS system implementation and natural resource GIS applications. Seminar sessions are given by a variety of natural resource GIS industry experts.

GIST 813 GIS Seminar for Local Government - A two-day seminar session introducing concepts and terminology of geographic information systems. Topics include hardware, software, system acquisition, base mapping issues, data conversion and accuracy, GIS system implementation and local government GIS applications. Seminar sessions are given by a variety of local government and GIS industry experts.

GIST 820 Project - Affords students the opportunity to work on a comprehensive project with an industry mentor, or on a project of their own choosing. Prerequisite: Completion of all course requirements; GIST 720.

GIST 821 Applied Mathematics 2 - Statistics. Prerequisite: GIST 721.

GIST 825 PAMAP GIS Level 2 - A continuation of GIST 725 covering the interpreter, topographer and file translator utilities and user commands. Prerequisite: GIST 725.

GIST 826 Terrasoft GIS Level 2 - A continuation of GIST 726 covering use of database software, coordinate geometry, digital terrain modelling, analytical GIS functions, and data import/export. Prerequisite: GIST 726.

GIST 828 ARC/INFO GIS Level 2 - A continuation of GIST 728 covering use of ARC macro language programming, coordinate geometry, digital terrain modelling, analytical GIS functions, data import/export, cartographic production. Prerequisite: GIST 728.

GIST 832 File and Data Structures - Sequential, direct and keyed indexed file handling. Queues, linked lists, trees. Prerequisite: AICO 523.

GIST 833 Object Oriented Programming With C++ - Introduces concepts of object oriented programming (encapsulation, inheritance, polymorphism) using C++ in a microcomputer environment. Problems drawn from computer graphics and geographic information systems. Prerequisite: AICO 523.

GIST 834 Data Communications and Networking - Communication between computers. Networking theory and practice. Distributed processing with special emphasis on microcomputers. Software management of LAN systems. Theory of ETHERNET and ISO standard. Prerequisite: GIST 730.

Faculty and Staff

D. Deans, B.A., Associate Dean
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K. Frankich, Dipl.Ing., M.A.Sc., Ph.D.
R. Miller, Dipl.Tech., B.A., Program Head
W.A. Tupper, Dipl.Ing.

Geographic Information Systems Advisory Committee

C. Hermansen, Chair, Timberline
R. Balser, Ministry of Crown Lands
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W. Herdin, District of Coquitlam
M. Kramer, H.A. Simons Ltd.
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R. Smith, Sierra Systems Consultants, Inc.
D. Stewart, ESRI Canada Ltd.
G. Tomlins, B.C. Research Council
B. Whitehead, MacMillan Bloedel

INDUSTRIAL EDUCATION (TECHNOLOGY EDUCATION) TEACHER EDUCATION

The teacher education program for (Industrial) Technology Education teachers is a cooperative program between BCIT and UBC which consists of 3 components:

- 30 credits of university transfer arts and science courses completed at a university or college;
- completion of a Certificate or Diploma of Industrial Education program at BCIT;
- completion of the pedagogical program at UBC culminating in a Bachelor of Education Degree.

All applicants apply first to BCIT to enter this cooperative program. Applicants may contact the Faculty of Education at UBC for specific information about the UBC portion of the program.

The BCIT portion of the program provides students with the technical skills and knowledge and some basic pedagogical experiences required for teaching industrial and technology education in B.C. secondary schools. It may also lead to post-secondary and industrial training and other occupations that require technical generalists. There are 2 program options: **Regular** and **Accelerated.**

Regular Program Option

The BCIT Regular program is open to graduates of secondary schools who do not have formal trade or technological training and work experience. In this program, the student will normally take one year of university transfer courses at any college or university, two years of technical training at BCIT and finally attend UBC for a 12-month program that culminates in the B.Ed. degree and B.C. Professional Teaching Certificate.

Applicants must have good English oral and writing skills and should complete one or more courses in mathematics and science at the graduation level. Preference will be given to applicants who have completed one or more IE courses or to applicants with some technical experience.

Assured Entrance

Applicants who are enrolled in first-year university transfer courses may apply to BCIT for assured entrance. Assured entrance applicants will be guaranteed a space in the program upon successful completion of the university transfer courses. Contact IETE Program Head for information.

Accelerated Program Option

To qualify for entrance to the Accelerated Program, an applicant must have journeyman or technology certification, or equivalent, in an area related to the B.C. secondary curriculum. This program allows successful students to earn a B.C. Standard Teaching Certificate after two years training, one at BCIT and one at UBC. The requirements for the B.Ed. degree and the Professional Certificate may be completed later through part-time evening and summer courses.

Although admission is possible without completion of university transfer courses, preference will be given to applicants who have completed 6 or more credits. It is strongly recommended that applicants to this program complete a course equivalent to UBC's English 100 before entering BCIT (UBC requires completion of English 100 before admission to their portion of the program). Therefore, admission preference will be given to applicants who have completed English 100 or equivalent.

Program: IETE

			Clrm hrs/wk
Level 1			
INED	504	Precision Measurement	1.0
INED	506	Computer Application for Teaching	3.0
INED	515	Design and Drafting	6.0
INED	535	Introduction to Teaching Production Technology	16.0
INED	575	Materials Science	4.0
Level 2			
INED	606	Computer Applications for Teaching	2.0
INED	615	Design and Drafting	6.0
INED	650	Introduction to Teaching Power Technology	8.0
INED	660	Introduction to Electronics	8.0
INED	675	Materials Technology	4.0
Level 3			
*MATH	594	Basic Mathematics for IETE	4.0
*INED	605	Organization and Materials Necessary for Instruction	2.0
INED	706	Computer Applications for Teachers	2.0
INED	850	Teaching the General Automotive Shop	10.0
INED	860	Teaching Advanced Electronics	10.0
Level 4			
*TCOM	594	Communication for Technology Teachers	4.0
INED	605	Organization and Materials Necessary for instruction	4.0
INED	715	Advanced CAD for Classroom	3.0
INED	731	Advanced Construction for the Classroom	8.0
INED	741	Advanced Metalworking	8.0
INED	806	Computer Workshop	2.0
INED	875	Research in Applied Materials/Industrial Processes	4.0

* Accelerated Program students take these courses during their first year; other level 3 & 4 courses are taken during summer session for diploma/degree completion.

FIRST-YEAR COURSES

***TCOM 594 Communication** - Emphasizes practical communication skills for those in technical fields and "English Across the Curriculum" applications.

INED 504 Precision Measurement - The development of basic measuring skills required for success in the early parts of the program, with emphasis on teaching these skills to adolescent students.

INED 505/605 Organization and Materials Necessary for Instruction - Examines a wide range of topics related to teaching industrial and technical subjects with specific pedagogy for technical teaching. Includes observation visits to secondary schools.

INED 506/606 Computer Applications for Teaching - DOS operations and application programs useful in preparing lesson materials and managing a lab/shop.

INED 515/615 Design and Drafting - The basic principles of design, relationship between design and manufacturing processes, aesthetic elements of design, design in classroom projects. The basic concepts and skills taught in drafting courses at the junior secondary level using projects as a teaching tool; integrating drafting and design with projects in other subjects; effective use of equipment and materials, with a major focus on computer aided drafting.

INED 535 Introduction to Teaching Production Technology - The principles and systems of manufacturing and construction using wood, metal and synthetic materials. The design and planning procedures used in production. The equipment, materials and skills necessary to teach production courses using these materials at the junior secondary level. Safe use and maintenance of light and heavy machinery with adolescent students. Management of individually produced student projects.

INED 650 Introduction to Teaching Power Technology - The mechanics of various power sources from the internal combustion engine to turbines. Transmission of power and principles of power application. Design of projects for the study of power with application to mechanics shops and technology courses. Principles of robotic control in transmission of power.

INED 660 Introduction to Teaching Electronics - The basic concepts of electronics taught at the junior secondary level. The use of experiments and projects for teaching electronics, integrating electronics into the technology education program. Electrical shop control, planning and safety. Effective use of equipment and materials.

SECOND-YEAR COURSES

***MATH 594 Basic Mathematics for IETE** - A first-year math course covering skills necessary for teaching mechanical, electronics and technology courses at the secondary level.

***INED 575 Materials Science** - The study of materials commonly used in secondary school industrial and technology education, through testing, research and experimentation. Specific application to teaching technology courses at secondary level and integration with the objectives of technology education.

***INED 675 Materials and Technology** - The uses of new materials and processes to solve technological engineering and design problems, with emphasis on student research projects for technology education programs. Includes the study of new systems and materials relevant to current economic development.

INED 706 Computer Applications for Teachers - Advanced computer applications including configuration of software for running various programs and peripherals.

INED 707 Practicum - Provides an opportunity for students to observe and begin to apply technical and pedagogical skills in the secondary classroom.

INED 715 Advanced CAD for Classroom - Applied problems in design and drafting for technology education. Prerequisite: INED 615.

INED 731 Advanced Construction for the Classroom - The equipment, materials and skill necessary to teach wood and related materials at the senior secondary level. Management of large and mass-produced student projects. Prerequisite: INED 535.

INED 741 Advanced Manufacturing for the Classroom - The equipment, materials and skills necessary to teach metal materials at the senior secondary level: casting, forming, and conditioning processes; advanced and non-traditional machining; consideration of the role of the machine shop in emerging Technology Education programs. Prerequisite: INED 535.

INED 806 Computer Workshop - Advanced computer applications including troubleshooting and system configuration.

INED 850 Teaching the General Automotive Shop - The skills students need to master senior and career preparation, automotive shops, shop management, supervising student work on clients' cars. Prerequisite: INED 650.

INED 860 Teaching Advanced Electronics - The concepts of electronics taught at the senior secondary level. The use of experiments and projects for teaching linear, digital and microprocessor materials and projects. Prerequisite: INED 660.

INED 875 Research in Applied Materials / Industrial Processes - Individual research project requiring the student to examine and report on the application of a technological product or process to industry, with emphasis on how the application might be used in teaching technological subjects.

Faculty and Staff

Trevor Williams, B.Sc., M.Sc. (Mech Eng.), P.Eng.
Associate Dean
Robert Merriam, B.Ed., M.Ed., Program Head.
Stephen Harrison, N.D.D.
Ian Mathie, B.Ed., M.Ed.
Jim Smith, B.A.Sc., P.Eng
Peter Trant, B.Ed., M.A.

MECHANICAL ADVANCED DIPLOMAS

These programs will interest practising technologists or engineers who are seeking to advance their technical competence.

Candidates may enroll in either part-time or full-time studies and select credits to fill the requirements for an Advanced Diploma from either the full-time courses, part-time courses or ITTN modules. The program of courses must be approved on an individualized basis by the Mechanical Design & Manufacturing department. The general requirements for an Advanced Diploma are a minimum of 50 credits drawn from various components.

Components	Credits
Management Subjects	8.0
Core Technology Subjects	12.0
Advanced Technology Subjects	15.0
Graduation Project	15.0

The graduation project must be approved by the Mechanical Design & Manufacturing Department who will assign a faculty supervisor for the project prior to its commencement. Credits obtained from similar courses that may have been taken as part of an undergraduate program are not transferable. The courses offered are based upon demand and are as follows.

Management Courses			Credits
AICO	702	System Analysis	3.0
AICO	706	Manufacturing Management	4.0
AICO	707	Graphic System Management	2.0
AICO	807	Graphic Information Management	3.0
Core Technology Courses			
AICO	213	AutoCAD 1	3.0
AICO	214	AutoCAD 2	2.5
AICO	220	SmartCAM	3.0
AICO	225	AutoCAD 3	1.5
AICO	504	Data Structures in "C"	6.0
AICO	605	Issues in Networking	4.0
AICO	701	File Handling and Database	8.0
AICO	703	CAD Graphics Microstation	3.0
AICO	705	Applied Mathematics	3.0
AICO	710	CAD Graphics (AutoCAD)	6.0
AICO	715	Computervision	2.5
AICO	722	Introduction to "C" Programming	3.0
AICO	732	Intro to UNIX Shell Script Programming	2.0
AICO	735	UNIX System Management	3.0
AICO	823	Data Structures in "C"	2.0

Students select their major courses in the appropriate area of advanced topics as well as completing their industrial projects in that area. Advanced topics currently available include:

Advanced Courses			Credits
CAD Programming			
AICO	704	Graphics Programming	3.0
AICO	708	Advanced CAD Graphics	5.5
AICO	712	CAD Customization Using AutoLISP	2.5
AICO	718	CAD Customization in Microstation	2.5
AICO	729	UNIX	2.0
AICO	814	Advanced AutoLISP	2.5
Advanced Manufacturing			
AICO	709	CNC Programming	9.0
AICO	712	CAD Customization Using AutoLISP	2.5
AICO	713	Quality Control	2.0
AICO	716	Computer Integrated Manufacturing	4.0
AICO	815	Robot Applications	5.5
AICO	818	CNC Setup and Operation	2.5
AICO	819	Advanced CAM Applications	2.5
Machine Vision			
AICO	XXX	Graphics Programming in "C"	3.0
AICO	751	Introduction to Machine Vision	2.5
AICO	752	Digital Image Processing 1	2.5
AICO	753	Digital Image Processing 2	2.5
AICO	754	Applications in Machine Vision	2.5
AICO	755	Microprocessor Programming	2.5
AICO	756	Microcomputer Interfacing	2.5
COMP	357	Introduction to Expert Systems	5.0
Graduation Project			
AICO	809	Advanced Diploma Project	15.0

Other courses to be announced.

COURSE DESCRIPTIONS

AICO 213 AutoCAD 1 - An introduction to the AutoCAD workstation including basic 2D drawing creation, editing, view manipulation, text, dimensioning and plotting. Prerequisite: Basic engineering graphics.

AICO 214 AutoCAD 2 - A continuation of AutoCAD 1 with the focus on increasing production by customizing the AutoCAD environment. Class assignments may be tailored to discipline areas depending on student background. Prerequisite; AICO 213 or equivalent.

AICO 218 Architectural CAD (ASG) - Emphasizes the production of 2D/3D drawings for the architectural environment using ASG, an AutoCAD third party software package. The student will progress from basic drawings to the generation of more advanced projects using customized ASG templates. Prerequisite: AICO 213.

AICO 220 SmartCAM - Use of SmartCAM software for automatic tool path generation from CAD models produced with AutoCAD software. Programs are proven on CNC milling machines and lathes.

AICO 225 AutoCAD 3 - An introduction to the 3D capabilities of AutoCAD. This course will cover the fundamentals of 3D construction, surface generation and shading using AutoSHADE. Prerequisite: AICO 214.

AICO 504 Data Structures In "C" - Introduction to "C". Emphasis will be on the solution of problems solvable in a microcomputer environment, software package design and implementation, and programming techniques. Problems will be selected from polygon processing algorithms. Prerequisite: CDCM 101 or equivalent.

AICO 605 Issues In Networking - Communication between computers. Networking theory and practice. Distributed processing with special emphasis on microcomputers. Software management of LAN systems. Theory of ETHERNET and ISO standards.

AICO 701 File Handling and Database - Sequential, direct and keyed indexed file handling. Introduction to database systems: hierarchical, network and relational. Stress on micro-based systems and engineering applications. Inventory control, BOM, etc. Discussion of DB and its impact in an integrated DP environment. Prerequisite: AICO 704 or AICO 722 and 823.

AICO 702 Systems Analysis - Introduction to standard problem analysis tools: flow charting, Nassi-Schneidermann, decision tables, systems analysis tools, flow graphs, structure charts, and data flow analysis, scheduling and CP methodology.

AICO 703 CAD Graphics Microstation - This concentrated CAD course gives the student extensive hands-on practice on leading edge CAD equipment. Students will be given exposure to both 2D and 3D graphics.

AICO 704 Graphics Programming - Emphasis will be on the solution of engineering problems and theory of CAD systems using structured programming techniques. At the completion of the course, the student will understand how a simple CAD system is implemented. Prerequisite: CDCM 101, 201 or equivalent.

AICO 705 Applied Mathematics - Gives students expertise in numerical methods. Floating point computations, matrices, simultaneous linear equations, interpolation and approximation methods, solutions to non-linear equations and random number generation.

AICO 706 Manufacturing Management - At the completion of this course, students will be familiar with techniques, models, procedures and philosophies for managing a manufacturing process.

AICO 707 Graphic System Management - Issues related to the acquisition, implementation and management of computer systems for CAD/CAM applications. Drawing files management, hardware and software selection, networking, security and maintenance.

AICO 708 Advanced CAD Graphics - Computer generation of 3D models using wireframe, surface and solids, modelling software. The creation and generation of shaded models and animation for engineering application. Prerequisite: AICO 225 and CDCM 311 or equivalent.

AICO 709 CNC Programming - Introduces the student to current CNC and Robot languages such as APT and VAL. Investigates the integrated manufacturing centre. Special emphasis on exposure to CNC machines, model milling machines and lathes, drill presses, and 2.5 axis milling machines.

AICO 710 CAD Graphics (AutoCAD) - This concentrated CAD course provides the student with extensive hands-on practise on leading edge, micro-based CAD equipment. Both the AutoCAD system and Computervision's MicroCAD packages will be used. 2D drafting, 3D wire frame models and surface modelling.

AICO 712 CAD Customization Using AutoLISP - An introduction to AutoLISP programming. In addition to the concepts of AutoLISP programming the student will be required to develop applications in parameterizing drawings, user defined commands and interfaces with the drawing file database. Prerequisite: AICO 213 and 214 or equivalent programming experience.

AICO 713 Quality Control - Provides the student with a concentrated applications-focused overview of the fundamentals of statistical process control.

AICO 715 Computervision - Microcomputer-based CAD using Computervisions Personal Designer. The course provides a detailed study of the design and engineering functions as well as menus and screen ICONS that are available in Personal Designer.

AICO 716 Computer Integrated Manufacturing - This is the capstone course of the advanced manufacturing management program. The CIM course has been designed to integrate and expand on topics covered in the other courses in the program.

AICO 718 CAD Customization Using Microstation - An introduction to MDL Microstation Development Language programming. In addition, the student will be required to develop applications in parametric design and interface with the drawing file database. Prerequisite: CDCM 311 or CDCM 215 and 216.

AICO 722 Introduction to "C" Programming - An introductory course in "C" programming with emphasis on algorithm development and structural programming techniques. Includes engineering applications and is a required prerequisite for AutoCAD users interested in the AutoCAd Development System (ADS).

AICO 729 UNIX - An informative overview of the UNIX operating system. Topics include user accounts, file handling, user communication, directory structure, the UNIX kernel and shell, input-output re-direction, environment customization, the VI editor and shell script commands.

AICO 730 Introduction to UNIX - Topics include elementary UNIX commands, files and directory structures, the VI editor, piping, and shell script programming with Bourne or C shells. Taught on workstations using a hybrid SYSTEM V/BSD UNIX. Prerequisite: Computer experience required. Operating system experience a definite asset.

AICO 732 Introduction to UNIX Shell Script Programming - Covers basic shell script programming based on the Bourne and C shell. Includes control structures, shell variables and commands, as well as the user shell environment. The kernel and its relationship to the shell is introduced. Prerequisite: AICO 730 or equivalent industry experience (minimum one year).

AICO 735 UNIX System Management - Reviews UNIX operating system commands and provides an introduction to system management. Topics include account management, system backup, startup and shutdown procedures, system accounting and security. Taught on workstations using a hybrid system V/BSD UNIX. Prerequisite: AICO 730 or equivalent industry experience.

AICO 751 Introduction to Machine Vision - The purpose of this course is to provide an introduction to the use of Machine Vision systems using state-of-the art techniques and equipment. Emphasis is on the use of the hardware required for capturing, transmitting and storing images.

AICO 752 Digital Image Processing 1 - The second phase of the process of utilizing Machine Vision is to employ computational techniques to process, modify and analyze the image data. This course deals with the techniques used in the analysis of stored images. Prerequisite: AICO 751.

AICO 753 Digital Image Processing 2 - Machine Vision is used for many practical applications in industrial environments. This course considers factors which influence the quality of the image and methods which can be used to enhance necessary features. Prerequisite: AICO 752, Aico 504 or equivalent.

AICO 754 Applications of Machine Vision - Applications for visual sensing are found in a variety of areas including manufacturing, product inspection, robot guidance, medicine and security. In this course a variety of application are investigated.

AICO 755 Microprocessor Programming - Explores the programming model of the 8088/8086 family of microprocessors and teaches the student how to write, execute and debug assembly language programs. The compac 386 personal computer and a data acquisition card will be used for programming and introductory interfacing. Prerequisite: Departmental approval.

AICO 756 Microcomputer Interfacing - Examines the concepts necessary to utilize the personal computer for controlling auxiliary devices: the use of interrupts, handshaking, memory address decoding, digital to analog and analog to digital conversions and noise detection/ reduction techniques.

AICO 807 Graphic Information Management - This course provides a detailed discussion of the engineering database and includes graphic standards (IGES, DXF) and graphics translations. It also includes strategies for the integration of non-graphic and graphic information. Prerequisite: AICO 707.

AICO 809 Advanced Diploma Projects - To meet the graduation requirements of the ADP program, a student must complete an industrial project approved and supervised by the department. The student must have completed 25 credits of the ADP program prior to commencing the project and complete the project within two years of commencement. Prerequisite: Completion of 25 credits of the ADP program.

AICO 814 Advanced AutoLISP - An advanced course in AutoLISP programming. Topics will include database manipulation, DXF and DXB file creation and an introduction to C interfaces with AutoCAD. Prerequisite: AICO 312 or AICO 712 or equivalent and AICO 722.

AICO 815 Robot Applications - Theory and practice in automated manipulators and servers. Multi-axis arms, painters, welding units, pick and place devices. Programming methodologies. Prerequisite: AICO 709 or equivalent.

AICO 818 CNC Setup and Operations - This course will provide the student with a practical background in the setup and operation of production scale CNC equipment. The student is required to perform process planning, tool selection and set forth jig and fixture requirements for a variety of CNC machine tools. A detailed discussion of work and machine coordinate selection as well as length and diameter considerations is included. Prerequisite: AICO 709 or equivalent.

AICO 819 Advanced CAM Applications - Acquaints the student with advanced multi-axis machining including 3D surface applications. A number of CAM software packages are utilized including SmartCAM 3D. Prerequisite: AICO 220 or 709 or equivalent.

AICO 823 Data Structures in "C" - A continuation of AICO 722. Stress on data structures, type definitions and fields. Prerequisite: AICO 722.

COMP 357 Introduction to Expert Systems - Gives students proficiency in the LISP language for use as an Expert System development tool. Once the basic syntax and features of the language have been covered, the course focuses on LISP application areas, in particular those suitable for Expert Systems work. Prerequisite: Permission of the instructor.

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.

Faculty and Staff

T. Williams, B.Sc.,M.Sc. (Mech Eng.), P.Eng.
Associate Dean
B. Bayley, Program Assistant
B. Dunn, B.A.Sc.
D. Lewis, B.A. Sc. (Mech), P.Eng.
P. Morrison, Dipl.T., B.Eng., A.Sc.T.

MECHANICAL SYSTEMS

Diploma Program

Graduates from this program will be able to pursue careers 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, mechanical equipment selection and maintenance.

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 use (greater fuel economy), testing and balancing of new systems, and physical changes to existing systems for industrial and institutional plant operation and maintenance.

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 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 for installation and equipment operation.

The Program

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

Program Length

Two years full-time beginning in September each year.

Tuition Fees(subject to change)

$3,631 for the two-year program (1992/93).

Accreditation

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

Prerequisites

High school graduation with English 12, Math 12 and Physics 11 are course requirements for this program. Applicants should have a solid academic background and good

communication skills, be able to apply ideas to practical situations and to work effectively with people in a team situation. Supervisory posts may be assumed after appropriate job experience.

Program: MECHANICAL SYSTEMS

		Clrm hrs/wk
Level 1		
CDCM 101	Computer Science 1	3.0
CDCM 102	Intro to CAD Graphics Level 1	4.0
CHSC 105	Engineering Materials	4.0
MATH 149	Basic Technical Mathematics for Mechanical	5.0
MECH 100	Engineering Graphics 1	3.0
MECH 104	Statics	4.0
MECH 107	Introduction to Thermal Processes	3.0
TCOM 109	Technical Communication for Mechanical	4.0
Level 2		
CDCM 202	CAD Graphics Level 2	4.0
CHSC 205	Engineering Materials	4.0
MATH 249	Calculus for Mechanical	4.0
MECH 206	Mechanics of Materials	4.0
MECH 208	Dynamics	4.0
MECH 220	Engineering Graphics 2	3.0
MECH 225	Manufacturing Processes	4.0
PHYS 216	Physics for Mechanical	4.0
Level 3		
ELEC 256	Instrumentation for Mechanical Systems	5.0
MATH 349	Numerical Methods for Mechanical	4.0
MECH 302	Thermal Engineering 1	4.0
MECH 303	Fluid Mechanics	4.0
MSYS 302	Air Conditioning 1	3.0
MSYS 303	Interpretation of Building Construction	4.0
MSYS 304	Plumbing	3.0
MSYS 307	Heating and Ventilating 1	4.0
Level 4		
MECH 410	Mechanical Estimating (Term 4B)	4.0
MECH 460	Engineering Economy (Term 4A)	3.0
MSYS 402	Air Conditioning 2	6.0
MSYS 404	Mechanical Equipment	4.0
MSYS 405	Maintenance (Term 4B)	4.0
MSYS 406	Fire Protection (Term 4A)	4.0
MSYS 407	Heating and Ventilating 2	4.0
OPMT 460	Industrial Engineering	4.0
TCOM 210	Technical Communication for Mechanical	4.0

COURSE DESCRIPTIONS

CDCM 101 Computer Science 1 - Introduction to computer science and programming using popular commercially available spreadsheet software. Emphasis will be on engineering problems using structured problem-solving techniques. Introduction to DOS and Basic Programming.

CDCM 102 Intro to CAD Graphics Level 1 - Computer-aided design using commercially available software. Includes an introduction to hardware requirements, operating systems, file handling and CAD concepts. CAD skills include element placement and manipulation, view control, measurement, text, dimensioning and plotting.

CDCM 202 CAD Graphics Level 2 - Continuation of CAD Graphics 1. Advanced 2D drafting techniques, blocks, attributes, macro commands and menu customization. Introduction to 3D graphic modelling; wireframe, surface and solid models. Relationship of CAD software to other computer programs. Prerequisite: CDCM 102.

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 256 Instrumentation for Mechanical Systems - 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 behaviour and controllability. On/off, proportional, integral and derivative control. Control strategy. Ratio, cascade, multivariable and feedforward systems. Introduction to computer control.

MATH 149 Basic Technical Mathematics - 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 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 - The application of numerical methods to engineering problems is introduced. Using the BASIC language, the algorithms are programmed and used in complex problem-solving. Matrix methods and their application to computer graphics, linear programming and other applied mathematics problems are presented.

MECH 100 Engineering Graphics 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 constructions, isometrics, with emphasis placed on orthographic projection, auxiliary views, sections, dimensions and working drawings.

MECH 104 Statics - Vectors, force systems, concurrent and coplanar, non-concurrent 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 107 Introduction to Thermal Processes - 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, shaft, pressure vessels and hoop stresses, riveted and welded joints.

MECH 208 Dynamics - Kinematics: basic equation of motion, motion diagrams, trajectories. Kinetics: Newton's Laws, inertia, rectilinear and rotational kinetics, systems of bodies. Work, energy, power and efficiency.

MECH 220 Engineering Graphics 2 - Advanced engineering graphic techniques including sections, isometrics, intersections, developments, single line pipe drawings, structural steel and connections, dimensional limits, tolerances and fits. Course work leads into specific engineering drawing assignments developed according to the student's program. Computerized drafting techniques may be used where appropriate. Prerequisite: MECH 100.

MECH 225 Manufacturing Processes - A basic orientation course providing the student with practice in metal joining using various brazing, soldering, epoxy, and welding techniques, and tensile testing methods. The course leads into metal removal processes and their related theory dealing with machine tools, tool materials and selection, material machinability, use of coolants and cutting oils, calculations for power, cutting speeds, estimate of time and productivity along with the technical language required in the industry.

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. Prerequisite: MECH 104.

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 "labour calculator," for ventilation, domestic hot water heating and sanitary drainage systems.

MECH 460 Engineering Economy - 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.

MSYS 302 Air Conditioning 1 - Heat transfer as applied to building construction including solar effect, calculation of cooling loads for single space and zoning of buildings. Use of psychrometric charts for air conditioning cycles, by-pass factor and cooling coil selection. Introduction to all-air systems with computer applications.

MSYS 303 Interpretation of Building Construction - Principles and practices of light building construction, encompassing a study of building components and drawings. Students will produce a basic set of architectural drawings to demonstrate their understanding of building design and construction. This set of drawings will be used as a learning vehicle for Mechanical Systems.

MSYS 304 Plumbing - B.C. plumbing code, basic engineering principles related to the plumbing field, and graphic presentations in plumbing system design, load/demand calculations, piping methods, sizing of system components for water distribution and storm and sanitary drainage.

MSYS 307 Heating and Ventilating 1 - Introduction to building heat loss and practices in heating and ventilation, including study of system components and design procedures. Assignments provide for heat loss calculations and preparation of a drawing set for a heating/ventilating system.

MSYS 402 Air Conditioning 2 - Selection of air conditioning equipment, fans, air outlets, refrigeration devices, control of air conditioning systems and cost analysis by computer software. Course includes sound propagation and transmission of vibration, sound absorption and vibration isolation. Prerequisite: MSYS 302.

MSYS 404 Mechanical Equipment - A study of belts, chains and gear reducers for drive configurations, along with associated components such as clutches, couplings, bearings and ancillary systems from an application, specification, selection, maintenance and safety point of view.

MSYS 405 Maintenance - An introduction to the management and administration of basic maintenance practices, organization, planning, scheduling, control and reporting with emphasis on preventive maintenance. Typical maintenance software is used in labs/tutorials to produce preventive maintenance schedules, work orders, inventories and other maintenance related schedules and reports.

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. Prerequisite: MECH 303.

MSYS 407 Heating and Ventilating 2 - Continuation of MSYS 307. Principles and practices of heating and ventilation for residential, commercial and institutional buildings. Includes various energy sources such as natural gas, fuel oil and solar energy; heating equipment types; building heating and ventilation load evaluation and distribution. Prerequisite: MSYS 307.

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 labour supervision. Prerequisite: TCOM 210.

PHYS 216 Physics for Mechanical - A general level course covering the elements of wave motion, sound, light, 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 techniques 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 apply techniques from TCOM 109 to produce a project proposal, evaluation or comparison report, a progress report and a major formal report. Meetings, interpersonal communication techniques, and oral reports are an integral part of this Term 4 course. Prerequisite: TCOM 109.

Faculty and Staff

T. Williams, B.Sc., M.Sc. (Mech Eng.), P.Eng.
Associate Dean
E.B. Barry, B.Sc.
D.C. Gerlitz, B.Sc., M.S.
A. Graham, H.N.C.
R.G. Graham, B.A.Sc., M.A.S.H.R.A.E., P.Eng.
Program Head, Systems
G. Henderson, Dipl.T., ASTT
G.D. Johnson, M.I.Mech.E., C.Eng., M.I. Mfg.E., P.Eng.
Program Head, Design and Manufacturing
E.H. Labounty
E. Morse, B.Sc., B.Eng., P.Eng.
H. Rienks, Dipl.T., A.Sc.T.
V.M. Strijack, B.Sc., P.Eng., Program Head
First-Year Studies
A. Wijesinghe, B.Eng., Dipl.Tech.
K. Wong, B.A.Sc., M.A.Sc., P.Eng.

MECHANICAL TECHNOLOGY

Diploma Program

The mechanical technologist may be employed in the design, fabrication and installation of machines and mechanical devices, and in the production side of manufacturing. It is a field of tremendous scope where technologists 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 other installations. 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: Design and Manufacturing Options

First-year students in these technology options share a common curriculum which includes math, physics and specialized studies in mechanical engineering, production, engineering materials, and computer applications. Lecture material is applied 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 specialization.

In the final two levels students select one of two options: Design or Manufacturing. The Mechanical Technology reserves the right to limit the number of students in any of its options in the second year.

Program Length
Two years full-time beginning in September each year.

Tuition Fees(subject to change)
$3,631 for the two-year program (1992/93).

Prerequisites
High school graduation with English 12, Math 12 and Physics 11 are course requirements for this program.

Direct entry applicants into second year are assessed individually on their post-secondary academic achievement, experience and computer skills (CDCM 202 or equivalent). Applicants should have a solid academic background and good communication skills, be able to apply ideas in practical situations and be able to work effectively with people in a team situation.

Accreditation
This program is accredited by the Applied Science Technologists and Technicians of B.C.

Program: MECHANICAL

Level 1		Clrm hrs/wk
CDCM 101	Computer Science 1	3.0
CDCM 102	CAD Graphics 1	4.0
CHSC 105	Engineering Materials	4.0
MATH 149	Basic Technical Mathematics for Mechanical	5.0
MECH 100	Engineering Graphics 1	3.0
MECH 104	Statics	4.0
MECH 107	Introduction to Thermal Processes	3.0
TCOM 109	Technical Communication	4.0

Level 2

CDCM 202	CAD Graphics 2	4.0
CHSC 205	Engineering Materials	4.0
MATH 249	Calculus for Mechanical	4.0
MECH 206	Mechanics of Materials	4.0
MECH 208	Dynamics	4.0
MECH 220	Engineering Graphics 2	3.0
MECH 225	Manufacturing Processes	4.0
PHYS 216	Physics for Mechanical	4.0

Option: DESIGN

Level 3

ELEC 257	Electrical Equipment	4.0
MATH 349	Numerical Methods	4.0
MECH 301	Machine Design 1	4.0
MECH 302	Thermal Engineering 1	4.0
MECH 303	Fluid Mechanics	4.0
MECH 304	Manufacturing Processes 3	4.0
MECH 320	Fluid Power 1	3.0
MECH 325	Manufacturing Processes	4.0

Level 4		Clrm hrs/wk
ELEC 256	Instrumentation for Mechanical Systems	4.0
MECH 401	Machine Design 2	5.0
MECH 404	Thermal Engineering 2	4.0
MECH 420	Fluid Power 2	3.0
MECH 460	Engineering Economy (Term 4A)	3.0
MECH 463	Computer Aided Design Projects	5.0
MECH 466	Fluid Systems (Term 4B)	4.0
TCOM 210	Technical Communication	4.0

Option: MANUFACTURING

Level 3

ELEC 257	Electrical Equipment	4.0
MATH 349	Numerical Methods for Mechanical	4.0
MECH 301	Machine Design 1	4.0
MECH 303	Fluid Mechanics	4.0
MECH 304	Manufacturing Processes 3	4.0
MECH 320	Fluid Power 1	3.0
MECH 325	Manufacturing Processes	4.0
MECH 413	Tool Design	4.0

Level 4

MATH 449	Statistics / Quality Control	4.0
MECH 420	Fluid Power 2	3.0
MECH 444	Metrology	4.0
MECH 445	Computer Numerical Control Laboratory	3.0
OPMT 182	Operations Management	4.0
OPMT 411	Production Engineering Management	4.0
ROBT 402	Computer Integrated Manufacturing	4.0
TCOM 210	Technical Communication	4.0

COURSE DESCRIPTIONS

CDCM 101 Computer Science 1 - Introduction to computer science and programming using popular commercially available spreadsheet software. Emphasis will be on engineering problems using structured problem-solving techniques. Introduction to DOS and Basic Programming.

CDCM 102 CAD Graphics 1 - Computer-aided design using commercially available software. Includes an introduction to hardware requirements, operating systems, file handling and CAD concepts. CAD skills include element placement and manipulation, view control, measurement, text, dimensioning and plotting.

CDCM 202 CAD Graphics 2 - Continuation of CDCM 102. Advanced 2D drafting techniques, blocks, attributes, macro commands and menu customization. Introduction to 3D graphics modelling; wireframe, surface and solid models. Relationship of CAD software to other computer programs. Prerequisite: CDCM 102.

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 behaviour 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.

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 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 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 - The application of numerical methods to engineering problems is introduced. Using the BASIC language, the algorithms are programmed and used in complex problem-solving. Matrix methods and their application to computer graphics, linear programming and other applied mathematics problems are presented.

MATH 449 Statistics / Quality Control - The application of basic statistical principles and techniques to industrial quality control is emphasized in this course. Topics include descriptive statistics (Pareto and CE analysis), the hypergeometric, poisson, binomial and normal probability models; an introduction to hypothesis testing, tolerances and fits; sampling distributions, basic capability analysis, design of acceptance sampling plans, etc.

MECH 100 Engineering Graphics 1 - Techniques for 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, with emphasis on orthographic projection, auxiliary views, dimensions and working drawings.

MECH 104 Statics - Vectors, force systems, concurrent and coplanar, non-concurrent 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 107 Introduction to Thermal Processes - 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, pressure vessels and hoop stresses, riveted and welded joints.

MECH 208 Dynamics - Kinematics: basic equation of motion, motion diagrams, trajectories. Kinetics: Newton's Laws, inertia, rectilinear and rotational kinetics, systems of bodies. Work, energy, power and efficiency.

MECH 220 Engineering Graphics 2 - Advanced engineering graphic techniques including sections, isometrics, intersections, developments, single line pipe drawings, structural steel and connections, dimensional limits, tolerances and fits. Course work leads into specific engineering drawing assignments developed according to the student's program. Computerized drafting techniques may be used where appropriate. Prerequisite: MECH 100.

MECH 225 Manufacturing Processes - A basic orientation course providing the student with practice in metal joining using various brazing, soldering, epoxy and welding techniques, and tensile testing methods. The course leads into metal removal processes and their related theory dealing with machine tools, tool materials and selection, material machinability, use of coolants and cutting oils, calculations for power, cutting speeds, estimate of time and productivity along with the technical language required in the industry.

MECH 301 Machine Design 1 - An introductory course in machine design, with emphasis on elementary design and analytical procedures for machine components. The course covers theories of failure, combined stresses, stress concentration, fatigue phenomena, welded and threaded connections, shafts, belt drives, geometric and force relationships in spur gearing, and an introduction to other machine elements. Problems are handled in both SI and Imperial units.

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 - A study of hot and cold fabrication processes, materials and machines, quantities/costs will be investigated. An introduction to CNC programming by both manual and punched tape inputs.

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 325 Manufacturing Processes - Machine tool operation, production processing and economics, evaluation of production features and equipment maintenance. Prerequisite: MECH 225.

MECH 401 Machine Design 2 - This course is a sequel to MECH 301, covering couplings, brakes and clutches; anti-friction and journal bearings; helical, bevel and worm gearing; power screws, springs and machine frame components; and an introduction to mechanical vibration, with emphasis on critical speeds of rotating bodies. An introductory treatment of bulk material handling systems is also included. Problems are handled in both SI and Imperial units. Prerequisite: MECH 301.

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. Energy management. Prerequisite: MECH 302.

MECH 413 Tool Design - The course includes an introduction to the design of special purpose tooling, process planning design considerations of various types of jigs, fixtures, gauges, metalcutting dies, feed mechanisms, presses, scrap strip-layout, standard parts. Initial six weeks of Tool Design will use AutoCAD and Carr Lane tool design assistance software.

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.

MECH 444 Metrology - Includes measurement of surface texture and flatness, optical and electrical comparators, metrology of screw threads, precision measuring instruments, fundamentals of inspection, mass production gauging.

MECH 445 Computer Numerical Control Laboratory - Computer Numerical Control programming and verification on a 3-axes CNC mill and other CNC machines.

MECH 460 Engineering Economy - 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 463 Computer Aided Design Projects - This course provides students the opportunity of developing engineering solutions to current industrial problems. Students are introduced to CAE methods using finite element analysis and other engineering software. Students work individually or in teams to analyze industry sponsored projects and prepare solutions through drawings, calculations and design application software.

MECH 465 Computer Aided Engineering - Students are introduced to CAE methods using finite element analysis and other software.

MECH 466 Fluid Systems - Dimensionless parameters. Pump characteristics, operation and maintenance. Cavitation. Air movement and supply, fan performance and characteristics, duct sizing and networks. Prerequisite: MECH 303.

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 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. Students are required to work with packaged computer programs.

OPMT 411 Production Engineering Management - Presents aspects of management 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, location and layout; production control, maintenance management, production planning, job design and time standards.

OPMT 460 Industrial Engineering - Covers problem-solving, decision-making and operations management approaches to a project installation. Topics include critical path methods for planning and scheduling, allocation and control of project resources, productivity improvement and operations management techniques.

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

ROBT 402 Computer Integrated Manufacturing - Teaches the use of a microcomputer-based CAD system. Programming the operation of CNC machine tools using manual and computer-assisted methods is also covered in depth. The integration of Computer Aided Design and Manufacturing is investigated.

TCOM 109 Technical Communication - In this course students learn the basic techniques for effective writing and speaking in the mechanical technology field. They learn layout, organization and graphic techniques for technical writing. They produce memos, letters, instructions,short reports and a new resume. Two oral reports are required.

TCOM 210 Technical Communication - In this course, students apply techniques from TCOM 109 to produce a project proposal, evaluation or comparison report, a progress report and a major formal report. Meetings, interpersonal communication techniques, and oral reports are an integral part of this Term 4 course. Prerequisite: TCOM 109.

Faculty and Staff

See Mechanical Systems, page 161.

MINING

Diploma Program

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. Gross profits and total numbers employed indicate the mining industry still commands a major position in B.C. Copper, zinc, gold, and coal production predominate. Industrial mineral production is expanding. The technology is many-faceted, and the opportunities are similarly wide-ranging.

