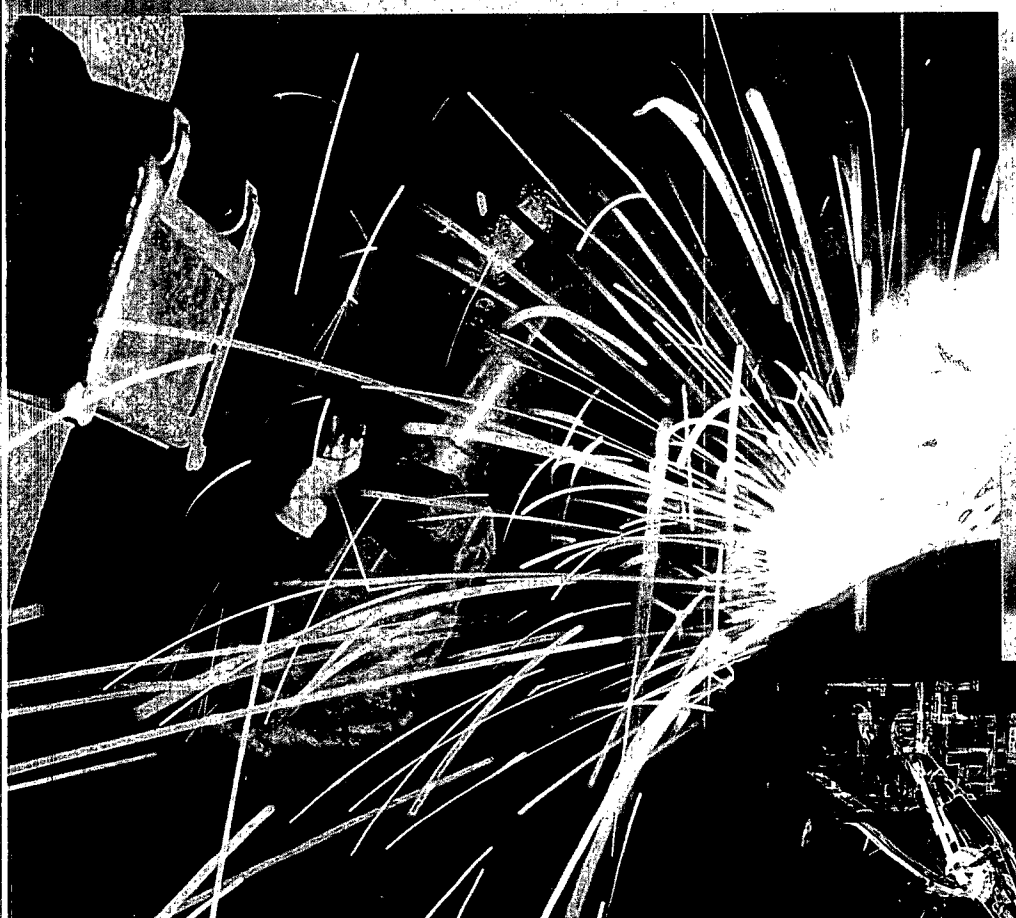
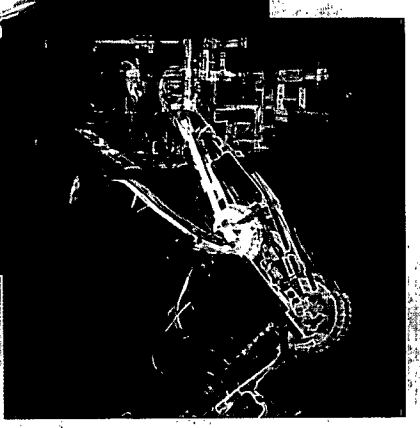
BCIT

FULL-TIME
TECHNOLOGY
& TRADE
PROGRAMS

CATALOGUE





BRITISH
COLUMBIA
INSTITUTE OF
TECHNOLOGY

1989-90

DATE DUE

OCT 16 1989	1340	
[illegible]		
OCT 18 1989	2230	
OCT 18 1989		
NOV 02 1989	11:54	
NOV 02 1989	9:03	
NOV 17 1989	1:45	
MAR 04 1990	4:30	
MAR 04 1990	2:35	
MAR 25 1990	15:57	
MAR 25 1990	1400	
APR - 1 1990	1630	
APR 01 1990	16:30	
APR - 9 1990	1538	

The New BCIT Mandate

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:

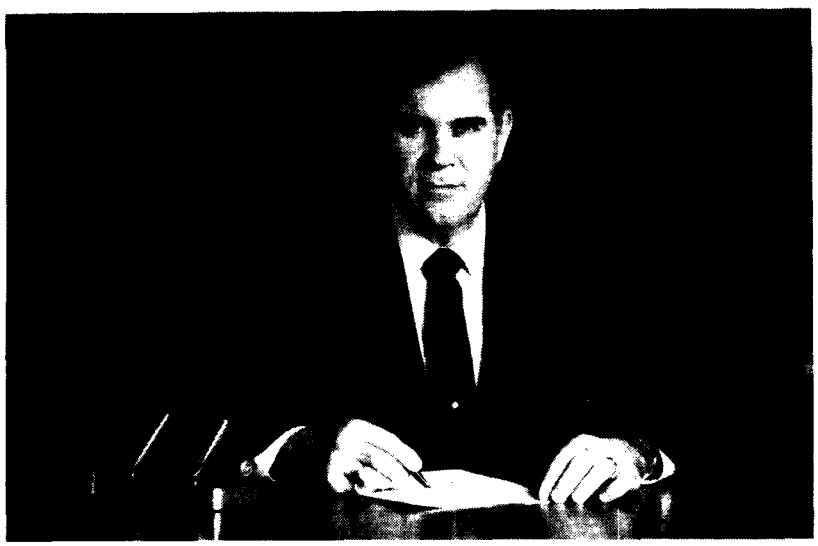
- establish **expertise** in specific **technological** areas and develop **applications** for British Columbia **business** and **industry;**

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

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

Sept. 1988

President's Message



Dear Students

I would like to take this opportunity to welcome you to BCIT. I am confident you will find your studies challenging, and the curriculum current and relevant to the field you have chosen.

These are exciting and challenging times for the Institute. As recently announced by the Government, BCIT is to become the centre for advanced technology training for the Province of British Columbia. This new mandate will provide an opportunity to do some creative and innovative programming in the high tech field – a challenge we look forward to eagerly.

We have a dedicated group of instructors, support staff and management who will do their utmost to ensure that the education you receive at the Institute will fully prepare you for advancement in your career.

You will find the Student Association active, energetic and dedicated to making your time at the Institute as enjoyable as possible.

I hope to have the opportunity of meeting you during your time with us and wish you every success in your studies.

Sincerely,

Roy V. Murray

Roy V. Murray, P.Eng.
President

BCIT

Published by:	The Office of the Registrar Mario Mazziotti, Registrar
Editor:	Mary Bacon, B.A.
Typesetting:	Laser's Edge Ltd.
Graphics:	BCIT Print Services
Printer:	College Printers

Changes in Curricula and Regulations

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 either the programs of study or the regulations. The Institute reserves the right to cancel any program.