BCIT mining students enjoy an unusually high level of student financial assistance.

Job Opportunities

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 (e.g. 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. 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.

Placement of graduates, on graduation, is in the 90% range.

The Program

Courses reflect the wide range of applications and include the following: geology and mining topics in all terms, mineral processing and assaying, civil engineering, 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.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Degree Transfer/Completion

There are good transfer arrangements with several universities and approximately 70% of our students ultimately continue to engineering degrees.

Accreditation

The program is accredited by the Applied Science Technologists and Technicians of British Columbia.

Prerequisites

High school graduation with English 12, Math 12 and Physics 11 or Chemistry 11, are course requirements for this program.

Program: MINING

Level 1		Clrm hrs/wk
CHEM 101	Applied Chemical Principles 1	6.0
MATH 150	Basic Technical Mathematics for Mining	5.0
MINE 101	Geology	3.5
MINE 102	Mining	2.0
MINE 103	Introduction to Computers	1.0
MINE 108	Graphical Communication	2.0
PHYS 101	Physics for Mining	6.0
SURV 140	Surveying for Mining	3.0
TCOM 101	Introduction to Technical Communication	3.0
Level 2		
CHEM 201	Applied Chemical Principles 2	6.0
MATH 250	Calculus 1 and 2 for Mining	5.0
MINE 201	Geology	4.0
MINE 202	Mining	2.0
MINE 208	Mine Drafting and Computer Graphics	2.0
PHYS 201	Physics for Mining	3.0
PHYS 204	Introductory Geophysics	3.0
SURV 240	Surveying for Mining	3.0
TCOM 211	Technical Communication for Mining	3.0
Level 3		
CHSC 305	Assaying	4.0
CHSC 314	Mineral Processing	3.5
CIVL 339	Statics and Strength of Materials	3.0
MATH 350	Numerical Methods and Computing for Mining	5.0
MINE 301	Structural Geology	3.5
MINE 302	Mining	4.0
PHYS 304	Mining Geophysics	3.0
SURV 340	Surveying for Mining	3.0
TCOM 306	Advanced Technical Communication for Mining	2.0

Level 4		Clrm hrs/wk
CHSC 405	Assaying	4.0
CHSC 414	Mineral Processing	3.5
CIVL 441	Hydraulics	3.0
CIVL 443	Strength of Materials for Mining	3.0
CIVL 444	Geotechnical for Mining	3.0
MATH 450	Numerical Methods and Statistics for Mining	5.0
MINE 401	Geology: Mineral Deposits	3.5
MINE 402	Mining	4.0
SURV 440	Surveying for Mining	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.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 applied to the B.C. mining industry. Covers the essential operations of applied mineral processing: 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. Topics include: free bodies, trusses, stresses, shear and bending moment diagrams.

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.

CIVL 443 Strength of Materials for Mining - 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. Prerequisite: CIVL 339.

CIVIL 444 Geotechnical for Mining - Study of environmental aspects of tailings, dam disposal, quantity take off for feasibility and pond life. Optimization of pond sites. Longterm monitoring of pond and dam. General geotechnical topics including soil mass/volume composition classification, compaction, permeability, pore pressures and shear strength. Prerequisite: CIVL 443.

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 Numerical Methods and Computing for Mining - Microsoft Quick BASIC will be used to solve selected problems related to the Mining Technology. An introduction to linear programming using the Simplex method and Transportation algorithms. An introduction to the Hardy Cross method for analyzing nonlinear flow distribution.

MATH 450 Numerical Methods and Statistics for Mining - Part of the course will be used to introduce the elements of Critical Path Scheduling and Levelling of Resources. Most of the time will be spent on an introduction to statistics and geostatistics. Topics include estimation, hypothesis testing, regression and correlation, semivariograms and kriging.

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 rocks, clastic and chemical sediment; igneous rocks, deformation of earth's crust; metamorphic rocks.

MINE 102 Mining - 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, geology, geophysics, sampling and diamond drilling. Maps, photos, reports and references, economics and planning.

MINE 103 Introduction to Computers - Provides a practical understanding of MSDOS which will allow students to manipulate files and run some application programs. The course is competency-based with a series of evaluations. Topics include computer system components, disk preparation, file creation and movement, directories and hard-disk management, and file editing. A secondary objective for more progressive students will be an introduction to Lotus 1-2-3 spreadsheets.

MINE 108 Graphical Communication - Students learn to produce freehand engineering style sketches using only basic field type instruments. They learn general conventions for scales, orientation, dimensioning, orthographics and perspectives. Exercise applications include surveying, geological, mining and civil engineering topics.

MINE 201 Geology - Deformation of earth's crust, folds, faults; 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 with 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 208 Mine Drafting and Computer Graphics - Enables students to apply computer drafting fundamentals to the solution of mining problems. Exercise applications include surveying, geological, and mine engineering topics. This course is a prerequisite to MINE 402.

MINE 301 Structural Geology - Brief review of mechanical principles of rock deformation and the primary structures of sedimentary, igneous and metamorphic rocks. The origin, nature and classification of joints, folds and faults, with emphasis on their relation to mineral resources. Lab work includes examination of specimens, methods of recording structural data, mapping and solution of structural problems, with emphasis on economic aspects. Prerequisite: MINE 201.

MINE 302 Mining - Products, initiation systems, underground and open-cast applications and design, control blasting, safety, field labs. Rock mechanics: rock-mass classification and field observations, data storage and retrieval, stress field description, modes of failure, ground water effects, ground control methods (slope stability, support, stope design), ground movement monitoring. Prerequisite: MINE 202.

MINE 401 Geology: Mineral Deposits - The terminology, classification, 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 201.

MINE 402 Mining - Sampling, geo-statistics and modelling, cutoff grades, waste/ore ratios, capital and operating cost estimation, taxation, marketing, ore schedules, cash-flow and present value, and rate-of-return projections. Services: mine ventilation, electrical distribution, compressed air, water control, other materials handling systems, reclamation and pollution control. Prerequisite: MINE 302.

PHYS 101 Physics for Mining - A general level course covering mechanics, dynamics and the properties of solids and fluids. The associated lab covers the principles of measurement and the experimental method of acquiring knowledge.

PHYS 201 Physics for Mining - 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. Lectures, case study exercises and some field exercises cover 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 for Mining - Substance of course is 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; plane table; 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 240 Surveying for Mining - See SURV 140.

SURV 340 Surveying for Mining - 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 for Mining - A continuation of SURV 340. The content is the same.

TCOM 101 Introduction to Technical Communication - This course covers basic writing and speaking skills needed for communicating technical information in industry. Students learn how to organize messages, illustrate documents, define and describe mechanisms and processes; write memos, letters and instructions. Students also prepare and deliver oral presentations.

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 101.

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 reports, illustration techniques and technical briefings. Prerequisite: TCOM 101, 211.

TCOM 404 Advanced Technical Communication for Mining - In this course students update their job search packages and write advanced analytical reports and proposals which emphasize environmental conflicts, management techniques, and conflict resolution. They also write more complex letters. As much as possible, assignments are integrated with students' other courses. Prerequisite: TCOM 101, 211, 306.

Faculty and Staff

J.T. Neilson, B.A.Sc., P.Eng., Associate Dean
J.F. Fairley, B.A.Sc., P.Eng., Program Head
F.R.K. Edmunds, B.A., M.Sc., Ph.D
M. Gendron, Dipl. T.

Advisory Committee Members

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J. Anderson, Teck Corporation
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D. Jennings, Quartz Mountain Gold Corporation
T. Johnson, Mining Association of B.C.
J. Meech, University of British Columbia
J. Patterson, B.C. Yukon Chamber of Mines

NONDESTRUCTIVE TESTING

Intermediate Certificate Program

The BCIT program leading to an Intermediate Certificate of Technology in Nondestructive Testing is aimed at satisfying industry requirements for Certified Nondestructive Testing Technicians. Prospective students should note that this program is offered in both a part-time, night school format and in a concentrated full-time, 18-week format in which the student attends day classes.

Both the day and night school programs include courses in all standard NDT methods together with support courses in Metallurgy, Mathematics and Quality Assurance. The NDT courses are designed to satisfy the academic requirements for certification of NDT operators as developed by the Canadian Government Standard's Board (CGSB). However, before obtaining CGSB certification in any NDT method, a student must also obtain some practical work experience and pass a government examination.

Job Opportunities

Graduates are expected to work as NDT technicians with specialty NDT companies and with a wide variety of manufacturing, aeronautical, chemical process and equipment maintenance firms.

Program Length

18 weeks full-time beginning in September each year. Part-time courses are offered throughout the year. Consult our tabloids for details.

Tuition Fees

$904 for the full-time program (1992/93).

Prerequisites

Applicants for the full-time day school program leading to the Intermediate Certificate in Nondestructive Testing must have High School graduation with Math 11 and English 12, plus Trades Training or experience. Suitable trades include Welding, Pipefitting, Ironworking, Boilermaking, Aeronautical Trades, Millwright, Machinist, previous NDT.

Program: NONDESTRUCTIVE TESTING

A. 15 weeks September - December		Credits
CHSC	156 Metallurgy	6.0
CHSC	169 NDT Radiography Level 1	3.0
CHSC	170 NDT Ultrasonics Level 1	3.0
CHSC	172 Magnetic Particle & Liquid Penetrant Testing 1 & 2	3.0
CHSC	270 NDT Ultrasonics Level 2	3.0
COMM	101 Communication Nondestructive Testing	3.0
MATH	130 Technical Mathematics 1 for NDT	5.0
OPMT	136 Quality Assurance for NDT	6.0

Nondestructive Testing Contd. -->

B. 3 weeks January	Credits
CHSC 138 NDT Practicum	1.0
CHSC 171 NDT Eddy Current	3.0
CHSC 269 Radiography Level 2	3.0

COURSE DESCRIPTIONS

CHSC 136 NDT Practicum - The student will obtain practical experience in nondestructive testing by working under the supervision of senior NDT technicians.

CHSC 156 Metallurgy - Includes casting and forming of metals, heat treatment, physical testing, nondestructive testing and metallurgy of welding. Lab work in metals testing,metallography, heat treatment and corrosion constitutes approximately half the course.

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).

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 requirement of CGSB Standard 48-GP-7M, condition (b) for

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-GP-13M for Levels 1 and 2 classroom training.

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) Levels 1 and 2.

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, code standards, specifications and procedures. Prerequisite: CHSC 169 or be a Certified Level 1 Radiographer.

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.

COMM 101 Communication Nondestructive Testing - This course will teach you how to communicate quickly, clearly and effectively. You will learn practical writing techniques including correct formats for instructions, process descriptions, correspondence and some short informal reports. You will also complete a resume and letter of application.

MATH 130 Technical Mathematics 1 for NDT - A review and application of algebra functions and graphs in Cartesian and Polar Coordinates in two and three dimensions: trigonometry of right and general triangles, graphs of trigonometric functions, vectors and applications, logarithmic and exponential functions, growth and decay, decibels, plotting graphs with logarithmic scales. A short introduction to descriptive statistics may be included if time permits.

OPMT 136 Quality Assurance for NDT Certificate Program - Definition of desired product quality and conditions for its achievement. Technical concepts of reliability. Selection and control of production processes. Establishing quality objectives and planning to meet them. Human factors, motivation, employee involvement and Quality Circles. Inspection operations. Product testing. Qualification of operators. Control of special processes. Workmanship standards. Calibration control. Quality data feedback and corrective action system. Quality records and documentation, procedures and work instructions. Quality manuals.

Faculty and Staff

J.T. Neilson, B.Sc., P.Eng., Associate Dean
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J. Lloyd, P.Eng.
D. McLeod, A.R.M.T.C., M.I.M.
R. Pike

Advisory Committee Members

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K. Kaye, Ministry of Municipal Affairs Recreation & Housing
M. Koestlmaier, Ebco Industries Ltd.
T. McLean, Industrial Nondestructive Testing Ltd.
F. Pfeiffer, Canadian Airlines International Ltd.
G. Sale, Prism Systems Incorporated
G. Sieben, Coast Testing
D. Stasuk, Stasuk Testing & Inspection Ltd.

PETROLEUM AND NATURAL GAS

Diploma Program

Due to its large size and diversity, the oil and gas 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 technologist is much sought after in the marketplace. There are many career choices for both men and women in industry and government, working in the office, plant and the field. There is unlimited potential for growth and success. Positions are available in the following areas:

Exploration and Production: Geologic studies, seismic surveys, reservoir studies, well testing and servicing.

Transmission and Distribution: Operation and maintenance of pipelines, systems planning, corrosion studies and control, gas control and measurement.

Manufacturing: Laboratory technologist, environmental control technologist. Oil refining and gas processing operations.

Other areas include government regulatory agencies, research laboratories, and petroleum products application and marketing. The need for trained personnel continues to grow.

The Program

The curriculum is designed to cover all major aspects of the oil and gas industry, thereby enabling the graduate to successfully enter any area of the industry.

The first year covers petroleum geology, reservoir behavior, oil and gas production and field handling, and gas processing. Emphasis is also given to the basic sciences - chemistry, physics and mathematics - necessary for the scientific and engineering principles involved in studies throughout the program.

The second year covers pipeline transmission, oil refining and product utilization, and gas distribution. Computer use is emphasized in process control and all other aspects of the curriculum. Classroom and laboratory instruction are supplemented by field trips to local installations.

Program Length

Two years full-time beginning in September each year.

Tuition Fees(subject to change)

$3,631 for the two-year program (1992/93).

Accreditation

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

Degree Transfer/Completion

Full credit is given toward a petroleum engineering degree at selected U.S. universities. Credit is also given toward a chemical engineering degree at Lakehead University.

Prerequisites

High School graduation with English 12, Math 12 and either Chemistry 11 or Physics 11 are course requirements for this program. Exemptions from academic requirements may be made in the case of mature applicants with practical experience in the industry.

Program: PETROLEUM AND NATURAL GAS

		Clrm hrs/wk
Level 1		
CHEM 101	Applied Chemical Principles 1	6.0
CHSC 106	Engineering Materials	3.5
MATH 147	Basic Technical Mathematics for Petroleum	5.0
PETR 102	Petroleum Geology	4.0
PETR 103	Properties of Reservoir Fluids	3.0
PHYS 101	Physics for Petroleum	6.0
TCOM 101	Introduction to Technical Communication	3.0
Level 2		
CHEM 201	Applied Chemical Principles 2	6.0
COMP 122	Computer Applications	2.0
MATH 247	Calculus 1 and 2 for Petroleum	5.0
PETR 201	Field Production of Gas and Oil	3.0
PETR 202	Field Handling of Gas and Oil and Gas Processing	2.0
PHYS 201	Physics for Petroleum	3.0
PHYS 204	Introductory Geophysics	3.0
SURV 128	Introduction to Surveying for Petroleum	3.0
TCOM 208	Technical Communication for Petroleum	3.0

Level 3		Clrm hrs/wk
CHEM	310 Physical Chemistry	5.0
CHSC	341 Unit Operations	6.0
CHSC	351 Pollution Control	3.0
MATH	347 Differential Equations for Petroleum	5.0
PETR	306 Oil Refining	4.0
PETR	307 Pipeline Transmission	6.0
PETR	308 Fuels	2.0
Level 4		
CHEM	415 Petroleum Chemistry	5.0
CHSC	441 Unit Operations	6.0
MATH	447 Statistics and Numerical Methods for Petroleum	5.0
PETR	401 Gas Distribution and Utilization	4.0
PETR	402 Petroleum Products: Testing and Utilization	5.0
PETR	403 Process Dynamics	3.0
PETR	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. Prerequisite: CHEM 101.

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. Prerequisite: CHEM 201.

CHEM 415 Petroleum Chemistry - Correlates the physical and chemical properties of petroleum chemicals with their structures. Naming compounds and the production and end-use of petro-chemicals of commercial importance are emphasized. Instrumental analyses of petroleum fractions and products is covered in lectures and in practical work. Prerequisite: CHEM 201.

CHSC 106 Engineering Materials - Imparts a basic knowledge of the structure, properties, behavior and application of metals. Terminology and significance of physical testing of metals: tensile testing, hardness, impact, etc. Reasons for metal failure: fatigue, creep, embrittlement. Crystal structure of metals, properties and forming methods of metals, corrosion and nondestructive testing.

CHSC 341 Unit Operations - An introduction to chemical engineering. Topics include transportation of fluids, thermodynamics, heat transfer, evaporation, distillation, liquid/liquid extraction, solid/liquid extraction, gas absorption, psychrometry.

CHSC 351 Pollution Control - Examines the hydrocarbon processing industry: air pollution meteorology, fundamentals of waste products 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 and to programming in BASIC on personal, mini and mainframe computers. FORTRAN programming on mainframe. Problems solved via programming are in the petroleum field.

MATH 147 Basic Technical Mathematics for Petroleum - Graphical linear programming. Exponential/logarithmic theory and transformations, common and natural logarithms and logarithmic/semilogarithmic graphs. Radian measure and its applications. Trigonometric functions of any angle, vectors and solution of triangles, graphs of trigonometric functions, identities, compound and double angles, trigonometric equations and inverse functions.

MATH 247 Calculus 1 and 2 for Petroleum - 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 areas and volumes. Tables of integrals, integration by parts and by trigonometric substitution. Prerequisite: MATH 147.

MATH 347 Differential Equations for Petroleum - Integration using partial fraction methods. Elementary differential equations and separation of variables. Integrating factor method for first order differential equations; solutions by numerical methods. Second order differential equations. Partial differentiation. Practical applications of all of the above topics.

MATH 447 Statistics and Numerical Methods for Petroleum - Organization and graphical presentation of data, frequency distributions and measures of location and dispersion including mean and standard deviation. Probability theory and laws. Random variables, discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Correlation. Linear programming using the Simplex method. Gauss-Jordan method for solving sets of simultaneous equations. Solution of algebraic and transcendental equations by iterative methods. Prerequisite: MATH 347.

PETR 102 Petroleum Geology - Relates historical and physical geology to the formation, migration and accumulation of economically producible oil and gas fields; also covers the basic processes required to locate and produce these accumulations. Emphasis is placed on the practical utilization of computer-based technology in this field.

PETR 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.

PETR 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: PETR 102.

PETR 202 Field Handling of Oil and Gas - Covers the handling of crude oil and natural gas from the wellhead 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. Prerequisite: PETR 103.

PETR 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 include: atmospheric and vacuum distillation; thermal, catalytic and hydro cracking; catalytic reforming; alkylation; polymerization; hydro-treating; chemical treating; lubricating oil refining; process and effluent water treating. A term paper with oral presentation is required.

PETR 307 Pipeline Transmission - Covers the basic skills required for a student to enter a gas transmission company. Topics include gas quality measurement, control, pipeline design and construction, corrosion control, testing, compressor station operations. Emphasis is placed on adherence to the Canadian Safety Code of Pipelines. Practical utilization of computer technology in this field is stressed.

PETR 308 Fuels - Examines alternative conventional and substitute fossil fuels, the processes used to produce and handle such fuels, their utilization, and the advantages and disadvantages of these fuels in relation to present day conventional fuels.

PETR 401 Gas Distribution and Utilization - An introduction to the distribution and utilization of natural gas. Topics 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. Prerequisite: PETR 307.

PETR 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. Lectures examine the desired properties and specifications of these products and the equipment in which the products are used. Labs 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: PETR 306.

PETR 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. Prerequisite: CHSC 341, MATH 247.

PETR 404 Computer Simulation and Control - A course in basic computer simulation and control techniques. Emphasis will be on practical input/output applications. Topics include: concept of computer control, input/output software and hardware, interfacing, analog/digital conversions and practical applications. Students will have hands-on experience with current petroleum oriented computer programs.

PHYS 101 Physics for Petroleum - Basic concepts and calculations in the mechanics of particles, solids and fluids which serve as a foundation for later studies in petroleum technology. The laboratory deals with the principles of measurement and the experimental method of acquiring knowledge.

PHYS 201 Physics for Petroleum - Basic concepts and calculations in heat transfer, electricity, magnetism, waves, and atomic physics. These sciences are the basis for much of modern technology and exploration geophysics. Prerequisite: PHYS 101.

PHYS 204 Introductory Geophysics - Utilizing the concepts covered in PHYS 201, this course is an introduction to the uses of geophysics in the search for gas and oil deposits. Acquired skills will include operation of geophysical instruments, data reduction, and the elementary aspects of data interpretation. Prerequisite: PHYS 101.

SURV 128 Introduction to Surveying for Petroleum - Familiarizes students with the instruments and fundamental field and computational procedures which are used in the survey industry. The course covers survey theory, surveying objectives, practical applications of surveying equipment, mathematical computations and graphical representations as they apply to surveying.

TCOM 101 Introduction to Technical Communication - In this course, students learn the fundamentals of clear technical writing and the principles of style and organization. They write documents relevant to the petroleum industry including technical descriptions, instructions, letters and memos. They also give an oral report.

TCOM 208 Technical Communication for Petroleum - A continuation of TCOM 101. This course focuses on technical reports of various lengths and deals with organization, format, graphics and writing strategies. Students make oral presentations, learn how to write resumes and application letters,and participate in job interviews and meetings. Prerequisite: TCOM 101.

Faculty and Staff

J.T. Neilson, B.A.Sc., P.Eng., Associate Dean
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R.G. Kinney, Dipl.T., A.Sc.T.

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M. Tarr, B.C. Gas Inc.

PLASTICS

Diploma Program

The program is designed to provide practical and theoretical training in production processes used in the manufacture of plastic products for a variety of applications: packaging, coatings and adhesives, construction, electronics, electrical, consumer, automotive, etc.

Job Opportunities

The plastics industry is the fastest growing secondary manufacturing industry in Canada, particularly in B.C. This tremendous growth is expected to continue on a broad scale. Graduates of the Plastics Technology program will find opportunities for satisfying and rewarding careers in manufacturing, product and process research and development, technical sales and marketing, product and mold design, inspection and quality control. It is anticipated that supervisory posts will be assumed with appropriate job experience.

The Program

Emphasis is placed on plastics processes such as thermoforming, rotational molding, injection molding, blow molding, extrusion, film production, and related testing procedures. A study of the construction and design of plastic dies and molds and product design is strongly backed by studies in materials science, polymer chemistry, mathematics, technical communication, mechanical design and computer-aided drafting.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Accreditation

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

Prerequisites

High school graduation with English 12, Math 12 and Chemistry 11 or Physics 11 are course requirements for this program. Applicants should have a solid academic background and good communication skills, be able to work effectively with people, and enjoy the challenge of applying ideas to practical situations.

Technology: PLASTICS

Level 1		Clrm hrs/wk
CDCM 101	Computer Science 1	3.0
CDCM 102	Intro to CAD Graphics Level 1	4.0
CHEM 120	General Chemistry for Plastics	4.0
MATH 149	Basic Technical Mathematics for Mechanical	5.0
MECH 100	Engineering Graphics 1	3.0
MECH 104	Statics	4.0
PLAS 100	Plastics Technology 1	4.0
TCOM 109	Technical Communication	4.0
Level 2		
CHEM 220	Organic Chemistry for Plastics	4.0
CHSC 262	Engineering Materials for Plastics Technology	3.0
MATH 249	Calculus for Mechanical	4.0
MECH 206	Mechanics of Materials	4.0
MECH 220	Engineering Graphics 2	3.0
MECH 225	Manufacturing Processes	4.0
PHYS 215	Physics for Plastics Technology	4.0
PLAS 200	Plastics Technology 2	4.0
Level 3		
CHEM 320	Polymer Chemistry and Technology	4.0
ELEC 256	Instrumentation for Plastics	5.0
MATH 349	Numerical Methods for Mechanical	4.0
MECH 301	Machine Design 1	4.0
MECH 320	Fluid Power 1	3.0
PLAS 300	Plastics Technology 3	7.0
PLAS 302	Plastic Products and Mold Design	2.0
PLAS 303	Injection Molding Simulation and Analysis	2.0
Level 4		
MATH 449	Statistics and Quality Control for Mechanical	4.0
MECH 420	Fluid Power 2	3.0
MECH 460	Engineering Economy.(4A)	3.0
OPMT 411	Production Engineering Management	4.0
PLAS 401	Fiber Reinforced Plastics	4.0
PLAS 409	Plastics Technology 4	6.0
PLAS 411	Senior Plastic Project	4.0
TCOM 217	Technical Communication for Plastics	4.0

COURSE DESCRIPTIONS

CDCM 101 Computer Science 1 - Introduction to computer science and programming using popular commercially available spreadsheet software. Emphasis will be on engineering problems using structured problem-solving techniques.

CDCM 102 Introduction to CAD Graphics Level 1 - Computer-aided design using commercially available software. Includes an introduction to hardware requirements, operating systems, file handling and CAD concepts. CAD skills include element placement and manipulation, view control, measurement, text, dimensioning and plotting.

CHEM 120 General Chemistry for Plastics - Review of general principles of chemistry leading to an understanding of matter, plastic or otherwise. Includes physical and chemical change, atomic structure and bonding. Equations, molar weights and stoichiometry provide the tools necessary to carry out reaction calculations and quantitative analysis. Also includes solution chemistry (mechanism preparation acid-base and redox), corrosion and the behaviour of gases, liquids and solids. Laboratory exercises are designed to teach safe working techniques and correct attitude, and include analysis and aqueous reactions.

CHEM 220 Organic Chemistry for Plastics - Surveys the wide field of organic compounds. Starting with hydrocarbons, a firm foundation of organic structure and naming is established, typical reactions are described. Derivatives of hydrocarbons (alcohols), halides, phenols, carbonyl compounds, carboxylic acids and derivatives, esters, amides, acid chlorides and anhydrides, are presented. Naming, structure, reactions and involvement in the plastics industry is emphasized. Knowing the structure of commercial plastic materials, a correlation is made between their physical properties, intermolecular forces and end-use requirements.

CHEM 320 Polymer Chemistry and Technology - The different ways in which plastics behave during processing and in service performance depend on the polymer which is present; additives and copolymers modify this behaviour. CHEM 320 shows how these variables are related to the chemical structure of the polymer by exploring many commercial examples of condensation and addition polymers. Lab work involves the use of safe techniques in a series of polymer preparations, analyses, identifications and characterizations.

CHSC 262 Engineering Materials for Plastics Technology - Comparative properties of all classes of engineering materials including metals, alloys, plastics, concrete, wood and ceramics. Common causes of failure in service including fatigue, weathering, embrittlement and corrosion.

ELEC 256 Instrumentation for Plastics - 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 behaviour and controllability. On/off, proportional, integral and derivation control. Control strategy. Ratio, cascade, multivariable and feedforward systems, introduction to computer control.

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 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 - The application of numerical methods to engineering problems is introduced. Using the BASIC language, the algorithms are programmed and used in complex problem-solving. Matrix methods and their application to computer graphics, linear programming and other applied mathematics problems are presented.

MATH 449 Statistics / Quality Control for Mechanical - The application of basic statistical principles and techniques to industrial quality control is emphasized in this course. Topics include descriptive statistics (Pareto and CE analysis), the Hypergeometric, Poisson, Binomial and Normal probability, an introduction to hypothesis testing, tolerances and fits, sampling distributions, basic capability analysis, design of acceptance sampling plans, operating characteristic curves, use of Mil-Std 105D, risks in sampling, use and interpretation of control charting for x-bar and R or s, and statistical process control (SPC). MATH 449 provides a sound foundation for students hoping to eventually challenge the American Society for Quality Control's Certified Quality Technician and Engineer examinations.

MECH 100 Engineering Graphics 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, with emphasis on orthographic projection, auxiliary views, dimensions and working drawings.

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

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 220 Engineering Graphics 2 - Advanced engineering graphic techniques including sections, isometrics,intersections, developments, single line pipe drawings, structural steel and connections, dimensional limits, tolerances and fits. Course work leads into specific engineering drawing assignments developed according to the student's program. Computerized drafting techniques may be used where appropriate. Prerequisite: MECH 100.

MECH 225 Manufacturing Processes - A basic orientation course providing the student with practice in metal joining using various brazing, soldering, epoxy, welding techniques, and tensile testing methods. The course leads into metal removal processes and their related theory dealing with machine tools, tool materials and selection, material machinability, use of coolants and cutting oils, calculations for power, cutting speeds, estimate of time and productivity along with the technical language required in the industry.

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, bolted and riveted connections; spur, helical and worm gear drives; speed reducers; belt and roller chain drives; flexible couplings; shafts, antifriction and journal bearings; brakes and clutches; power screws; helical and leaf springs; an introduction to mechanical vibrations with emphasis on the critical speeds of rotating assemblies.

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.

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.

MECH 460 Engineering Economy - 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.

OPMT 411 Production Engineering Management - Surveys 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 lectures, labs, assignments and a student teamwork project. Prerequisite: TCOM 217 (may be taken concurrently).

PHYS 215 Physics for Plastics Technology - This introductory course deals with basic concepts in linear and rotational kinematics/dynamics, electricity and magnetism and solid state physics. General problem-solving skills are emphasized and concept applications are discussed. Data acquisition and analysis are stressed in the laboratory.

PLAS 100 Plastics Technology 1 - This is a general introduction to plastics technology. Information is presented on the scope of the plastics industry, the basic composition of plastic materials; health, safety and environmental considerations. The various forms of plastics and ingredients added to plastics are reviewed. The plastics families, their properties and how those properties are determined, are discussed in detail. Laboratory work complements lecture material.

PLAS 200 Plastics Technology 2 - Introduction to manufacturing processes used in the shaping and forming of plastic products. All the major processes such as injection, extrusion, blown film, expansion, compression, blow molding, casting, coating as well as fabricating, decorating and radiation processes, are covered. In addition, some discussion of tooling, mold making, design and the commercial aspects of a plastics business are discussed. For each process, operating steps are reviewed. In general, the key features, advantages and disadvantages, and equipment used are presented.

PLAS 300 Plastics Technology 3 - A more in-depth presentation of thermoplastic processes, equipment, operating characteristics, process variables and their effect on product quality. Considerable time is spent learning to set up equipment and to operate it effectively. Material processing characteristics and product quality are related to laboratory studies of the rheological properties of plastics under various process conditions. Operation of production scale equipment is included. Prerequisite: PLAS 200 or permission of instructor.

PLAS 302 Plastic Products and Mold Design - Focuses on injection molds and part design. Mold components, their function, care and maintenance are covered. Mold stresses during and after injection are discussed and detailed stress calculations performed. Design rules for injection molded parts are reviewed along with the form and function of runners and gates. In general, dies and tooling are discussed. Prerequisite: PLAS 200 or permission of instructor.

PLAS 303 Injection Molding Simulation and Analysis - This is a lab course introducing the use of MOLDFLOW software on SUN spark workstations for the analysis of plastic flow regimes in injection molds. The optimum selection of molding conditions for a given part and proper choice for part thickness, gate location, materials and a variety of other processing variables are evaluated using "MOLDFLOW" software. Prerequisite: PLAS 200 or permission of instructor.

PLAS 401 Fiber Reinforced Plastics - General review of fiber reinforced manufacturing processes from fiberglass to more exotic composite materials. Includes resin systems, cure cycles, materials handling and safety; repair and finishing procedures. Prerequisite: PLAS 300 and CHEM 320 or permission of instructor.

PLAS 409 Plastics Technology 4 - An extension of PLAS 300, this course includes plant engineering aspects as well as material handling systems. A more in-depth review of extrusion, injection molding and blow molding processes, equipment and operating characteristics is covered along with some specialized topics in compounding and plant locating. Prerequisite: PLAS 300 or permission of instructor.

PLAS 411 Senior Plastic Project - Students select from a folio of industry sponsored projects or propose their own project. Each person or project team prepares a proposal and, once approved, presents the information to the class. Verbal and written status and final reports are presented. Students are assigned to a faculty advisor and may seek help from their peers. Emphasis is on acquiring good project management skills. Prerequisite: PLAS 300 or permission of instructor.

TCOM 109 Technical Communication - In this course, students learn the basic techniques for effective writing and speaking in the mechanical technology field. They learn layout, organization and graphic techniques for technical writing. They produce letters, memos, instructions, short reports and a new resume. Two oral reports are required.

PLAS 217 Technical Communication for Plastics- 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 report. They also present an oral technical report. Prerequisite: TCOM 109.

Faculty and Staff

T. Williams, B.Sc., M.Sc. (Mech Eng.), P.Eng.
Associate Dean
D.F. Wilson, Ph.D., Program Head
J.E. Pretzlaff, Dipl.T.
E. Kulhanek, M.Sc.

QUALITY ASSURANCE AND NONDESTRUCTIVE TESTING

Post-diploma Program

This is a one-year program leading to a Diploma of Technology. The program emphasizes nondestructive testing, quality control, and quality assurance concepts and techniques.

Graduates will be equipped to work as quality assurance technologists in a wide variety of light and heavy manufacturing industries.

Program Length

One year beginning in September each year.

Tuition Fees (subject to change)

$1823 for the one-year program (1992/93).

Prerequisite

BCIT Diploma of Technology in an Engineering Program or Operations Management, or a two-year college Diploma in Science, or a minimum of two years university science or engineering courses.

Program: QUALITY ASSURANCE AND NONDESTRUCTIVE TESTING

		Clrm hrs/wk
Level 5		
CHSC 538	Metallurgy and Physical Testing	6.0
CHSC 539	Nondestructive Testing 1	10.0
ELEC 258	Electrical Metrology	4.0
MATH 514	Statistical Quality Control 1	4.0
OPMT 536	Quality Assurance 1	6.0

		A	**B**
Level 6			
CHSC 639	Nondestructive Testing 2	9.0	9.0
MATH 614	Statistical Quality Control 2	4.0	4.0
MATH 624	Computer Applications: Statistical Quality Control	3.0	-
MECH 441	Metrology for QA/NDT	3.0	3.0
OPMT 636	Quality Assurance 2	5.0	5.0
OPMT 637	Management of Quality	3.0	3.0
OPMT 638	Computer Applications for QA	-	3.0
Electives:			
CHSC 638	NDT Practicum	4.0	4.0
OPMT 639	QA Practicum	4.0	4.0

COURSE DESCRIPTIONS

CHSC 538 Metallurgy and Physical Testing - Metallurgy topics will include metal processing, material defects and failure analysis. Laboratory work will emphasize metallography, physical testing methods, codes and specifications.

CHSC 539 Nondestructive Testing 1 - Introduces the five major methods of nondestructive testing used in industry: radiography, ultrasonics, magnetic particle, liquid penetrant and eddy current including the basic principles of the different methods including safety and reporting. Extensive hands-on time will be allotted.

CHSC 638 NDT Practicum - This course allows the student to gain valuable hands-on experience working in the local NDT industry with senior technicians. Prerequisite: CHSC 539, 639 should be taken concurrently.

CHSC 639 Nondestructive Testing 2 - Advanced techniques in the five major methods of nondestructive testing; radiography, ultrasonics, magnetic particle, liquid penetrant, eddy current. Special techniques including photostress measurements, strain gauging, acoustic emission, vibration analysis, thermography, environmental tests.

ELEC 258 Electrical Metrology - Starting with a review of basic DC circuit theory, this introductory course covers AC theory basics, concepts of measurement, measurement of electrical quantities, transducers, bridge circuits, error analysis and temperature compensation techniques.

MATH 514 Statistical Quality Control 1 - Covers basic probability theory and the statistical principles necessary to understand industrial applications of QC. Topics include descriptive statistics, the hypergeometric, binomial, Poisson, and Normal probability models, and an introduction to hypothesis testing and process capability. These concepts will be introduced in the context in which they could arise or be utilized in industry. This course and its sequel, MATH 614, will cover most of the statistical knowledge necessary to meet the requirements of ASQC'S Quality Technician (CQT) and Quality Engineer (CQE) exams.

MATH 614 Statistical Quality Control 2 - Uses the principles learned in MATH 514 for specific industrial applications of quality control. Topics include sampling distributions and introduction to Statistical Process Control (SPC), troubleshooting with control charts (x-bar, R, s, p, u, c, cusum charts), process capability, acceptance sampling techniques and terminology (construction of sampling plans, the use of established plans such as ANSI/ASQC Z1.4 and Z1.9, Dodge-Romig), and some experimental design. MATH 614 will function in tandem with MATH 624.

MATH 624 Computer Applications: Statistical Quality Control - This course will utilize microcomputers and statistical quality control software to demonstrate methods of quality control used in industrial applications. The course will parallel and augment the related course MATH 614 and joint projects are planned.

MECH 441 Metrology for Quality Assurance and Nondestructive Testing - Measurement of surface texture and flatness, optical and electrical comparators, metrology of screw threads, precision measuring instruments, fundamentals of inspection, mass production gauging.

OPMT 536 Quality Assurance 1 - Definition of desired product quality and conditions for its achievement. Technical concepts of reliability. Selection and control of production processes. Establishing quality objectives and planning to meet them. Human factors, motivation, employee involvement and Quality Circles. Inspection operations. Product testing. Qualification of operators. Control of special processes. Workmanship standards. Calibration control. Quality data feedback and corrective action system. Quality records and documentation, procedures and work instructions. Quality manuals.

OPMT 636 Quality Assurance 2 - Total quality assurance concepts. Tender and contract review. QA activities in new product development. New design assurance. QA engineering team. Selection and assessment of potential suppliers, vendor performance rating. QA procurement team. Quality cost analysis. Quality and productivity. Product liability and legal aspects of product safety. Quality improvement programs. Quality system auditing. Japanese quality management methods. The impact of JIT on product quality. Automated inspection and test operations. Quality assurance for software.

OPMT 637 Management of Quality - Deals with planning and implementing quality management to meet company objectives or to comply with regulations, codes and standards. Students will work on quality management case studies involving selected standards for CSA, ANSI, ASME, AQAP and US military, ASTM, UL, ISO, and Transport Canada. The course will explain how the techniques discussed in OPMT 536/636 fit into a planned, systematic program, to the extent required by whatever standard affects the company operations.

OPMT 638 Computer Applications for QA - An introduction to computerized management information systems and the use of industry-standard software products to meet the reporting needs of management and provide decision support. In the IBM PC lab, each student will use dBASE III Plus to develop a computerized database. The student will then use that database to organize data, answer queries, and generate custom reports. Emphasis is on Quality Assurance system applications. Prerequisite: MATH 624 (or familiarity with microcomputer hardware, DOS and spreadsheet applications).

OPMT 639 Quality Assurance Practicum - An industry-based study under faculty supervision designed to give the student an opportunity to work in a quality assurance function in local industry on a special project, by arrangement with the quality manager of the company involved. Criteria, objectives, monitoring and evaluation are established by formal terms of reference for the practicum. While taking this post-diploma program course students will normally also be registered in OPMT 636 and OPMT
637.

Faculty and Staff

J.T. Neilson, B.A.Sc., P.Eng., Associate Dean
W. Irvine, B.A., M.Sc., P.Eng., Program Head
J. Lloyd, P.Eng.
D. McLeod, A.R.M.T.C., M.I.M.
R. Pike

Advisory Committee Members

T. Coughlan, B.C. Research, Chair
A. Jenner, Sulzer Bingham Pumps Inc.
K. Kaye, Ministry of Municipal Affairs Recreation & Housing
M. Koestlmaier, Ebco Industries Ltd.
T. McLean, Industrial Nondestructive Testing Ltd.
F. Pfeiffer, Canadian Airlines International Ltd.
G. Sale, Prism Systems Incorporated
S. Salter, Quality Management Institute
G. Sieben, Coast Testing
D. Stasuk, Stasuk Testing & Inspection Ltd.
D.A. Wensley, M B Research
D.A. Wensley, M B Research

RENEWABLE RESOURCES

Diploma Programs

British Columbia's greatest natural renewable resource is its forest land. The benefits which derive from intelligently planned use of this land are many, varied and extremely valuable. Wise use of the land and related resources is essential for the continued survival of many industries and their dependent communities, as well as for the perpetuation of the resources themselves. The Renewable Resources programs have been established to meet these needs. Training is offered in two programs: **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. Student enrolment is restricted so as to approximate the number of jobs available.

The Programs

Forestry covers forest management; botany, ecology and soils; photo interpretation and mapping; silviculture and reforestation; protection and fire management; measurements; engineering, logging production and utilization.

Accreditation

The program is accredited at the technologist level by the Applied Science Technologists and Technicians of B.C.

Fish, Wildlife and Recreation covers the management of fish, wildlife and wildland recreation and includes habitat ecology, environmental inventory techniques and environmental law with respect to these resources.

When course credits are given, electives will be chosen in consultation with the Program Head.

Prerequisites *

The following are **minimum** requirements: High school graduation with Math 11 with C+; a Science 11 (for F.W.R. option must be Biology 11); any one of another Science 11, or a Science or Math 12, and English 12. Work experience in natural resources strengthens an application for either of the programs.

* Out of province and mature student applications will be reviewed by the Associate Dean.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3631 for the two-year program (1992/93).

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 $500 for first year and $600 for second year.

Program: FORESTRY

			Clrm hrs/wk
Level 1			
RENR	100	Enhanced Learning Skills	0.5
MATH	145	Basic Technical Mathematics for Renewable Resources	5.0
RENR	101	Natural Resource Measurement	5.0
RENR	103	Plant Identification	5.0
RENR	104	Photo Interpretation and Mapping 1	4.0
RENR	106	Microcomputer Applications	3.0
RENR	108	Applied Ecology in B.C. Natural Resources 1	5.0
TCOM	116	Introduction to Technical Communication	3.0
Level 2			
MATH	245	Mathematics 2 for Renewable Resources	5.0
RENR	201	Forest Measurement 1	8.0
RENR	202	Introduction to Soils	4.0
RENR	203	Applied Ecology in BC Natural Resources 2	5.0
RENR	204	Photo Interpretation and Mapping 2	4.0
RENR	205	Fire Management 1	3.0
*RENR	208	Integrated Resource Project	40.0
TCOM	206	Technical Communication	3.0

* a one-week course at end of term

Level 3			
RENR	301	Forest Measurement 2	6.0
RENR	304	Forest Pestology	4.0
RENR	305	Silviculture 1	4.0
*RENR	311	Summer Technical Report	4.0
RENR	315	Fire Management 2	3.0
RENR	318	Forest Engineering 1	10.0
RENR	326	Forest Management	4.0
TCOM	304	Advanced Technical Communication	2.0

• prepared during summer

Level 4			
RENR	404	Forest Pestology	4.0
RENR	405	Silviculture 2	5.0
*RENR	413	Independent Studies	30.0
RENR	414	Log Scaling	4.0
RENR	417	Forest Engineering 2	7.0
RENR	421	GIS	3.0
RENR	423	DBase IV	2.0
RENR	426	Forest Administration	4.0
TCOM	402	Advanced Technical Communication	2.0

* a two-week course

Program: FISH, WILDLIFE AND RECREATION

			Clrm hrs/wk
Level 1			
MATH	154	Basic Technical Mathematics for FWR	4.0
RENR	101	Enhanced Learning Skills	0.5
RENR	101	Natural Resource Measurement	5.0
RENR	103	Plant Identification	5.0
RENR	104	Photo Interpretation and Mapping 1	4.0
RENR	106	Microcomputer Applications	3.0
RENR	108	Applied Ecology in B.C. Natural Resources 1	5.0
TCOM	116	Introduction to Technical Communication	4.0
Level 2			
BISC	224	Zoology	5.0
RENR	202	Introduction to Soils	4.0
RENR	203	Applied Ecology in B.C. Natural Resources 2	5.0
RENR	207	Introduction to Fish, Wildlife and Recreation	4.0
*RENR	208	Integrated Resource Project	40.0
RENR	209	GIS	3.0
MATH	254	Statistics for FWR	6.0
RENR	210	Environmental Monitoring	3.0
TCOM	215	Advanced Technical Communication	4.0

* a one-week course

Level 3			
RENR	307	Recreational Land Management	7.0
RENR	308	Wildlife Management	7.0
RENR	309	Fish Management 1	6.0
RENR	310	Projects	6.0
*RENR	311	Summer Technical Report	
RENR	316	Natural Resource Administration	3.0
TCOM	307	Advanced Technical Communication	2.0

* prepared during summer

Level 4			
RENR	407	Recreational Land Management	7.0
RENR	408	Wildlife Management	7.0
RENR	409	Fish Management 2	7.0
RENR	410	Projects	5.0
RENR	412	Environmental Law Enforcement	3.0
*RENR	413	Independent Studies	30.0
TCOM	415	Public Information Techniques for FWR	3.0

* a two-week course

COURSE DESCRIPTIONS

BISC 224 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.

MATH 145 Basic Technical Mathematics for Renewable Resources - Systems of measurement, mensuration, Trapezium and Simpson's rules. Angular systems and angular motion. Trigonometric and inverse ratios. Oblique triangle solutions, vectors. Ratio, proportion and variation. Polynomials, general formulae formation and modification. General graphing. Linear programming. Exponential and logarithmic relations, and empirical linear and curvilinear relation determination.

MATH 154 Basic Technical Mathematics for Fish, Wildlife and Recreation - Accuracy and precision in measurements, word problems of ratio, proportion and variation, mensuration including geometrical applications, trapezoidal and Simpson's rules, right and general triangle trigonometry, functions and graphs, linear programming, quadratic, logarithmic and exponential functions, graphs on logarithmic scales, introduction to population models.

MATH 245 Mathematics 2 for Renewable Resources - Descriptive statistics. Probability laws. Random variables, discrete and continuous theoretical distributions. Estimation as applied to sampling theory, hypothesis testing, count data analysis and sampling by stratified analysis. Regression and correlation of linear, power, and exponential relations.

MATH 254 Statistics for 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.

RENR 101 Natural Resource Measurement - Concepts of field measurement and basic surveying. Includes field note-taking, traverse calculations and plotting, sketching of topographic detail, horizontal and vertical error corrections, differential levelling of roads and streams, latitude and departure calculations of traverses, map assembly field notes, and sampling for population estimates. Emphasis is on field labs with supporting lectures.

RENR 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 plant reproduction with particular emphasis on conifers. Recognition and evaluation of common plants in forest, range land and alpine habitats of B.C. and their uses in land management practices. A plant collection containing at least 75 native plant species is required from students.

RENR 104 Photo Interpretation and Mapping 1 - Practical use and application of aerial photography for natural resources. Classification, reconnaissance, planning and inventory using aerial photos. Practice in the use of stereoscopes. 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. Continues in RENR 204.

***RENR 106 Microcomputer Applications** - Introduction to computer applications for various forestry, fish, wildlife and recreation requirements. The course enables the first-time computer user to become familiar with specific microcomputer hardware, an operating system, and application software. Technology-related applications will be used to help students become acquainted with word processing, spreadsheets, graphics, databases, and the integrated nature of a software package.

RENR 108 Applied Ecology in B.C. Natural Resources 1 - Provides basic background material on B.C.'s land and climatic regions, major natural resources, the agencies and industries involved with such resources, and their relative value to the province. The evolution of each resource industry and the current relevant legislation are discussed. Fisheries, forestry, range, wildlife, agriculture, parks and recreation, tourism, mining, gas and oil, and hydro power are explored. Resource integration processes are discussed and relevant tenure systems are described. The need for cooperation and understanding among resource users is emphasized.

RENR 201 Forest Measurement 1 - Continuation of RENR 101. Methods of measuring standing and felled timber. Direct measurement of tree diameter, height and age. Field mapping. Characteristics and uses of standard volume tables. Construction of local volume tables. Types of sampling and design and elementary statistical analysis. Compilation methods for sample data. Computer use for data summary. Report writing. Prerequisite: RENR 101, 104, and MATH 145; or instructor's approval.

RENR 202 Introduction to Resource Valuation - Builds on RENR 101 basics and uses the appraisal cruising process as a vehicle for introducing: sampling principles; gross and net volume concepts; basic biometrics, utilization history and policy; inventory and appraisal cruise compilation; computer applications; tenure and appraisal basics; project planning and integration of data for use in GIS based "total chance" planning. Prerequisite: RENR 101, 104, 106, MATH 145 or instructor approval.

RENR 203 Applied Ecology in B.C. Natural Resources 2 - Introduction to basic concepts and terminology of ecology. Discusses ecosystem components, energy flow and management of ecosystems. Students will identify numerous terrestrial and aquatic ecosystems. Emphasis is placed on the Biogeoclimatic Zone System of B.C., and on field identification of ecosystem associations, their productivity and management constraints. Forest succession, the role of fire, fish and wildlife habitats, and recreational planning are discussed. Examples are drawn from current environmental issues. Prerequisite: RENR 101, 103, and 108; or instructor's approval.

RENR 204 Photo Interpretation and Mapping 2 - See RENR 104. Prerequisite: RENR 104, and MATH 145 or 154; or instructor's approval.

RENR 205 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.

RENR 207 Introduction to Fish, Wildlife and Recreation - Basic identification of fish and wildlife and their importance and interaction with other natural resources.

RENR 208 Integrated Resource Project - This course is an intensive one-week project in which students from the Forestry and Fish, Wildlife, Recreation programs work together in teams to produce integrated resource use plans for a specific watershed. L.R.U.P. (Local Resource Use Plans) data and appropriate environmental, fish, wildlife, recreational, logging, silvicultural and financial information is presented by staff to implement first-year course material. Each term prepares a plan, presents it with visual aids, and engages in a public involvement process. An industry/agency group provides the final review.

RENR 301 Resource Sampling and Valuation - An elaboration of the principles, concepts and techniques from RENR 201 and the application and practice of these procedures. Introduces more advanced sampling analysis and procedures such as v. bar theory, count/enhanced count plots, 3-p sampling, current waste assessment techniques and quality cruising for appraisal purposes. Introduces alternate remote and electronic data sources, their applications and limitations. Prerequisite: RENR 201, 204, MATH 245; or instructor's approval.

RENR 304 Forest Pestology - An integrated study of forest insect and disease problems. Basic life histories. The interaction of damage agencies in the forest. Improved sampling techniques related to insect and disease damage. Use of subject literature. Cooperation with appropriate agencies. Damage prevention and control. Measuring and reporting of insect and disease damage. Recognition of the currently important insects and diseases. Prerequisite: 1st year Forestry or instructor's approval.

RENR 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, site preparation, planning and methods. Prerequisite: RENR 101,103, 108, 201, 202 and 203; TCOM 101 and 206; or instructor's approval.

RENR 307 Recreational Land Management - An introductory course in recreational land management. Development and recreational use of areas designated as 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 recreational areas both in and out of established parks. Recognition of recreational sites by aerial photo interpretation of landforms. Private and public programs in forest recreation. Land tenures and land acquisition for recreation. Visual resource management. Summer and winter sports area development. Water-oriented activities, trail design, mountaineering, search and rescue. The packaging of outdoor recreation opportunities including the operation of hunting and fishing camps, guided hikes and commercial rafting companies. Prerequisite: 1st year of the program or instructor's approval.

RENR 308 Wildlife Management - The principles and practice of wildlife management, with particular reference to problems and procedures in B.C. 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. Prerequisite: 1st year of the program or instructor's approval.

RENR 309 Fish Management 1 - The biology of B. C. fish including anatomy, taxonomy, physiology, behavior and ecology. Management 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 will be done in the field. Emphasis throughout is on the B.C. situation. Prerequisite: 1st year of the program or instructor's approval.

RENR 310 Projects - The student selects a topic of interest and prepares a field-oriented study plan. A major library research paper is prepared using the Council of Biological Editors' (CBE) style format. This work is continued in RENR 410. Prerequisite: 1st year of the program or instructor's approval.

RENR 311 Summer Technical Report - A detailed report on a phase of resource management from first-hand experience, or from approved library research.

RENR 312 Environmental Law Enforcement - Deals with the many aspects of 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."

RENR 315 Fire Management 2 - See RENR 205. Prerequisite: RENR 205 or instructor's approval.

RENR 318 Forest Engineering 1 - During outdoor labs, students work in groups and prepare an operational harvesting plan utilizing cable harvesting systems. Course introduces cable harvesting systems, deflection lines, route reconnaissance, field surveys and forest road design. Prerequisite: Completion of first year forestry or instructor approval.

RENR 326 Forest Management - Forest tenure and policy in B.C., calculation of coastal and interior concepts of resource use, planning guidelines, understanding the compilation of a five-year development plan, application of a Cutting Permit Application, understanding discounted cash flows in forest management, application of G.I.S. to forest management.

RENR 404 Forest Pestology - See RENR 304. Forest health issues. The ecology of pests, insect and disease sampling and analysis techniques, forest pest decision-making techniques, pest situation analysis techniques leading to PHSP and stand treatment recommendations. Prerequisite: RENR 304 or instructor's approval.

RENR 405 Silviculture 2 - Site examination, analysis and prescriptions; 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: RENR 305 or instructor's approval.

RENR 407 Recreational Land Management - See RENR 307. Prerequisite: RENR 307 or instructor's approval.

RENR 408 Wildlife Management - See RENR 308. Prerequisite: RENR 308 or instructor's approval.

RENR 409 Fish Management 2 - See RENR 309. Prerequisite: RENR 309 or instructor's approval.

RENR 410 Projects - This is a continuation of the work begun in RENR 310. The student conducts a professional field research study and prepares a final report of a quality suitable for publication. Prerequisite: RENR 310 or instructor's approval.

RENR 413 Independent Studies - Offers an opportunity to student groups or individuals to be involved in a project which is of special interest to them. Each student will select a subject area and devote two full weeks to fulfil the requirements of the course, under the direction of a staff member. The student must submit a memo, project outline, daily journal, and report of acceptable standard to the Independent Studies Committee before the designated deadlines. The course occurs during the last two weeks of level 4, after final exams have been written.

RENR 414 Log Scaling - A metric log scaling course with instruction occurring primarily on log booms in the Fraser River and theory reinforced through classroom sessions. The course includes species recognition, volume calculation, deduction for defect and log grading. Visits to conversion facilities to observe lumber recovery, shake and shingle production and veneer manufacturing from logs will be included. Prerequisite: RENR 301 or instructor's approval.

RENR 416 Natural Resource Administration - Many of the functions once performed by government agencies and industry in the natural resources 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 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.

RENR 417 Forest Engineering 2 - Introduction to ground-based harvesting systems, bridges and drainage structures, sorting and transportation of logs, engineering economics, harvest planning and forest landscaping. Students use current microcomputer software including databases and spreadsheets to solve various engineering problems. Prerequisite: RENR 106, 318.

RENR 421 GIS -

RENR 423 dBase IV - Introduction to spreadsheet and database applications with the emphasis on forestry applications. Students get hands-on experience using Lotus 1-2-3 and dBase IV. Prerequisite: RENR 106.

RENR 426 Forest Administration - See RENR 416.

TCOM 116 Introduction to Technical Communication - This course introduces Forestry and Fish, Wildlife and Recreation students to professional writing skills as applied to routine request letters, persuasive requests, claim letters, adjustment letters, bad-news letters, and in written instructions. It also includes resume writing and the basic skills of oral presentation.

TCOM 206 Technical Communication - This course teaches Forestry students professional writing skills as applied to memo and formal reports: incident reports, progress reports, inspection reports, proposals, and comparison reports, including the use of graphics. It includes job-search skills, application letters, resumes and interviewing. It also includes oral presentations, library research and literature-citing skills. Prerequisite: TCOM 101.

TCOM 215 Technical Communication - This course teaches Fish, Wildlife and Recreation students professional writing skills as applied in memo and formal reports: stream surveys, incident reports, progress reports, proposals, and comparison reports, including the use of graphics. It includes job-search skills: application letters, resumes and interviewing. It also includes oral presentation experience, library research and literature-citing skills. Prerequisite: TCOM 115.

TCOM 304 Advanced Technical Communication - In this course students review and practise the writing, thinking and revision skills that apply to the Summer Technical Report. This analytical report forms the major writing component of the course, but students also write several memos and give a major oral technical briefing. Prerequisite: TCOM 101 or 115 and 206 or 215.

TCOM 307 Advanced Technical Communication - In this course students review and practise the writing, thinking and revision skills that apply to the Summer Technical Report and other industry-related documents. In addition, students prepare and present extended slide/tape presentations. Prerequisite: TCOM 101 or 115 and 206 or 215.

TCOM 402 Advanced Technical Communication - Students update their resumes and write application letters. In addition, they learn specialized techniques for communicating with the public through media plans, newspapers and video interviews. They practise their writing and revising skills in a Forestry Engineering Research Report. Prerequisite: TCOM 101 or 115, and 206 or 215 and 304 or 307.

TCOM 405 Public Information Techniques for Fish, Wildlife and Recreation - Students study specialized principles and techniques for communication with the public through interpretive, educational programs and the media. They write promotional data, news releases and journal articles. They practice public speaking, graphic display preparation, interview techniques and interpretive program design. Prerequisite: TCOM 101 or 115 and 206 or 215 and 307.

Faculty and Staff

M. A. Angelo, B.S.F., M.F., Associate Dean
N. E. Alexander, M.P.M., R.P. Bio.
D. Campbell, Dipl.T., Dipl. Adult Ed., Program Head, Forestry
R. Chester, B.A., M.R.M.
T. D. Chisholm, B.Ed.
C. Diebold, C. Tech.
D. Guthrie, B.Sc., M.Sc., Ph.D.
A. G. Jakoy, B.S.F., M.Sc., R.P.F.. 1st Year Co-ordinator
R. Kley, Dipl.T., A.Sc.T.
R. W. Reisen, Dipl.T., E.T.I., A.Sc.T.
G. Rosberg, B.Sc., Dipl.T., R.P. Bio.
J. Rudolph, Dipl. T.
N. Shaw, Dipl.T., A.Sc.T.
J. Simpson, B.Sc.F., M.Sc.
B. Sivak, B.S.F., M.F., Ph.D., R.P.F.
J. Smyth, Dipl.T.
P. Yanciw, B.A.Sc.

Advisory Committee Members: Fish, Wildlife Recreation Option

E. W. (Ted) Richardson, Aprotek Design
T. Bell, Ministry of Crown Lands and Parks
D. Carmichael, Ministry of Crown Lands and Parks
G. Carlson, Ministry of Environment
B. Cox, Ministry of Environment
R. Forbes, Ministry of Environment
J. Hawes, Ministry of Crown Lands and Parks
M. Hayden, Ministry of Environment
D. Herchmer, Ministry of Forests
R. Hoffos, Ministry of Forests
L. Kalnin, Department of Fisheries & Oceans
J. Lamb, Department of Fisheries & Oceans
D. Lowe, Ministry of Environment
R. McKelvey, Canadian Wildlife Service
S. MacNaughton, Canadian Parks Service
J. Miller, Ministry of Crown Lands and Parks
R. Moody, Habitat Conservation Fund
B. Nyberg, Ministry of Forests
W. Pollard, Consultant
B. Richman, Department of Fisheries & Oceans
J. Scott, Consultant
C. Scrivener, Department of Fisheries & Oceans
G. Taylor, Ministry of Environment
M. Turner, Ministry of Crown Lands and Parks

Advisory Committee Mernbers: Forestry Option

P. Affleck, Manager, Fortrends Consulting Inc.
R. Deboo, RPF, Pacific Forestry Centre
J. Chettick
R. Clark, Fletcher Challenge Canada
M. DeHaan, Regional Manager, Ministry of Environment
S. Dixon, Independent Consultant
D. Fletcher
D. Gilbert, Ministry of Forestry
S. Huddart, Basic Forestry
D. Jepsen, R.P.F.
K. Joy, Parks Forester, Ministry of Parks
L. Kaivanto, Ministry of Education
L. Kiss,Valuation Officer, Fletcher Challenge Canada Ltd.
D. Lockwood
H. Lynum, Independent Consultant
S. Lowrey, Air Co-ordination, B.C. Forest Service
B. Manfield, Sylva Management Services
M. Mosher, RPF., P. Eng., Forestland Industries Ltd.
J. Nelson, University of B.C., Faculty of Forestry
A. Orr-Ewing, Fletcher Challenge Canada Ltd.
E. (Ted) Richardson, Aprotek Design Ltd.
C. Perry, International Woodworkers Association
A. Simon, Ministry of Forests
M. Stewart, RPF, Stewart Ewing Associates Ltd.
B. Vink, MacMillan Bloedel Ltd.
D. Winston, Director, Forestry Canada
Pacific & Yukon Region
C. Wood, Ministry of Forests
P. Wooding, Administrator Forester

ROBOTICS AND AUTOMATION

Diploma Program

The Robotics and Automation Technology program will provide the student with knowledge of the applications of flexible automation equipment, the various mechanical systems used and the electronics incorporated for their control. Gaining hands-on experience with a variety of industrial robots and automated machinery in a modern, well-equipped lab will be emphasized. Particular attention will be given to applying automation techniques to industries in British Columbia.

The Program

This is a cooperative program which includes 4 equal-length academic study levels of 17 weeks duration each and 2 salaried cooperative work terms during which the student can gain invaluable experience working in associated industries. Students are admitted into the first level in September only.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Degree Transfer/Completion

Transfer credit from the Robotics and Automation Technology to University degree programs is possible, on an individual basis.

Prerequisites

High school graduation with Math 12 and Physics 11 , both with C+ or better, and English 12 are required for this program.

Preference will be given to those candidates who have completed the prerequisites and an Industrial Education course within the last three years.

Program: ROBOTICS AND AUTOMATION

		Clrm hrs/wk
Level 1 (September - January)		
ELEX 100	Circuit Analysis 1	6.0
ELEX 102	Digital Techniques 1	5.0
ELEX 201	PASCAL for Electronics	4.0
MATH 134	Basic Technical Math for Robotics	6.0
MECH 106	Manufacturing Processes 1	4.0
PHYS 108	Physics for Robotics Technology	5.0
TCOM 118	Technical Writing for Robotics	3.0
	Library and Research	
Level 2 (February - May)		
ELEX 200	Circuit Analysis 2	5.0
ELEX 202	Digital Techniques 2	6.0
ELEX 203	Electronic Circuits 1	7.0
MATH 234	Calculus for Robotics	6.0
MECH 211	Manufacturing Processes	4.0
PHYS 208	Applied Physics for Robotics Technology	5.0
	Library and Research	
Level 3 (September - January)		
ELEX 341	Data Acquisition and Signal Conditioning	6.0
MATH 334	Transform Calculus for Robotics	4.0
MECH 320	Fluid Power 1	3.0
ROBT 301	Robot Applications	7.0
ROBT 302	Automation Equipment	5.0
ROBT 303	Microprocessors: Programming and Interfacing	6.0
	Library and Research	
Level 4 (February - May)		
ELEX 460	Feedback Systems	7.0
MECH 421	Fluid Power 2 (Robotics)	3.0
OPMT 183	Industrial Engineering for Robotics	4.0
ROBT 401	Robot Sensors	5.0
ROBT 403	Project	4.0
ROBT 404	Computer Integrated Manufacturing	5.0
TCOM 218	Advanced Technical Writing for Robotics	3.0
	Library and Research	

COURSE DESCRIPTIONS

ELEX 100 Circuit Analysis 1 - Teaches the principles and methods of analysis related to DC circuits. Topics include SI units and terminology, voltage, current, work, energy, power and resistance. Methods of analysis include mesh, superposition, nodal, Thevenin and Norton. Transients in RC and RL circuits are analyzed. Average and RMS values for sinewaves and rectangular waves are calculated. Labs are synchronized with lectures so that theory is studied and confirmed by application.

ELEX 102 Digital Techniques 1 - Begins with a description of the fundamental theory of the decimal and binary number systems followed by the binary (two states or levels) concept and the description of binary variables as related to mechanical switches. Various digital logic circuits are discussed and their truth tables and Boolean output equations are generated. Various logic sources are defined and interfaced to combinational logic circuits comprised of electronic logic gates. A TTL data book will be utilized to facilitate combinatorial logic circuit design. Boolean identities and Karnaugh mapping will be used to minimize algebraic expressions. Combinational digital logic will be designed and constructed implementing NAND and NOR gates using their proper Demorgan's equivalent logic symbols (Duality of Gates). Encoders and decoders will be introduced if time permits.

ELEX 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, coupled circuits. The circuit theory is verified using multimeters, sine wave generators and dual trace oscilloscopes.

ELEX 201 PASCAL for Electronics - Introduces microcomputer use, DOS operating system, programming languages, compilers and interpreters. The IBM personal computer is used throughout this course for interactive student training. The main part of the course covers PASCAL programs for engineering applications. Students will also learn to document and debug software, and to utilize available software libraries.

ELEX 202 Digital Techniques 2 - Builds on the knowledge gained in ELEX 102. Studies the utilization of logic gates in larger combinational circuits such as magnitude, comparators etc.; digital arithmetic and associated hardware; sequential logic devices such as D, J-K and T; flip-flops counters, shift registers and their application to systems such as frequency counters and parallel/serial data manipulation circuits; gathering and comprehension of electrical specifications from data books; noise margins; propagation delay and loading considerations. Interfacing techniques to discrete devices, analog and digital data multiplexing, bus structures and techniques, and an introduction to solid state memory devices. Prerequisite: ELEX 102.

ELEX 203 Electronic Circuits 1 - Explains how electronic circuits work, how to analyze, 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; DC power supplies and characteristics, and application of switching devices.

ELEX 341 Data Acquisition and Signal Conditioning - Examines the application and design of precision analog circuits to interface and signal conditioning systems. Topics include the specification, design and evaluation of amplifier systems commonly used in transducer interfacing applications, high accuracy and stability signal conditioning design techniques and 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: ELEX 203.

ELEX 460 Feedback Systems - An introduction to linear feedback theory and practice as applied to motor position and speed control. Topics include block diagram representation and block diagram reduction of closed-loop systems; the characteristics and transient behaviour of closed-loop control systems. Classification of systems into type, sensitivity to parameter variation, and system stability. Design of compensated motion control systems based on the Root Locus method and the Frequency Response method are discussed. The Z-Transform is introduced as an aid in the design of digital rather than analog controllers. Students use engineering software to aid them in problem-solving. Both analog and digital motion control systems are designed, assembled and tested. Prerequisite: ELEX 341, MATH 334, ROBT 303.

MATH 134 Basic Technical Math 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 234 Calculus for Robotics - The derivative, differentiation rules, applied maxima/minima and implicit differentiation with applications to robotics 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 134.

MATH 334 Transform Calculus for Robotics - Fourier series, evaluation of Fourier coefficients and line spectrum. Numerical harmonic analysis. First and second order differential equations with application to robotics technology. Step and impulse functions. Laplace transforms of functions and mathematical operations. Partial fractions. Inverse Laplace transforms. Solutions of differential equations. Solutions of applied problems appropriate to the robotics technology.

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. Prerequisite: MECH 106.

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 421 Fluid Power 2 (Robotics) - Provides an understanding of hydraulic 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 183 Industrial Engineering for Robotics - Surveys the general background to operations management in terms of planning and organizing manufacturing operations. Topics include facility location and layout, methods improvement and production/inventory management.

PHYS 108 Physics for Robotics Technology - This course emphasizes topics of special relevance to robotics. Part 1: measurement and data analysis. Part 2: basic mechanics, including static equilibrium, work, energy, power, torque and rotational motion. Part 3: electrical fields, electrical potential and basic electrical properties of materials. Part 4: semiconductor physics including the theory, construction and operation of semiconductor devices.

PHYS 208 Applied Physics for Robotics Technology - This course emphasizes topics of special relevance to robotics. Part 1: magnetics and electromagnetics with applications to robotic pickup systems and stepper motors. Part 2: thermal energy and thermodynamics. Part 3: advanced mechanics with special emphasis on mechanical properties of matter, 3D force systems, stress and vibration. Prerequisite: PHYS 108.

ROBT 301 Robot Applications - Discusses various robot configurations, the coordinate systems in which they operate and kinematics of robot motion. Investigates specifications such as accuracy, repeatability and load capability, and their importance in various applications. Machine elements used in automated equipment and associated machinery will be investigated.

ROBT 302 Automation Equipment - Covers the basic principles of generators and the construction, speed-torque characteristics, braking conditions and speed control of permanent magnet DC motors. The course will also cover the operation and control of brushless DC motors and stepper motors.

ROBT 303 Microprocessors: Programming and Interfacing - Investigates the software and hardware involved in the real-time control of a microprocessor-based system. Topics include microprocessor architecture, assembly language programming, input/output operations, interrupt handling and interfacing techniques between a computer and an automated controller. Troubleshooting techniques used in fault analysis are taught.

ROBT 401 Robot Sensors - Investigates various methods of interfacing real-world systems to a digital computer through the use of analog-to-digital and digital-to-analog converters. Machine vision and object recognition, tactile force sensors, range finding and navigation techniques using proximity sensors, are studied.

ROBT 403 Project - A graduation project researched and presented by the student on some aspect of automated technology. Students will give written and oral presentations on their proposed and completed designs.

ROBT 404 Computer Integrated Manufacturing - Teaches the use of a microcomputer-based CAD system. Programming the operation of CNC machine tools using manual and computer assisted methods is also covered in depth. The integration of Computer Aided Design and Manufacturing is investigated.

TCOM 118 Technical Writing for Robotics - Emphasizes clear, correct, concise technical writing for the robotics 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 learn how to prepare content and design visuals, and deliver technical briefings. Term.

TCOM 218 Advanced Technical Writing for Robotics - In lectures, students are introduced to advanced technical writing techniques and principles. In labs they write industry-oriented reports and give technical briefings. They prepare proposals, progress reports and documentation describing the project designed and produced for ROBT 403. Students also write a resume and application letter and prepare for and hold meetings and interviews. Students enrolled in TCOM 218 must be concurrently enrolled in ROBT 403. Prerequisite: TCOM 118.

Faculty and Staff

T. Williams, B.Sc., M.Sc. (Mech Eng.), P.Eng.
Associate Dean
D. Lewis, B.A.Sc. (Mech.), P.Eng., Program Head
P. Paleologou, M.Eng. (Elec.)
G. Thiessen, Dipl.T.

SURVEYING AND MAPPING

Diploma Program
Technician Program

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 opportunities for Surveying and Mapping graduates. Employment may be found throughout Canada and around the world.

The Program

BCIT offers both two-year and specialized one-year programs. In conjunction with Part-time Studies, the Surveying 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 and earth sciences, and should enjoy a vigorous outdoor lifestyle.

Students desiring a less academic program may take advantage of the more field-oriented technician level program. Students who select this program will normally complete Level 1 of the General Surveying 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-level course of studies specializing in production photogrammetry. Employment in surveying during the summer break is considered desirable.

Courses in Geographic Information Systems are offered under the Part-time Studies program (see Part-time Studies Calendar), and as a post-diploma program in the School of Engineering Technology.

Program Length

Two years full-time for the Diploma program beginning in September each year.

One year full-time for the Technician program beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year Diploma program (1992/93).

$1,823 for the one-year Technician program (1992/93).

Accreditation

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

Degree Transfer/Completion

Following completion of the two-year diploma program, students are eligible for membership in the Applied Science Technologists and Technicians of B.C. Graduates are granted some course credits at the University of Calgary in the Surveying Engineering Department, and at the University of New Brunswick; and towards examinations set by the Western Canadian Board of Examiners leading to registration as a Professional Land Surveyor.

Prerequisites

High school graduation with English 12, Math 12 and Physics 11 are course requirements for this program. Preference will be given to students achieving a 'C' grade or better in the prerequisites. Photogrammetry students must have good stereo vision.

Program: SURVEYING AND MAPPING

		Clrm hrs/wk
Level 1		
MATH 151	Basic Technical Mathematics for Survey	7.0
PHYS 123	Physics for Surveying	5.0
SURV 161	Plane Survey Computations 1	3.0
SURV 164	Field Survey 1	8.0
SURV 165	Surveying Instrumentation 1	1.0
SURV 172	Computer Applications 1	2.0
SURV 185	Drafting and Cartography 1	2.0
TCOM 101	Introduction to Technical Communication	3.0
Level 2A		
MATH 251	Calculus for Survey	7.0
PHOT 267	Photogrammetry 2	3.0
PHYS 223	Physics for Surveying	3.0
SURV 261	Plane Survey Computations 2	3.0
SURV 262	Surveying Instrumentation 2	1.0
SURV 264	Field Surveying 2	8.0
SURV 265	Survey Drafting and Computer Graphics	2.0
SURV 272	Computer Applications 2	2.0
TCOM 212	Technical Communication	3.0

Level 2B		Clrm hrs/wk
MATH 251	Calculus for Survey	7.0
PHYS 223	Physics for Surveying	3.0
SURV 261	Plane Survey Computations 2	3.0
SURV 262	Surveying Instrumentation 2	1.0
SURV 264	Field Surveying 2	8.0
SURV 265	Survey Drafting and Computer Graphics	2.0
SURV 272	Computer Applications 2	2.0
SURV 367	Earth Sciences	3.0
TCOM 212	Technical Communication	3.0
Level 3		
MATH 351	Matrix Methods for Survey	4.0
PHOT 367	Photo 3 (Survey Option)	2.0
SURV 361	Plane Survey Computations 3	3.0
SURV 362	Geodetic Surveying 1	3.0
SURV 363	Adjustment of Surveying Measurements	3.0
SURV 364	Field Surveying 3	6.0
SURV 365	Drafting and Survey CAD	3.0
SURV 369	Hydrographic Surveying	2.0
SURV 372	Computer Applications 3	2.0
SURV 378	Mining Surveying	2.0
Level 4A		
MATH 451	Statistics for Survey	5.0
PHOT 467	Photogrammetry 4	3.0
SURV 461	Plane Survey Computations 4	3.0
SURV 462	Geodetic Surveying 2	4.0
SURV 463	Mathematical Cartography	4.0
SURV 465	Surveying CAD 2	3.0
SURV 468	Cadastral Surveying	3.0
SURV 469	Planning and Land Utilization	3.0
SURV 472	Engineering Surveying	2.0
Level 4B		
PHOT 467	Photogrammetry 4	3.0
SURV 461	Plane Survey Computations 4	2.0
SURV 462	Geodetic Surveying 2	3.0
SURV 463	Mathematical Cartography	3.0
SURV 465	Survey CAD 2	3.0
SURV 464	Field Surveying 4	14.0
SURV 480	Position Based Land Information Systems	3.0

Option: PHOTOGRAMMETRY

Level 3		Clrm hrs/wk
Math 351	Matrix Methods for Survey	4.0
PHOT 365	Cartography: Photogrammetry	2.0
PHOT 377	Photogrammetry (Photo Option)	11.0
SURV 361	Plane Survey Computations 3	2.0
SURV 362	Geodetic Surveying 1	3.0
SURV 363	Adjustment of Surveying Measurements	3.0
SURV 372	Computer Applications 3	2.0
SURV 374	Field Surveying for Photo Option	3.0
Level 4A		
MATH 451	Statistics for Survey	5.0
PHOT 465	Cartography: Photogrammetry	3.0
PHOT 477	Photogrammetry	5.0
SURV 461	Plane Survey Computations 4	3.0
SURV 462	Geodetic Surveying 2	4.0
SURV 463	Mathematical Cartography	4.0
SURV 469	Planning and Land Utilization	3.0
SURV 474	Field Surveying for Photo Option	3.0
Level 4B		
PHOT 477	Photogrammetry	13.0
SURV 461	Plane Survey Computations 4	2.0
SURV 462	Geodetic Surveying 2	3.0
SURV 463	Mathematical Cartography	3.0
SURV 465	Surveying CAD 2	3.0
SURV 474	Field Surveying for Photogrammetry	3.0
SURV 480	Land Information Systems	3.0

Program: TECHNICIAN

Level 1		Clrm hrs/wk
MATH 151	Basic Technical Mathematics for Survey	7.0
PHYS 123	Physics for Surveying	5.0
SURV 161	Plane Survey Computations 1	3.0
SURV 164	Field Survey 1	8.0
SURV 162	Surveying Instrumentation 1	1.0
SURV 172	Computer Applications 1	2.0
SURV 185	Drafting and Cartography 1	2.0
TCOM 101	Introduction to Technical Communication	3.0
Level 2		
PHOT 267	Photogrammetry 2	3.0
SURV 260	Computational Methods for the Field Technician	5.0
SURV 265	Survey Drafting and Computer Graphics	1.0
SURV 268	Field Survey Techniques	13.0
SURV 272	Computer Applications 2	2.0
TCOM 212	Technical Communication	3.0

COURSE DESCRIPTIONS

MATH 151 Basic Technical Mathematics for Survey - Quadratic equations and systems of linear equations. Trigonometric functions of any angle, solution of triangle, graphics 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 transformations of coordinates.

MATH 251 Calculus for Survey - Limits, the derivative, differentiation rules for algebraic, trigonometric, inverse trigonometric, logarithmic and exponential functions; curve sketching, related rates, differentials and radius of curvature. Partial differential, Taylor and Maclaurin series.

MATH 351 Matrix Methods for Survey - Matrix theory and its application in surveying focusing 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 for Survey - A comprehensive course on the application of statistics and probability to surveying problems. Topics range from elementary data organization to propagation of measurement error and the relationship between error ellipses and bivariate normally distributed data.

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 - See SURV 365.

PHOT 367 Photo 3 (Survey Option) - 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 stereoplotters. Stereoplotters with mechanical or optical mechanical projections systems and automated stereo plotting instruments. Application of on and off-line projection systems and automatic contouring during orthophoto production. The location of points by intersection from two and more terrestrial photographs. Prerequisite: PHOT 267.

PHOT 377 Photogrammetry (Photo Option)- The geometry and physical nature of the photograph. Optics for photogrammetry. Principles of photography. Darkroom 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 transformation. Use of electronic computers. Photo-interpretation. Terrestrial and oblique photogrammetry. Map compilation. Cartography. Remote sensing. Photogrammetric refinement. General specifications.

PHOT 465 Cartography: Photogrammetry - See SURV 465. Prerequisite: PHOT 365.

PHOT 467 Photogrammetry 4 - Review of geometric projections, inner, relative and absolute orientation. Three-dimensional similarity transformation, projective transformation, collinearity and coplanarity equations. Restitution instruments - analogue and analytical types. Accuracy of photogrammetric measurement. Aerial triangulation. Photogrammetric products - topographic maps. Orthophoto maps and digital elevation models (DEM). Prerequisite: PHOT 367.

PHOT 477 Photogrammetry - Coordinate transformations. Colinearity and coplanarity equations. Accuracy of coordinate determination. Aerial triangulation - preparation, measuring and adjustment. Application of photogrammetry to survey and mapping projects. Introduction to digital mapping. Prerequisite: PHOT 377.

PHYS 123 Physics for Surveying - General topics 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. Application of these topics to the Surveying Technology.

PHYS 223 Physics for Surveying - 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 gross angular errors; area computations by coordinate and DMD methods; UTM traverse computations; missing parts. See SURV 261.

SURV 164 Field Survey 1 - Introduction to the principles of surveying; purposes and types of surveys; methods and field techniques in distance measurements; linear errors and corrections; datum; the principle of differential levelling; benchmark and detail levelling; test and adjustment of the level; introduction of the transit (theodolite); angle measurements; compass and theodolite traversing; note keeping.

SURV 165 Surveying Instrumentation 1 - An introduction to surveying equipment, its design, function, operation, testing and adjustment, care and handling.

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 185 Drafting and Cartography 1 - Map drawing is one of the fundamental skills required by surveyors. To be able to draw plans and maps requires the development of several skills and an understanding of basic cartographic theory. This introductory course will allow the student to gain the necessary skills and knowledge by completing exercises in: the use of drafting scales; lettering; interpolating and drawing contour lines, plans, profiles and cross use of the polar planimeter; plotting data resulting from typical surveying projects by various methods; mapping within a rectangular or polar coordinate system.

SURV 260 Computational Methods for the Field Technician - Review of important geometry theorems and their application to survey. Computations of simple circular curves and symmetrical vertical curves. The solution of problems related to the subdivision of land. The reduction of field acquired measurements. Prerequisite: SURV 161.

SURV 261 Plane Survey Computations 2 - Missing parts: different techniques of computation problems on subdivision of land; prismoidal 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. Prerequisite: SURV 161.

SURV 262 Surveying Instrumentation 2 - A continuation of SURV 165.

SURV 264 Field Surveying 2 - UTM traverse and computations; different field methods of angle measurements; trigonometric levelling; stadia surveys; topographic surveys by various methods and instruments; road location; slope staking; cuts and fills; setting out circular curves; building site layout; distance measurements by EDM's. Prerequisite: SURV 164.

SURV 265 Survey Drafting and Computer Graphics - Enables students to apply computer-aided drafting fundamentals to the solution of surveying problems. Students will acquire basic skills in computer disk operating systems (DOS), and computer-aided drafting software such as AutoCAD and Rapid Transit. Prerequisite: SURV 185.

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 EDM's. Prerequisite: SURV 164.

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. Prerequisite: SURV 172.

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. Prerequisite: SURV 261.

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, forward and inverse. Trigonometric levelling; reciprocal, non-reciprocal, refraction, intervisibility problems. Prerequisite: MATH 251.

SURV 363 Adjustment of Surveying 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 Surveying 3 - Operation of first and second order theodolites, EDM instruments, precise levels, gyrotheodolites; projects of precise and trigonometric levelling, EDM calibration, traversing and detailing by total station instrument, determination of azimuth by gyrotheodolite. Prerequisite: SURV 264.

SURV 365 Drafting and Survey CAD - A continuation of SURV 265. Topics include sequential files, string manipulation, microcomputer graphics. Programming in BASIC and FORTRAN for plotters and digitizers, data collector transfers, reduction of field data, the use of survey-specific CAD software. Prerequisite: SURV 265.

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 369 Hydrographic Surveying - Topics include tides and water levels, obtaining, positioning and reducing soundings, an overview of electronic positioning, electromagnetic wave propagation and positioning systems; propagation of sound in water; acoustic positioning and devices used in hydrography; types and uses of nautical charts. Prerequisite: SURV 261, 264.

SURV 372 Computer Applications 3 - Students will study the FORTRAN language and achieve 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 WATFIV compiler, fundamentals of the FORTRAN language, FORTRAN 77 compiler, CALCOMP calls, file handling and transfers, IBM PC, FORTRAN compilers. Prerequisite: SURV 272.

SURV 374 Field Surveying for Photo Option - Control surveys by triangulation, trilateration and traversing. Indirect optical distance measurement. Electro-magnetic distance measurements. The gyro-theodolite. Trigonometrical and barometric levelling. Prerequisite: SURV 261, 264.

SURV 378 Mining Surveying - Covers the forms of surveying specifically applied to mining with particular emphasis on underground surveying. Topics include the establishment of control (X,Y,Z) in underground workings using piano wires, gyrotheodolites and plummets; control of direction and gradient of tunnels; area and volume surveys; exploration surveys of drill holes; Mining Act responsibility of the mine surveyor. Prerequisite: SURV 261, 264.

SURV 461 Plane Survey Computations 4 - See SURV 361. Prerequisite: SURV 361.