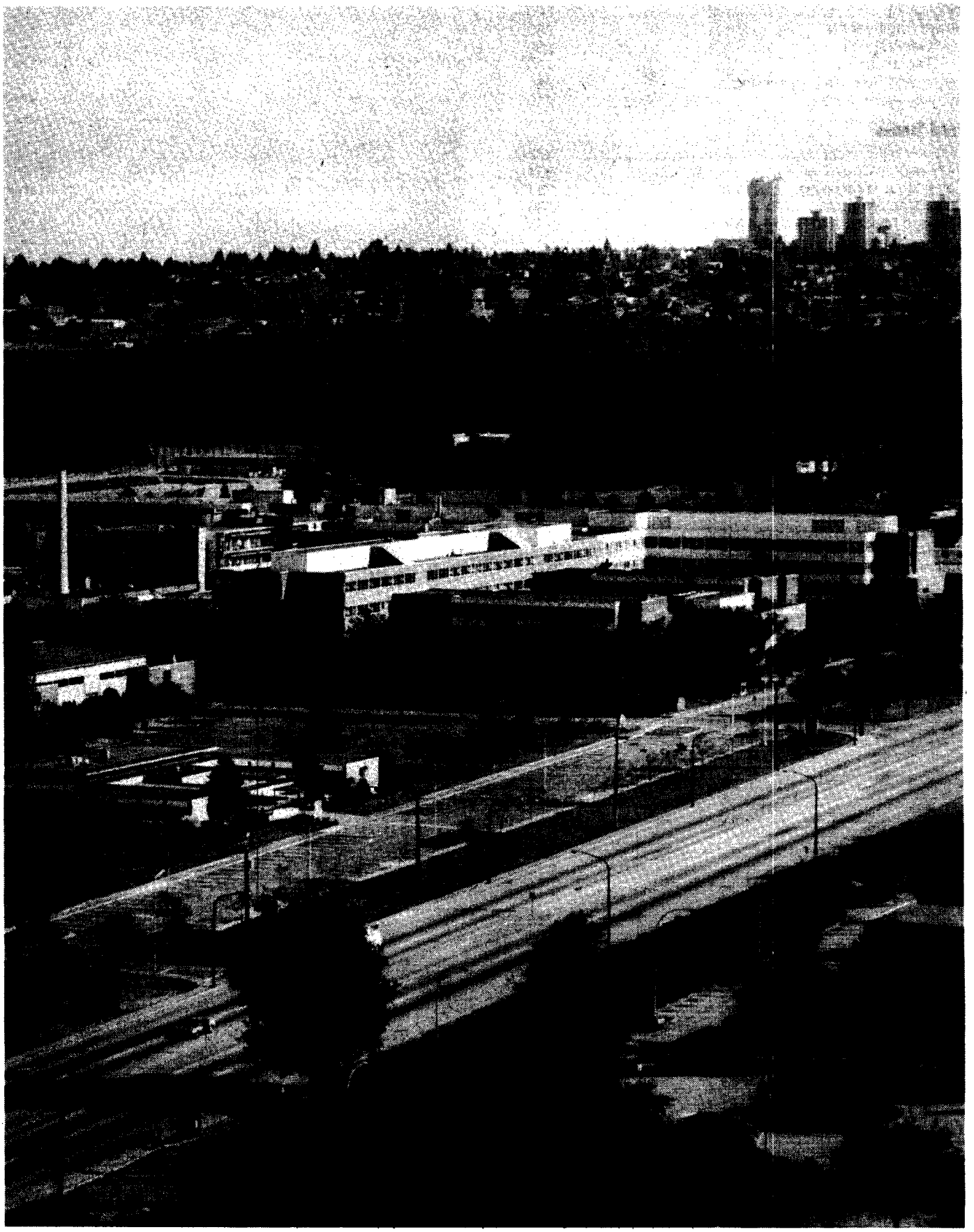
Table of Contents

Food Trades

Mechanical Industries Training

Process Trades

Renewable Resources Trades



General Information

Campus Locations

1. Burnaby, Main Campus – Full-time and part-time technology and trades courses and programs

   3700 Willingdon Avenue
   Burnaby, B.C.
   V5G 3H2
   434-5734 (Campus switchboard)

   Important telephone numbers:

Program Advising	434-3304
Counselling	434-3304
Financial Aid and Awards	432-8555
Admissions – Full-time Programs	432-8419
Registration – Part-time	434-1610
Student Records	432-8478

   Office hours for most departments are 0830 to 1630, Monday to Friday. Admissions office hours for enquiries regarding applications are 0830 to 1300 Monday to Friday; after 1300, enquiries should be directed to the Registration Office.

   Office hours for registration and general enquiries – From mid August to early December and early January to late April:

   0830-2030 Monday-Thursday
   0830-1630 Friday
   0830-1230 Saturday (except holiday weekends)

2. Downtown Education Centre (DEC) – Part-time studies technology courses only

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

   Office Hours – when school is in session:

   0830-1830 Monday-Thursday
   0830-1630 Friday
   Otherwise 0830-1730 Monday-Friday

3. Surrey – Part-time studies technology courses only

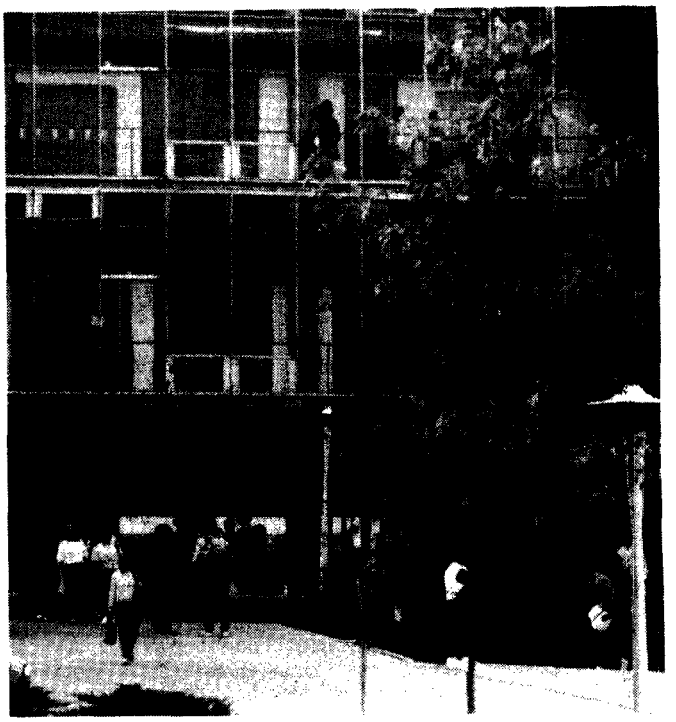
   Princess Margaret Senior Secondary School
   12870 72nd Avenue
   Surrey, B.C.
   V3W 2N1

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

4. Coquitlam: Part-time studies technology courses only.

   Coquitlam College
   1100 Winslow
   Coquitlam, B.C.
   V3J 2G3

   NOTE: While the Burnaby campus and DEC offer year-round registration service for part-time studies courses, the Coquitlam location has NO registration services. Please see our advertising supplements for registration and course details for this location.