SURV 462 Geodetic Surveying 2 - Gravitation and centrifugal forces; gravity, measurement and reduction, gravity anomalies, separation of the geoid, deflection of the vertical; precise levelling, orthometric and dynamic heights. Practical astronomy, review of spherical trigonometry, celestial sphere, systems of coordinates, time, celestial coordinates, star prediction and identification, solar and stellar observations for azimuth, latitude and longitude. Spherical and rectangular coordinate systems and transformations. Close satellite theory, Doppler positioning, the Geographical Positioning System. Prerequisite: SURV 362.

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. Prerequisite: SURV 363.

SURV 464 Field Surveying 4 - Students execute the following survey projects: a control scheme of triangulation and trilateration; astronomical observations on the sun and stars for azimuth, latitude and longitude; an engineering survey project including municipal, construction and highway surveys; a hydrographic project of sounding and the production of a hydrographic chart; a mining survey. The latter two projects are conducted off campus in an industrial setting. Prerequisite: SURV 364.

SURV 465 Survey CAD 2 - Topics include data structures, algorithms for computer cartography. Preparation of Legal Surveying plans under the terms set out in the "Surveyor General's Instructions to Land Surveyors." Engineering drawings such as plans, profiles and earthwork diagrams. Base mapping for Geographical Information Systems (GIS).

SURV 468 Cadastral Surveying - Introduction to the Canadian legal system, real property law, boundary concepts. Liability of surveyors. Land registration systems; the multipurpose cadastre. The Dominion Lands System and land systems used in British Columbia: history, detailed description, calculations. Operation of land titles systems in Western Canada. Descriptions of land. Laws and regulations governing surveys in Western Canada (including offshore surveys) as they apply to the systems of 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 affecting planning. Zoning and its implications for land use and land development. Land use studies, the subdivision of land and elementary economics related to land development. Prerequisite: SURV 367.

SURV 472 Engineering Surveying - Enables students to recognize and solve the problems associated with the survey of large construction projects. Topics include: preliminary surveys for the design of public works water, sewer, and roads. Surveying practices for specialized projects such as bridge construction, dam site monitoring and tunnelling. Prerequisite: SURV 369, 378.

SURV 474 Field Surveying for Photo Option - See SURV 374.

SURV 480 Position Based Land Information Systems - Design and operation of land related information systems and their role in digital mapping and spatial data management, including concepts of information and LRIS's, the multipurpose cadastre, spatial data management, georeferencing, land information modelling, geoprocessing, input/output operations, file storage, database management and distributed processing, techniques involved in project specifications, design and implementation and the selection of computer hardware/software for the LRIS's. Review and evaluation of some major LRIS's.

TCOM 101 Introduction to 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 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; occurrence, trip, progress, evaluation and recommendation reports. Prerequisite: TCOM 101.

Faculty and Staff

D.C. Deans, B.A., Associate Dean
K. Bracewell, Dipl.T.
R. Bremner, Dipl.T., A.Sc.T.
B. Crocker
D. Conroy, Dipl.T.
K. Errington, B.C.L.S., Cert.Min.Surv., Program Head
K. Frankich, Dipl.Ing., M.A.Sc., Ph.D.
D. Jarvos, Dipl.T.
G. Kehoe, B.A.Sc., B.C.L.S.
D.S. Martens, Dipl. T., B.C.L.S.
W.A. Tupper, Dipl.Ing.
N. Wong, Dipl.Ing., A.R.I.C.S., Part-time Studies Coordinator

Surveying and Mapping Technology Advisory Committee

C.J. Ramsay, Chair, Ministry of Transportation and Highways
K. Kyler, Hobbs, Kyler and Winter
R.G. Lyall
P. McCarron, Pro-Tech Surveys Ltd.
P. Mueller, District of Surrey
S. Russell, Delcan Corporation
R. W. Sandilands, Retired
J. Shortreid, Shortreid Terrain Data Ltd.
M.V. Woods, Institute of Ocean Sciences

WOOD PRODUCTS MANUFACTURING

Diploma Program

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 great 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 supervisory, technical, marketing and sales positions. 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 Wood Products 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.

Program Length

Two years full-time beginning in September each year.

Tuition Fees(subject to change)

$3,631 for the two-year program (1992/93).

Prerequisites

High school graduation with English 12, Math 12 and one Science 11: Biology, Chemistry or Physics (Physics preferred), 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.

Program:
WOOD PRODUCTS MANUFACTURING

		Clrm hrs/wk
Level 1		
MATH 146	Basic Technical Mathematics for Wood Products Manufacturing	5.0
PHYS 118	Introductory Applied Physics	5.0
TCOM 101	Introduction to Technical Communication	3.0
WOOD 101	Wood Science	17.0
WOOD 102	Lumber Grading	12.0
WOOD 103	Lumber Tallying	2.0
WOOD 104	Log Utilization	6.0
Level 2		
CHSC 208	Engineering Materials	3.0
MATH 246	Statistics and Quality Control for Wood Products Manufacturing	5.0
MECH 146	Interpretation of Engineering Drawings	2.0
PHYS 218	Introductory Applied Physics	5.0
TCOM 207	Technical Communication for Wood Products Manufacturing	3.0
WOOD 108	Lumber Grading 2	8.0
WOOD 201	Wood Science 2	4.0
Level 3		
COMP 121	Computer Applications	3.0
ELEC 257	Electrical Equipment	4.0
MECH 416	Mechanical Equipment (Wood Products Manufacturing)	3.0
OPMT 164	Management Engineering 1: Wood Products Manufacturing	3.0
TCOM 305	Advanced Technical Communication for Wood Products Manufacturing	2.0
WOOD 105	Lumber Manufacture 1	8.0
WOOD 106	Plywood Manufacture	4.0
WOOD 107	Mill Management 1	3.0
WOOD 202	Summer Technical Report	1.0
Level 4		
COMP 283	Linear Programming	3.0
MKTG 420	Wood Products Sales and Distribution	4.0
OPMT 264	Management Engineering 2: Wood Products Manufacturing	4.0
TCOM 403	Advanced Technical Communication for Wood Products Manufacturing	2.0
WOOD 205	Lumber Manufacture 2	5.0
WOOD 206	Plywood/Panelboard Manufacture	3.0
WOOD 207	Mill Management 2	10.0

*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 nondestructive 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.

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.

MATH 146 Basic Technical Mathematics for Wood Products Manufacturing - Numerical computations. Linear and quadratic equations. Systems of linear equations. Geometry of plane and solid figures. 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 Wood Products Manufacturing - 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 146 Interpretation of Engineering Drawings - An introductory course for persons with little or no experience in graphics. Students learn to produce by sketching basic orthographic and pictorial drawings. A strong emphasis will be placed on the understanding of engineering graphics rather than developing drawing skills. The latter part of the course will deal with blueprint reading in areas of wood products manufacturing.

MECH 416 Mechanical Equipment (Wood Products Manufacturing) - 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: Wood Products Manufacturing - 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: Wood Products Manufacturing - 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 a job in an industrial plant in the forest products industry for study. 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. Prerequisite: OPMT 164.

PHYS 118 Introductory Applied Physics - 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, atomic and nuclear phenomena.

PHYS 218 Introductory Applied Physics - See PHYS 118.

TCOM 101 Introduction to Technical Communication - This course covers basic writing and speaking skills needed for communicating technical information in the wood products industry. Students learn to write routine letters and memos, and to plan and present an oral report. They also write a resume and job application letter and prepare for job interviews.

TCOM 207 Technical Communication for Wood Products Manufacturing - This course prepares students to write reports for the wood products industry. They learn to write technical descriptions and instructions, prepare effective graphics, and write several reports. They also learn how to do primary and secondary research and to use a word processing package. Prerequisite: TCOM 101.

TCOM 305 Advanced Technical Communication for Wood Products Manufacturing - Students review and practice technical reporting. They write several memos and a Summer Technical Report which is evaluated jointly by the instructor and by people employed in the lumber and plywood industry. They practice illustrating, revising and editing skills, and present an oral technical report. Prerequisite: TCOM 101, 207.

TCOM 403 Advanced Technical Communication for Wood Products Manufacturing - 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 101, 207, 305.

WOOD 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.

WOOD 102 Lumber Grading 1 - Given in Level 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.

WOOD 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 a

70% pass mark. 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.

WOOD 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 sawmill and plywood industries. Considerable time is spent practising scaling techniques on selected log booms.

WOOD 105 Lumber Manufacture 1 - Methods and equipment used in the manufacture of lumber in the B.C. Coast and Interior are examined including log preparation, primary and secondary breakdown, and sawmill remanufacture. Saw dynamics and maintenance are also examined. Field trips augment lecture material.

WOOD 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, drying, 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.

WOOD 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.

WOOD 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.

WOOD 201 Wood Science 2 - Topics 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 methods and results. Prerequisite: WOOD 101.

WOOD 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.

WOOD 205 Lumber Manufacture 2 - Methods and equipment used in the kiln drying and planing of lumber are examined as well as quality control, fibre usage, manufacturing economics, specialty remanufacture and machine stress grading. A charge of lumber will be dried at the BCIT dry kiln and the results examined.

WOOD 206 Plywood/Panelboard Manufacture - A continuation of WOOD 106. Methods and equipment used in the manufacture of plywood in the B.C. Coast and interior are examined. Processes discussed include lay-up, pressing and finishing. Methods and equipment used in other types of panelboard manufacture will also be discussed. Field trips augment material given in lectures.

WOOD 207 Mill Management 2 - A continuation of WOOD 107.

*The attainment of a recognized industrial certificate with a minimum mark of 70% is required as a condition of graduation.

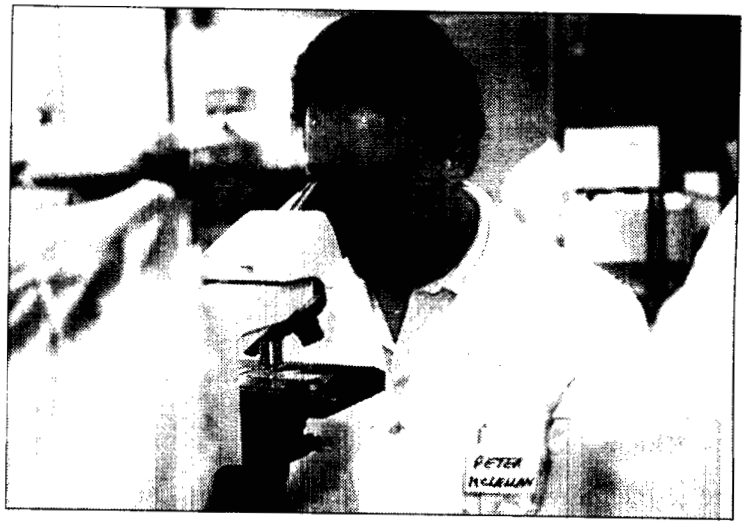
Faculty and Staff

J.T. Neilson, B.A.Sc., P.Eng., Associate Dean
E.G. Worthy, Dipl.T., A.Sc.T., Program Head
D.G. Mickey, B.Sc., A.Sc.T.

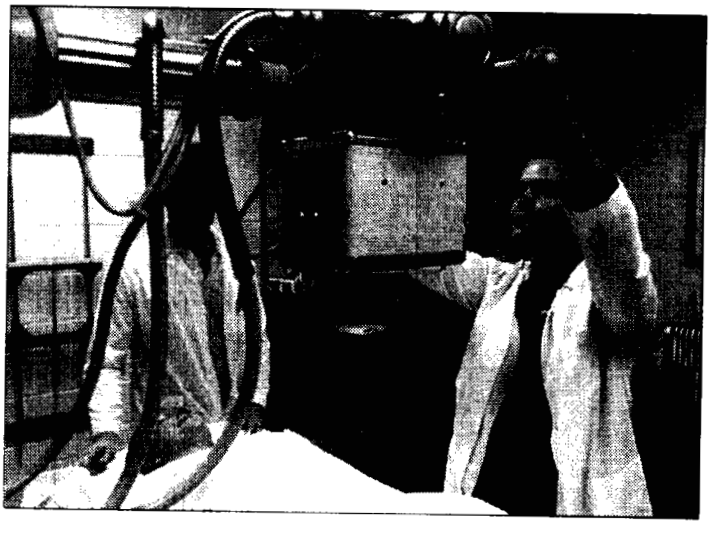
Advisory Committee Members

W. Beatty, Council of Forest Industries, Chair
A. Coombs, Weldwood of Canada Ltd.
L. Haines, Fletcher Challenge Canada Ltd.
F. Ibis, Northwood Pulp & Timber Ltd.
P.J. Jamieson, MacMillan Bloedel Limited
J. Kennedy, Crestbrook Forest Industries Ltd.
P. Legg, IWA - Canada
K. McClelland, Council of Forest Industries
B. McLean, B.W. Creative Wood Industries Ltd.
B. Strongitharm, Primex Forest Products Ltd.




PETER
McLEHAN





School of Health Sciences

ADMINISTRATION 200

BASIC HEALTH SCIENCES 200

BIOMEDICAL ENGINEERING TECHNOLOGY 200

CARDIOLOGY TECHNOLOGY 204

CARDIOVASCULAR TECHNOLOGY 204

CYTOGENETICS LABORATORY TECHNOLOGY 206

DIAGNOSTIC MEDICAL SONOGRAPHY 208

ELECTROPHYSIOLOGY TECHNOLOGY 211

ENVIRONMENTAL HEALTH: PUBLIC HEALTH INSPECTOR TRAINING PROGRAM 213

MEDICAL LABORATORY TECHNOLOGIST 217

MEDICAL RADIOGRAPHY TECHNOLOGY 220

NUCLEAR MEDICINE TECHNOLOGY 224

GENERAL NURSING 228

OCCUPATIONAL HEALTH AND SAFETY 233

PROSTHETICS AND ORTHOTICS TECHNOLOGY 236

ADMINISTRATION

Office of the Dean
George Eisler, M.A.Sc., P.Eng., M.B.A., Dean
Andrea Labé, Administrative Assistant/Executive Secretary to the Dean
Patti Mark, B.A., Administrative Officer

Health Technologies
W. Bruce Sandy, B.A., M.H.S.A., Associate Dean

Environmental Health (Public Health Inspector Training)
Occupational Health and Safety

Health Engineering
W. Bruce Sandy, B.A., M.H.S.A., Associate Dean

Biomedical Engineering
Cardiology
Electrophysiology
Prosthetics and Orthotics

Medical Imaging
Verna Magee Shepherd, M.Sc., CHE, Acting Associate Dean

Diagnostic Medical Sonography
Medical Radiography Technology
Nuclear Medicine Technology

Medical Laboratory Science
Verna Magee Shepherd, M.Sc., CHE, Acting Associate Dean

Cytogenetics Laboratory Technology
Medical Laboratory Technology

Nursing
M. Bernadet Ratsoy, B. Sc. N., M. Sc., R. N., Associate Dean

General Nursing
Credit Courses for Nursing

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 School of Health Sciences Programs. 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 future challenges of the modern health worker.

Faculty and Staff

Verna Magee Shepherd, M.Sc., CHE, Acting Associate Dean
D. W. Martin, B.Sc. (Hons.), M.S.R., Program Head
B.M.Alder, B.S.N., R.N., M.A.
R. Bakan, B.A., M.A., Ph. D.
J. H. Emes, B.Sc. (Hons.), M.Sc., Ph.D.
A G. Handford, B.A.
G. R. Marshall, B.Sc. (Kines.), M.Sc. (Kines.)
T. J. Nowak, B.A, Dipl.Ed.
E. Shkurhan, B.Sc., M.Sc., Chief Instructor

BIOMEDICAL ENGINEERING TECHNOLOGY

Diploma Program

Program Objective

The objective of the program is to graduate technologists with the ability to ensure safe and correct performance of equipment used in medicine and biology. The curriculum covers physiological monitors, defibrillators, electrosurgery units, chemistry and clinical laboratory instrumentation, radiology equipment, ultrasound imaging machines and other electro-medical diagnostic and therapeutic devices.

Employment Opportunities

Graduates of the Biomedical Engineering Technology Program may be employed in hospitals, clinics, research labs and medical equipment sales and service organizations.

Biomedical Engineering Technologists may be responsible for scheduled and corrective maintenance and safety inspection of electro-medical equipment, and participate in research and development, purchase specification, equipment evaluation, operator training and management of risks involving the use of biomedical equipment.

The Program

Graduates from the Biomedical Engineering Technology Program receive a National Diploma of Technology. The Biomedical Engineering Program provides education and training in the following subject areas: Technical communication; algebra; calculus; statistics; basic chemistry, organic chemistry, biochemistry and analytical chemistry; human anatomy and physiology; biophysics; electricity and electronics; biomedical devices; 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 five weeks in supervised clinical training 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.

Memberships in the Canadian Medical and Biological Engineering Society (CMBES) and the Applied Science Technologists and Technicians of British Columbia (ASTTBC) are recommended.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Accreditation

The Biomedical Engineering program is accredited by ASTTBC. Graduates are eligible for registration as Applied Science Technologists (ASc.T.) after two years of relevant work experience following graduation.

Prerequisites

a) High School graduation with English 12 and a minimum of C+ in Math 12, Physics 11 and Chemistry 11. Prerequisites must be current within the last 5 years.

b) Selection interview with program instructors.

c) Applicants with relevant practical experience or special background may be considered.

Program: BIOMEDICAL ENGINEERING TECHNOLOGY

Level 1		Credits
BHSC 101	Human Anatomy and Physiology	4.0
BMET 100	Electronics Principles and Practice 1	9.0
CHEM 107	Chemistry for Biomedical Engineering Technology	6.0
HCOM 104	Technical Writing for Biomedical Engineering Technology	3.0
MATH 178	Basic Technical Mathematics for Biomedical Engineering Technology	8.0

Level 2		
BHSC 201	Human Anatomy and Physiology	4.0
BMET 200	Electronics Principles and Practice 2	10.5
CHEM 207	Introduction to Organic and Biochemistry	6.5
ELEC 260	Electronic Prototype Manufacturing	4.0
GNNU 182	Patient Care	1.0
HCOM 203	Technical Writing for Biomedical Engineering Technology	2.5
MATH 278	Calculus for Biomedical Engineering Technology	10.5

Level 3		Credits
BMET 300	Electronics Principles and Practice 3	6.0
BMET 301	Biomedical Device Technology 1	7.0
BMET 310	Digital Electronics 1	8.0
ELEC 252	Measurement for Biomedical Engineering Technology	4.0
MATH 378	Statistics for Biomedical Engineering Technology	2.0
PHYS 324	Biophysics	3.0

Level 4		
BMET 401	Biomedical Device Technology 2	6.0
BMET 402	Biomedical Engineering Technology Project	3.0
BMET 403	Medical Imaging	5.0
BMET 410	Digital Systems and Microprocessors	8.0
BMET 420	Practical Experience in Biomedical Engineering Technology 1	11.5
CHEM 411	Instrumental Analysis for Biomedical Engineering Technology	4.0
ELEC 259	Video Fundamentals	3.0
HCOM 301	Advanced Communication for Biomedical Engineering Technology	1.0

Most courses taken within the program require successful completion of certain prerequisites. For further information contact the Registrar's Office.

COURSE DESCRIPTIONS

BHSC 101/201 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 and AC circuit analysis techniques for R, RC, RL and RLC circuits. 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 301 Biomedical Device Technology 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, 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 and MATH 278.

BMET 401 Biomedical Devices Technology 2 - 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 are presented. Lab exercises, coordinated with course content, emphasize calibration and repair techniques. Prerequisite: BMET 300, 301, 310.

BMET 402 Biomedical Engineering Technology Project - Students build a device such as an ECG simulator using the latest technology and design techniques. Students gain experience with the implementation of a project planning, design, material acquisition, prototyping, printed circuit design, construction, testing, calibration, commissioning and evaluation. A technical report is required for the project. Prerequisite: BMET 300, 301, 310.

BMET 403 Medical Imaging - Introduces the concepts involved in imaging systems used in medicine. X-ray, nuclear medicine, and ultrasound equipment is examined. Prerequisite: BMET 300, 301, BHSC 202.

BMET 410 Digital Systems and Microprocessors - An introduction to microprocessor hardware and software. Topics include: 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, 310.

BMET 420 Practical Experience in Biomedical Engineering Technology - During this period of training, students gain practical experience in biomedical technology and related fields while working under supervision at a number of hospitals, research agencies and private companies throughout the province. The work experience is four weeks in duration. Prerequisite: BMET300, 301, 401, 402, 403, 410.

CHEM 107 Chemistry for Biomedical Engineering Technology - 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 gravimetric and volumetric quantitative analysis.

CHEM 207 Introduction to Organic and Biochemistry - The naming, properties and main reactions of the major classes of organic compounds are discussed. The biochemistry includes 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 Engineering Technology - 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 252 Measurement for Biomedical Engineering Technology - An orientation course covering basic devices for measuring pressure, temperature, density and flow. A study of the principles of analytical 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. Prerequisite: BMET 300, 310.

ELEC 260 Electronic Prototype Manufacturing - Through the design and manufacture of specific electronic projects, students learn the skills required to do basic soldering, printed circuit board repair and rework, high reliability soldering, and fabrication of a single-sided printed circuit board. Upon successful completion of the course, the student will be able to demonstrate knowledge of components used in the manufacture of electronic equipment; chassis and metal cabinet design; safe use of tools and techniques used in electronic fabricating and PWB repair; high reliability soldering, and repair of heat and mechanically damaged PC boards.

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 Engineering Technology - This applied course introduces students to the communication needs of biomedical engineering technologists. It includes organizing and sequencing technical information and writing effective letters and memos. Students will also deliver a formal oral presentation.

HCOM 203 Technical Writing for Biomedical Engineering Technology - This course builds on the skills taught in HCOM 104. Students will write hospital and industry-oriented reports, prepare a professional job application and deliver a persuasive presentation. Effective meeting and interview skills are also covered. Prerequisite: HCOM 104.

HCOM 301 Advanced Communication for Biomedical Engineering Technology - Students will build on the skills learned in HCOM 104 and HCOM 203 to write effective reports and a project manual. This operation and service manual is for a device that they design and build in their technology course. In addition, students will update their resumes to graduate level requirements. Prerequisite: HCOM 104 and 203.

MATH 178 Basic Technical Mathematics Biomedical Engineering Technology - 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, logarithms 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. 12 hours of PC-DOS and Turbo Pascal in preparation for Math 278.

MATH 278 Calculus for Biomedical Engineering Technology - An introduction to differential and integral calculus. Topics include: limits, the derivative, differentiation rules, applied maximum and minimum problems, curve sketching, differentials, antidifferentiation, definite and indefinite integral, area, mean and RMS values, differentiation and integration of the transcendental functions. Fourier Series. First order differential equations. All of these topics will be applied to problems related to the technology. An introduction to Turbo Pascal and its application to numerical method problems. Topics include assignment statements, branching and looping statements, procedures and files. The Boolean Algebra section includes the following: numbers in different bases, logic gates, truth tables; Boolean algebra, Karnaugh Maps, design of simple circuits.

MATH 378 Statistics for Biomedical Engineering Technology - 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 - Tcation to electr level course in basic physics with emphasis on applications to biological systems. The topics 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.

Faculty and Staff

W. Bruce Sandy, B.A., M.H.S.A., Associate Dean
D. Moreau, B.Sc., Dipl.T., A.Sc.T., Program Head
M.J. Barrett, Dipl.T., A.Sc.T.
P.K. Chiu, B.Eng., M.Sc., Ph.D., P.Eng.,

CARDIOLOGY TECHNOLOGY

This two-phase program is designed to fulfil the need for specialized technologists in hospitals where non-invasive and invasive cardiology procedures utilizing sophisticated electrocardiographic and physiological monitoring equipment, are performed. Upon completion of the first year, students will be able to enter the field of CARDIOLOGY TECHNOLOGY.

The Program

The program combines lectures, lab and class projects at BCIT as well as clinical experience in designated hospitals.

It consists of basic anatomy and physiology with special emphasis on the cardiac and respiratory systems. Students will receive an introduction to basic biomedical electronics and electricity and cardiac physics. Significant emphasis will be placed on theoretical and clinical application of electrocardiography, cardiac pathology, pacemakers, stress-testing and holter monitoring.

Studies in biomedical electronics, physical sciences, mathematics, human physiology and cardiology ensure graduates a strong background in non-invasive electrocardiography. Courses specific to human behavior, clinical environments and patient care will ensure all students develop the necessary skills to work in this exciting field. Upon completion of the first year, students will receive a CERTIFICATE OF TECHNOLOGY IN CARDIOLOGY TECHNOLOGY.

After a designated period of work-related experience, graduates will be eligible to write the registration exam for Cardiology Technologists.

Job Opportunities

First-year graduates will find employment in the electro-diagnostic departments of hospitals and labs which provide EKG testing, stress testing, holter monitoring and pacemaker clinics. Graduates of both levels will be involved in the performance of vital cardiac testing, utilizing a wide range of medical equipment, essential for providing the physician with valuable diagnostic information. Cardiology is a fast paced, ever growing medical discipline with opportunities throughout Canada. Beginning salaries range from $28,000/annum to $32,000/annum for a cardiology technologist.

Prerequisites

High school graduation with Math 12, Physics 11, Chemistry 11, Biology 11 and English 12, all with C+ or better. Biology 12 is preferred. Work-related or volunteer hospital experience is desirable. Individuals entering this field should be interested in dealing with potentially critically ill patients and their families. They should have an aptitude/interest in the use of biomedical equipment and the ability to work in an often demanding environment. Applicants are requested to submit resumes, complete with two references and phone numbers, and a 500-word statement indicating their reasons for enrolling in the program. A preadmission interview is conducted at BCIT by the Cardiology Technology Faculty who will assess applicants' skills and suitability for the field.

Program Length

Certificate Program: One year full-time beginning in September each year.

Tuition Fees (subject to change)

$1,823 for the one-year program (1992/93).

CARDIOVASCULAR TECHNOLOGY

It is proposed to offer the Cardiovascular program in September 1993.

Following the one-year Cardiology program, this one-year program will provide students with a more intensive approach to cardiac pathophysiology, cardiac anatomy, chemistry and the theoretical and clinical application of cardiovascular dynamics. Emphasis will be placed on diagnostic and intervention procedures performed in the cardiac cath lab. Graduates will receive a **Diploma of Technology in Cardiovascular Technology**. After a period of work-related experience graduates will be eligible to write the national registration exams for the appropriate certifying body.

Job Opportunities

Second-year graduates will be qualified to work in cardiovascular and cardiac electrophysiology labs in major cardiac centres. Registered Cardiovascular Technologists will be employed in major cardiac centres. Beginning salaries range from $36,000 to $40,000 per annum for a cardiovascular technologist.

Prerequisites

Candidates must apply for admission to this one-year program. Admission will be based on academic and clinical performance in the Cardiology Technology program.

Program Length

One year full-time proposed to begin in September 1993.

Tuition Fees (subject to change)

$1,823 for the one-year program (1992/93).

Level 1		Credits
BHSC 111	Anatomy and Physiology	4.0
BMET 382	Electrical Circuits	2.0
CARD 150	Electrocardiographic Theory & Principles or ECG Theory & Principles	12.0
GNNU 185	Patient Care	4.0
HCOM 115	Communication in Cardiology	4.0
MATH 179	Basic Technical Mathematics	5.0

Level 2		
BHSC 201	Human Anatomy and Physiology	4.0
BHSC 313	Human Anatomy and Cardiopathophysiology	4.0
BMET 482	Applied Electrical Fundamentals	2.5
CARD 250	Cardiology Devices and Techniques	13.0
CARD 251	Cardiology Practicum 1	20.0
HCOM 215	Communication for Cardiology	5.5

CARDIOVASCULAR OPTION PROPOSED CURRICULUM

Level 3		
BHSC 340	Human Behavior	4.0
CARD 350	Cardiovascular Technology	9.0
CARD 351	Cardiovascular Technology Practicum	8.0
CHEM 107	Chemistry for Biomedical Engineering	6.0
PHYS 230	Physical Principles in Cardiology	4.0

Level 4		
CARD 451	Clinical Experience in Cardiovascular Technology	46.5

COURSE DESCIPTIONS

BHSC 111 Anatomy and Physiology - A basic introductory course in human anatomy and physiology, which uses the systems approach. It provides the cardiology and electrophysiology student with terminology and physiological concepts likely to be encountered during the first term of the program.

BHSC 201 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 313 Human Anatomy and Cardiopathophysiology - This course builds on material given in BSHSc 111 and 201. The cardiovascular system is considered in detail, including cardiac embryology. Pathophysiologic considerations include congenital heart defects, rhythm and conduction disturbances, ischemic and valvular diseases, cardiomyopathies, and pulmonary vascular diseases. Prerequisite: BHSC 111, 201.

BHSC 340 Human Behavior - Basic considerations of behavioral science relevant to cardiology 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.

BMET 382 Electrical Circuits - Students become familiar with AC and DC circuits as well as other electrical building blocks. Prerequisite: MATH 179.

BMET 482 Applied Electrical Fundamentals - This course is a continuation of BMET 382. Topics include review of magnetism, inductance, motors, transformers, capacitance, electrical safety and principles. Prerequisite: BMET 382.

CARD 150 Electrocardiographic Theory and Principles or ECG Theory and Principles - A study of the electrocardiographic theory and principles required to perform 12-lead electrocardiograms. Instruction in ECG graph interpretation to identify cardiac rate, axis, arrhythmias, myocardial infarctions, ischemia and other ECG anomalies. The course will further include an introduction to cardiac stress testing, artificial pacemaker evaluation and 24-hour Holter monitoring and cardiac pharmacology.

CARD 250 Cardiology Devices and Techniques - A study of advanced electrocardiographic theory and principles with a practical application for recording and interpreting ECG's for abnormalities in a laboratory setting. The course will include advanced cardiac arrhythmia recognition and telemetry monitoring as well as continued work in stress-testing application, pacemaker analysis and interpretation and holter monitor scanning. Prerequisite: CARD 150.

CARD 251 Cardiology Practicum 1 - Students will rotate through the ECG departments of various hospitals to obtain clinical experience in performing electrocardiograms, stress testing, holter scanning and pacemaker evaluation. The rotation will consist of two days per week for the length of the term. Specific projects are assigned throughout the semester to insure competency within the prescribed objectives. Prerequisite: BHSC 111.

CARD 350 Cardiovascular Technology - This course will interrelate closely with Human Anatomy and Cardiopathophysiology. The interrelationships of the cardiac and pulmonary systems will be presented in terms of their mechanical, electrical and dynamic components as they are observed and measured in the Cardiac Cath Lab. Methods of hemodynamic data collection, calculation and analysis will be presented. This course will further introduce the principles of modern techniques for the diagnosis and treatment of cardiovascular diseases in the area of invasive cardiology. Further emphasis will be placed on cardiac pharmacology as it relates to the treatment of cardiac disease. Prerequisite: CARD 250, BHSC 201, PHYS 230.

CARD 351 Cardiovascular Technology Practicum - An introduction to clinical diagnostic testing, patient care, patient-technician relationships and interaction with other medical professionals in the Cardiac Cath Lab setting. The course is offered two mornings a week for the length of term. Prerequisite: CARD 251.

CARD 451 Clinical Experience in Cardiovascular Technology - This course is designed to perfect clinical, manipulative and cognitive skills in the utilization of Cardiovascular Instrumentation and techniques. Students will rotate through the various Cath Labs and Electrophysiology Labs of designated hospitals. Specific projects are assigned throughout the semester to insure competency within the prescribed objectives. Prerequisite: CARD 350, 351.

CHEM 107 Chemistry for Biomedical Engineering Technology - 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 gravimetric and volumetric quantitative analysis.

HCOM 115 Communication for Cardiology - Emphasizes clear, concise technical writing in the Cardiology field. Students will learn how to write for specific audiences, how to make technical descriptions accurate and readable, how to present oral information effectively. The course includes memos, letters, reports, technical descriptions, job resume and application letters, information interviews, and oral presentations.

HCOM 215 Communication for Cardiology - A continuation of HCOM 115. In the second term students will apply the skills they developed HCOM 115 to oral and written projects of greater length. This course includes interviews, oral and written reports, meetings, conflict resolution, writing for professional publications. Prerequisite: HCOM 115.

GNNU 185 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.

MATH 179 Basic Technical Mathematics - Review of arithmetic with approximate numbers, unit conversion and percent. The equation of a straight line and solution of systems of linear equations with applications to chemical mixtures, f-response curves, etc. Properties of exponential and logarithmic functions and their manipulations; exponential and logarithmic graphs; solving exponential and logarithmic equations with applications to exponential growth and decay, light absorption, pH scale, decibel scale, etc. Semi-log and log-log graphs with applications, transients, fast roll-off curves, time constants. Right angle trigonometry review, trigonometric functions of an angle, radian measure, oblique triangles, sine and cosine laws, vectors, graphs of trigonometric functions, voltage and impedance triangles, current and admittance triangles.

PHYS 230 Physical Principles in Cardiology - An exploration of basic physical principles employed, both in theory and practice, in the field of cardiology. A problem-solving approach will be consistently applied throughout the course. Topics include biomechanics, fluid mechanics (with special emphasis on cardiac hemodynamics), tissue temperature regulation, the gas laws and respiration. In addition, wave theory, sound and ultrasound, electricity and magnetism, light and lasers will be covered with special emphasis on biological impedance and instrumentation.

CYTOGENETICS LABORATORY TECHNOLOGY

Post-diploma Program

Clinical Cytogenetics deals with the analysis of human chromosomes for diagnosis and prognosis of disease. Cytogenetics Laboratory Technology (CGLT) is the area of specialization in Laboratory Medicine which investigates the chromosome bands and chromosome number in human cells. It involves the culture of different tissues and the production of banded metaphases to reveal chromosome abnormalities.

Employment Opportunities

Upon graduation and successful completion of the certification exams of the Canadian Society of Laboratory Technologists (CSLT), the CGLT technologist may be employed in cytogenetic laboratories found in larger hospitals throughout Canada. Beginning salaries for entry level positions range from $35,000 /annum to $42,000 /annum.

The Program

The training program is 14 months in length and consists of a didactic phase of 31 weeks of academic studies at the Institute and a 6-week clinical orientation phase which combines lectures and labs at the Institute with practical experience in an affiliated hospital laboratory.

This is followed by a 22-week clinical phase during which the student will spend all of the remaining time in one of the clinical facilities affiliated with the program.

After successful completion of all three phases, the student is eligible to write the Certification Examination of the Canadian Society of Laboratory Technologists, which leads to the qualification of Registered Technologist (R.T.) in Cytogenetics, the nationally recognized qualification for employment in the field.

Affiliate Training Facilities

There are four clinical training laboratories affiliated with the CGLT program: B.C.'s Children's Hospital, Vancouver General Hospital, B.C. Cancer Agency, and the Royal Columbian Hospital.

Program Length

14 months full-time beginning in August each year.

Tuition Fees (subject to change)

$1,823 for the 14-month program (1992/93).

Prerequisites

B. Sc. in Cell Biology with emphasis on genetics and medical/ molecular genetics

or

current certification with the CSLT (R.T.) in general Medical Laboratory Technology with academic prerequisites for fourth-year university courses in genetics and medical/ molecular genetics.

The Cytogenetics Laboratory Technology program will start on **August 3rd,** 1993. Note that this is an earlier start than most other programs at BCIT.

Course of Studies

DIDACTIC PHASE

Level 5 (20 weeks including exam week)			**Credits**
BHSC	104	Anatomy and Physiology (10 wks)	4.0
BHSC	121	Introductory Principles of Immunology (10 wks)	3.5
CGLT	501	CGLT Fundamentals 1 (first part of the course); second partis given in Level 6)	6.0
CGLT	502	Chromosome Analysis 1	10.0
CGLT	503	Seminar Assignments 1	1.0
CGLT	504	Darkroom Photography 1	3.0
CGLT	505	Technical Assignment 1	2.5
MLAB	100	MLT Fundamentals (7 wks)	7.0
MLAB	113	Introductory Hematology for Cytogenetics (4 wks)	2.0

Level 6 (11 weeks including exam week)			
CGLT	601	CGLT Fundamentals 2	9.0
CGLT	602	Chromosome Analysis 2	8.5
CGLT	603	Seminar Assignments 2	1.0
CGLT	604	Darkroom Photography 2	2.0
CGLT	605	Technical Assignment 2	3.0

Spring Break: March 14-18, 1993

CLINICAL ORIENTATION PHASE (6 WKS)			
CGLT	605	Technical Assignment 2 contd.	3.5
CGLT	606	Clinical Orientation	10.5

CLINICAL PHASE (22 wks)			**Credit**
CGLT	607	Clinical Training	50.0

COURSE DESCRIPTIONS

BHSC 104 Anatomy and Physiology - A systematic approach to the study of human anatomy and physiology for medical laboratory and cytogenetics laboratory technology students. The course includes basic cytology and an introduction to the skeletal, muscular, nervous, circulatory, respiratory, digestive, urinary and reproductive systems.

BHSC 121 Introductory Principles of Immunology - A basic course designed to give medical laboratory and cytogenetic laboratory technology students 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/hyper-sensitivities, their characteristics and management; immune deficiency diseases and auto-immunity.

CGLT 501 CGLT Fundamentals 1 - An introduction to Cytogenetics Laboratory Technology with extensive hands-on training, demonstrations, lectures on the principles and methodologies of clinical cytogenetics technology. The student is introduced to the theoretical and practical aspects involved in cell growth and culture as they relate to the major tissue culture laboratory procedures. The principles and practical application of various banding techniques are studied as they relate to the human tissue types such as amniotic fluid, chorionic fluid, fibroblasts and products of conception. Cytogenetic syndromes will be introduced.

CGLT 502 Chromosome Analysis 1 - A wide range of metaphase chromosomes in print and microscopic form are studied to introduce students to the human chromosome karyotype. Both abnormal and normal metaphases are examined. Results are described according to the 1985 ISCN (International Standard Chromosome Nomenclature).

CGLT 503 Seminar Assignments 1 - Students are assigned topics from the R.T. (Subject, CGLT) Syllabus to research and study in consultation with the instructor and present to the class.

CGLT 504 Darkroom Photography 1 - Students learn to use darkroom equipment to produce high quality negatives and prints of cell metaphases, taken with a standard Nikon photomicroscope. Both theoretical and practical aspects of equipment, film, paper and chemicals will be introduced.

CGLT 505 Technical Assignment 1 - Students are given a technically oriented assignment based on technical skills demonstrated in CGLT 501. Topics are researched, a plan is drafted by the student and approved by the instructor, experiments conducted, and a final report submitted.

CGLT 601 CGLT Fundamentals 2 - A continuation of CGLT 501 with emphasis on quality and timely chromosome results. The blood culture techniques primarily used are routine and prophase technology. Special banding and procedures will be emphasized and discussed relative to when and why they are used in clinical cytogenetics. Prerequisite: CGLT 501.

CGLT 602 Chromosome Analysis 2 - A challenging series of prints and slides will be used to stimulate knowledge gained from lessons and practise in Term 1. Prerequisite: CGLT 502.

CGLT 603 Seminar Assignments 2 - Students are assigned topics from the current cytogenetic literature as well as aspects of the work not covered in class.

CGLT 604 Darkroom Photography 2 - Students learn to organize all aspects of producing a complete cytogenetics report including the photography. Enhancement of the microscopic image reproduced on paper for maximum reproduction is stressed. The student learns the role of the cytogenetics technologist in the photographic darkroom.

CGLT 605 Technical Assignment 2 - The student is given a technically more difficult assignment based on the technical skills and theory demonstrated in CGLT 501 and 601. Topics are assigned by the instructor, a plan is drafted by the student, experiments are conducted and a final report is submitted.

CGLT 606 Clinical Orientation - Students spend a decreasing amount of time in formal instruction at the Institute and an increasing amount of time at one of the affiliated hospital cytogenetics laboratories.

CGLT 607 Clinical Training - Students are assigned to various sub-sections of one of the affiliated cytogenetics laboratories. The clinical experience will vary amongst the major tissue types; productivity expectations will be approximately 80% of manual workloads per training technologist.

MLAB 100 MLT Fundamentals - An introductory course for medical laboratory and cytogenetic laboratory technology students with emphasis on general techniques, equipment (microscopy, balances and weighing, centrifuges, electrophoresis and chromatography, water purifying equipment, automatic pipettes and diluters, potentiometry); laboratory safety, specimen handling, laboratory math, reagent preparation and other basic knowledge that applies to most medical laboratories. Professionalism, medical terminology and general principles of laboratory policies are also covered.

MLAB 113 Introductory Hematology For Cytogenetics - This course introduces the student to the origin, development and function of white blood cells. Both theoretical and practical knowledge are introduced.

Faculty and Staff

Verna Magee Shepherd, M.Sc., C.H.E.
Acting Associate Dean
Fred Bauder, B.Sc., A.R.T. (Cg), CLSp (Cg), Program Head

Clinical Instructors for Cytogenetics Laboratory Technology Affiliated Hospitals and Clinical Sites

B.C. Cancer Agency
Helena Sroka, M.Sc., R.T. (Cg.) Cytogenetics Laboratory

B.C. Children's Hospital
Sharon O'Brien, R.T. Cytogenetic/Embryopath Laboratory

Royal Columbian Hospital
Joyce Sandercock, B.A, R.T. (Gen.), R.T. (Cg.) Cytogenetics Laboratory

Vancouver General Hospital
Chris Haessig, B.Sc., R.T. (Cg.) Wilma Roodbergen, R.T. (Cg.) Cytogenetics Laboratory

DIAGNOSTIC MEDICAL SONOGRAPHY

Post-diploma Program

Diagnostic Medical Sonography (Ultrasound) is a rapidly expanding medical technique. High frequency sound waves are emitted from a probe (transducer) that is moved over the body. Images of various body organs are produced. This technique provides valuable diagnostic information regarding the underlying anatomy and any pathology that may be present. Unlike X-rays, diagnostic ultrasound is a non-ionizing technique. To date, no significant biological effects have been demonstrated.