5. Sea Island – Aviation courses and programs only

   Vancouver International Airport (South)

   5301 Airport Road, South
   Richmond, B.C.
   V7B 1B5
   278-4831

Personal Data

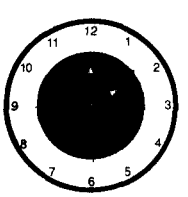
It is the student's responsibility to ensure all personal data on file with the Registrar's Office is accurate.

Refund Deadline

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

BCIT uses 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 – 6:00	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	



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). BCIT's Medical Services Department will develop a clear set of guidelines for assisting its staff and students to understand and deal with the appropriate handling of bodily fluids. BCIT will not insist on mandatory blood testing for the AIDS antibody. 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."

"If an employee's or student's health status deteriorates because of AIDS and if his/her condition indicates alternative or special arrangements, the individual will be treated in the same manner and with the same confidentiality as any other person with a serious illness."

Clean Air Policy

It is the policy of the British Columbia Institute of Technology that a smoke free environment be provided for employees, students and visitors. Smoking is, therefore, restricted to specially designated areas throughout the Institute.

Conduct and Attendance

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

1. Students are expected to conduct themselves in exemplary fashion at all times and pay diligent attention to their studies. If the School Dean or the Registrar believes a student's conduct is such that it is detrimental to the interests of the Institute, a recommendation may be made to the President to exclude the student from further attendance. The President has the final power to suspend or expel a student for disciplinary reasons, subject to the student's right to appeal this decision to a committee designated by the Board of Governors. A student who has been expelled or suspended for misconduct will not be admitted to the Institute grounds or buildings.
2. Acts of cheating, plagiarism and dishonesty will not be tolerated by this Institute, and the degree of punitive action may range from a written warning, to a 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, the student may be required to wear a uniform or otherwise dress himself/herself in the appropriate manner acceptable to the affiliating agency.

   Based on experience to date, BCIT faculty believe that there is a positive relationship between general dress standards and employment of graduates. Faculty are prepared to advise students in the area of acceptable attire.
8. Regular attendance in lectures, seminars and laboratory periods is required of all students. If a student is absent for any cause other than illness for more than 10% of the time prescribed for any subject, he/she may be prohibited from completing the course. In case of illness or other unavoidable cause of absence, the student should communicate immediately with his/her department head, stating the cause of absence. Special regulations governing attendance in clinical experience areas are prescribed by the School of Health Sciences.

   Due to the nature of Trades Training, regular attendance is critical for successful completion. Students failing to report absences to their departments, for five or more days, may be prohibited from completing the program.
9. 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 discover or change any users' charges.
   c. 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.
   d. Do not knowingly consume excessive resources.
   e. 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.
   f. 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

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

Vice-Chairman: Wynne Powell, Dipl.T. (Hons), C.G.A.
Vice President,
Marketing & Retail Technical Group
London Drugs Limited
Richmond

Jake Abrahams
Clearbrook Realty
Clearbrook

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

J.G. Colbert, B.A., M.D., F.R.C.S.(C)
Trail

Tyrone G. Colgur, B.Comm., LL.B.
Hislop & Co.
Barristers & Solicitors
Cranbrook

Rick Frey
United Fishermen & Allied Workers' Union
Campbell River

Kenneth Frederick Harding
Whillis-Harding Insurance Agencies Ltd.
Westbank

Patrick Lett, C.A.
Lett Tricky & Co. Chartered Accountants
Vernon

W. Cameron McKenzie, B.A.Sc., P.Eng.
West Vancouver

Oona M. McKinstry
North Vancouver

J. Basil Peters, Dipl.T., B.A.Sc., Ph.D., P.Eng.
Chairman and C.E.O.
Nexus Engineering Corp.
Burnaby

Frederick George Randall
Business Manager
International Union of Operating Engineers
Local 115
Burnaby