The diagnostic medical sonographer (ultrasound technologist) is trained academically and clinically to provide patient services using ultrasound. Areas of particular importance to sonographers are the abdomen, obstetrics, gynaecology and the heart. Sonographeourse is a contie supervision of a doctor of medicine, qualified in the use and interpretation of ultrasound. Males and females are equally qualified to enter this dynamic field.

Job Opportunities

Graduates in this dynamic allied health field will assume an important role in maintaining high quality patient care using this diagnostic imaging technique. Employment opportunities exist in hospitals (in Radiology, Obstetrics/Gynecology and Cardiology departments), commercial areas, and research. The current graduate placement rate is 100%, due to rapidly increasing ultrasound services across the province. Beginning salaries for Ultra Sound Technologists range from approximately $18 to $22 per hour.

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.

Graduates from the program are eligible to write the American Registry of Diagnostic Medical Sonographers examinations.

Program Length

One year full-time beginning in September each year.

Tuition Fees (subject to change)

$1,823 for the one-year program (1992/93).

Prerequisites

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, educational and professional achievements, clinical experience, an autobiographical letter outlining the reasons for your Interest in Dourse is a contiound as a career, and a letter of reference from a physician and/or a supervisory technologist. Based upon the documentation submitted, the most suitable applicants will be invited to an interview.

Program: DIAGNOSTIC MEDICAL SONOGRAPHY

CORE: ALL STUDENTS September - December

Level 5 (15 weeks including exam week)		**Credits**
BHSC 508	Anatomy and Physiology	3.0
BHSC 509	Pathophysiology	3.0
DSON 502	Applied Echocardiography	3.0
DSON 503	Applied Abdominal Sonography	9.0
DSON 504	Applied Obstetrical and Gynecology Sonography	8.0
PHYS 523	Physics of Ultrasound	4.5

SPECIALTY OPTION 1 January - August

Level 6A (17 weeks including exam week)		
DSON 603A	Abdominal Sonography	31.0
DSON 604A	Obstetrical/Gynecological Sonography	31.0
DSON 605A	Vascular Sonography	8.0

Midterm Break

Level 6B (16 weeks including exam week)		
DSON 603B	Abdominal Sonography	31.0
DSON 604B	Obstetrical/Gynecological Sonography	31.0
DSON 605B	Vascular Sonography	5.5

SPECIALTY OPTION 2 January - August

Level 6A (17 weeks, including exam week)		
DSON 602A	Echocardiography	14.5
BHSC 610	Pathophysiology	1.0

Midterm Break

Level 6B (16 weeks including exam week)		
DSON 602B	Echocardiography	14.5

SPECIALTY OPTION 3 September - December
Prerequisite: Option 1

Level 7 (15 weeks including exam week)		
DSON 602	Echocardiography	14.5
BHSC 610	Pathophysiology	1.0

All courses have a 60% pass mark.

COURSE DESCRIPTIONS

BHSC 508 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 509 Pathophysiology - An outline of the etiology and pathogenesis of those diseases commonly investigated by ultrasonography. The course focuses on obstetrics, gynaecology, and abdominal applications and includes some cardiac pathophysiology.

BHSC 610 Pathophysiology - An outline of the etiology and pathogenesis of cardiac pathology as seen by ultrasonic techniques.

DSON 502 Applied Echocardiography - The student will acquire the theory to recognize normal cardiac structures and some common pathologies on ultrasound. A brief clinical orientation is included.

DSON 503 Applied Abdominal Sonography - The student will acquire the theory and skills to carry out sonographic examinations and the ability to recognize normal and abnormal sonographic patterns in the abdomen.

DSON 504 Applied Obstetrical and Gynecological Sonography - The student will acquire the theory and skills to carry out sonographic examinations and the ability to recognize normal and abnormal sonographic patterns in the female pelvis.

DSON 602 Echocardiography - This course is a continuation of DSON 502. The student will acquire the knowledge and necessary skills to perform cardiac ultrasound examinations.

DSON 603 Abdominal Sonography - In this course, essentially a continuation of DSON 503, the emphasis shifts to more clinical experience.

DSON 604 Obstetrical/Gynecological Sonography - In this course, essentially a continuation of DSON 504, the emphasis shifts to more clinical experience.

DSON 605 Vascular Sonography - The student will acquire the knowledge and necessary skills to perform Doppler ultrasound examinations of the neck and leg vessels.

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

Faculty and Staff

Verna Magee Shepherd, M. Sc., CHE
Acting Associate Dean
Anne Rhodes, R.T.R., R.D.M.S., Program Head
Danelda Johnston, R.T.N.M., R.D.M.S., Assistant Instructor

Clinical Coordinators and Instructors for Affiliated Hospitals

Burnaby Hospital
Dixie Cowi, R.D.M.S.

Children's Hospital
Mumtaz Karmali, R.D.M.S.

Grace Hospital
Vickie Lessoway, R.D.M.S.

Lions Gate Hospital
Laurie Cullen, R.T.R., R.D.M.S.
Michele Stasiuk, R.T.N.M., R.D.M.S.

Royal Columbian Hospital
Janet Graham, B.Sc., R.D.M.S.

Royal Jubilee Hospital
Eileen Nurmi, R.D.M.S.

St. Paul's Hospital
Brenda Harrigan, R.D.M.S.
Roz Gillis, B.Sc.

Surrey Memorial Hospital
Heather Gretchen, R.T.R., R.D.M.S.

University Hospital, Shaughnessy Site
Pam Casson
Eric Shipley, R.D.M.S.

University Hospital, UBC Site
Anne Hope

Vancouver General Hospital
Breige McConville
Wendy Forrest, R.T.R., R.D.M.S.

Eagle Ridge Hospital
Dianne Hagen, R.D.M.S.
Karen Ashley, R.D.M.S.

Kelowna General Hospital
Jennifer Charles

ELECTROPHYSIOLOGY TECHNOLOGY

Diploma Program

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 mathematics, physical science and engineering. Courses in the basic health sciences will inform the student about human physiology and the biological signals to be measured. In addition, courses in the social sciences will prepare the student for interpersonal relationships within 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 will principally find employment in Diagnostic Neurophysiology Departments of hospitals or private clinics in the following fields: electroencephalography (electrical activity of the brain), electromyography (electrical activity of the neuro-muscular system), and evoked potentials (electrical activity generated by stimulation of the sensory systems). 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 and perform quality control procedures on equipment and basic 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 major 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, and evoked potentials.

Upon successful completion of the two-year program, graduates will receive a Diploma of Technology in Electrophysiology. After a period of work experience in a clinical situation, graduates will become eligible to write the Technologist Registration Examinations of the appropriate certifying body in their chosen fields of interest.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Prerequisites

High school graduation with Math 12, Physics 11 and Chemistry 11 all with C+, and English 12, 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 backgrounds and/or experience will also be considered on an individual basis. Most courses taken within the program require successful completion of certain prerequisites. Based on the documentation submitted, the most suitable applicants will be invited to an interview.

Program: ELECTROPHYSIOLOGY

		Credits
Level 1		
BHSC 111	Anatomy and Physiology	4.0
CHEM 107	Chemistry for Biomedical Engineering	6.0
ENPY 150	Electrophysiology	9.0
HCOM 113	Communication for Electrophysiology	4.0
MATH 179	Basic Technical Mathematics for Electrophysiology	5.0
Level 2		
BHSC 212	Anatomy and Physiology	5.5
CHEM 207	Introduction to Organic and Biochemistry	6.5
ENPY 250	Electrophysiology Devices and Techniques	9.5
GNNU 181	Patient Care	4.0
HCOM 213	Communication for Electrophysiology	2.5
MATH 279	Basic Statistics, Calculus, and Numerical Methods for Electrophysiology	8.0
Level 3		
BHSC 312	Neuroanatomy and Physiology	6.0
BHSC 339	Human Behavior	4.0
ENPY 350	Electrophysiology	9.0
ENPY 351	Electrophysiology Clinical	8.0
PHYS 324	Biophysics	3.0
Level 4		
ENPY 450	Clinical Experience in Electrophysiology	46.5

Most courses taken within the program require successful completion of certain prerequisites.

COURSE DESCRIPTIONS

BHSC 111 Anatomy and Physiology - A basic introductory course in human anatomy and physiology, which uses the systems approach. It provides the cardiology technology and the electrophysiology students with terminology and physiological concepts likely to be encountered during the first term of the program.

BHSC 212 Anatomy and Physiology - Builds on information given in BHSC 111, which is prerequisite. Emphasis is placed on the human anatomy and physiology of most interest to the electrophysiology student. Special attention is given to the nervous, neuromuscular and cardiovascular systems. The nervous system information forms a basis for the material presented in the third term course, BHSC 312, Neuroanatomy and Physiology.

BHSC 312 Neuroanatomy and Physiology - Provides a basic understanding of anatomy, physiology and pathophysiology of immediate relevance to the current practice 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 technologist's concerns will be explored. Theory and research findings dealing with stress and illness behaviour 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 Engineering - 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 gravimetric and volumetric quantitative analysis.

CHEM 207 Introduction to Organic and Biochemistry - The naming, properties and main reactions of the major classes of organic compounds are discussed. The biochemistry includes 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.

ENPY 150 Electrophysiology - Provides the basic electrical/ electronic knowledge and skills needed by technologist practitioners of EEG/Electrophysiology. Emphasis will be on dealing with problems encountered in the clinical environment.

ENPY 250 Electrophysiology Devices and Techniques - Introduces the student to devices and techniques used in clinical EEG laboratory practice. Correct placement and application of electrodes for this technique 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 350 Electrophysiology - Students will be instructed for practical competence in the performance and technical interpretation of the following clinical electrodiagnostic procedures: visual evoked potentials, somatosensory evoked potentials, brainstem auditory evoked potentials, EMG, Polysomnography (diagnosis of sleep disorders).

ENPY 351 Electrophysiology Clinical - Scheduled on Tuesday and Thursday mornings at local hospital EEG laboratories, this course will provide hands-on patient contact under direct supervision, in preparation for fourth term practicum experience.

ENPY 450 Clinical Experience in Electrophysiology - An appropriate amount of time is spent in each of the following clinical areas: EEG, EMG, opthalmology, polysomnography (diagnosis of sleep disorders). Program will be tailored to the specific student. Clinical work may be out-of-town. Prerequisite: ENPY 350, 351.

GNNU 181 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 113 Communication for Electrophysiology - This course emphasizes clear, concise technical writing in the electrophysiology field. Students learn how to write for specific audiences, how to make technical descriptions accurate and readable, and how to present oral information effectively. The course includes memos, letters, reports, technical descriptions, job resumes and application letters, information interviews and oral presentations.

HCOM 213 Communication for Electrophysiology - This course is a continuation of HCOM 113. Students apply the skills they have learned to oral and written projects of greater length. The course includes interviews, oral and written reports, meetings, conflict resolution, and writing for professional publications.

MATH 179 Basic Technical Mathematics for Electrophysiology - Review of arithmetic with approximate numbers, unit conversion and percent. The equation of a straight line and solution of systems of linear equations with applications to chemical mixtures, f-response curves, etc. Properties of exponential and logarithmic functions and their manipulation; exponential and logarithmic graphs; solving exponential and logarithmic equations with applications to exponential growth and decay, light absorption, Ph scale, decibel scale, etc. Semi-log and log-log graphs with applications, transients, fast roll-off curves, time constants.

Right angle trigonometry review, trigonometric functions of an angle, radian measure, oblique triangles, sine and cosine laws, vectors, graphs of trigonometric functions, voltage and impedance triangles, current and admittance triangles.

MATH 279 Basic Statistics, Calculus, and Numerical Methods for Electrophysiology - Descriptive statistics, basic probability distributions including the binomial, Poisson and normal distributions. Sampling and sampling distributions; introduction to statistical inference; point and interval estimates of the population mean and population proportion, large and small sample cases; introduction to concepts of hypothesis testing. Differential and integral calculus for algebraic functions, maximum and minimum problems, differentials and applications in error analysis, calculation of area under a curve, rms and average values and other applications in electrophysiology. Introduction to calculus of trigonometric functions and basic concepts of Fourier series and related topics. Introduction to the IBM PC-type microcomputer, DOS and Turbo Pascal. Algorithms, flowcharts, program development process. Data types, arithmetic statements, branching and looping, files, input/output, arrays, strings, functions and procedures. Introduction to computer graphics.

PHYS 324 Biophysics - This is a general level course in basic physics with emphasis on applications to biological systems. Topics 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.

Faculty and Staff

W. Bruce Sandy, B.A., M.H.S.A., Associate Dean
Michael Young, B.A., Dipl.T., R.E.T., Program Head
Karin Liddle, R.E.T.

ENVIRONMENTAL HEALTH: PUBLIC HEALTH INSPECTOR TRAINING PROGRAM

Diploma Program

The Public Health Inspector/Environmental Health Officer is a vital member of the public health team and delivery system. This role includes preventing disease, promoting health and improving the environment through the use of education, consultation, inspection and monitoring techniques and, if necessary, by the enforcement of health legislation. The scope of interest covers 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 the public's 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. Proficiency is required in problem-solving and decision-making.

Job Opportunities

Employment possibilities 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 and the health engineering sciences, math and the physical and social sciences. This has been found 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 experiences. Environmental health is a complex and rapidly changing area of human endeavour. A firm foundation of education and experience in science and health is provided to allow this field to be dealt with.

Prerequisites

High School graduation with English 12, Math 12, Physics 11, Biology 11 and Chemistry 12 are requirements for this program. Preference is given to applicants who have completed their prerequisites within five years of applying, and have achieved a C+ standing in these courses. Preference may also be given to applicants who have successfully completed Biology 12. Applicants must be in good health with adequate hearing and vision. An up-to-date immunization program is suggested for applicants accepted into the program. The nature of the work precludes individuals who are physically impaired. Applicants should be able to show evidence of maturity, have a positive outlook and be interested in serving the community.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Post-graduation

In addition to completing the requirements of the two-year program leading to a Diploma of Technology, graduates must satisfactorily complete 24 weeks of practicum training in a recognized health unit in Canada under the direction of a Public Health Inspector or Environmental Health Officer. 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.

Program: ENVIRONMENTAL HEALTH

Level 1			Credits
BHSC	123	Public Health and Pollution Control Microbiology	3.0
CHEM	108	Chemistry for Environmental Health	6.0
ENVH	124	Pest Control	2.5
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 Health	3.0
MATH	182	Basic Technical Mathematics for Environmental Health	4.0

Level 2			
BHSC	204	Basic Anatomy and Physiology	2.5
BHSC	223	Public Health and Pollution Control Microbiology	4.0
CHEM	208	Chemistry for Environmental Health 2	8.0
ENVH	231	Food Hygiene 2	2.5
ENVH	232	Public Health Inspection 2	2.5
ENVH	266	Epidemiology and Biostatistics	5.5
ENVH	275	Drinking Water and Waste Disposal	7.5
HCOM	205	Communication for Environmental Health	4.0
PHYS	212	Environmental Physics	4.5

Level 3			Credits
CHEM	313	Instrumental Analytical Methods for Environmental Health	4.0
ENVH	331	Food Hygiene 3	2.0
ENVH	332	Public Health Inspection 3	2.0
ENVH	337	Public Health Administration 1	2.0
ENVH	350	Industrial Hygiene 1: Noise	5.0
ENVH	358	Environmental Health Relations	5.0
ENVH	379	Technical Research Methods 1	7.0

Level 4			
BHSC	424	Communicable Disease Control	5.5
CHEM	419	Industrial Chemical Processes	2.5
CHSC	413	Environmental Analytical Methods	4.0
ENVH	437	Public Health Administration 2	2.5
ENVH	453	Environmental Health and Engineering 2	4.0
ENVH	456	Public Health Law	4.0
ENVH	459	Technical Research Methods 2	4.0
ENVH	470	Industrial Hygiene and Toxicology	6.5
ENVH	471	Food Hygiene	6.5

COURSE DESCRIPTIONS

BHSC 123 Public Health and Pollution Control Microbiology - An introductory course in microbiology which prepares the student for the applied microbiology in BHSC 223 and which graduates will use in their daily work. The course includes a discussion of the structure, physiological characteristics and pathogenesis of bacteria, viruses, fungi and protozoan parasites. An introduction to body defense, immunity and basic immunizations is included.

BHSC 204 Basic Anatomy and Physiology - Provides 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 Pollution Control Microbiology - Building on the basic concepts of BHSC 123, the course deals with the applied concepts of Microbiology to public health. The course deals with the proper collection and handling of specimens and the basic microbiology of water, foods and foodborne illnesses, milk and dairy products, waste water and waste water treatment. 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. Prerequisite: BHSC 223.

CHEM 108 Chemistry for Environmental Health 1 - A general chemistry course for environmental health. Topics include chemical symbols, formulae, acid base reactions, calculations 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 chemistry includes 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 for 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 419 Industrial Chemical Processes - Provides an overview of the chemical processes used in industry, chemicals, chemical reactions, products manufactured, waste products, pollutants and the hazards to personnel. Students will make field trips to selected industries. Prerequisite: CHEM 208.

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. Prerequisite: CHEM 313.

ENVH 124 Pest Control - An introduction to pests of public health significance. Through lectures and laboratories, the student will examine the life history, health significance and methods of identification of pests encountered by the graduate. Current chemical, physical and biological control methods are examined in detail.

ENVH 141 Food Hygiene 1 - Examines the public health concerns associated with the food industry. Specific attention is directed to legislative control and enforcement, inspection techniques, causes and investigation of food-borne illnesses, microbiological concerns and educational programs, as these apply to the food industry in production, processing, handling, storage, service display, construction and materials.

ENVH 142 Public Health Inspection 1 - Provides the student with information on duties and responsibilities in government organizations. Includes a detailed study of related environmental and health legislation as well as the division of control and authority at the federal, provincial and local levels. Control techniques and procedures used by field practitioners are stressed for a variety of common situations.

ENVH 143 Environmental Health and Engineering 1 - Covers a number of environmental health topics including emergency measures, recreational sanitation, indoor air, housing, swimming pools, plumbing, investigation of communicable diseases and other topical subjects.

ENVH 231 Food Hygiene 2 - See ENVH 141. Prerequisite: ENVH 141.

ENVH 232 Public Health Inspection 2 - See ENVH 142. Prerequisite: ENVH 142.

ENVH 266 Epidemiology and Biostatistics - This course enables the student to apply epidemiological principles to assess the distribution and causes of disease in the population, and to use biostatistical methods to critically evaluate data and study conclusions. Prerequisite: MATH 182.

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 diposal methods of domestic solid wastes.

ENVH 331 Food Hygiene 3 - See ENVH 141. Prerequisite: ENVH 231.

ENVH 332 Public Health Inspection 3 - See ENVH 142.

ENVH 337 Public Health Administration 1 - This survey course examines the principles of organizational behavior, organization and design. The theoretical aspects of public health administration will be examined, showing administrative philosophies from the classical school of administration to the present day. These administrative concepts will be applied to the functioning of government agencies and health departments. Particular reference will be made to local government organizations. ENVH 437 examines in greater depth the fields of labor relations, budgeting and management information systems.

ENVH 350 Industrial Hygiene 1: Noise - Reviews noise topics relevant to occupational and community noise assessment and control. Through lectures and laboratory exercises the student is introduced to the basic theory of sound, noise measurement and analysis, equipment calibration, selection of personal protective equipment and the assessment of hearing loss. At the end of this course the student will be able to recommend simple sound control measures such as the use of barriers and absorbent materials. Prerequisite: MATH 182 and PHYS 212.

ENVH 358 Environmental Health Relations - Examines the interrelationships and interactions within a health agency and between various government departments and agencies. Additionally the forces which underlie the social behavior of individuals and groups will be examined. Interpersonal relations will be examined through the practical application of public health skills and the interaction of personnel in the environmental health field. The principles of dealing with situations such as political pressures and the media will be examined, with emphasis on problems specific to public health.

ENVH 379 Technical Research Methods 1 - Provides for the development of 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.

ENVH 437 Public Health Administration 2 - See ENVH 337. Prerequisite: ENVH 337.

ENVH 453 Environmental Health and Engineering 2 - See ENVH 143. Prerequisite: 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 public health officials are likely to come in contact with in the course of their duties. Special attention will be given to the 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 and Toxicology - See ENVH 379. Prerequisite: ENVH 379.

ENVH 470 Industrial Hygiene and Toxicology - A basic survey course in occupational health. The student is introduced to common chemical, physical and biological stressors. Through lectures and laboratory exercises the student will be able to recognize common occupational health hazards, demonstrate the use of appropriate environmental sampling equipment and recommend control measures to alleviate potential health hazards. Prerequisite: MATH 182 and PHYS 212.

ENVH 471 Food Hygiene 4 - See ENVH 141. Prerequisite: ENVH 331.

HCOM 106 Communication for Environmental Health - This applied course introduces students to the communication needs of professionals working in the environmental health field. 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 Health - This course builds on skills learned 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 propose, design and sell a training module for an environmental health 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 measurement, data analysis and experimental techniques, while confirming and expanding the lecture concepts. Prerequisite: MATH 182.

Faculty and Staff

W. Bruce Sandy, B.A., M.H.S.A., Associate Dean
L. Woolsey, B.Sc., C.P.H.I.(C), R.P.H.I., Program Head
E.J. Borsky, Dipl.T.
T. Getty, B.A.A., (Env. Health), C.P.H.I.(C)
B. Price, C.P.H.I.(C),
C.L. Young, M.Ed., C.Tech., C.P.H.I.(C), R.P.H.I.

MEDICAL LABORATORY TECHNOLOGY

Diploma Program

The Medical Laboratory Technologist

The medical laboratory technologist, as a member of the Health Care Team, performs 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, treatment, and prevention 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. Medical Laboratory Technology is a field suited to both men and women.

Employment Opportunities

Hospital, private medical and public health laboratories, Red Cross transfusion services, clinical research laboratories and commercial supply companies are all areas where graduates of Medical Laboratory Technology can expect to find employment. Medical Laboratory Technology is a highly regarded career which offers good financial rewards. Employment opportunities are good locally, throughout British Columbia, and across Canada. Beginning salaries for entry level positions are approximately $34,000 /annum. Technologists in senior management positions earn about $60,000 /annum.

Transfer Credit/Degree Completion

Degree transfer into the Bachelor of Medical Laboratory Science program at the University of British Columbia is possible on completion of the Diploma Program and certification with the Canadian Society of Laboratory Technologists.

The Program

The present BCIT program is a two-year Diploma program consisting of ten months 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) affiliated with the program. This program begins on August 3rd, 1993 with the academic year concluding at the end of May 1994. The clinical training year will begin in June 1994 and end in May 1995.

A new three-year MLT Diploma program has been proposed for September 1993 pending funding approval. This program will consist of 2 school years (9 months each) of academic studies at the Institute followed by a 12 month clinical training period in one of the clinical facilities (hospital or private lab) affiliated with the Program. The entry prerequisites for the three-year program will be Grade 12 instead of the first-year university/college prerequisites required for the present two-year program. This new program may begin on September 7, 1993.

If the new program is approved, there is a possibility that for one year only both the present program commencing in August and the first year of the proposed new program commencing in September will be offered. For more information, please contact the Program Head, Karen Nicolson, at 432-8831 after January 1, 1993.

After successful completion of the MLT training program, the student is eligible to write the Certification Examinations of the Canadian Society of Laboratory Technologists (CSLT) which leads to the qualification of Registered Technologist (RT), the nationally recognized qualification for employment in a medical laboratory.

Accreditation

The MLT program (BCIT and affiliated clinical facilities) are accredited by the Conjoint Committee of the Canadian Medical Association and the Canadian Society of Laboratory Technologists.

Program Length

Two years full-time beginning in August each year. The program starts August 3, 1993.

Tuition Fees (subject to change)

$3,631 for the 2-year program (1992/93).

Affiliated Clinical Training Facilities

There are eight clinical training laboratories affiliated with the MLT program. Six of the laboratories are located in the Vancouver Lower Mainland and two are on Vancouver Island (Victoria and Nanaimo).

Prerequisites

A. For the present two-year program:

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 120
English UBC 6 credits at the English 100 level
Mathematics UBC 6 credits at the Math 100 level

*No specific Mathematics courses are recommended. However, a total of 6 UBC credits at the Math 100 level (or its equivalent) are required. Statistics courses are recommended. These prerequisites should have been completed during the past 5 years. If longer than 5 years has elapsed, individual assessment will be required.

B. For the proposed three-year program:
Secondary School Graduation with Biology 12, Chemistry 12, English 12, Mathematics 12, and Physics 11, all with a minimum of C+ or better. Prerequisites should have been completed within the past 5 years. If longer than 5 years has elapsed, individual assessment will be required.

Other Admission Requirements and Selection Process

Students are expected to be competent in written and oral English. Applicants should possess a caring and professional attitude, meticulous work habits, logical thinking, and good manual dexterity, the ability to work quickly and accurately under pressure and to make decisions which directly affect the diagnosis and treatment of disease. Applicants should be aware that this program is physically demanding and requires students to stand for long periods of time. Students should have fine motor skills and clear skin (open lesions may prohibit participation due to potential risk to students and patients.) Final acceptance to the program will be based on the results of a personal interview with a team composed of BCIT and clinical teaching staff. Prior to the interview, applicants will be required to attend an orientation session at BCIT and complete a tour of a hospital laboratory (details will be provided upon receipt of an application).

Students must complete an immunization program. A hepatitis vaccine is strongly recommended for students accepted into the program and is available at the Institute at a reduced cost.

Applicants lacking the required prerequisites but who have graduated from a Medical Laboratory Science program and have relevant work experience will be considered for admission to the Medical Laboratory program.

Entry into Second (Clinical) Year of the MLT Program

MLT students may not continue into the second (clinical) year of the MLT program unless they have obtained a passing grade in all of the MLT program courses.

Course of Studies

YEAR 1

Level 1 (20 weeks including exam week)			**Credits**
BHSC	104	Anatomy and Physiology	2.5
BHSC	121	Introductory Principles of Immunology	3.5
MLAB	100	MLT Fundamentals	7.0
MLAB	103	Clinical Chemistry	9.5
MLAB	104	Clinical Microbiology	9.0
MLAB	105	Hematology	5.0
MLAB	109	Histotechnology	9.0

Level 2 (20 weeks including exam week, excluding Spring Break)			**Credits**
MLAB	200	MLT Clinical Orientation	2.5
MLAB	203	Clinical Chemistry	9.5
MLAB	204	Clinical Microbiology	11.5
MLAB	205	Hematology	10.5
MLAB	208	Immunohematology	10.5

YEAR 2

Clinical training in an affiliated clinical facility in the Vancouver area (Lower Mainland), or Vancouver Island.

Level 3 (28 weeks)			
MLAB	300	Clinical Training	60.0

Level 4 (20 weeks)			
MLAB	400	Clinical Training	60.0

Levels 3 and 4 total 48 weeks of clinical training. The addition of 2 weeks of vacation, a Christmas break and one week didactic studies make the complete second year 52 weeks in length.

COURSE DESCRIPTIONS

BHSC 104 Anatomy and Physiology - A systematic approach to the study of human anatomy and physiology for MLT students. The course includes basic cytology and an introduction to the skeletal, muscular, nervous, circulatory, respiratory, digestive, urinary and reproductive systems.

BHSC 121 Introductory Principles of Immunology - A basic course designed to give the MLT 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; hypersensitivities, their characteristics and management; immune deficiency diseases and auto-immunity.

MLAB 100 MLT Fundamentals - An introductory course for the MLT student with emphasis on general techniques, equipment (microscopes, balances, centrifuges, water purifying equipment, automatic pipettes and diluters, potentiometry); laboratory safety, specimen handling, laboratory math, reagent preparation and other basic knowledge that applies to most medical laboratory departments. Professionalism, medical terminology and general principles of laboratory policies are also covered.

MLAB 103 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.

MLAB 104 Clinical Microbiology - This course provides a detailed study of clinical microbiology theory, laboratory methodology and techniques. Emphasis is on understanding the interrelationships between the characteristics of microorganisms, their natural habitats, sources of infection pathogenicity for man and the detailed methodology used by the clinical laboratory technologist to isolate, identify and test the antibiotic susceptibility of human pathogenic organisms. Through practical laboratory sessions, the student develops the basic skills and understanding required to perform and interpret clinical microbiology tests and procedures correctly.

MLAB 105 Hematology - This course is designed to provide the student with a detailed study of the production and function of blood cells, blood diseases and blood coagulation. Emphasis is placed on the theory and practical application of hematological tests and instrumentation necessary to interpret the resulting data in a clinical situation.

MLAB 109 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, and to prepare students to work in the histopathology laboratory.

MLAB 200 MLT Clinical Orientation - The topics discussed in this course will include professionalism, ethics, career prospects available to graduates from this program; laboratory information flow, the fundamentals of laboratory management and organization. Through a short series of case study seminars, the interrelationship between the five major MLT subject areas will be emphasized.

MLAB 203 Clinical Chemistry - See MLAB 103.

MLAB 204 Clinical Microbiology - See MLAB 104.

MLAB 205 Hematology - See MLAB 105.

MLAB 208 Immunohematology - Uses the sciences of genetics and immunology to explore the major antigen systems of human blood. The practical importance of these systems is applied to the technology of blood and blood component transfusion, and the investigation of the immune hemolytic anemias.

MLAB 300 Clinical Training - Clinical training requires full-time attendance in an affiliated laboratory. The purpose is to further develop the skills necessary for students to function safely and competently in a medical laboratory.

MLAB 400 Clinical Training - See MLAB 300.

Faculty and Instructors

Verna Magee Shepherd, M.Sc., CHE, Acting Associate Dean
Karen E. Nicolson, B.Sc., A.R.T. (Clin. Micro.)
Program Head
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Paul Bradbury, F.I.M.L.S., A.R.T. (Hist).
Frank L. Curtis, F.I.M.L.S., A.R.T. (Immunohem.)
Pat Johnston, A.R.T. (Hematol.)
Kathleen McCord, R.T.
Lloyd Simandl, A.R.T. (Hematol.), on leave
Sylvia Sinclair, A.I.M.L.T., R.T.
Shelley Tiffin, A.R.T., (Clin. Micro.)
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Jean Henderson, R.T.
Elinor Hudon, R.T., on leave
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Heather A. Pedlar, R.T.
Linda Preston
Peter Sawrenko, R.T.
Judy Steele
Vivian Tang, R.T.

Clinical Coordinators and Instructors

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George Metcalfe, B.Sc., FCSLT (Clin. Chem.)
Ellen Tate, A.R.T. (Hematol.)
Gerald Todd, A.R.T. (Hist.)
Mitzi Ujimoto, R.J.

Assisted by other instructors from Victoria General and Royal Jubilee Hospital Laboratories.

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Kevin Gibbons, F.I.M.L.S.

MEDICAL RADIOGRAPHY TECHNOLOGY

Diploma Program

The medical radiographer is a technologist who works as part of the health team composed of radiologists, internists, surgeons, nurses, laboratory technologists, biomedical technologists, nuclear medicine technologists, sonographers and other specialists. Radiographs are widely used as an aid in making medical diagnoses. A radiograph (x-ray) 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. Radiographers work under the direction of a medical specialist (a radiologist) in the hospital radiology department, at the patient's bedside or in the operating room or Emergency Department. 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.

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. The final 12-month clinical training must be completed at one of the participating hospitals (five in the Lower Mainland; three in the Interior; two on Vancouver Island). This additional training is a prerequisite for writing the certification examination set by the Canadian Association of Medical Radiation Technologists. Students can expect to be sent to any of the ten hospitals for their final 12 months of clinical experience.

Job Opportunities

BCIT graduates in medical radiography find employment in hospitals and private clinics, which may employ from one to 35 technologists. Most x-ray technologists work a 37.5 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. Entry level salaries begin at $34,000 /annum to $54,000 /annum for senior levels.

Accreditation

The program is accredited by the Canadian Medical Association - Conjoint Accreditation Services.

Transfer Credit/Degree Completion

BCIT offers an Advanced Diploma in Medical Imaging. Simon Fraser University grants 57 credits towards a Bachelor of Science degree to graduates of this program.

Program Length

Two and one-half years full-time beginning in January each year.

Tuition Fees (subject to change)

$3,631 for the 2.5 year program (1992/93).

Prerequisites

High school graduation with Math 12, Physics 11 and 12, Biology 11 and 12 and English 12, all with a minimum of C+, are the required subject prerequisites. These prerequisites must have been completed during the past 5 years. If longer than 5 years has elapsed, upgrading in the required subjects will be necessary.

Also required are basic typing skills, an introductory computer course, and a minimum of 40 hours of volunteer work in a hospital such as candy striping and Basic Life Support (Level C).

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 also complete an immunization program as well as a medical examination by a qualified physician. A pre-admission interview with the program head of Medical Radiography is conducted to assess the applicant's suitability for this field. Students must be competent in written and oral English. The applicant's suitability for the program is also assessed by hospital staff and management, following a 3 day clinical orientation in a radiology department.

Course of Studies

YEAR ONE

Level 1 January to April (17 weeks)		**Credits**
BHSC 113	Anatomy and Physiology	2.5
BHSC 141	Human Behavior	1.0
GNNU 180	Patient Care	2.5
MRAD 100	Clinical Experience	17.0
MRAD 101	Radiographic Procedures	5.5
MRAD 102	Medical Imaging	4.5
MRAD 103	Radiographic Technique and Evaluation	2.5
MRAD 104	Radiographic Anatomy and Physiology	3.5
PHYS 110	Physics for Medical Radiography	5.5

Students are in hospitals for clinical experience for one day per week for 17 weeks and full-time for 4 weeks during the month of May.

Level 2 September to December (15 weeks)		**Credits**
BHSC 213	Anatomy and Physiology	2.0
GNNU 280	Patient Care	3.0
MRAD 200	Clinical Experience	11.5
MRAD 201	Radiographic Procedures	5.0
MRAD 203	Radiographic Technique and Evaluation	2.5
MRAD 204	Radiographic Anatomy and Physiology	2.0
MRAD 205	Case Studies	1.5
MRAD 207	Pathology	2.0
MRAD 212	Medical Imaging	1.5
PHYS 210	Physics for Medical Radiography	3.0

Level 2 is 15 weeks in length, including exam week. During the months of October, November and December, students alternate every two weeks between BCIT and the clinical area (scheduled for 35 hours-per-week). The hours-per-week listed above are the hours averaged over the length of the course. The actual hours-per-week in a certain course will vary depending on the month.

YEAR TWO

Level 3 January to April (16 weeks)		
BHSC 241	Human Behavior	1.5
HCOM 102	Communication for Medical Radiographers	2.0
MRAD 300	Clinical Education	16.0
MRAD 301	Radiographic Procedures	2.5
MRAD 303	Radiographic Technique and Evaluation	1.5
MRAD 304	Radiographic Anatomy and Physiology	1.5
MRAD 305	Case Studies	1.5
MRAD 307	Pathology	2.0
MRAD 308	Radiation Biology and Protection	1.5
MRAD 309	Special Procedures	1.5
MRAD 312	Medical Imaging	2.0

Level 3 is 16 weeks in length, including exam week. Students are in the clinical area for alternate two-week periods at 35 hours-per-week (averaging out at 17.5 hours-per-week for the term). Actual lecture and lab hours-per-week, for the weeks students are on campus, are therefore scheduled at twice the hours listed above.

Level 4 May to December (33 weeks)		
MRAD 400	Clinical Experience	66.0

Level 5 January to April (17 weeks)		
MRAD 500	Clinical Experience	34.0

Levels 4 and 5 total either 50 or 49 weeks in length depending on number of weeks of vacation. Length of vacation and time of year it is taken is dependent upon clinical training facility (i.e. hospital).

- **All courses have a 60% pass mark.**

COURSE DESCRIPTIONS

BHSC 113/213 Anatomy and Physiology - A systematic study of the basics of human anatomy and physiology which prepares the student for MRAD 104/304/404, Radiographic Anatomy and Physiology. Included are basic physiological chemistry, cytology and histology.

BHSC 141 Human Behavior - The first half of the course deals with organizational behaviour from the perspective of the technologist and his/her immediate supervisor. The second half provides the student with social and psychological concepts related to processes.

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. This course also introduces the basics of the psychological and social environments of the health care organization.

GNNU 280 Patient Care - Provides the student with advanced concepts and techniques necessary to meet the comfort and safety measures of patients undergoing x-ray examinations. 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 Medical Radiographers - Introduces students to the communication needs of health care workers communicating with supervisors and patients. The course includes organizing and explaining information, objective and subjective descriptions, short reports, action memos, oral briefings and meetings. All assignments are based on radiography case studies.

MRAD 100 Clinical Experience - Students are orientated to the clinical area and gain experience in basic radiographic positioning and techniques relating to the chest, abdomen, and upper and lower extremities as well as preparation of contrast media.

MRAD 101 Radiographic Procedures - An introduction and orientation to the field of radiography will be presented together with a brief introduction to x-radiation protection practices. Radiographic procedures relating to the upper and lower extremities, chest, pelvic girdle, spine, and abdomen will be covered.

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 103/203/303 Radiographic Technique and Evaluation - The student will review patient radiographs with instruction being given regarding film evaluation, identification of pertinent structures as well as the technical considerations for each area. The student will develop technique charts, become aware of all factors affecting radiographic quality and develop the necessary skill to adjust technical factors to produce optimum quality radiographs.

MRAD 104/204/304 Radiographic Anatomy and Physiology - In this course a detailed study is made of the human skeleton. The body organs, glands, vessels and nerves are studied according to region. Throughout the course, the emphasis is upon surface anatomy, the radiographic appearance of structures, and the details of structure and function which are pertinent to radiographic procedures. Prerequisite: BHSC 113/213.

MRAD 200/300 Clinical Experience - Students will gain practical experience in the following areas: upper and lower extremity (trauma patient), non-ambulatory chest with I.V. or drainage, non-traumatic vertebra, routine fluoroscopy and routine I.V.P.'s.

MRAD 201 Radiographic Procedures - The radiographic procedures related to the digestive, urinary and biliary systems and the thoracic cage are covered. Three 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. Prerequisite: MRAD 101.

MRAD 205/305 Case Studies - Designed to provide the bridge between classroom theory and clinical work. A case study is presented and students discuss all aspects of the case including the anatomy and physiology, positioning, radiation protection, imaging and equipment issues, technique and patient care. Students have the opportunity to develop analytical and planning skills in a laboratory setting.

MRAD 207 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. Laboratory sessions allow students to become familiar with the radiographic appearance of some of the more common bone pathologies.

MRAD 212 Medical Imaging - Continuing from MRAD 102, this course includes details of x-ray circuits, mobile units, and rapid serial film units. Quality assurance includes: processor monitoring, various tests on x-ray units and imaging equipment. Laboratory work related to these subjects is included.

MRAD 301 Radiographic Procedures - 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. Prerequisite: MRAD 201.

MRAD 307 Pathology - This course, which follows MRAD 207, 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. Laboratory sessions allow the student to become familiar with the radiographic appearance of some of the more common pathologies.

MRAD 308 Radiation Biology and Protection - The first part of this course deals with the fundamental concepts of Radiobiology through a discussion of radiation interaction with tissue, radiosensitivity; radiation effects at doses greater than, and within, the diagnostic range, effects of radiation on the embryo and fetus, as well as low-level radiation effects. In the second part of the course, Radiation Protection concepts are introduced. First, the principles of radiation protection and the establishment of dose limits are described. This is followed by a discussion of various methods used to minimize radiation doses to both patients and personnel. Finally, the course concludes with equipment specifications and shielding guides for diagnostic x-ray installations.

MRAD 309 Specialized Procedures - Includes discussion of the specialized radiographic procedures utilized to demonstrate the circulatory and central nervous systems as well as the digestive, biliary and genito-urinary tracts. Also included is a brief discussion of CT Scanning, mammography, trauma and interventional radiology.

MRAD 312 Medical Imaging - Continues from MRAD 212 with study of special tubes, artifacts, image presentation, and rollfilm processing. Advanced imaging includes computer basics, computerized tomography (CT), digital imaging, and magnetic resonance imaging (MRI). Allied imaging includes Nuclear Medicine and Diagnostic Sonography.

MRAD 400/500 Clinical Experience - The student gains practical experience in the following areas: skeletal radiography; trauma vertebra; fluoroscopy examinations; horizontal beam procedures; injectable contrast exams and mobile/operating room exams.

PHYS 110/210 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.

* For specific program information, please contact the Program Head at 432-8743.

Faculty and Staff

Verna Magee Shepherd, M.Sc., C.H.E.
Acting Associate Dean
Ann McMillen, R.T.R., Dipl.Hlth.Care Mgt., M.Ed.
Program Head
Mary Filippelli, R.T.R.
Shirley Hundvik, R.T., M. Ed.
Dori Kaplun, A.C.R.
Rita McLaughlin, A.C.R.
Gisela Paches, R.T.R.
Euclid Seeram, R.T.R., B.Sc., M.Sc.
Roger Smith, D.C.R., R.T.R.
Iris Williamson, A.C.R., R.D.M.S.

Clinical Instructors for Medical Radiography Technology affiliated hospitals

Burnaby Hospital
Eleanore Nuttall, R.T.R.

B.C. Children's Hospital
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Greater Victoria Hospital Society
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Lions Gate Hospital
Kristin Carabetta, R.T.R.

Kelowna General Hospital
Patti Anderson, R.T.R.

Prince George Regional Hospital
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Royal Columbian Hospital
Henry Ross, R.T.R.

Royal Inland Hospital
Anna Yoshida, R.T.R.

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Joanne Peterson, R.T.R.

University Hospital, Shaughnessy Site
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University Hospital, UBC Site
Lois Tanner, A.C.R.

Vancouver General Hospital
Phylis Washylyshyn, R.T.R.

NUCLEAR MEDICINE TECHNOLOGY

Diploma Program

Nuclear medicine is the application of radioactive materials to the diagnosis and management of disease in humans. It is primarily a diagnostic specialty 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 concentrations of certain substances in blood serum and other patient samples.

Nuclear medicine is responsible for a host of revolutionary, safe, non-invasive diagnostic procedures that are now available to physicians in many 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 patient 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. Beginning salaries for entry level positions are approximately $34,000 /annum. A senior (chief) technologist salary begins at $41,000 /annum.

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, the student spends alternate two-week periods at BCIT and the nuclear medicine department of a Lower Mainland hospital. 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.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two year program (1992/93).

Post-graduation/Degree Completion

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.) and work as registered nuclear medicine technologists anywhere in Canada and in many other parts of the world. Advanced Certification is available. Simon Fraser University grants two years credit towards a Bachelor of Science degree to graduates of this program.

Accreditation

The program is accredited by the Canadian Medical Association - Diagnostic Imaging in Medical Radiation Technology.

Prerequisites

High school graduation with English 12, Math 12, Chemistry 11 and 12 and Physics 11. Preference will be given to those applicants who have obtained a C+ or better in all prerequisites. Since the work is highly technical and exacting, the student must feel comfortable with complex instruments, possess considerable manual dexterity and have meticulous work habits. Applicants must have a strong sense of responsibility and a desire to work with patients of all age groups. A pre-admission interview is conducted by members of the Nuclear Medicine Technology program faculty who will assess applicants' suitability for the field and their communication skills.

Applicants must undergo a medical examination by their own physician and have a complete updating of immunizations. A hepatitis vaccine is strongly recommended and is available at the Institute at a reduced cost. Applicants selected for the program 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.

Program:
NUCLEAR MEDICINE TECHNOLOGY

Level 1		Credits
BHSC 106	Anatomy and Physiology	4.0
BHSC 126	Basic Medical Microbiology and Immunology	2.0
CHEM 116	Chemistry for Nuclear Medicine Technology 1	4.0
MATH 175	Basic Technical Mathematics for Nuclear Medicine Technology	4.0
MLAB 111	Clinical Laboratory Orientation	3.0
NMED 102	Radiopharmaceuticals	4.0
NMED 104	Introduction to NMT	3.0
PHYS 105	Basic Physics for Nuclear Medicine Technology	6.0
Level 2		
BHSC 206	Anatomy and Physiology	5.5
CHEM 216	Chemistry for Nuclear Medicine Technology 2	5.5
GNNU 181	Patient Care	4.0
MATH 275	Statistics for Nuclear Medicine Technology	4.0
NMED 202	Radiopharmaceuticals	2.5
NMED 203	Radioassay Procedures	2.5
NMED 204	Applied Physiology	2.5
NMED 205	Radiobiology and Protection	2.5
PHYS 205	Radioactivity and Instrumentation	10.5
Summer (12 weeks)		
NMED 209	Clinical Experience in Diagnostic Procedures	24.0
Level 3		
BHSC 306	Pathophysiology	3.0
NMED 301	Imaging	2.0
NMED 304	Applied Physiology	10.0
NMED 305	Clinical Experience in Diagnostic Procedures	14.0
PHYS 305	Radioactivity and Instrumentation	3.0
Level 4		
BHSC 406	Pathophysiology	2.5
BHSC 439	Human Behavior	2.5
HCOM 114	Communication for NMT	2.5
NMED 404	Applied Physiology	11.0
NMED 405	Clinical Experience in Diagnostic Procedures	18.5
PHYS 405	Radioactivity and Instrumentation	4.0
Summer (15 weeks)		
NMED 409	Clinical Experience in Diagnostic Procedures	30.0

*** All courses have a 60% pass mark.**

During Levels 3 and 4 students are in the clinical area for alternate two-week periods of 35 hours per week. The hours listed for these levels are the average hours per week for the term on campus.

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 microorganisms, the communicability of infection, host-parasite relationships, methods of destruction and control of microorganisms, 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 306/406 Pathophysiology - An introduction to the principles of pathology based on a disease process approach. 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 environment of health care organizations, with the aim of understanding how communication affects task activities.

CHEM 116 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 216 Chemistry for Nuclear Medicine Technology 2 - 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 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 114 Communication for NMT - Introduces students to the communication needs of the nuclear medicine profession communicating with supervisors and patients. This course includes organizing and explaining information, oral and written reporting, and resume writing.

MATH 175 Basic Technical Mathematics for Nuclear Medicine - Emphasizes enhancement of calculation skills and development of problem-solving techniques. Topics include logarithms, exponential growth and decay (physical, effective and biological half-lives, transmission of shielded radiation), graphing techniques applied to RIA (log, semi-log, logit-log, cubic spline), curve stripping, an introduction to calculus.

MATH 275 Statistics for Nuclear Medicine Technology - Offers a solid introduction to statistical data treatment and decision-making with illustrative health applications. Topics include descriptive statistics, binomial, Poisson and Normal probability models, estimation and hypothesis testing, regression and correlation in RIA. Emphasis is on learning relevant jargon and techniques in order to appraise technology journal articles and use quality control in the lab.

MLAB 111 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 102 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 radiopharmaceuticals.

NMED 104 Introduction to Nuclear Medicine Technology - An overview of the many components that comprise Nuclear Medicine Technology and its role in the health care system. Topics also include laboratory safety, blood handling and procurement, basic darkroom technique and medical terminology.

NMED 203 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 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 competently in a nuclear medicine lab. Hands-on experience will be gained in all aspects of "in vitro" and "in vivo" procedures.

NMED 301 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 and computer visual displays will be covered in theory and practice.

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 404 Applied Physiology - A continuation of NMED 304. 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 - An introductory level course covering forces and motion, energy, static electricity, DC electricity, magnetism, and AC electricity.

PHYS 205 Radioactivity and Instrumentation - The radioactivity portion of this course includes atomic structure, nuclear structure, nuclides, nature and production of x-rays, measures of radioactive decay, modes of decay, interaction of radiation with matter and nuclear reactions. The instrumentation topics are an in depth study of scintillation detectors and an introduction to the Anger type gamma camera.

PHYS 305 Radioactivity and Instrumentation - Continues the instrumentation work begun in PHYS 205. Includes a detailed study of Anger type gamma camera, multichannel analyzers, sensitivity and resolution, modulation transfer function and collimators.

PHYS 405 Radioactivity and Instrumentation - Completes the instrumentation work begun in PHYS 205 and 305. Includes liquid scintillation counting, G.M. detectors, proportional counters, ionization detectors, semiconductor detectors, thermoluminescent dosimeters, SPECT and an introduction to computers.

Faculty and Staff

Verna Magee Shepherd, M.Sc., CHE, Acting Associate Dean
Randy Singer, R.T.N.M., Program Head
Lorie Klit, R.T.N.M.
Lawrence Parisotto, B.Sc., R.T.N.M.
Lorraine Deverall, R.T.N.M., Technical Staff
Sheila Backeland, R.T.N.M., Clinical Coordinator

Clinical Instructors for Nuclear Medicine Technology Affiliated Hospitals and Clinical Sites

Burnaby Hospital
Alvena Getz, R.T.N.M.

B.C. Children's Hospital
Louise Rimanic, R.T.N.M.

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Robert Conzatti, R.T.N.M.

Lions Gate Hospital
Debbie Shaw, R.T.N.M.

Metro-McNair Clinical Laboratories
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Nazma Tarmahmed, R.T.N.M.

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Lori Lot, R.T.N.M.

University Hospital, UBC Site
Dara Barrett, R.T.N.M.

Vancouver General Hospital
Linda Harrison, R.T.N.M.

Victoria General Hospital
Jean Campbell, R.T.N.M.

GENERAL NURSING

Diploma Program

Today's registered nurse assists people in meeting health needs in collaboration with other members of the health care team such as dietitians, occupational therapists, pharmacists, physicians, physiotherapists, respiratory therapists, 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 new graduates are available mainly in medical and surgical units. Salary range from entry level to senior level for Registered Nurses is $36,756 - $45,552/annum. Additional payment is received for shift work and charge positions.

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 judgment are required. The program 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, audiotaping, video taping and experience with patients and families in medical, surgical, obstetrical, pediatric and psychiatric units. *Students assigned to selected agencies will be required to have a criminal record search prior to placement.*

The first year of the program is also offered at 3 access colleges: North Island College; East Kootenay College and Northern Lights College. Upon successful completion of the first year, the student automatically transfers to BCIT for the second year. Graduates are awarded a joint diploma certified by both institutions. These students may be able to complete Level 5 in their home regions, dependent on such factors as available placements, preceptors, and student achievement.

Independent study is based on printed modules that contain objectives, learning activities, post-tests and reference lists. Students are expected to have completed modules on their own prior to associated classroom or laboratory activities. In the classroom or laboratory, the instructor responds to questions and provides activities designed to assist students to integrate their learning or to apply it to clinical practice. To be successful in modular instruction, students should be selfdirected, disciplined and have well-developed reading, study and organization skills. Remedial courses on these skills are available at some high schools through evening programs, as well as many post-secondary institutions, such as the colleges and BCIT.

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.

Program Length

Two and one-half years full-time beginning in January and August each year.

Tuition Fees (subject to change)

$4,550 for the 2.5-year program (1992/93).

Expenses

In addition to tuition fees, students will spend approximately $1,000 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 financial assistance program: scholarships, loans and bursaries. Details are available from Financial Aid and Awards in Student Services. Telephone 432-8555.

Prerequisites

Applicants must have all the admission requirements completed at least 30 days prior to registration to be eligible for a seat.

1. **ACADEMIC**
   - A. Applicants admitted into the program with Senior Secondary graduation:
     - a) Chemistry 11 with C+ minimum
     - b) Either Chemistry 12 or Biology 12 (preferred) with C+ minimum
     - c) Math 11 with C minimum
     - d) English 12 with C+ minimum.
   - B. Applicants admitted into the program with G.E.D. or B.T.S.D. Level 4:
     - a) Chemistry 11 with C+ minimum
     - b) Either Chemistry 12 or Biology 12 (preferred) with C+ minimum
     - c) Math 11 with C minimum.

Note: Applicants must have satisfactorily completed (C+ minimum) one of the Grade 12 required science courses or a higher level science course within the last 5 years.

2. HEALTH CARE EXPERIENCE (Work or Volunteer)
Experience with adult patients, preferably elderly persons, or with children with mental or physical disabilities. Hospital experience is preferred. Minimum of 30 hours of patient contact. Satisfactory confidential references are required.

3. EMPLOYMENT
For individuals with previous employment, a satisfactory confidential reference is required.

4. Completion of the immunization form 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 and motivation towards a nursing career
- appreciation of the financial costs of the program
- appreciation of the stress of the program
- demonstrated communication skills, including fluency in English.

7. First Aid:
Standard level first aid certificate (e.g. St. John's Ambulance, Canadian Red Cross Society) or equivalent is required and must be valid for the student's first year in the program.

8. English 100:
6 credits at UBC English 100 level or equivalent is a preferred prerequisite.

Notes:

1. Applicants with baccalaureate degrees within 5 years will be assessed on an individual basis to determine equivalency with academic criteria.
2. C.P.R. (Level C) certificate is prerequisite to Term 4. It must be current during both Terms 4 and 5.
3. A criminal record search is required by certain agencies.

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. There is a significant fee for these examinations. Applicants for nurse registration are required to disclose previous criminal convictions and to have a criminal record search. Concerns regarding criminal records should be discussed with the R.N.A.B.C.

Advanced Training/Degree Completion

After gaining some experience, graduates may elect to undertake one of the many post-diploma programs at BCIT or elsewhere in B.C., Canada or the U.S., to further their knowledge and skills in specialty areas of nursing. Most universities in major cities offer Bachelor of Nursing programs for graduates from diploma programs.

All B.C. universities recognize diploma nursing preparation thus reducing the 4-year program. The specific time reduction depends on the degree granting institution.

Program: GENERAL NURSING

		Credits
Level 1		
BHSC 105	Anatomy and Physiology	3.5
BHSC 118	Personal Fitness Management	2.0
BHSC 140	Human Development 1	3.5
GNNU 100	Nursing 1: Theory and Clinical	25.0
	or	
GNNU 101	Nursing 1: Theory	10.0
GNNU 102	Nursing 2: Clinical	15.0
GNNU 110	Becoming a Master Student	2.5
Level 2		
BHSC 205	Physiology	3.5
BHSC 227	Microbiology	2.0
BHSC 239	Sociology	1.5
BHSC 240	Human Development 2	1.5
GNNU 200	Nursing 2: Theory and Clinical	24.0
	or	
GNNU 201	Nursing 2: Theory	9.0
GNNU 202	Nursing 2: Clinical	15.0
Level 3		
BHSC 328	Immunology	2.0
GNNU 300	Nursing 3: Theory and Clinical	26.0
	or	
GNNU 301	Nursing 3: Theory	9.0
GNNU 302	Nursing 3: Clinical	17.0
HCOM 107	Writing for General Nurses	3.5
Level 4		
GNNU 400	Nursing 4: Theory and Clinical	25.0
	or	
GNNU 401	Nursing 4: Theory	8.0
GNNU 402	Nursing 4: Clinical	17.0
Level 5		
GNNU 450	Nursing 5: Theory and Clinical	42.0

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 227 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 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.

BHSC 328 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, 227.

GNNU 100 Nursing 1: Theory and Clinical - This course, offered in the first term of the General Nursing Diploma Program, is an overview of the nursing curriculum. The student is introduced to basic concepts of the nursing model, nursing process, nursing skills, and professional behavior. Emphasis is placed on the normal requirements for need satisfaction, the stressors associated with lifestyle patterns, and assisting the individual by supporting appropriate responses. The common response of general adaptation syndrome is introduced. Principles of pharmacology are discussed. Concurrent theory, laboratory and clinical practice focus on basic assessment, interactive and psychomotor skills. Clinical experience is provided in acute and extended care units and community agencies. Students are expected to provide care to 2 individuals.

GNNU 101 Nursing 1: Theory - This course is offered in the first term of the General Nursing Program. Students are admitted with permission of the Program Head in consultation with the term Instructor and Chief Instructor. The course presents an overview of the nursing curriculum. Basic concepts of the nursing model, nursing process, nursing skills, and professional behavior are introduced. Emphasis is placed on normal requirements for need satisfaction, the stressors associated with lifestyle patterns, and assisting the individual by supporting appropriate responses. The common response of general adaptation syndrome is introduced. Principles of pharmacology are discussed. Concurrent theory and laboratory focuses on the nursing measures required to assist individuals to satisfy needs.

GNNU 102 Nursing 2: Clinical - This course is offered in the first term of the General Nursing Program. It is a clinical practice course which focuses on the nursing measures required to assist individuals to satisfy needs. Knowledge and skills learned in GNNU 101 Nursing 1: Theory are applied. Clinical experience is provided with adults on medical and extended care units and in community agencies. Students are expected to provide care to individuals. Prerequisite: GNNU 101.

GNNU 110 Becoming a Master Student - This is a nursing student success course designed to help students learn more efficiently, assume control of their learning and maximize their health during the learning process. The course will focus on increasing life skills, academic skills and awareness of the resources available for assistance.

GNNU 200 Nursing 2: Theory and Clinical - The study of individuals of adult age who require assistance to satisfy their needs. Emphasis is placed on stressors associated with selected stages and tasks of growth and development, and selected unanticipated events related to inflammatory disorders. The student will use selected interactive skills to initiate, maintain and terminate a helping relationship with patients. Concurrent theory, laboratory and clinical practice will focus on the nursing skills required to assist individuals to satisfy needs. Selected pharmacology content is integrated with core content as a therapeutic measure. The surgical patient is discussed to prepare the student for the clinical area. Clinical experience will be provided in hospital settings on adult general surgical units. Students are expected to provide care to 2-3 individuals. Community visits will be integrated throughout the course. Prerequisite: GNNU 100, BHSC 105,140.

GNNU 201 Nursing 2: Theory - This course is offered in the second term of the General Nursing Program. Students are admitted with permission of the Program Head in consultation with the term Instructor and Chief Instructor. The course focuses on stressors associated with selected stages and tasks of growth and development and selected unanticipated events. Responses to these stressors may be appropriate or inappropriate. The common responses of pain, anxiety, altered self-image and general adaptation syndrome are studied. Theory content about the surgical patient is provided. Selected pharmacology content is included as part of therapeutic measures for specific stressors/responses. Concurrent theory and laboratory focuses on the nursing measures required to assist individuals to satisfy needs. Prerequisite: GNNU 100 or 101 and 102, BHSC 105, 140.

GNNU 202 Nursing 2: Clinical - This course is offered in the second term of the General Nursing Program. It is a clinical practice course which assists individuals to satisfy needs. Knowledge and skills from GNNU 201 Nursing 2: Theory are applied. Clinical experience is provided in hospital settings with adults on general surgical units. Students are expected to provide care to 2-3 individuals. Community visits are made during the course. Prerequisites: GNNU 201.

GNNU 300 Nursing 3: Theory and Clinical - The study of individuals of all ages whose responses to stressors may be appropriate or inappropriate. Emphasis is placed on the stressors associated with both selected unanticipated events and with the selected growth and development stages and tasks of childhood and of childbearing. Concurrent theory, laboratory and clinical practice will focus on the nursing skills required to assist individuals to satisfy needs. Selected pharmacology content is integrated with core content as a therapeutic measure. Emphasis is placed on developing selected interactive skills to initiate, maintain and terminate helping relationships with patients and involved family members. Clinical experience is provided in hospitals on family-centred units and pediatric units. Students are expected to provide care to 2-3 pediatric patients and a maximum of 4 maternity patients and their neonates. Community visits are integrated throughout the course. Prerequisite: GNNU 200, BHSC 205, 227, 240.

GNNU 301 Nursing 3: Theory - This course is offered in the third term of the General Nursing Program. Students are admitted with permission of the Program Head in consultation with the term Instructor and Chief Instructor. It focuses on stressors associated with the stages and tasks of growth and development related to childhood and childbearing and selected unanticipated events. Responses to these stressors may be appropriate or inappropriate. The common response of general adaptation syndrome (exhaustion phase) is studied. Altered physiology and pharmacology theory are integrated within the course. Concurrent theory and laboratory focus on nursing measures required to assist individuals to satisfy needs of growth and development related to childhood and childbearing and selected unanticipated events. Responses to these stressors may be appropriate or inappropriate. The common response of general adaptation syndrome (exhaustion phase) is studied. Altered physiology and pharmacology theory are integrated within the course. Concurrent theory and laboratory focus on nursing measures required to assist individuals to satisfy needs. Prerequisites: GNNU 200 or 201 and 202, BHSC 205, 227, 240.

GNNU 302 Nursing 3: Clinical - This course is offered in the third term of the General Nursing Program. It focuses on the nursing measures required to assist individuals to satisfy needs. Knowledge and skills from GNNU 301 Nursing 3: Theory are applied. Clinical experience is provided on family-centred maternity, general pediatric units and in community agencies. Students are expected to provide care to 2-3 pediatric patients and a maximum of 4 maternity patients and their neonates. Some experience is provided in the labour and delivery unit. Prerequisite: GNNU 301.

GNNU 400 Nursing 4: Theory and Clinical - This course focuses on stressors associated with selected stages and tasks of growth and development, selected unanticipated events, and multiple unanticipated events. Response to these stressors may be appropriate or inappropriate. The common response of dying is studied. Altered physiology and pharmacology are integrated within the course. Concurrent theory, laboratory and clinical practice focus on the nursing measures required to assist individuals to satisfy needs. Clinical experience is provided with adults on acute psychiatric, medical, and surgical units. Students are expected to provide care to 2-4 individuals. A community visit related to substance abuse is included in the course. Prerequisite: GNNU 300, CPR (Level C), BHSC 328.

GNNU 401 Nursing 4: Theory - This course is offered in the fourth term of the General Nursing Program. Students are admitted with permission of the Program Head in consultation with the term Instructor and Chief Instructor. It focuses on stressors associated with selected stages and tasks of growth and development, selected unanticipated events, and multiple unanticipated events. Responses to these stressors may be appropriate or inappropriate. The common response of dying is studied. Altered physiology and pharmacology are integrated within the course. Concurrent theory and laboratory focus on the nursing measures required to assist individuals to satisfy needs. Prerequisite: GNNU 300 or 301 and 302, BHSC 328, CPR - Course C (Current and valid).

GNNU 402 Nursing 4: Clinical - This course is offered in the fourth term of the General Nursing Program. It is a clinical practice course which focuses on nursing measures required to assist individuals to satisfy needs. Knowledge and skills from GNNU 401 Nursing 4: Theory are applied. Clinical experience is provided with adults on acute psychiatric, medical, and surgical units. Students are expected to provide care to 2-4 individuals. A community visit related to substance abuse is included in the course. Prerequisite: GNNU 401.

GNNU 450 Nursing 5: Theory and Clinical - This course focuses on the integration of previously presented concepts related to stressors, responses and nursing measures. Emphasis is placed on organization and leadership skills and the responsibilities of the graduate nurse. Clinical experience is provided with adults on medical and surgical units. Working with a preceptor, students are expected to provide care to 4-6 patients or to assume responsibility for care given to patients by a nursing team. Prerequisite: GNNU 400, BHSC 118, HCOM 107, GNNU 410, CPR (Level C).

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.

CREDIT COURSES FOR 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 the academic entrance requirements may wish to complete some of these courses prior to enrolment to lighten their study loads during the program. Students with lighter loads pay full fees as the nursing courses account for the majority of credits taken each term. Nursing students are responsible for applying to the Institute in which they are enrolled for credit for these courses.

For information, write to Health Part-time Studies, British Columbia Institute of Technology, 3700 Willingdon Avenue, Burnaby, B.C. V5G 3H2 or call 439-4100. These courses are offered in Fall, Winter and Spring Terms.

Faculty and Staff

M. Bernadet Ratsoy, B.Sc.N., M.Sc., R.N., Associate Dean
Mrs. L. Barratt, B.A., R.N., M.A., Diploma Psychiatric Nursing
Mrs. D.M. Belyk, B.Sc.N., R.N.
Ms. L. Brazier, R.N., B.Sc.N., M.Sc.N.
Mrs. E. Carr, B.Sc.N., R.N.
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Mrs. K. Negoro, Diploma Nrsg. Ed., R.N.
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Mrs. K. Quee, B.Sc.N., R.N.
Mrs. C. Segaric, R.N., B.Sc.N.
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Mrs. M. Walmsley, M.Ed., B.Sc.N., R.N.
Mrs. M.W. Whitehead, Ph.D., M.A (Educ.), B.Sc.N., R.N. Diploma Obs.
Ms. P.V. Zabawski, B.Sc.N., R.N.
Mrs. D. Zimka, B.Sc.N., R.N.

Support Staff

Mrs. N. Sayre, Sec/Supervisor
Mrs. I. Friesen, Records Assistant
Mrs. F. Nordstrand, R.N., Psychomotor Lab Coordinator
Ms. J. Pfaff, Clerk Typist
Mrs. K. Whitham, Clerk Typist
Ms. J. Del Vecchio, Lab. Assistant

Nursing Advisory Committee

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Kathy Brosseau, Chair, Director of Nursing Maternal/Child/Psychiatry
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Clive Thompson, Asst. Executive Director
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OCCUPATIONAL HEALTH AND SAFETY

Diploma Program

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; improve productivity by implementing loss control programs in consultation with company and labour officials; identify health and safety hazards in the work environment and advise corrective action. The occupational health and safety officer has a major role in the development and conduct of safety training programs for workers, accident investigation and prevention.

To achieve these career objectives, applicants are expected to be mature, objective persons who possess the ability to communicate decisions and goals in a tactful and professional manner.

Job Opportunities

Career openings are found throughout industry and in 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 solutions and methods of improving the workplace environment.

Program Length

Two years full-time beginning in September each year.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Prerequisites

High school graduation with English 12, Math 12, Chemistry 11 and Physics 11. Candidates will be interviewed. Preference will be given to applicants who have completed the prerequisites within 5 years of applying.

Program:
OCCUPATIONAL HEALTH AND SAFETY

Level 1		Credits
ADMN 161	Microcomputer Software 1	3.0
CHEM 115	Applied Chemical Principles	6.0
HCOM 112	Communication for OH&S Professionals	3.0
MATH 188	Basic Mathematics for OH&S	4.0
OH&S 142	OH & S Legislation	3.0
OH&S 161	Loss Management Principles	5.0
PHYS 126	Applied Physics for OH & S	5.0
Level 2		
ADMN 261	Software Systems	4.0
CHEM 215	General Chemistry for OH&S	6.5
CHSC 288	Engineering Concepts 1	5.5
HCOM 212	Communication for OH&S Professionals	4.0
MATH 288	Statistics for OH&S	5.5
OH&S 247	Security Systems	0.5
OH&S 271	Safety Engineering and Technology	6.5
PHYS 226	Applied Physics for OH&S	6.5
Level 3		
ADMN 333	Industrial Relations (OH & S)	3.0
BLDG 121	Drafting and Blueprint Reading	3.0
CHEM 315	Organic Chemistry for OH&S	6.0
CHSC 388	Engineering Concepts 2	4.0
HCOM 312	Advanced Communication for OH&S	2.0
OH&S 350	Industrial Hygiene 1: Noise	5.0
OH&S 359	Loss Management	3.0
OPMT 181	Ergonomics	5.0
Level 4		
ADMN 435	Personnel Management for OH&S	3.5
ADMN 484	Introductory Law for OH&S	1.5
BHSC 407	Anatomy and Physiology	4.0
CHEM 418	Industrial Chemical Processes	4.0
FMGT 416	Accounting for Health Managers	2.0
HCOM 412	Writing Professional Audits	1.5
OH&S 436	Occupational Diseases	4.0
OH&S 458	Safety Program Evaluation	6.5
OH&S 464	Fire Protection	4.0
OH&S 465	Electrical Safety	4.0
OH&S 470	Industrial Hygiene 2: Toxicology	6.5

COURSE DESCRIPTIONS

ADMN 161 Microcomputer Software 1 - 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 spreadsheets, as well as the application of software to the field of Occupational Health and Safety.

ADMN 261 Software Systems - See ADMN 161.

ADMN 333 Industrial Relations for OH&S - An introductory analysis of the fundamental issues and facts of labour-management relations. Special emphasis is given to collective agreement content and interpretation, bargaining and basic labour economics.

ADMN 435 Personnel Management for OH&S - Provides students with working knowledge of recruitment and selection performance appraisal, job evaluation and job descriptions.

ADMN 484 Introductory Law for OH&S - An introduction to the Canadian legal system including its development, constitutional law, the Charter, torts, contracts and business relationships.

BHSC 407 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 Applied Chemical Principles - An introductory course in basic inorganic chemistry. Topics include: chemical bonding, stoichiochemistry, formula writing, solution preparation, oxidation and reduction, acid-base theory, titration calculations and buffer solutions.

CHEM 215 General Chemistry for OH&S - Offers an applied approach to melding established chemical principles to chemical hazards, their problems and solutions. Terminology encountered in the field allied to related principles such as acid base, oxidation-reduction, electrochemistry, stoichiometry, equilibrium, chemical bonding, simple thermodynamics, etc., are linked to potential and real chemical hazards. Laboratory exercises and field trips are designed to complement and integrate the lecture material. The language of practical and theoretical applications is emphasized. Prerequisite: CHEM 115.

CHEM 315 Organic Chemistry for OH&S - 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 - Provides an overview of the chemical processes used in industry, the chemicals, chemical reactions, products manufactured, waste products and pollutants produced, and the hazards to personnel. Students will make field trips to selected industries. Prerequisite: CHEM 215.

CHSC 288 Engineering Concepts 1 - Covers test procedures for mechanical properties: nondestructive testing and failure analysis, the basic concepts of engineering materials including metals, alloys, plastics, woods, ceramics and concrete.

CHSC 388 Engineering Concepts 2 - See CHSC 288.

FMGT 416 Accounting for Health Managers - Provides students with a basic understanding of the concepts and principles of accounting. Specific topics include financial statements, the recording process, budgeting methods, zero-based budgeting and cost-volume-profit analysis.

HCOM 112 Communication for OH&S Professionals - This applied course introduces students to the communication needs of professionals working in the environmental and Occupational Health & 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 & Safety topic.

HCOM 212 Communication for OH&S Professionals - This course builds on skills learned in HCOM 112 and adds incident, inspection, and investigation reports, proposals and a professional job application package. Meetings and interview skills are also covered. Students propose, design and sell a training module for an environmental health or Occupational Health & Safety topic.

HCOM 312 Advanced Communication for OH&S - This advanced project course complements the industry audit done at the end of the second year. Students write proposals, questionnaires, terms of reference, progress reports, and mini-audits focusing on one element of a full industry audit. They also present their findings to industry contacts and the OH&S program head, communication instructor and classmates. Students will work with industry representatives, BCIT staff and WCB staff while conducting interviews for their mini-audits.

HCOM 412 Writing Professional Audits - This advanced project course assists students with their industry audit design, layout, editing and packaging. Students present their final audit orally and in writing to their industry contacts and the OH&S program head. Students work with industry representatives, handle correspondence, conduct interviews and analyze audit data before reporting their findings in their industry audit.

MATH 188 Basic Mathematics for OH&S - 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 for OH&S - 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. Prerequisite: Math 188.

OH&S 142 Occupational Health and Safety Legislation - Deals with legislation relevant to the safety field, claims management, safety policies, the concept of workers' compensation, the structure of the Workers' Compensation Board, appeals procedures, the right to know, the right to refuse and the right to participate.

OH&S 161 Loss Management Principles - Covers the history of the safety movement, the 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 247 Security Systems - A basic security program, including threat assessment, physical and electronic barriers, key control, security lighting procedures, data security, robbery, shoplifting and guard services.

OH&S 271 Safety Engineering and Technology - 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 350 Industrial Hygiene 1: Noise - 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: MATH 288, PHYS 226.

OH&S 359 Loss Management - A study of the principles of loss management, measurement of safety program effectiveness, risk management, basic insurance principles, transportation of dangerous goods, emergency planning and WHMIS legislation.

OH&S 436 Occupational Diseases - Provides the student with an overview of occupational diseases, causes and prevalence, methods of spread and prevention. Discusses the responsibility of the worker and various professionals 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 and food supplies, to scabies and causes of silicosis, and white fingers disease.

OH&S 458 Safety Program Evaluation - A study of the safety audit. Students will conduct a complete safety program evaluation of an industrial firm and produce a report complete with recommendations and a plan for implementation of improvements. Prerequisite: HCOM 312.

OH&S 464 Fire Protection - Deals with the concept of fire Prevention Topics including the handling and storage of flammable and combustible liquids, chemical hazards, dust explosions, bleve, electrical hazards, construction features, fire chemistry, fire detection, portable extinguishers, automatic sprinkler systems, and inspection procedures.

OH&S 465 Electrical Safety - 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 288, PHYS 216.

OH&S 470 Industrial Hygiene 2: Toxicology - This basic course allows the student to identify, monitor, evaluate and recommend control measures for common chemical and physical hazards in the workplace. 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, vapors, 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. Prerequisite: MATH 288, PHYS 226.

OPMT 181 Ergonomics - Concentrates on human factors in the scientific study of people at work, especially 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 126 Applied Physics for Occupational Health & Safety - This course studies basic physical principles and applies them to relevant situations in the Occupational Health & Safety Technology. Two thirds of the course is mechanics, followed by sections on properties of matter and fluids. Topics in mechanics include kinematics, vectors, dynamics, statics, friction energy, momentum, simple machines, rotational kinematics and dynamics, power transmission. Properties of matter deals primarily with elasticity and ultimate strength of materials. Topics in fluids include fluid pressure, buoyancy, viscosity, fluid dynamics. Problem analysis and problem solving techniques are stressed. The accompanying lab program emphasizes careful measurement techniques, data analysis and concise report writing. Prerequisite: PHYS 11.

PHYS 226 Applied Physics for OH&S - The second term of this Applied Physics program covers areas of thermal physics, wave motion, sound, electricity and magneticism, electromagnetic radiation. Topics in thermal physics include kinetic theory, ideal gases, specific and latent heat, thermal expansion, heat transfer, thermodynamics. Wave motion covers types of waves, standing waves and resonance. Sound topics focus on sound intensity and the dB scale. Topics in electricity and magnetism include electrostatics, dc and ac circuits, electrical safety, electromagnetism. The electromagnetic radiation section studies light waves, illumination, lasers, X-rays, nuclear radiation and shielding. The problem solving techniques and lab work are continued from the previous term. Prerequisite: PHYS 126.

Faculty and Staff

W. Bruce Sandy, R.A, M.H.S.A., Associate Dean
Lars G. Larsson, C.R.S.P., Program Head
Val Wuorinen, C.D., Ph.D., C.R.S.P.

PROSTHETICS AND ORTHOTICS TECHNOLOGY

Diploma Program

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 orthopedic 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 fabricate the artificial limb or support personally, 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 $25,000 /annum, rising to about $40,000 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, 1994.

Program Length

Two years full-time beginning in September alternating on even number years.

Tuition Fees (subject to change)

$3,631 for the two-year program (1992/93).

Post-graduation

After three years work experience under the guidance of a certified orthotist or prosthetist, graduates may write the national certification examination of the Canadian Board of Certification for Prosthetists and Orthotists.

Prerequisites

High school graduation with English 12, Math 12 and Physics 11 are course requirements for this program. Metalwork and woodwork courses are recommended. Applicants should have a good academic background (C+ average or better), 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 or clinical seminars are held, and should be prepared to purchase certain small hand tools.

Program: PROSTHETICS AND ORTHOTICS

			Credits
Level 1			
BHSC	110	Anatomy and Physiology Systems	4.0
HCOM	111	Technical Writing for Prosthetics and Orthotics	3.0
MATH	184	Basic 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			
BHSC	210	Anatomy and Physiology Systems	3.5
BHSC	211	Anatomy and Physiology	2.5
BHSC	242	Behavioral Science	3.5
CHSC	284	Materials Workshop	2.5
HCOM	206	Technical Writing for Prosthetics and Orthotics	3.5
MATH	284	Basic Mathematics for Prosthetics and Orthotics	3.0
P/OT	200	Prosthetics and Orthotics 2	15.5
P/OT	202	Practicum (2 weeks)	4.5
P/OT	220	Biomechanics	2.5
Level 3			
BHSC	310	Pathology and Pathophysiology	3.0
BHSC	311	Anatomy and Physiology Regional	2.0
BMET	382	Electrical Circuits	2.0
GNNU	183	Patient Care	2.0
P/OT	301	Prosthetics and Orthotics 3	19.0
P/OT	320	Biomechanics	2.0
Level 4			
BHSC	410	Applied Pathology	3.0
BMET	482	Applied Electrical Fundamentals	2.0
P/OT	400	Prosthetics and Orthotics 4	20.0
P/OT	401	Business Practices	3.0
P/OT	402	Practicum (5 weeks)	10.0
P/OT	410	Patient Assessment and Care	3.0

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 Anatomy and Physiology - 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 disabled to reintegrate with society. Topics include the psychology of illness, 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. Prerequisite: BHSC 210.

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. Prerequisite: BHSC 211.

BHSC 410 Applied Pathology - Specific diseases frequently encountered by the orthotist/prosthetist are investigated in detail. Prerequisite: BHSC 310.

BMET 382 Electrical Circuits - Students become familiar with AC and DC circuits as well as other electrical building blocks. This theory will be used to explain the operation of electrically powered prostheses. Prerequisite: MATH 284.

BMET 482 Applied Electrical Fundamentals - This course is a continuation of BMET 382. Topics include review of magnetism, inductance, motors, transformers, capacitance, electrical safety and principles of the myoelectric prosthesis. Prerequisite: BMET 382.

CHSC 284 Materials Workshop - Provides basic coverage of the structures, properties and applications of common engineering materials with emphasis on those used in prosthetic/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 - 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 - In this course, through a series of lectures and projects, students improve their ability to express themselves clearly and appropriately to patients and their families and to health care professional groups such as government and fee-paying agencies. Topics include basic skills in writing instructions, memos, 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/orthotics field. Prerequisite: HCOM 111.

MATH 184 Basic Mathematics for Prosthetics and Orthotics - Trigonometry functions and inverse functions, oblique triangle solutions, vectors, angular systems and angular motion. Graphs of trigonometric relationships. General quadratics, linear systems, matrices, more algebraic relations and their graphs. Linear and curvilinear regression.

MATH 284 Basic Technical Mathematics for Prosthetics and Orthotics 2 - Power, exponential, and logarithmic relationships and their graphs. Descriptive statistics with measures of central tendency, dispersion, skewness, and kurtosis. An introduction to some quality control theory that stems from descriptive statistics. Simple estimation with sampling error.

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 Trans-Tibiax Prosthetics is examined in detail. Design principles underlying the patellar-tendon-bearing prosthesis and its variants are analyzed. Students design, construct, fit and align a variety of prostheses for trans-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 practising prosthetic/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, 220, BHSC 210, 211.

P/OT 220 Biomechanics - Normal human locomotion is studied in 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 301 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 320 Biomechanics - Force tolerance and mobility of the skeletal system are examined in detail to determine 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 spinal 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 techniques. 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 labour 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.

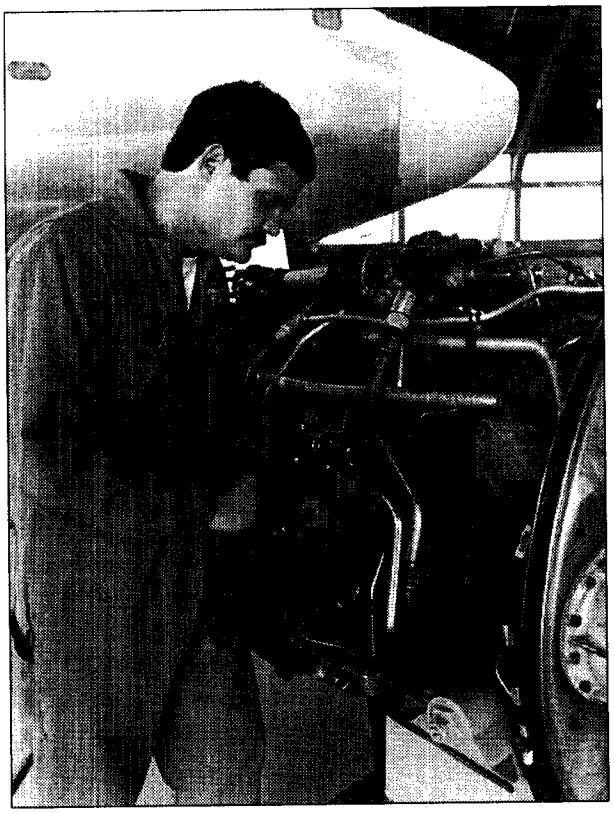
P/OT 402 Practicum - See P/OT 202. Prerequisite: P/OT 301, BHSC 310.

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.

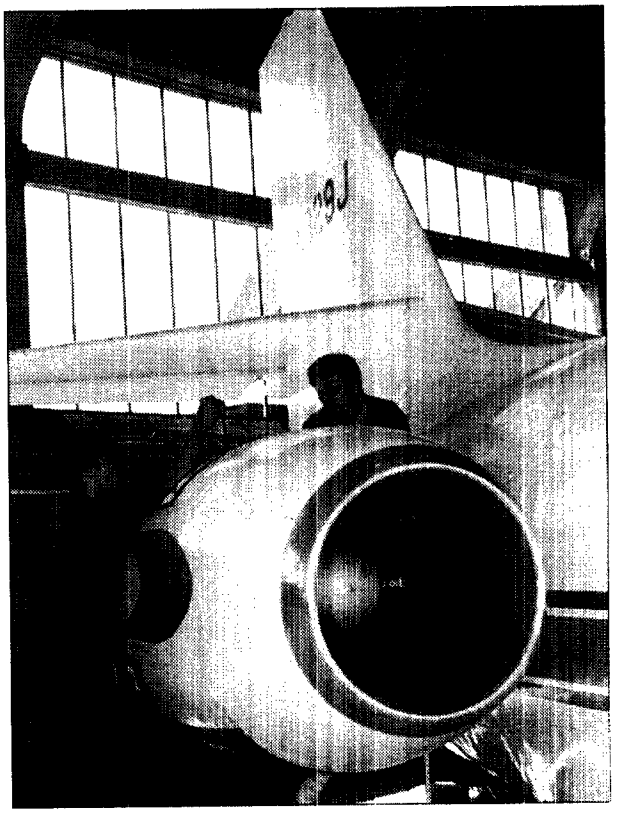
Faculty and Staff

W. Bruce Sandy, B.A., M.H.S.A., Associate Dean
Wm. J. McGuiness, M.A., C.P.O., Program Head
S.U. Raschke, B.A., C.O., Assistant Instructor









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ADMINISTRATION

Office of the Dean
Raymond Walton, B.A.Sc., M.Sc., N.Eng., Dean

Aviation Trades
Bill Foyle, A.M.E., Associate Dean

Aircraft Maintenance Engineer (M.)
Aircraft Structures
Avionics (E.)
Gas Turbine Technician

Construction and Metal Industries Training
Mike Cannell, Associate Dean

Construction
Benchwork and Joinery (Cabinetmaker)
Carpentry
Painting and Decorating
Plumbing
Practical Horticulture
Steamfitting

Metal Industries
Boilermaking
Ironworking
Sheet Metal Working
Steel Fabricating
Welding

Electrical/Electronic Trades
Dennis Duffey, Associate Dean

Automated Business Equipment Technician
Drafting
Electricity and Industrial Electronics
Electronics Technician Common Core Program
Power Engineering
- General Program
- Technical Program

Power and Process Engineering - 3rd Class
Security Alarm Installer
Telecommunications Technician Program

Mechanical Industries Training
Ron Evans, Associate Dean

Auto Collision Repair/Refinishing
Automotive Electronics Technician
Automotive Mechanic
Automotive Service Technician
Commercial Transport Mechanic
Computer Numerical Control (CNC) Machinist
CNC Programmer 1
Advanced CNC Programmer 2
Diesel Engine Mechanic
Heavy Duty Mechanic
Inboard/Outboard Mechanic
Industrial Maintenance Mechanic
Machinist
Millwright
Motorcycle Mechanic
Tool and Die Technician

AIRCRAFT MAINTENANCE ENGINEER : CATEGORY M

Diploma Program

This program is recognized by Transport Canada. Graduates are accredited with 18 months toward the four-year practical experience required for the A.M.E. License.

Job Opportunities

Theoretical and practical training enables students to carry out maintenance tasks on light/medium/heavy fixed/rotary wing aircraft, and provides the necessary preparation for employment in the aviation industry, first as an aircraft mechanic learner and later as a mechanic or Aircraft Maintenance Engineer (Category M License). Successful completion of the program assures 18 months credit toward the Category M License.

The Program

Program content includes aircraft powerplant and air frame; air frame and powerplant control systems and components; electrical and avionics; ground equipment operating principles; methods of servicing, maintenance and repair, testing, parts identification and use for maintaining aircraft and their components; how to use manuals, technical bulletins, documentation systems, air regulations, etc., in the planning and maintenance of aircraft and their components.

Program Content

Apply safe and acceptable work practices
Sketch and read drawings
Air regulations
Use of aircraft manuals and log books
Care and use of support and test equipment
Basics - hand tools
Aircraft structures
Theory of flight
Electricity
Elementary engines
Ignition and fuel systems
Gas turbine engine
Powerplant systems
Propellers
Sheet metal
Hydraulics

Plumbing
Landing gear
Controls and rigging
Rotary wing
Maintenance procedures
Aircraft systems

Program Length
16 months full-time beginning every two months throughout the year.

Tuition Fees (subject to change)
$3,336 for the 16-month program (1992/93).

Normal Course Hours
0800-1530, Monday through Friday.

Prerequisites
Category M: Grade 12 with Math 11 and Physics 11. Good color vision is essential. A mechanical background is recommended.

Instructors
Jack Baryluk, A.M.E.
Larry Bell, A.M.E.
John Edwards, A.M.E.
Alan Keeling, A.M.E.
Brian Lockwood, A.M.E.
Peter Mills
Stephen Peszel, A.M.E.
Brian Proulx, A.M.E.
Charles Roberts, A.M.E.
Charles Torrey, A.M.E.
David Upton, A.M.E.

AIRCRAFT STRUCTURES
Certificate Program

This program trains students in the basics of repairs to aircraft structures. How to use materials and tools safely; how to repair damaged composite/stressed skin aircraft structures; the major parts of an aircraft; the laws of nature governing flight and the forces acting on aircraft structures; how to interpret simple shop drawings and blueprints; how to use manufacturers manuals in the repair of aircraft structures; the role of Transport Canada in the aviation industry; the importance of time management in profitability.

Job Opportunities
Theoretical and practical training enables students to carry out repairs to composite and stressed skin (sheet metal) aircraft of varying types, and provides the basis for employment in the aircraft industry as a learner structures mechanic.

Aircraft structures graduates have found lifetime careers in the aviation industry. Several companies give preference to BCIT students when hiring new learner mechanics.

Program Content
Basics - hand tools
Identify and use materials
Aircraft structures
Theory of flight
Apply safe and acceptable work practices
Sketch and read drawings
Air regulations
Use of aircraft manuals and log books
Care and use of support and test equipment
Sheet metal repair
Sheet metal fabrication techniques
Use and set up of jigs
Composite parts fabrication
Composite repairs
Care and use of shop and hand tools

Program Length
8 months full-time beginning in January, May and September each year.

Normal Course Hours
0800-1530, Monday through Friday.

Tuition Fees (subject to change)
$914 for the 8-month program (1992/93).

Prerequisites
Grade 12 with Math 11A or Aviation Trade Math. Good color vision is essential. Some drafting is recommended.

Instructors
Malcolm Stirling, A.M.E.
Jim Henke, A.M.E.

Please note: the School of Trades Training, through its Part-time Studies department, offers a wide range of part-time courses related to the aviation industry.

AUTO COLLISION REPAIR/ REFINISHING

Cooperative Diploma Program

Job Opportunities

Training prepares students for entry-level employment in the automotive collision repair and refinishing trade.

Autobody repair and refinishing personnel are currently in short supply in British Columbia and graduates of the program have an excellent chance of finding employment. The major employers of autobody personnel are dealerships, privately owned service shops and franchised automotive service shops. Students have an opportunity to meet potential employers during the coop work periods.

The Program

Basic theory and related information, along with hands-on shop practice, enable students to become proficient in autobody repair. At the end of a 26-week Core Program students progress into intermediate and advanced levels of the collision repair or refinishing options.

This program is offered in a cooperative education format. Cooperative programs integrate paid work experience with training at BCIT. The work experience relates to your training program. In addition to helping you to finance your education, coop programs allow you to explore your career in a structured and purposeful manner; to test your skills; to adjust to the working environment, and to acquire relevant work experience as well as first class training.

Applicants must be in good physical condition and have good color vision and freedom from respiratory problems; must be non-allergic to paint and thinners. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content

Core (repair/refinishing)
Use safe work practices
General shop practice
Welding
Electrical systems
Cooling systems
Air conditioning
Rebuild methods, techniques of shaping metals
Fitting methods
Refinishing

Intermediate (repair/refinishing)
Operate welding equipment
Auto body construction
Panel replacement
Fibreglass in panel repairs
Refinishing

Advanced (repair)
Evaluate damage
Remove and replace body components
Replace panels
Use shop equipment
Business management

Advanced (refinishing)
Identify type and condition of finishes
Use shop tools
Surface preparation
Use refinishing equipment
Use masking materials and equipment
Use undercoats
Use topcoats

Specialty Repair
New science of unibody repair
Business management practices
Trends in technology

Specialty Refinishing
Apply special finishes
Business management practices
Trends in technology

Program Length

Total length of the program is 87 weeks full-time which includes a 39-week work term. The program begins in January and September each year.

Normal Course Hours

0700-1415, Monday through Friday.

Tuition Fees (subject to change)

$1,842 for the complete program (1992/93).

Prerequisites

Grade 12 completion or successful completion of an entrance test in Math and Reading skills. Valid B.C. Driver's Licence required. Good physical condition, freedom from respiratory problems and non-allergic to paints, thinners, etc.

Instructors

Gordon Smith
Clarence Heppner

AUTOMATED BUSINESS EQUIPMENT TECHNICIAN

Certificate Program

This program covers a variety of modern electronic and microprocessor-controlled business equipment including facsimile machines, photocopiers, many types of printers, word and information processing systems, lap-top computers, bar code systems, computer networks, desk-top publishing systems and other microprocessor-controlled office equipment.

Job Opportunities

Graduates will be able to install, maintain and repair business equipment as well as employ troubleshooting techniques and preventive maintenance procedures. They will be familiar with equipment operations from a technical and a user point of view and able to deal with customers in a professional manner.

Graduates will be ready for entry into the dynamic market of electronic business equipment. Challenging career opportunities with firms dealing with modern business equipment and systems exist throughout the country in this rapidly expanding field of technology.

The Program

The program is conducted in a realistic environment using up-to-date equipment and methods/procedures currently accepted as industry standard. The use of standard tools and test equipment for both field and depot activities will always be part of shop practical exercises.

Customer relations, appropriate dress, office routines and courtesies are all stressed to prepare graduates for entry into this field of business.

Applicants should possess good health and physical condition necessary to meet the demands of the work; good hearing, eyesight and hand/eye coordination.

This program has a dress code consistent with those found in industry.

Prerequisite

Successful completion of the Provincial Electronics Technician Common Core program.

Length of Program

40 weeks full-time beginning in September each year.

Normal Course Hours

0800-1500, Monday through Friday.

Tuition Fees (subject to change)

$1,080 for the 40-week program (1992/93).

Instructor

Len Worley

AUTOMOTIVE ELECTRONICS TECHNICIAN

Certificate Program

This program will take technicians through basic electrical diagnosis and repair to the latest "state of the art" automotive electronics. Courses leading to completion of this certificate program may be taken through full-time or part-time studies.

Job Opportunities

Graduates of this program are prepared for entry level employment in automotive electronics repair shops.

Program Content

Electronic engine management
Charging systems
Electronic fuel systems
Electronic ignition systems
Emission controls
Electronic suspension systems
A.B.S. brakes
Body electronics
Electrical/electronic steering
Alternate fuel tuning
Automatic transmission electronics

Program Length

17 weeks full-time beginning in January and August each year.

Normal Course Hours

0700-1345, Monday through Friday.

Tuition Fees (subject to change)

$459 for the 17-week program (1992/93).

Prerequisites

Apprentice with minimum 2 years in the trade;
or
Certified mechanic;
or
Successful completion of Automotive Mechanic;
or
Pre-test.**
** Pre-testing is available in the Mechanical Resources Centre.

Pre-Test

The pre-test will take up to one hour to complete. The general basis of the exam will be questions on electrical/electronics related to automotive repair.

Pre-Testing Procedure
All interested persons must fill out an application form prior to being allowed to write the pre-test. The Admissions department will supply applicants with a form to take to the Resource Centre so that Resource Centre staff know that the applicant is eligible to write the exam. Resource Centre staff will mark the exam and complete the results section of the form for return to the Admissions department.

Resource Centre Hours
Pre-testing is available Monday to Friday, between 0830 and 1400 hours.

Instructor
Richard Plett, T.Q., I.P.

AUTOMOTIVE MECHANIC
Certificate Program

Automotive mechanics repair and test motor vehicles. They disassemble, inspect and assemble engines and accessories, cooling systems, transmissions and clutches, drive lines, braking and suspension systems. Automotive mechanics employ logic and deductive reasoning in diagnosing and troubleshooting vehicle mechanical and electrical/electronic systems.

Job Opportunities
Changes in the automobile of today are providing many new opportunities for individuals looking for a challenging career in this service industry. Employers are searching for young men and women with mechanical aptitude who are well motivated and willing to work and learn. Employment is found with local service stations, dealerships and chains of specialty repair shops. A typical career path involves starting as a trainee until an apprenticeship becomes available. Although employment opportunities are mixed at this point, a reasonably good percentage of graduates are still expected to be successful getting into the trade.

The Program
BCIT's entry level Automotive Mechanic Program provides the basic knowledge and practical skills to meet the needs of both students and employers for entry into the automotive industry. Upon graduation, students are faced with career choices in specialty shops such as; brakes and alignments, automatic transmissions, tune-ups, etc., or to pursue a career as a General Repair Technician. Many of these are apprentice trades where credit may be given for completion of this program.

Automotive mechanics must have a valid driver's license. Good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content
Use safe work practices
Solve mathematical problems
Apply science concepts
Process technical information
Use basic measuring and layout hand tools
Use power tools
Use fasteners and fittings
Lift loads
Welding
Describe basic hydraulic systems
Use mechanics shop equipment
Operate selected gas-powered equipment
Describe mechanics trades
Service wheels, tires, hubs and bearings
Service suspension systems
Service steering systems
Service hydraulic brake systems
Perform gasoline engine major overhaul
Service engine support systems
Service transmissions
Service drive lines and drive axles
Service electrical systems
Service emission control systems
Prepare for employment

Program Length
33 weeks full-time beginning every two months throughout the year. Students may receive credit for selected modules depending on previous training.

Normal Course Hours
0700-1345 (first shift); 1000-1545 (second shift), Monday through Friday. Shift will be assigned at orientation session.

Tuition Fees (subject to change)
$1,071 for the 33-week program (1992/93).

Prerequisites
Grade 12 or pre-test.

Instructors

Norm Cloutier, T.Q., I.P., I.D.
Terry Fletcher, I.D.,T.Q.,I.P.,
David Huesken, I.D.,T.Q.,I.P., Chief Instructor
Vito Ialungo, T.Q., I.D.
Rob Macgregor, I.D., T.Q., I.P., Chief Instructor (AST, AET groups)
Jim Marchant, I.D., T.Q., I.P.
David Ney, T.Q., I.P. (GM Auto Group)
Vince Piva, T.Q., I.P., I.D.
Richard Plett, T.Q., I.P., I.D.
Fred Raadsheer, I.D., T.Q., I.P. Chief Instructor (GM Auto Group)
Gary Remenyk, T.Q., I.P.
Gabor Retei, T.Q., I.P.
Mel Rudeen, I.D., T.Q., I.P.
Sandy Sudom, I.D., T.Q., I.P., B.Ed.
Mike Thomas, T.Q., I.P., I.D.
Tim Wood, T.Q., I.P.

AUTOMOTIVE SERVICE TECHNICIAN

Cooperative Diploma Program

This new, specialized training program has been designed to meet the need for skilled technicians who can diagnose and repair the sophisticated systems in today's automotive vehicles.

In addition, the automotive industry needs skilled administrative personnel, who have technical as well as business training, to manage the growing automotive repair business. No longer is it possible for owners to repair today's sophisticated vehicles themselves.

The Automotive Service Technician program answers both of these needs.

Why This Training Program ?

Students come to BCIT for state-of-the-art training given by top-notch instructors in our first-class training facilities.

Employer Reaction To The Program

Because the local automotive industry employs AST students during the cooperative work terms, these students gain valuable practical experience and employers have a great opportunity to evaluate the worth of the program and the calibre of the trainees. Employers have expressed great interest in employing graduates of the AST program.

Salaries

Starting salaries for our graduates are in the region of $12 per hour. AST graduates will go on to complete their apprenticeship training and, upon certification, they will earn approximately $40 thousand (plus) per year.

The Program

The AST program consists of four 13-week academic terms at BCIT where students will receive training common to both the technical and business aspects of the automotive industry. The first three academic terms will alternate with three, 13-week periods of paid employment in an automotive repair facility.

On completion of the program, students will receive an Automotive Technician Diploma and may be able to challenge academic portions of the Provincial Apprenticeship curriculum.

Program Length

Two years full-time beginning April 1993.

Normal course hours

0700-1530, Monday through Friday.

Tuition Fees (subject to change)

$1,950 for the two-year program (1992/93).

Prerequisites

Grade 12 with Math 11 with C+ and English 12 with C **or** successful completion of a pre-entry exam. Applicants must also attend a personal interview to determine their suitability for the program.

Potential students with medical or physical disabilities should contact Student Services to arrange an interview with the Institute's Special Needs counsellor. Tel. 434-3304.

Instructors

Rob MacGregor, Chief Instructor
Gary Remenyk, T.Q., I.P.
Gabor Retei, T.Q., I.P.

AVIONICS: CATEGORY E

Diploma Program

This program is recognized by Transport Canada. Graduates are accredited with 18 months toward the three-year practical experience required for the A.M.E. Category "E" License.

This program provides an in-depth knowledge of electricity, electrical generation, power distribution, analog electronics, digital electronics and radio theory. Students learn to interpret and comply with Transport Canada Regulations and Airworthiness Standards.

The program enables students to understand the operating principles of aircraft, powerplants, avionics and associated ground equipment; theoretical and practical knowledge of basic systems, components and methods to service, overhaul and repair aircraft electrical and avionics systems; to identify and state the major components and functions of electrical communication, navigation and instrumentation systems; how to use technical bulletins, manuals and associated documentation when planning and carrying out tests; maintenance and repairs to aircraft electrical, avionics systems, ground equipment and associated systems or sub-systems.

Job Opportunities

Training enables students to carry out maintenance tasks on light, medium or heavy fixed-wing or rotary-wing aircraft, and provides the preparation necessary for entry level employment in the aviation industry as a technician or Aircraft Maintenance Engineer (Category "E" License).

Program Content

Apply safe and acceptable work practices
Sketch and read drawing
Air regulations
Use of aircraft manuals and log books
Care and use of support and test equipment
Basics · hand tools
Aircraft structures
Theory of flight
Power generation
Distribution systems
Instrument and systems
Avionics installations
Sheet Metal
Airframe systems
Power plant systems
Control systems
Navigation systems
Communication systems
Pulse systems
Auto flight systems

Program Length

16 months full-time beginning every 8 months.

Normal Course Hours

088-1530, Monday through Friday.

Tuition Fees (subject to change)

$3,536 for the 16-month program (1992/93).

Prerequisites

Electronics Technician Common Core Program or equivalent plus Grade 12 with Math 11 with C (Math 12 preferred). Good color vision is essential.

Instructors

Patrick Mulldoon, A.M.E.
Vincent Murray, A.M.E.
Doug Grant, A.M.E.
Greg Lambrecht, A.M.E.

BENCHWORK AND JOINERY (CABINETMAKER)

Certificate Program

A joiner works in a wide range of specialties such as cabinetmaking, furniture making, pattern making, store fixture manufacturing and millwork. The type of work in each of these areas varies. In some shops the joiner will be a machine operator, feeding components in at one end and/or extracting them at the other. In other shops the joiner will be required to read detailed blueprints and visualize the item to be built, lay out and compile a cutting bill, cut and machine all the components, and then assemble the final product.

The joiner must be familiar with all the machinery in the shop and be able to set up, use and maintain this machinery. Any hardware items such as hinges, locks or drawer slides specified in the blueprints must be considered during fabrication. The joiner not only installs these items, but also ensures that the units will accept each particular hardware.

Training prepares students for entry-level employment in the joinery trade. Basic theory and related information along with hands-on shop practice enable students to become competent in basic interior woodworking tasks. Upon successful completion of the program, students should seek employment as an apprentice.

Job Opportunities

Employment opportunities vary with the shop size, location and type of work produced. Shops range from small custom shops to large production shops, with the large shops generally located in areas of denser population. Type of work may include but is not limited to: millwork, cabinetmaking, furniture manufacturing, boatbuilding and door, window and stairbuilding.

Program Content
Use safe work practices
Solve mathematical problems
Sketch and read drawings, use layout procedures
Care and use of hand tools
Care and use of portable power tools
Care and use of shop equipment
Identify and use materials
Use specialty tools
Floor and wall framing (theory)
Interior and exterior finishing (theory)
Cabinets and finishes
Prepare for employment

Program Length
28 weeks full-time beginning February, July and October each year.

Normal Course Hours
0730-1415, Monday through Friday.

Tuition Fees (subject to change)
$936 for the 28-week program (1992/93).

Prerequisites
Grade 10 or pre-test.

Good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Instructors
Carl Catt, T.Q.
Ron Hill, T.Q.
Rob Sawatzky, B.Ed.
Dave Stimson, T.Q.
Erwin Bublitz, T.Q., Chief Instructor

BOILERMAKING
Certificate Program

Boilermakers possess the full range of knowledge and skills required to fit, install, assemble, erect, repair and maintain a wide variety of vessels, tanks, towers, hoists and other structures, as well as ancillary equipment and fixtures made of metal and fiberglass materials.

Job Opportunities
Training prepares students for entry-level employment as boilermakers (erectors). Upon successful completion of the program, students should seek employment as an apprentice.

Graduates of this program are eligible for acceptance into the International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers Lodge 359. Apprenticeships are arranged through the union which dispatches workers to job sites throughout B.C. and the Yukon. Possible work sites include pulp mills, refineries and hydro electric projects.

The Program
Basic theory and related information along with hands-on shop practice enable students to become competent in basic vessel construction tasks.

Boilermakers must be able to work at heights. Good physical condition is desirable. Potential students should arrange an interview with a Boilermaking Instructor at (604) 432-8203.

Program Content
Describe the boilermaking trade
Apply safe and acceptable work practices
Mathematics
Sketch and read drawings
Develop patterns and make templates for shop application
Use basic measuring, layout, hand and power tools
Use metal fabrication power equipment
Use oxyacetylene
Arc welding
Apply rigging
Apply layout and fitting techniques
Fabricate and erect tanks
Fabricate and erect boiler components
Fabricate and erect penstocks
Assemble and dismantle refinery components
Fiberglass reinforced plastics

Program Length
23 weeks full-time beginning in January and July each year.

Normal Course Hours
0700-1345, Monday through Friday.

Tuition Fees (subject to change)
$801 for the 23-week program.

Prerequisites
Grade 10 or pre-test and department interview.

Instructor
Joe Kiwior
Richard MacIntosh

CARPENTRY

Certificate Program

Carpentry is divided into three sections: framing, concrete forming and finish work. The framing carpenter builds the basic structure (foundations, floors, walls and roof). The concrete forming carpenter builds the formwork necessary for the placement of concrete, wall panelling and trim, stairs, exterior siding and trim. Most carpenters are skilled in all areas of construction but tend to specialize in one area.

Today, with so many new products and techniques, some carpenters specialize in one particular field of the trade. Among the specialties are:

- site preparation and layout
- blueprint reading
- installing cabinets and hanging doors
- building stairs and railings
- installing exterior siding.

Job Opportunities

The steady upturn in the construction industry has resulted in increased employment opportunities for carpenters. Most jobs are still in the residential building section although employment is sometimes available on commercial projects.

The Program

Training prepares students for entry-level employment in the carpentry trade. Basic theory and related information along with hands-on shop practice enable students to become competent in basic carpentry tasks. Upon successful completion of the program, students should seek employment as an apprentice.

Carpenters must be able to work at heights and in adverse weather. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content

Use safe work practices
Solve mathematical problems
Sketch and read drawings
Care and use of hand tools
Care and use of portable power tools
Care and use of shop equipment
Identify and use materials
Lift and support loads
Site preparation and layout
Concrete and formwork
Specialty tools
Oxyacetylene cutting and welding
Floor and wall framing
Ceiling and roof framing
Exterior finishing
Interior finishing
Cabinets and finishes
Prepare for employment

Program Length

28 weeks full-time beginning August and November each year.

Normal Course Hours

0730-1415, Monday through Friday.

Tuition Fees (subject to change)

$936 for the 28-week program (1992/93).

Prerequisites

Grade 10 or pre-test.

Instructors

Rick Dohl, B.Ed., T.Q., I.P., Carpentry
John-Allan Eliasen, T.Q., I.P., Carpentry/Joinery I.D.
Poul Jacobsen, T.Q., I.P., Carpentry I.D.
Poul Nielson, T.Q., I.P., Carpentry I.D.
Wayne Stevens, T.Q., I.P., Carpentry/Joinery
Kurt Traugott, B.Ed., T.Q., Carpentry
Peter Wilson, T.Q., I.P., Carpentry/Joinery I.D.
Chief Instructor
R. Ainsworth, T.Q., I.P., Carpentry I.D.
K. Simpson, T.Q., I.P., Carpentry, I.D.
Kal Klasen, T.Q., I.P., Carpentry, I.D.
Luigi Fontana, T.Q., Carpentry I.D.

COMMERCIAL TRANSPORT MECHANIC

(Truck and Bus Mechanic)
Certificate Program

Commercial transport mechanics overhaul, recondition, repair, and maintain highway trucks, buses, fork-lifts and refrigeration equipped tractor trailers. Diagnostic troubleshooting is an important skill. Students learn to do tune-ups and general servicing of highway vehicles and disassembly/reassembly of various vehicle parts: motor, transmission, clutch, differential, suspension system and brakes.

Job Opportunities

Training prepares students for entry-level employment as commercial transport mechanics. Upon successful completion of the program, students should seek employment as an apprentice.

There has been an increase in opportunities in this trade generally, as the inspection of commercial vehicles has recently become compulsory. As the trade is expanding at this point, apprenticeship opportunities should become available. Graduates of this program are encouraged to seek formal apprenticeships in the industry.

The Program

Basic theory and related information along with hands-on shop practice enable students to become proficient in basic mechanical maintenance of commercial transport and passenger vehicles.

Because some heavy lifting is involved, good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content

Describe mechanical trade
Solve mathematical problems
Describe and use safe work practices
Technical communications
Apply science concepts
Electrical principles and practice
Start, run, move, shut down selected equipment
Describe and use mechanic's hand tools and measuring tools
Describe and use mechanic's power tools
Describe and service hydraulic systems
Oxyacetylene welding
Arc welding
Lifting and blocking
Describe and overhaul internal combustion engines
Describe and service engine support systems
Describe and service transmissions
Describe and service clutches
Describe and service differentials
Describe and service steering systems
Describe and service frames, suspensions and attachments
Describe and service hydraulic brake systems
Describe and service air brake systems
Describe and service air operated controls and accessories

Program Length

30 weeks full-time beginning November 1993.

Normal Course Hours

0700-1345, Monday through Friday.

Tuition Fees (subject to change)

$990 for the 30-week program (1992/93).

Prerequisites

Grade 12 or pre-test.

Instructors

Peter Congdon, I.D., Com.Trans., I.P., Auto I.P.
Ewan Sheard, Com.Trans. I.P., Auto I.P., B.Ed., H.D. T.Q.
Larry Strong, I.D., Auto.I.P., Com.Trans. Auto I.P.
Keith Whitter, Com. Trans T.Q., Auto I.P.

COMPUTER NUMERICAL CONTROL (CNC) MACHINIST

Certificate Program

This 420-hour program trains students to operate CNC machines. Training is designed for machinists and other trades wishing to upgrade their skills in the operation and introductory programming of CNC equipment.

Mathematical topics which are interwoven throughout all subject areas include: using algebra, geometry and trigonometry calculations to solve problems relating to CNC programs and locating required information from the "Machinery's Handbook" tables.

Job Opportunities

This efficient and precise method of machine operation has a variety of applications in machine shops, the tool and die and mold making fields, the aircraft industry, steel fabrication, sign making, furniture production, etc. Any industry which requires the manufacture of individual parts or limited production runs could use this method of manufacturing.

Program Content

Safety (10 hours) - Application of proper manual lifting techniques, safe work practices and survival first aid procedures. Compliance with rules governing the handling of hazardous materials.

Introduction to Computers (20 hours) - Identification of microcomputer system components and use of basic DOS commands to copy, delete, rename, etc. Application of editing operations to CNC programs.

CNC Training Lathe (90 hours) - Writing and debugging simple CNC programs, operating the machine control panel, inputting and editing programs, setting up the machine and using proper operating procedures.

CNC Turning Centre (120 hours) - Loading programs into memory, writing and debugging programs, using various special machining cycles and performing setup operations with the Fanuc and Okuma controls. Practising proper maintenance procedures. Application of tool offsets and radius compensation.

CNC Milling Machine (60 hours) - Performing operations using the General Numeric Control. Creation and use of MDI programs. Loading programs into memory from punched tape.

CNC Machining Centre (120 hours) - Selection of proper work-holding methods. Tooling setup in the automatic tool changer. Establishment of tool length and diameter compensations. Use of graphics for tool path verification. Creation of MDI programs on the Meldas and Okuma controls. Development of sub-programs for various machining operations.

Program Length
14 weeks full-time beginning January and September each year.

Course Hours
0700-1400, Monday through Friday.

Tuition Fees (subject to change)
$378 for the 14-week program.

Prerequisites
Applicants should have completed a machinist ELTT program, hold a trade certificate or journeyed status or have equivalent demonstrated ability in the following areas: use of conventional shop equipment; safe work practices; mathematical problem-solving; machine shop geometry and angles; reading and interpreting drawings and using precision measuring instruments.

Instructors
Ted Marchant, I.D., T.Q., I.P.
Fred Shim, I.D., I.P., Mech. Tech.
Pat Thomas, I.D., I.P., Electronics T.Q.

CNC PROGRAMMER 1
Certificate Program

The objective of this 240-hour program is to further improve the skills of graduates from the basic level. The intermediate level provides intensive applied training in computer-assisted programming, macro programming and graphic workstations for CAD/CAM applications. The student will be introduced to the concepts and applications of tool life management systems.

Job Opportunities
These programming techniques are of great advantage to all manufacturing shops using CNC machinery. Excellent job placement rates are anticipated as the use of CNC equipment expands throughout the province.

The Program
Topics which are interwoven throughout all subjects areas include: principles of clamping and workpiece location, use of fixture, selection of tooling, operation planning (sequencing), preparation of tooling and setup sheets, maintaining complete and accurate documentation, and selection of the most appropriate machines for a designated job.

Program Content
Manual Programming (30 hours) - Overview of the basic G-codes and follow-through using special canned and multiple repetitive cycles. Creation of CNC programs using text editing software; mathematical calculations using utility program. Mirroring and rotation functions.

Automatically Programmed Tools (APT) (15 hours) - Explanation of program structure, geometry definitions, cutting motions, toolchange statements, file management and plotting using a PC-based version of APT.

Macro Programming (20 hours) - Use of the Fanuc control to program for measuring probes, families of parts, variable programming and logical operations.

Graphics Programming 2-Dimensional (100 hours) - Use of CAM programs to create geometry and procedure toolpaths. Creation of material and tool libraries for future use. Exploration of backplotting, CNC code editors and communication modules. Importing drawing files from CAD software in various formats including IGES and DXF. Creation of code generators.

Computer Aided Drafting (CAD) (45 hours) - Designing and dimensioning parts in standard orthographic projections and plotting the finished blueprint. Use of layers to associate the geometry with specific tools.

Data Communications (15 hours) - Use of communications software to allow a computer to be connected to a CNC machine for the purpose of uploading and downloading programs. Examination of baud rates, hand shaking, and cable configurations.

Tool Life Management (15 hours) - Introduction to the concept and application of tool life management. Identification and selection of tool groups along with an overview of redundant tool and tool usage features.

Program Length
8 weeks full-time beginning March, August and October each year.

Course Hours
0700-1400, Monday through Friday.

Tuition Fees (subject to change)
$216 for the 8-week program (1992/93).

Prerequisites
Applicants must be graduates of CNC Machinist Basic Level or show satisfactory experience as CNC machine operators, journeyed machinists, or journeyed tool and die makers with CNC operating experience. Other applicants must verify their level of competence for admission to the program through a formal interview.

Instructors
Ted Marchant, I.D., T.Q., I.P.
Fred Shim, I.D., I.P., D.P.T.

ADVANCED CNC PROGRAMMER 2
Certificate Program

This 240-hour advanced program will improve the programming skills of graduates of CNC Programmer. The advanced level includes sophisticated applications of the UNIX system, macro and 3-D graphics programming, tool life management, CAD, CMM, as well as an introduction to job estimating.

Job Opportunities
This advanced programming is of great advantage to industries requiring complex surfaces and three-dimensional programming and to shops manufacturing injection and blow molds. Graduates will be able to analyze industry needs and make recommendations on the selection of equipment for specific situations.

The Program
Topics which are interwoven throughout all subject areas include: principles of clamping and workpiece location, use of fixtures, selection of tooling, operation planning (sequencing), preparation of tooling and setup sheets, maintenance of complete and accurate documentation, and selection of the most appropriate machines for a designated job.

Program Content
UNIX (20 hours) - Introduction to the UNIX operating system including commands, files and directory structures.

Macro Programming (20 hours) - Production of various shapes using mathematical formulas (ellipses, spheres, etc.) and creation of macro programs for the use of positioning probes.

Graphics Programming 3-Dimensional (130 hours) - Uses advanced features of CAM software to produce cutter paths in 3 dimensions for 4 and 5-axis positioning mills. Application of wireframe geometry to building complicated models. Process for geometric projections onto surfaces and 3-axis cutter compensation for 3-D work.

Tool Life Management (20 hours) - Introduction to adaptive controls for sensing the variations in machining conditions through torque, deflection, vibration, wear, etc.

Job Estimating (10 hours) - Estimation of realistic costs using various CAM software programs plus dedicated estimating programs.

Computer Aided Drafting 2 (20 hours) - Uses advanced features of the design program by creating arrays, patterns, solids and wire frames.

Coordinate Measuring Machines (CMM) (20 hours) - Uses CNC coordinate measuring machines to inspect workpieces and application of reverse engineering concepts to produce CNC code from existing parts/models.

Program Length
8 weeks full-time beginning January 1993.

Course Hours
0700-1400, Monday through Friday.

Tuition Fees (subject to change)
$216 for the 8-week program (1992/93).

Prerequisites
Applicants must be graduates of the CNC Programmer 1 intermediate level. Other applicants must verify their level of competence for admission to the program through a formal interview.

Instructor
Fred Shim, I.D., I.P., D.P.T.

DIESEL ENGINE MECHANIC

Certificate Program

The diesel engine mechanic repairs, maintains and rebuilds diesel engines which power a wide variety of mobile and stationary machinery. Students learn to disassemble, rebuild and reassemble diesel engines; replace working parts such as pistons, rings, bearings, gears, valves and bushings; rebuild engine blocks, cylinder heads, sub assemblies and components; repair fuel, electrical and cooling support systems.

Job Opportunities

Students are prepared for entry-level employment as diesel engine mechanics. Upon successful completion of the program, students should seek employment as an apprentice.

Diesel engine mechanics are required wherever diesel engines are found in industry: Railway, bus and truck lines, the marine industry, repair garages, logging and mining camps, and dealerships. Many opportunities exist in this trade, however, graduates should be prepared to work out of town in entry level jobs in industry until trainee positions become available.

The Program

Basic theory and related information along with hands-on shop practice enable students to become proficient in basic diesel engine maintenance and overhaul procedures.

Because some heavy lifting is involved, good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content

Describe mechanical trades
Solve mathematical problems
Describe and use safe work practices
Technical communications
Apply science concepts
Electrical principles and practice
Service electrical systems and components
Start, run, move, and shut down selected equipment
Describe and use mechanic's hand and measuring tools
Describe and use mechanic's power tools
Describe and service hydraulic systems
Oxyacetylene welding
Arc welding
Lifting and blocking
Describe and overhaul internal combustion engines
Describe and service engine support systems
Service cylinder block assemblies
Service emission control systems
Describe diesel fuel systems
Service diesel systems
Troubleshoot diesel engines
Marine gear
Prepare for employment

Program Length

42 weeks, full-time beginning in September each year.

Normal Course Hours

0700-1345, Monday through Friday.

Tuition Fees (subject to change)

$1,314 for the 42-week program (1992/93).

Prerequisites

Grade 12 graduation or pre-test.

Instructors

Paul Ehni, I.D., H.D.I.P.
Tom Kozar, I.D., H.D.I.P., Com. Trans. T.Q.

DRAFTING

Drafting at BCIT offers training for a variety of applications in Architecture, Building Construction, Mechanical Systems for Building and Industry, Civil & Municipal Construction and Highway design. CAD (Computer Aided Design) is an integral part of all our drafting programs.

All students must complete Drafting Core (8 weeks) before proceeding to their drafting specialty.

Prerequisite for Combined Program

Grade 12 with Math 11. Good hand/eye coordination and technical aptitude. Students will enter at the core level. Applicant must state an option preference when applying.

Drafting Core

Provides students with the basic knowledge and skills of drafting to enter any drafting specialty. The program includes introduction to drafting, math, surveying, and CAD training.

Program Length

8 weeks full-time beginning September each year.

Normal Course Hours

0700 to 1345, Monday through Friday.

Architectural Building Construction
Prepares the student to choose one of three available specialties and concentrates on developing basic drafting skills. Includes introduction to architectural specialty, introduction to building systems and graphic techniques, and continuation of CAD training.

Job Opportunities
Possible employment at the junior drafter level.

Program Length
12 weeks full-time beginning November 1, 1992.

Normal Course Hours
0700-1345, Monday through Friday.

CIVIL DRAFTING

The specialty prepares the student to combine the necessary understanding of building construction with the requirements of municipal regulations.

Job Opportunities
Students may be potential drafters and surveying assistants working for engineering firms, surveyors, and municipalities.

Specialty Content
Basics of civil drafting as combined with architectural building construction and highway design, municipal services, surveying; plus a continuation of CAD training

Length of Specialty
20 weeks full-time beginning February 1, 1993.

Normal Course Hours
0700-1345, Monday through Friday.

Tuition Fees (subject to change)
Core plus Civil Drafting Specialty: $1,080 for the 40-week program (1992/93).

MECHANICAL DRAFTING

The specialty prepares the student to combine the understanding of building construction with machine and sawmill design.

Job Opportunities
Employment may be found in offices specializing in machine and sawmill design.

Specialty Content
Conveyors and material handling equipment
Chute detailing and plate development
Gear design
Hydraulics
Applied Math and Physics
Strength of materials
Statics
Structural connections, bolting, welding
Shaft design
Casting design

Length of Specialty
20 weeks full-time beginning February 1, 1993.

Normal Course Hours
0700-1345, Monday through Friday.

Tuition Fees
Core plus Mechanical Drafting Specialty: $1,080 for the 40-week program (1992/93).

STRUCTURAL DRAFTING

The specialty provides 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.

Job Opportunities
Students may find employment in engineering offices which deal with reinforced concrete and structural steel.

Specialty Content
Combines building construction with the design of reinforced concrete and structural steel.

Length of Specialty
20 weeks full-time beginning February 1, 1993.

Normal Course Hours
0700-1345,Monday through Friday.

Tuition Fees
Core plus Structural Drafting Specialty: $1,080 for the 40-week program (1992/93).

ARCHITECTURAL DESIGN : TECHNICAL AND GRAPHICAL COMMUNICATION

In assessing their suitability for this specialty, applicants should consider that:

1. In general, programs of professional study are highly focused. Architecture is no exception to this, calling for a high degree of motivation.
2. Architectural studies involve an understanding of people's needs, of technologies, the humanities and fine arts. The student should, therefore, expect to draw upon a breadth of academic and personal experience.
3. Much of the program calls for judgement and decision-making ability in situations where there are no clear-cut solutions. Students find that in addition to intellectual and creative ability, they also need initiative, tenacity and a tolerance for uncertainty.

Job Opportunities

Employment may be found in architectural firms or related engineering companies.

Specialty Content

Graphic communication
Site planning
Architectural principles
Construction systems
The design process
Building elements
Behavioral design
Building types planning
Modern architectural history
Building codes and bylaws
Townscape and urban space
Directed studies projects

Length of Speciality

40 weeks full-time beginning September each year.

Normal Course Hours

0800-1430, Monday through Friday.

Tuition Fees (subject to change)

$1,080 for the 40-week program (1992/93).

Prerequisites

Applicants will be required to attend a personal interview at which time they will be required to submit the following:

1. a. A portfolio demonstrating their creative ability in the manipulation of three-dimensional form;
   b. A short essay (approximately 500 words) detailing their reasons for choosing Architecture as a career;
   and
2. Applicants will be required to complete an aptitude test administered at the interview.
3. Grade 12 graduation with Math 11.

Please note: preference will be given to applicants who have Grade 12 graduation with C+ or better in English 12 and Math 12.

Instructors

W. Chandler, Instructors Diploma
G. Cullen, B.A., B.Theol., Instructors Diploma
B. Hilliard, Instructors Diploma - Chief Instructor
P. Kavanagh, Instructors Diploma

ELECTRICITY AND INDUSTRIAL ELECTRONICS

Certificate Program

This program will provide the graduate with the theory and practical skills necessary to enter the electrical trade. The electrical worker plans, assembles, installs, tests, repairs and maintains electrical equipment and systems in commercial, industrial and marine facilities.

Job Opportunities

Graduates may qualify for advanced standing as indentured candidates within the apprenticeship system.

Job opportunities exist in the construction, mining, forestry, food production, manufacturing, grain handling, transportation, utility and service industries. The nature of the electrical trade has changed with the impact of solid state control and programmable logic controllers. Challenging career opportunities are available to the person who is prepared to acquire a broad range of technical skills.

The Program

The Electricity and Industrial Electronics Program emphasizes a hands-on approach to training where experience gained in the workshop is focused on industry practice. The necessary theoretical component is integrated into the program to complement and enhance the practical work. Industry tours will expose the student to a variety of work environments.

The program is divided into two levels. A passing grade is required in each Level 1 course to progress into Level 2. Evaluation is based on both classroom theory and shop performance.

Applicants should possess good health and physical condition necessary to meet the demands of the work: good hearing, eyesight and hand/eye coordination. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content

Level 1
Electrical math
Trade science
Fundamentals of electricity
Wiring methods
Blueprints, plans and specifications
Canadian Electrical Code

Level 2
Principles and applications of magnetism
AC circuit analysis
AC applications
Motor control and industrial wiring
Solid state electronics
Computer skills and job preparation

Program Length
40 weeks full-time beginning several times a year.

Program Locations
This program is available at the BCIT **Burnaby** campus and in **Langley**. Applicants must specify location preference when applying.

Normal Course Hours
0800-1500, Monday through Friday.

Tuition Fees (subject to change)
$1,260 for the 40-week program (1992/93).

Prerequisites
a. Grade 12 graduation with C or better in Math 11 (Algebra);
or
b. Pass an entrance test measuring math and reading skills.

Instructors
M. Wanstall, P.Eng., Chief Instructor
G. Denham
A. Dutta
J. Jordan
O. Wetzlmayr

ELECTRONICS TECHNICIAN COMMON CORE PROGRAM

Certificate Program

Electronics training will provide graduates with the skills to install, maintain, analyze, construct and troubleshoot electronic circuits and equipment. Students will learn the theory and demonstrate the practical applications of electronics through a series of lab experiments. Students will learn the correct use of tools and test equipment, troubleshooting procedures and soldering techniques.

Job Opportunities
Students who successfully complete this program have the option of either progressing into one of the specialty technician programs at BCIT or entering the electronics industry at an entry level position such as installer, assembler or quality control technician.

Program Content

Electronic Fundamentals Section
Safety
Tools for electronics
AC/DC circuit theory and network analysis
Test equipment and measurement

Analog Section
Semiconductor theory and devices
Semiconductor characteristics
Integrated circuits
Power supplies
Amplification
Oscillators
Operational amplifiers
Troubleshooting

Digital Section
Digital gates and devices
Numbering systems
Digital family characteristics
Combinational logic
Microprocessor basics

Program Length
30 weeks full-time consisting of 2-15 week terms beginning several times a year.

This program is also available on a part-time evening basis, three nights per week over two years.

Program Locations
BCIT **Burnaby** and at our **Langley** campus.

Program Preference
Applicants must specify the preferred location and program format (full-time or part-time) when applying for this program.

Normal Course Hours
0800-1500, Monday through Friday, full-time format.

Tuition Fees (subject to change)
$810 for the 30-week full-time program (1992/93). Check our flyers for part-time course fees.

Prerequisites
Grade 12 graduation with Math 11 . Math 12 with C or better preferred.

Transferability
This program comes under the guidelines of the Provincial Government's Common Core Electronics Technician Program. As such, students who successfully complete the Common Core Program will be able to transfer to other provincial institutions or colleges offering specialties not offered at BCIT.

Specialty programs currently offered at BCIT
Avionics Technician AME category 'E' (please refer to Avionics section of this calendar on page 248)
Automated Business Equipment Technician

Instructors
Patrick Mulldoon, Chief Instructor
Lance McCollum
Terry Knudson
Miro Angeles
Ed Bosman
Canede Wong
Gabriel Yam
Emile Gaudet

GAS TURBINE TECHNICIAN
Certificate Program

This full-time engine fitting program will give you the opportunity to develop new skills to overhaul gas turbine engines and other components.

Practical skills include filing, drilling, tapping, threading, fabricating special tools, inspection, nondestructive testing, reporting defects, engine disassembly and assembly, servicing, maintenance, and performance check run ups. BCIT has some 50 gas turbine engines including turbo-props, shafts, jets and fans.

Job Opportunities
Students are expected to develop the high standards of craftsmanship required by engine overhaul manufacturers for the aviation, marine, transportation, power (hydro, etc.), oil and natural gas industries, and Transport Canada.

The course takes place at the Sea Island, Aviation campus.

Program Content:
50% theory and 50% practice
Basic handtools
Blueprint reading; how to use manuals
Materials and processes (metallurgy)
Inspection and nondestructive testing
Approved hardware (nuts, bolts, washers, cotterpins)
Elementary gas turbine theory
Construction
Safety and regulations
Overhaul procedures
Gas turbine systems
Manufacturing and repair techniques
Engine performance and testing
Adjustments and troubleshooting
Inspection procedures and techniques
Specific engine type courses (5 days each)
1. Allison 250-C20
2. PT6 and ST6
3. Pratt and Whitney JT8D
4. General Electric CF6

Review and testing

Program Length
21 weeks (30 hours/week) full-time beginning in March and September each year.

Term 1: 8 weeks full-time
Term 2: 8 weeks full-time
Term 3: 5 weeks full-time

Normal Course Hours
0800-1500, Monday through Friday.

Tuition Fees (subject to change)
$567 for the 21-week program (1992/93).

Prerequisites
Grade 12 with Math 11. Physics 11 recommended. Communications 12 is acceptable in place of English 12. An interview may be required as part of the admissions process.

Instructor
Peter Mills

HEAVY DUTY MECHANIC

Certificate Program

The heavy duty mechanic repairs and tests heavy duty machines: tractors, crawlers, loaders, graders, cranes, shovels and trucks. The work ranges from simple daily maintenance checks to servicing hydraulic systems, air brakes and winches, blades and accessories.

Today's heavy duty mechanic not only knows how to use service manuals, tools and equipment to the best advantage, but also employs logic and deductive reasoning in diagnosing and troubleshooting.

Job Opportunities

Training prepares students for entry-level employment as heavy duty mechanics. Upon successful completion of the program, students should seek employment as an apprentice. There are employment opportunities in the Lower Mainland and throughout B.C. The majority of graduates can expect to find work in the heavy duty field within a year of graduation. However, they may have to work at an unskilled job in the industry until an apprenticeship becomes available.

The Program

Basic theory and related information along with hands-on shop practice enable students to become competent in basic heavy duty mechanical maintenance and repair.

Heavy duty mechanics must have a valid driver's license. Good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content

Describe mechanical trades
Solve mathematical problems
Describe and use safe work practices
Technical communications
Apply science concepts
Electrical principles and practice
Start, run, move, and shut down selected equipment
Describe and use mechanic's hand and measuring tools
Describe and use mechanic's power tools
Describe and service hydraulic systems
Oxyacetylene welding
Arc welding
Lifting and blocking
Describe and overhaul internal combustion engines
Describe and service engine support systems
Describe and service powertrains
Describe and service seals and bearings
Describe and service braking systems
Describe and service final drive systems
Describe and service track machine undercarriages
Describe and service track machine steering systems
Describe and service wheels, tires and rims
Describe and service working attachments
Service wheel machine steering and suspension
Prepare for employment

Program Length

30 weeks full-time beginning September and November each year.

Normal Course Hours

0700-1345, Monday through Friday.

Tuition Fees (subject to change)

$990 for the 30-week program (1992/93).

Prerequisites

Grade 12 or pre-test.

Instructors

Don Eklof, I.D., Diesel Eng.I.P., H.D.I.P., Chief Instructor
Al Westfall, I.D., H.D.I.P., Com. Trans. T.Q.
Edward Wilk, I.D., H.D.I.P.
Len Arychuk, I.D., H.D.T.Q., Auto T.Q.

INBOARD/OUTBOARD MECHANIC

Certificate Program

The inboard/outboard mechanic works primarily on gasoline engines in the marine pleasure craft industry. A mechanic must know all aspects of repair to outboard motors, inboard and inboard/outboard engines, and stern-drive units.

Mechanics will be required to do tune-ups and electrical troubleshooting, disassemble and overhaul complete units and/or components, make steering and shift adjustments, check gauges and instruments, and may install accessories such as radio-telephones and depth-sounders. Depending on the employer, a mechanic may need to be skilled in working with boat trailers as well as boats and boat rigging, and the maintenance and repair of outdrives, transmissions and engines.

Job Opportunities

Students are prepared for entry-level employment as inboard/outboard marine mechanics. Upon successful completion of the program, students should seek employment as an apprentice. Opportunities in this trade exist both in and out of town with dealers, marinas, fishing lodges and resorts. Most of these businesses are not unionized but apprenticeships are common in this trade. Experienced tradespeople who have not served a formal apprenticeship but can verify their employment may be eligible to write the Trades Qualification (T.Q.) examination.

Job placement of graduate students is high. The marine mechanic trade covers the province as well as the rest of the country and further comment from the marine trade at this time is that there is a shortage of qualified mechanics and the wages are increasing. There are always jobs for good mechanics.

The Program

Basic theory and related information along with hands-on shop practice enable students to become competent in basic inboard/outboard repair and maintenance.

Good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content

Use safe work practices
Describe the mechanics trades
Solve mathematical problems
Maintain mechanics measuring and hand tools
Use power tools
Use fastenings and fittings
Use materials
Use basic measuring, layout and hand tools
Lift loads
Oxyacetylene welding
Process technical information
Basic electricity
Disassemble and reassemble selected engines
Service outboard engines
Service outboard engine support systems
Service marine electrical systems
Service outboard gear cases
Service remote control systems
Boat rigging
Service inboard engines
Service inboard engine support systems
Service inboard propulsion systems
Describe and service outdrives
Service tilt and trim systems
Inboard/outboard installation and test running
Outboard installation and test running
Prepare for employment

Program Length

35 weeks full-time beginning the first Monday of the month, throughout the year, as required.

Normal Course Hours

0700-1400, Monday through Friday.

Tuition Fees (subject to change)

$1,098 for the 35-week program (1992/93).

Prerequisites

Grade 12 or pre-test.

Instructors

Kenneth Nichol, I.D., T.Q.
Jeff Mica, T.Q.

INDUSTRIAL MAINTENANCE MECHANIC

Cooperative Certificate Program

Industrial Maintenance Mechanics are responsible for the maintenance and repair of a wide variety of industrial equipment.

Job Opportunities

Opportunities exist throughout the Province in a variety of manufacturing plants from the food industry to machine building and maintenance and small service shops. Graduates may want to explore the prospects of an apprenticeship in either the millwright or machinist trades.

Program Content

Use safe working practices
Describe industrial maintenance mechanic occupation
Describe industrial, business and labor organizations
Solve mathematical problems and use the Machinery's Handbook
Solve science concepts
Sketch and read drawings
Communicate in the workplace
Use layout tools, hand tools, and fasteners
Lift loads
Select lubricants
Use power metal working tools and shop equipment
Use measuring tools
Use support machines
Use precision grinders
Use lathes
Use shapers, planers and slotters

Use milling machines
Complete a machine shop project
Solve basic gearing problems
Distinguish between properties in materials and their uses
Use arc welding and oxyacetylene equipment
Identify ferrous metals
Heat treat steel
Identify and test electrical equipment
Apply principles of fitting and assembling
Use steel fabrication hand tools, power tools and shop equipment
Install power drives
Perform machine installation
Describe material handling equipment
Describe, test and troubleshoot hydraulic components and systems
Describe the use of computers in industry
Describe preventive maintenance procedures
Prepare for employment

Program Length
80 weeks full-time beginning September each year.
3 16-week terms combined with 2 coop work terms: one 16 weeks and one 9 weeks.

Normal Course Hours
0730-1400, Monday through Friday.

Tuition Fees (subject to change)
$1,744 for the 80-week program (1992/93).

Prerequisites
Grade 12 graduation with mechanical electives or pre-test or individual assessment by the department.

Good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Cooperative Programs
Cooperative programs integrate paid work experience with training at BCIT. The work experience relates to your training program. In addition to helping you to finance your education, coop programs allow you to explore your career in a structured and purposeful manner; to test your skills; to adjust to the working environment, and to acquire relevant work experience as well as first-class training. For more information contact Coop Education at 432-8753.

Instructor
Owen Collings, I.D., Machinist T.Q., Millwright T.Q.

IRONWORKING

Certificate Program

Structural ironworkers raise structural steel girders, plates and columns, and join them permanently to form a framework or a completed structure. Work is usually broken down into various phases with separate crews, such as the raising gang or the high tensile bolt gang. The workers are usually interchangeable on all phases of work except welding, an activity which requires additional training. Workers with the crew are usually designated according to the work they do: bolter-up, connector, hooker-on or rigger, rod man, sheeter and curtain wall.

Job Opportunities
Training prepares students for entry-level employment in the ironworking trade. Upon successful completion of the program, students should seek employment as an apprentice. With the present level of industrial and commercial construction, job opportunities exist in both the structural steel and reinforced concrete sectors of the construction industry.

The Program
Basic theory and related information along with hands-on shop and field practice enable students to become competent in basic ironworking activities.

Ironworkers must be able to work at heights and in adverse weather. Good physical condition is desirable. Potential students should arrange an interview with Ironworker Instructor at (604) 432-8203.

Program Content
Apply safe and acceptable work practices
Mathematics
Sketch and read drawings
Prepare for employment
Use basic measuring, layout and hand tools
Use metal fabrication power tools
Metallurgy fundamentals
Use oxyacetylene and fit structural shapes
Perform arc welding
Apply rigging
Use cranes and derricks
Perform structural steel erection
Select reinforcing steel

Program Length
23 weeks full-time beginning in January and July each year.

Normal Course Hours
0700-1345, Monday through Friday.

Tuition Fees (subject to change)
$801 for the 23-week program (1992/93).

Prerequisites
Grade 10 or pre-test.

Instructors
Nino Romanin
Jim King

MACHINIST
Certificate Program

The machinist makes and repairs metal parts, tools and machines, including custom work such as line boring pump castings and operating semi-automatic equipment on long production runs. General machinists use lathes, drill presses and milling machines to shape metal. Higher level work includes programming and operating computer controlled machine tools.

Job Opportunities
Training prepares students for entry-level employment in the machinist trade. Upon successful completion of the program, students should seek employment as an apprentice. Opportunities exist throughout the province. Formal apprenticeships are common in this trade, but a graduate should be prepared to take an entry level job in a shop until an apprenticeship becomes available.

The Program
Basic theory and related information along with hands-on shop practice will enable students to become competent in the basic operations needed to make industrial parts and components.

Good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content
Apply safe working practices
Solve mathematical problems and use Machinery's Handbook
Read and interpret shop drawings
Use layout, measuring and testing tools and equipment
Use support machines
Identify common metals
Use lathes
Use shapers, planers and slotters
Use vertical and horizontal milling machines
Apply heat treatment
Use precision grinders
Oxyacetylene cut and weld
Fit bearings, seals, gaskets and packing
Select lubricants for specific applications
Describe the fundamentals of NC and CNC
Complete machine shop projects
Prepare for employment

Program Length
34 weeks full-time beginning March, September and November each year.

Course Hours
0700-1400 (first shift) or 1230-1915 (second shift), Monday through Friday.

Tuition Fees (subject to change)
$1,098 for the 34-week program (1992/93).

Prerequisites
Grade 12 or pre-test.

Instructors
Greg Burke, I.P., B.Ed.
Don Grant, I.D., T.Q.
Ted Marchant, I.D., T.Q., I.P., Chief Instructor
John Spencer, I.D., City & Guilds Machinist T.Q.
Pat Thomas, I.D., Machinist I.P., Electronics Tech.T.Q.
Fred Shim, Machinist I.P., Mech. Tech.
Brian Weir, Machinist I.P.
Terry Wadd, Machinist T.Q., Mach-Fitter

MILLWRIGHT
Certificate Program

Millwrights are often described as masters of all trades as they are expected to install, maintain and repair all types of machinery in almost any industry.

Job Opportunities
The potential for entry into a Millwright apprenticeship is good at this time. The expertise gained in this entry-level course is suitable for application to other trades and almost all industries. A graduate from this course should expect entry level employment until an apprenticeship becomes available.

Anywhere that machinery exists there is usually work for a millwright. Employment for millwrights is mainly centred on the major industries in B.C.: mining, pulp mills, wood processing and petro-chemical plants, with smaller groups being employed in the manufacturing field. The construction industry also employs millwrights on short and long-term contracts.

The Program

Training prepares students for entry-level employment in the millwright trade. Basic theory and related information along with hands-on shop practice will enable students to become competent in basic millwright duties.

Good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content

Use safe work practices
Process technical information
Solve mathematical problems
Physics
Identify common materials
Sketch and read drawings
Use basic measuring, layout and hand tools
Use fastenings and fittings
Use support machines
Shafts, hubs and keys
Bearings
Seals and packings
Lubrication
Power drives
Millwright shop equipment
Fitting and assembly
Riggings, ladders and scaffolds
Fluid power
Pneumatic systems
Material handling systems
Welding and cutting
Machinery installation and alignment
Machine shop equipment
Business organization and preparation for employment

Program Length

39 weeks full-time beginning January, April, July and September each year.

Normal Course Hours

0730-1400, Monday through Friday.

Tuition Fees (subject to change)

$1,223 for the 39-week program (1992/93).

Prerequisites

Grade 12 or pre-test.

Instructor

Ross Grigsby

MOTORCYCLE MECHANIC

Certificate Program

Motorcycle mechanics are involved with most aspects of motorcycle, ATV, and related equipment service and repair. They are required to perform operations such as new unit assembly and full service, top end and transmission/ crankshaft rebuilds, electrical component repair and chassis, wheel, suspension, final drive and accessory service.

Job Opportunities

Training prepares students for entry-level employment as motorcycle mechanics.

The industry demands qualified technicians due to the increasing sophistication of the equipment. Most positions for graduates are as mechanics in service departments at franchised motorcycle dealers. Graduate students have proven to be valued employees. Many progress to service management positions. Some are involved in their own service and repair businesses. Upon successful completion of the course, students should seek employment as an apprentice.

The Program

Basic theory and related information along with hands-on shop practice will enable students to work in the motorcycle service industry.

Applicants cannot be allergic to solvents. Good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content

Math and science
Process technical information
Basic measuring, hand, and power tools
Fasteners, fittings and materials
Oxyacetylene welding
Seal, gasket and bearing design and service
Two and four-cycle top end theory and design
Two and four-cycle top end service and rebuilding
Lubrication systems
Clutches, power transmissions, and crankshafts
Fuel delivery systems
Basic electricity and electrical systems
Ignition and charging systems
Brake systems
Final drives
Wheels and tires
Frames and suspensions
Perform selected service procedures
Prepare for employment

Program Length
34 weeks full-time beginning the first Monday of the month throughout the year, as required.

Normal Course Hours
0700-1400, Monday through Friday.

Tuition Fees (subject to change)
$1,098 for the 34-week program (1992/93).

Prerequisites
Grade 12 or pre-test.

Instructor
Tom Nelson, Dipl. Tech., T.Q.

PAINTING AND DECORATING
Certificate Program

Painters and decorators work in a wide range of specialties. Residential, commercial, industrial and production/ manufacturing facilities provide a variety of employment opportunities.

Job Opportunities
In some shops, painters will work on residential and commercial housing; other shops will have a factory environment where the painter must have good mechanical aptitude and be able to run expensive, very complicated machinery. Some industrial shops need painters who can be trained for large painting projects: pulp and paper mills, ships, bridges,tanks,etc. Cities and municipalities throughout B.C. and Canada employ painters.

Starting wages for first-year apprentices and production painters average $10-$12/hour. Once journeyed certification is achieved, you can expect to earn $40 thousand plus/ annum in this trade.

The Program
Training prepares students for entry-level employment in the Painting and Decorating trade. The program provides basic theory and related information together with a large amount of hands-on, practical experience. Upon successful completion of the program, students can work towards journeyed status in the trade by seeking employment as an apprentice or in another similar area.

Good physical condition is desirable. You cannot be allergic to paints and thinners. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (by telephone if out-of-town) with the Institute's Special Needs Counsellor. Tel. (604) 434-3304.

Program Content
Introduction to the trade
Safe work practices
Basic tools and equipment
Ladders and scaffolding
Basic paint technology
Color theory and color mixing
Surface preparation
Coating procedures and application
Paint failure
Spray finishing (conventional)
Spray finishing (airless)
Basic trade Math and estimating
Preparation for employment

Program Length
20 weeks full-time beginning in January.

Normal Course Hours
0730-1430, Monday through Friday.

Tuition Fees (subject to change)
$504 for the 20-week program (1992/93).

Prerequisites
Grade 10 or pre-test.

Instructor
David A. Lick

PLUMBING
Certificate Program

Plumbers work with domestic hot and cold water, drainage waste and vent systems, hot water heating systems, sewage disposal systems and septic tanks. Many plumbers hold gas tickets because of the widespread use of natural gas in B.C.

All plumbing work in Canada is closely regulated. Accordingly, plumbers must become familiar with the National Building Code, the B.C. Plumbing Code and Municipal by-laws and amendments.

Job Opportunities
With the steady improvement in the economy, the employment outlook for graduates in the piping trades has greatly improved.

The Program
Students are prepared for entry-level employment in the plumbing trade. Basic theory and related information along with hands-on shop practice enable students to become competent in basic plumbing tasks.Upon successful completion of the program, students should seek employment as an apprentice.

Plumbers must be able to work at heights and in enclosed spaces. Good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content

Use safe work practices
Solve related math problems
Solve related science problems
Use piping hand tools
Use specialized power tools
Use piping equipment
Use fasteners and fittings
Use measuring tools and hand tools
Describe the piping trades
Select common piping materials
Install valves, fittings, hangers, supports and sleeving
Rigging and scaffold
Use oxyacetylene equipment
Read and sketch basic drawings
Construct piping systems projects
Select common plumbing materials
Install and test low temperature hot water heating systems
Layout and design piping drawings
Maintain plumbing systems and components
Install and test a drainage, waste and venting system
Install and test a potable water supply system
Install standard plumbing fixtures
Prepare for employment

Program Length

28 weeks full-time beginning throughout the year, as required.

Normal Course Hours

0730-1415, Monday through Friday.

Tuition Fees (subject to change)

$990 for the 28-week program (1992/93).

Prerequisites

Grade 10 or pre-test.

Instructors

John Masse, Chief Instructor
David Bowles
James Endert
William Evans
Gary Norgard
Nick Potis
Bernie Koelzer
Dale Pfaff
Anne St. Eloi
Bill Bradbury
Tota Ram
Howard Rothenberg
Gary Clifford

POWER ENGINEERING: GENERAL PROGRAM

Certificate Program

This program provides sound practical and technical knowledge and skills to persons desiring to enter the power engineering field. After completing this program, graduates are prepared to write the B.C. Ministry of Municipal Affairs examination for an Interprovincial 4th Class Power Engineer's Certificate of Competency.

Job Opportunities

An analysis of five years of data shows that 70% of Power Engineering graduates were placed in a training related job within a few weeks of graduation. Average salaries reported by students were among the highest when compared to other occupational programs. Former graduates are presently employed by hospitals, chemical plants, oil refineries, breweries, pulp and paper plants, sawmills, schools and institutions.

Graduates of this program may be able to obtain employment as 4th Class Power Engineers in industry, and qualify for positions as operators and maintenance repairmen in oil refineries, chemical and refrigeration plants, and caretakers of large buildings with central heating and air conditioning systems.

The Program

The program is divided into two levels. Classroom activity consists of lectures, demonstrations, audiovisual presentations and exercises that provide practical working knowledge of power engineering. Power plant tours, extensive workshop and steam laboratory experience are provided to reinforce theoretical concepts, develop manual skills and familiarity with power engineering techniques.

Applicants should have a good command of oral and written English; sufficient physical strength and stamina to meet the demands of the work; good hearing, eyesight, normal color vision, manual dexterity, and hand/eye coordination. In addition, applicants should have good theoretical and practical mathematical and mechanical aptitude. Previous power generation experience and related training are assets. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content
Power plant training
Power plant drafting
General electricity
Power plant theory
Instrumentation
Power plant maintenance
General mathematics
Applied science and chemistry
Computer fundamentals

Program Length
40 weeks full-time beginning in August each year.

Normal Course Hours
0800-1515, Monday through Friday.

Tuition Fees (subject to change)
$1,080 for the 40-week program (1992/93).

Prerequisites
Grade 12 **or** pre-test.

POWER ENGINEERING: TECHNICAL PROGRAM
Certificate Program

This program provides sound practical and technical knowledge and skills to persons desiring to enter the power engineering field. In addition, the program includes courses which provide graduates with the necessary technical background in applied mathematics and science to be eligible to enter the Power and Process Engineering program.

After completing the program, graduates are prepared to write the B.C. Ministry of Municipal Affairs examination for an Inter-provincial 4th class Power Engineer's Certificate of Competency.

Job Opportunities
An analysis of five years of data shows that 70% of Power Engineering graduates were placed in a training related job, within a few weeks of graduation. Average salaries reported by students were among the highest when compared to other occupational programs. Former graduates are presently employed by hospitals, chemical plants, oil refineries, breweries, pulp and paper plants, sawmills, schools and institutions.

Graduates may then be able to obtain employment as 4th Class Power Engineers in industry and be qualified for positions as operators and maintenance repairmen in oil refineries, chemical and refrigeration plants, and caretakers of large buildings with central heating and air conditioning systems.

The Program
The program is divided into two levels. Classroom activity consists of lectures, demonstrations, audiovisual presentations and exercises that provide a practical working knowledge of power engineering. Power plant tours and extensive workshop and steam laboratory experience are provided to reinforce theoretical concepts, develop manual skills, and become familiar with power engineering techniques. Applicants should have a good command of oral and written English; sufficient physical strength and stamina to meet the demands of the work; good hearing, eyesight, normal color vision, manual dexterity, and hand/eye coordination. In addition, applicants should have good theoretical and practical mathematical and mechanical aptitude. Previous power generation experience and related training are assets. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content
Power plant training
Power plant operations and systems
Technical electricity
Power plant theory
Instrumentation
Power plant maintenance
Technical mathematics
Applied physics
Industrial electronics

Program Length
40 weeks full-time beginning in August each year.

Normal Course Hours
0800-1515, Monday through Friday.

Tuition Fees (subject to change)
$1,080 for the 40-week program (1992/93).

Prerequisites
Grade 12 including Math 12 or Survey Math 12 and Physics 11**or** pre-test.

POWER AND PROCESS ENGINEERING: 3RD CLASS

Certificate Program

This program provides sound practical and technical knowledge and skills to persons desiring advancement in the field of power engineering. After completing the program, graduates are prepared to write the B.C. Ministry of Municipal Affairs examination for an Interprovincial 3rd Class Power Engineer's Certificate of Competency.

Job Opportunities

An analysis of five years of data shows that 80% of Power Engineering graduates were placed in a training related job. usually within a few weeks of graduation. Average salaries reported by students were among the highest when compared to other occupational programs. Former graduates are presently employed by hospitals, chemical plants, oil refineries, breweries, pulp and paper plants, sawmills, thermal power stations, schools and institutions.

Graduates of this program may be able to obtain employment as 3rd Class Power Engineers and be qualified for positions of considerable responsibility in large industrial plants such as: pulp mills, saw mills, oil refineries, thermal power stations, refrigeration plants, breweries and hospitals.

The Program

The program is divided into two levels. Classroom activity consists of lectures, demonstrations, audiovisual presentations and exercises that provide practical working knowledge of power engineering. Plant tours, workshops, steam laboratory and troubleshooting exercises are provided to reinforce theoretical concepts, develop manual skills, and become familiar with additional power engineering techniques. Applicants should have a good command of oral and written English; sufficient physical strength and stamina to meet the demands of the work; good hearing, eyesight, normal color vision, manual dexterity, and hand/eye coordination. In addition, applicants should have good theoretical and practical mathematical and mechanical aptitude. Previous power generation experience and related training are assets. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content

Power plant theory
Technical communications
Thermal engineering
Technical electricity
Fluid mechanics
Metallurgy
Engineering mechanics
Plant management
Strength of materials
Distributed Control Systems
Power plant maintenance
Computer technology
H.V.A.C. Systems

Program Length

40 weeks full-time beginning in September each year.

Normal Course Hours

0800-1515, Monday through Friday.

Tuition Fees (subject to change)

$1,080 for the 40-week program (1992/93).

Prerequisites

a. A valid 4th Class Power Engineering certificate
and
b. Successful completion of the Power Engineering Technical program, **or** successful completion of the first year of an engineering-related, post-secondary program at a technical institute or engineering faculty of a university.
or
c. Applicants who do not possess the above qualifications may request individual assessment by the Power Engineering Department.

Instructors

A. Barnard
J. Brown, Chief Instructor
R. Carviel
H. Doad, Coordinator, Full-time Programs
P. George, Coordinator, Upgrading and Correspondence
F. Hajer
D. Hoffman
R. Johnstone
A. Lees
H. Rink
R. Smith
G. White

SECURITY ALARM INSTALLER

Certificate Program

The need for security in our society is increasing and the demand for qualified Security Alarm Installers is already at the critical stage. The Security Alarm Installer training program is the first full-time program of its kind in North America, and provides the training needed for graduates to excel in this growing industry.

Job Opportunities

Security is needed practically everywhere and at a growing rate - in large industrial plants, office buildings, large and small businesses, apartment buildings and private homes. You will be able to design, install and service alarm systems, central station monitoring equipment, access control systems and closed circuit television systems.

After you have completed the Security Alarm Installer program and have worked for 18 months with a licensed Security Alarm Company, you will be eligible to take the Security Alarm Installers' Tradesman Qualification Exam.

The Program

The program begins with an introduction to the principles of electricity and electronics, and progresses into building design, wiring methods, print interpretation and codes. Once the basics are covered, students progress to study advanced alarm systems and troubleshooting techniques. During this section of the program there are up to two weeks of job experience with a licensed security company. The final segment of the program involves design and communication techniques where students learn how to address clients' needs, handle central station documentation, and conduct surveys of premises.

Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content

Basic electricity/electronics
Use of electronic test equipment
Planning, installation and analysis of electrical/electronic circuitry
Installation, maintenance and repair of security alarm systems
Safe and effective work habits
Dealing effectively with the public

Program Length

20 weeks full-time beginning in March and September each year.

Normal Course Hours

0800-1500, Monday through Friday.

Tuition Fees (subject to change)

$540 for the 20-week program (1992/93).

Prerequisites

a. Grade 12 or equivalent. Preference will be given to applicants with Grade 12 graduation with a C or better in Math 11 **or** pre test **and**
b. Security clearance from the office of the B.C. Solicitor General will be required prior to final acceptance.

Instructors

M. Zecchel
M. Wanstall, P. Eng., Chief Instructor

SHEET METAL WORKING

Certificate Program

Sheet metal workers fabricate, assemble, alter and install a variety of sheet metal products. Typical jobs performed by a sheet metal worker include: air conditioning system ductwork, hospital and kitchen equipment (stainless steel), industrial exhaust systems, industrial sheet metal work, skylight work, roofing and flashing (copper, aluminum, stainless steel and galvanized iron).

Job Opportunities

Students are prepared for entry-level employment in the sheet metal industry. Upon successful completion of the program, students should seek employment as an apprentice.

With the continuing improvement in the construction industry in B.C., employment opportunities for sheet metal workers have greatly improved. Graduates are finding employment with both union and non-union employers. Apprenticeships are readily available. The bright employment picture in this trade is expected to continue for the next few years.

The Program

Basic theory and related information along with hands-on shop practice enable students to become competent in fabricating basic sheet metal products.

Sheet metal workers must be able to work at heights. Good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content
Use safe work practices
Solve mathematical problems
Sketch and read drawings
Process technical information
Use basic measurement and layout tools
Use power tools and shop equipment
Lift and support loads
Oxyacetylene cut and weld
Use fasteners and fittings
Use materials
Make seams and edges
Apply riveting techniques
Use sheet metal hand operated machines
Develop patterns using parallel line development
Develop patterns using radial line development
Develop patterns using triangulation development
Construct a number of metal projects involving all of the above
Prepare for employment

Program Length
20 weeks full-time beginning February and September each year.

Normal Course Hours
0730-1430, Monday through Friday.

Tuition Fees (subject to change)
$720 for the 20-week program (1992/93).

Prerequisites
Grade 10 or pre-test.

Instructors
Ted Kondo, T.Q., Sheet Metal I.D., Chief Instructor
Dave Stewart, T.Q., Sheet Metal I.D.
Gordon Torgerson, T.Q.

STEAMFITTING
Certificate Program

Steamfitters/pipefitters install, alter, maintain and repair piping systems which convey low and high pressure steam, hot water, air, fuel gases, fuel and finely divided solids. Steamfitters/pipefitters are employed in 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.

Job Opportunities
Training prepares students for entry-level employment as steamfitters/pipefitters. Upon successful completion of the program, students should seek employment as an apprentice. In this trade, opportunities are found in industrial plants, pulp and lumber mills, and commercial areas.

The Program
Basic theory and related information along with hands-on shop practice enable students to become competent in basic steamfitting/pipefitting tasks.

Steamfitters/pipefitters must be able to work at heights and in enclosed spaces. Good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content
Use safe work practices
Solve related math problems
Solve related science problems
Use piping hand tools
Use specialized power tools
Use piping equipment
Use fasteners and fittings
Use measuring tools and hand tools
Describe the piping trades
Select common piping materials
Install valves, fittings, hangers, supports and sleeving
Rigging and scaffolds
Use oxyacetylene equipment
Read and sketch basic drawings
Construct piping systems projects
Install a selected pump
Install and test low temperature hot water heating systems
Layout and design piping drawings
Install a basic steam heating system
Install manufacturing fittings
Fabricate fittings
Prepare for employment

Length of Program
30 weeks full-time. Program intake is continuous as required.

Normal Course Hours
0730-1415, Monday through Friday.

Tuition Fees (subject to change)
$990 for the 30-week program (1992/93).

Prerequisites
Grade 10 or pre-test.

Instructors
John Masse, Chief Instructor
Ron Marier
Nick Potis
Bernie Koelzer
Anne St. Eloi

STEEL FABRICATING
Certificate Program

Steel fabricators deal with the selection, layout, shearing, cutting (with a torch), punching, drilling, forming, fitting and welding of steel plates and structural steel shapes into products for the forest, mining, construction, transportation and agricultural industries. Typical projects that involve steel fabricators include: bridges, buildings, hoppers, conveyors, towers, cranes, heavy mining equipment, logging equipment, ship parts and equipment.

Job Opportunities
Training prepares students for entry-level employment as steel fabricators. Upon successful completion of the program, students should seek employment as an apprentice.

The Program
Basic theory and related information along with hands-on shop practice enable students to become competent in basic steel fabrication methods for products such as steel buildings, tanks, and equipment.

Good hand/eye coordination and good physical condition are desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content
Describe safe work practices
Solve mathematical problems
Sketch and read drawings
Erect ladders and scaffolds
Describe the properties of metals used in fabrication industry
Use common steel fabrication fasteners
Lift loads
Use steel fabrication hand tools
Use steel fabrication portable power tools
Clean and prepare metal surfaces
Read and interpret steel fabrication drawings
Describe patterns for shop fabrication
Make templates for shop construction
Use weld with oxyfuel equipment
Use arc welding equipment
Use steel fabrication shop equipment
Fabricate projects

Program Length of Program
23 weeks full-time beginning November each year.

Normal Course Hours
0700-1345, Monday through Friday.

Tuition Fees (subject to change)
$801 for the 23-week program (1992/93).

Prerequisites
Grade 10 or pre-test.

Instructors
Gary Blidook
Gil Cooper
Kevin Neustaedter
Terry Subtelny

TELECOMMUNICATIONS TECHNICIAN
Certificate Program

This program builds on the foundation of generic technical skills developed in the Electronics Technician Common Core Program.

Focusing on the installation, maintenance and repair of Telecommunications equipment, the student is prepared to work in a variety of roles in this field. The program emphasizes hands-on practical training on equipment typically encountered in industry.

Job Opportunities
Graduates are employed in all aspects of the telecommunications industry including telephone companies, telecommunications equipment manufacturers, utility companies, cable and satellite entertainment and communications companies, data communications companies, fiber-optic companies and government departments.

Program Content
Safety and shop skills
Telephone communications theory
Radio communications theory
Data communications theory
Installation techniques
Microwave techniques
Technical documents and written communication

Program Length
40 weeks full-time beginning September each year.

Normal Course Hours
0800-1500, Monday through Friday.

Tuition Fees (subject to change)
$1,080 for the 40-week program (1992/93).

Prerequisites
Successful completion of the Electronics Technician Common Core Program or equivalent. Math 11 with C; Math 12 preferred.

TOOL AND DIE TECHNICIAN
Cooperative Diploma Program

This technician program will provide you with tool-making skills.

A tool maker is required to operate all types of shop equipment such as lathes, grinders, milling machines and Computer Numerical Control machines. On completion, graduates will receive a technician diploma.

Job Opportunities
Graduates of the two-year Tool and Die Technician Program can look forward to an apprenticeship in machining, tool and die making or mold making, or a career in modern production processes: quality control, process planning, designing, estimating, or technical sales.

The Program
The student will require patience, deductive reasoning and above average academic and practical skills in the designing and building of tools, dies, molds and special machinery.

Program Content
Tool and die machining
Mathematics
Metallurgy
Mechanics
Tool design
Blueprint reading and drafting
Manufacturing processes
Materials and processes
Computer Numerical Control (CNC)
Electrical discharge machining
Technical communication
Industry work terms

Program Length
100 weeks full-time beginning in January each year (3 academic levels with 3 coop work sessions).
Level 1 - 40 weeks
Level 2 - 40 weeks
Level 3 - 20 weeks

Course Hours
0700-1400, Monday through Friday.

Tuition Fees (subject to change)
$2,180 for the 100-week program (1992/93).

Prerequisites
a. Grade 12 graduation with mechanical electives ;
b. Pre-test;
c. Individual assessment by the department.

Cooperative Programs
Cooperative programs integrate paid work experience with training at BCIT. The work experience relates to your training program. In addition to helping you to finance your education, coop programs allow you to explore your career in a structured and purposeful manner; to test your skills; to adjust to the working environment, and to acquire relevant work experience as well as first class training. For more information contact Coop Education at 432-8753.

Instructors
George Ainslie, I.D./Machinist, I.P., Tool & Die T.Q.
Tony Hurley, I.D., Machinist T.Q., Instrument Maker

WELDING

Provincial Welder Certificate Program

The Programs

The three welding programs, (Levels C, B and A) provide the training required for Provincial Welder certification.

Each of these qualification levels is followed by a job experience requirement to be completed before certification can be awarded through the **Employment Training Branch of the B.C. Ministry of Advanced Education, Training and Technology.**

Welding programs are available on three shifts.

1st shift: 0700-1330
2nd shift: 1300-1930
3rd shift: 1530-2200

Job Opportunities

Nearly every industry employs welders. Most of our graduates find work in such diverse work places as metal fabricating shops, general repair shops, new construction sites, mining, logging, ship building, and oilfield camps.

LEVEL C PROGRAM

This program is designed to develop the fundamental skills and knowledge required for initial employment in the welding industry.

P Practical Module
RK Related Knowledge Module

Level C Modules/Courses

P1 Safe work practices
P2 Oxyfuel gas cutting
P3 Gas welding and braze welding
P4 Shielded metal arc welding 1 (SMAW 1)
P5 Carbon arc gouging (AAC)
P6 Gas metal arc welding (GMAW 1)
Flux core arc welding (FCAW 1)
RK1 Material handling
RK2 Blueprint reading 1
RK3 Welding metallurgy 1
Math Supplement

Program Length

30 weeks full-time beginning September and November each year.

Normal Course Hours

0700-1330 or 1300 - 1930, Monday through Friday.

Tuition Fees (subject to change)

$810 for the 30-week program (1992/93).

Prerequisites

Completion of Grade 10 recommended but an appropriate combination of work experience and education will be considered.

LEVEL B PROGRAM

This program develops more advanced welding skills and related theory than were taught in the Level C program: pipe welding, gas tungsten arc welding, etc., providing graduates with a broader base of skills and resulting employment opportunities.

Level B Modules/Courses

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 (GTAW 1)
RK4 Welding quality control and inspection procedures
RK5 Welding code standards and specifications
RK6 Blueprint reading 2
RK7 Welding metallurgy 2

Program Length

Up to 16 weeks depending on modules required.

Prerequisites

Completion of the BCIT Level C program or other training equivalent to the Level C Institutional/College training component of the Provincial Registered Welder Program.

LEVEL A PROGRAM

This program develops more advanced welding skills and related theory than were taught in the level C and B programs: pipe welding with stainless steel electrodes, low alloy steel electrodes, more advanced blueprint reading and welding metallurgy, etc. Completion of this program along with the required work experience modules should provide the graduate with the broadest base of skills and employment opportunities in the diverse metal joining industries.

Level A Modules/Courses

P11 Shielded metal arc welding 3 (SMAW 3)
P12 Gas tungsten arc welding 2 (GTAW 2)
RK8 Metallurgy 3
RK9 Blueprint reading 3

Program Length

Approximately 8 weeks depending on number of modules required.

Prerequisites

Completion of the BCIT Level B program or other training equivalent to the level B Institutional/College Training component of the Provincial Registered Welder Program. (Completion of the Level B job experience is desirable but is not mandatory as an entrance requirement).

Note: Completion of the Gas Tungsten Arc Welding 1 course in Level B program or its equivalent is a prerequisite to Gas Tungsten Arc Welding 2 course.

Short-term Part Programs and Upgrading Options (or C, B, A Options)

This program of training and testing options will advance welders who possess basic welding skills and who now want to achieve a higher level of competency and specialization in order to meet most of the certification requirements of industry and the welding code governing agencies.

Content

Level C, B and A performance challenge tests**
Canadian Welding Bureau (CWB) procedural tests*
A.S.M.E. - M.A.E.T.T. pre-qualified welding procedure tests*
Company and/or manufacturers' performance tests*
Welding process upgrading
General brush-up of skills
Any individual module* from Levels C, B, or A
(see the modules listed under the Level C,B and A Programs) of the B.C. registered welder training programs.

* A letter of approval for welding test may be required for company/union welding tests

**A letter of approval is also required from the Apprenticeship Training Branch for level C, B and A challenge performance tests.

Part Programs vary according to individual requirements and upgrade option goals.

Part Program/Short-term Welding Upgrade (or C, B, A Options)

This program is offered on a continuous intake basis **where spaces will be filled as they become available.** Applicants must be welders currently or recently employed in the field of welding.

Welding Applied Processes

Training in the following processes is available by request. All enquiries should be directed to the Welding Department office for course costs and dates.

Submerged arc welding
Automated welding systems
GTAW of titanium alloys
Downhill pipeline

Part-time Courses

A number of introductory courses in welding are available through the Part-time Studies Department. Credit transfer from these courses can be arranged when enrolling in Welding Upgrade Options.

Instructors

Larry Cox, Chief Instructor
C. Bishop
Don Becker
Brian Finnie
C. Grass
Ray Holroyd
Elif Iverson
George Jones
Don McRae
Kerry Nielson
Al Pasichnyk
Eric Sukkel
Eric Waterfield
Al Wood

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