M. Bernadet Ratsoy, B.Sc.N., M.Sc., R.N.
Vice President, Nursing
St. Paul's Hospital
Vancouver

Hilda Rizun
Smythe, Ratcliff & Associates
Chartered Accountants
Squamish

Thomas A Simons, P.Eng.
President
H.A. Simons Ltd.
Consulting Engineers
Vancouver

Fleming Sondergaard
General Manager
Collins Manufacturing
Langley

Secretary
to the Board: Patricia Maertz

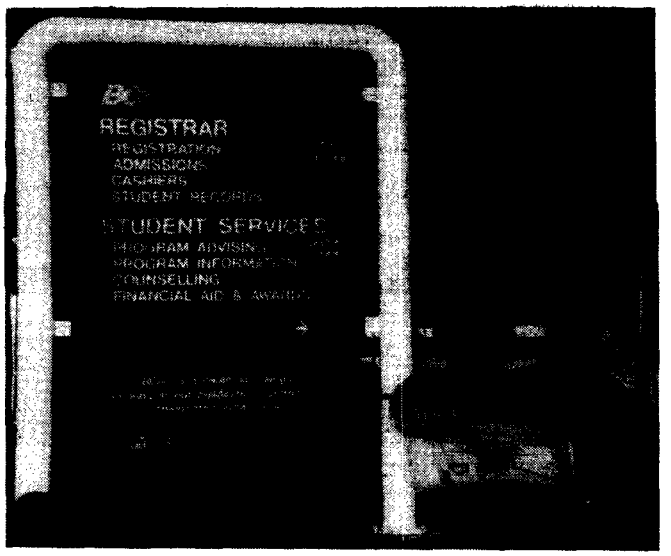
Academic and Administrative Personnel

R.V. Murray, P.Eng., President
B. Gillespie, Ed.D., Vice President, Education
C.E. McKinley, C.A., Vice President, Finance
P. Pick, B.A., M.L.S., Acting Vice President, Student Services and Educational Support
D.J. Svetic, P.Eng., Executive Director, Academic Projects
H. Arthur, B.A.(Hons.), M.A., Executive Director, International Education
G.S. Eisler, M.A.Sc., P.Eng., M.B.A., Dean, School of Health Sciences
L.T. McNeely, M.B.A., Acting Dean, School of Trades Training
D. Chowdhury, M.B.A., Ph.D., Acting Dean, School of Engineering Technology
L. Fingarson, BCOMM, Acting Dean, School of Business
B. Copping, M.D., B.Sc., M.Sc., Director, Medical Services
V. Karpinsky, B.A.(Hons.), Director, Student Services
M. Mazziotti, Dipl.T., Registrar
Robert A Roy, B.A., M.A., B.L.S., Acting Institute Librarian

Office of the Registrar

Registrar's Office

This office is the administration centre for all the related activities of the Registrar's office. It directs its efforts towards coordinating the major functions of Registration, Admissions processing, and Records keeping. The personnel in this office are part of a major link in the policy setting and implementation process of the Institute between the Administration, the Deans and the students, particularly as they relate to the students' progress through the Institute, from initial application to the final graduating ceremonies. Students may also utilize this office in the case of an appeal or re-assessment of the marks process.



Registration

This area is the Institute's first public contact and maintains a high profile for the Institute. This office handles all general information enquiries and receives applications for Trades/Technology programs. Part-time students also register here: over the phone, in person and through the mail. Other activities include processing incoming mail and mailing out information. Office hours are from 0830 to 2030 Monday through Thursday, 0830 to 1630 on Friday, and from 0830 to 1230 on Saturday (except on long weekends).

Admissions

This department processes and/or determines eligibility for applicants to full-time Trades and Technologies, part-time Electronics Technology and first time applicants to part-time day Technology programs as well as handling enquiries about applications. Office hours for application enquiries are 0830 to 1300, Monday to Friday. From 1300 on, enquiries should be directed to the Registration Office.

Student Records

Student Records information for part-time and full-time studies can be obtained here. Student services are available as follows: transcripts, verification of attendance, tax deduction forms (T2202A), applications for graduation, course credit/exemption, applications for course-by-course registration, and applications for program approval/certificate.

Office hours are 0830 to 1630 Monday to Friday.
Tel: 432-8478

Timetabling

The Timetabling Department produces the Institute's master timetables, including those for full-time technology programs, part-time trades and technology programs and full-time technology examinations. It handles day to day room bookings for meetings and other events.

Staff

Mario Mazziotti, Dipl.T., Registrar
Sam DiGiando, B.A., Associate Registrar
Michelle Philippe, B.Sc., Dipl.T., Systems Assistant

Registration

Kelly Durkin, Supervisor
General enquiries: 434-1610

Admissions

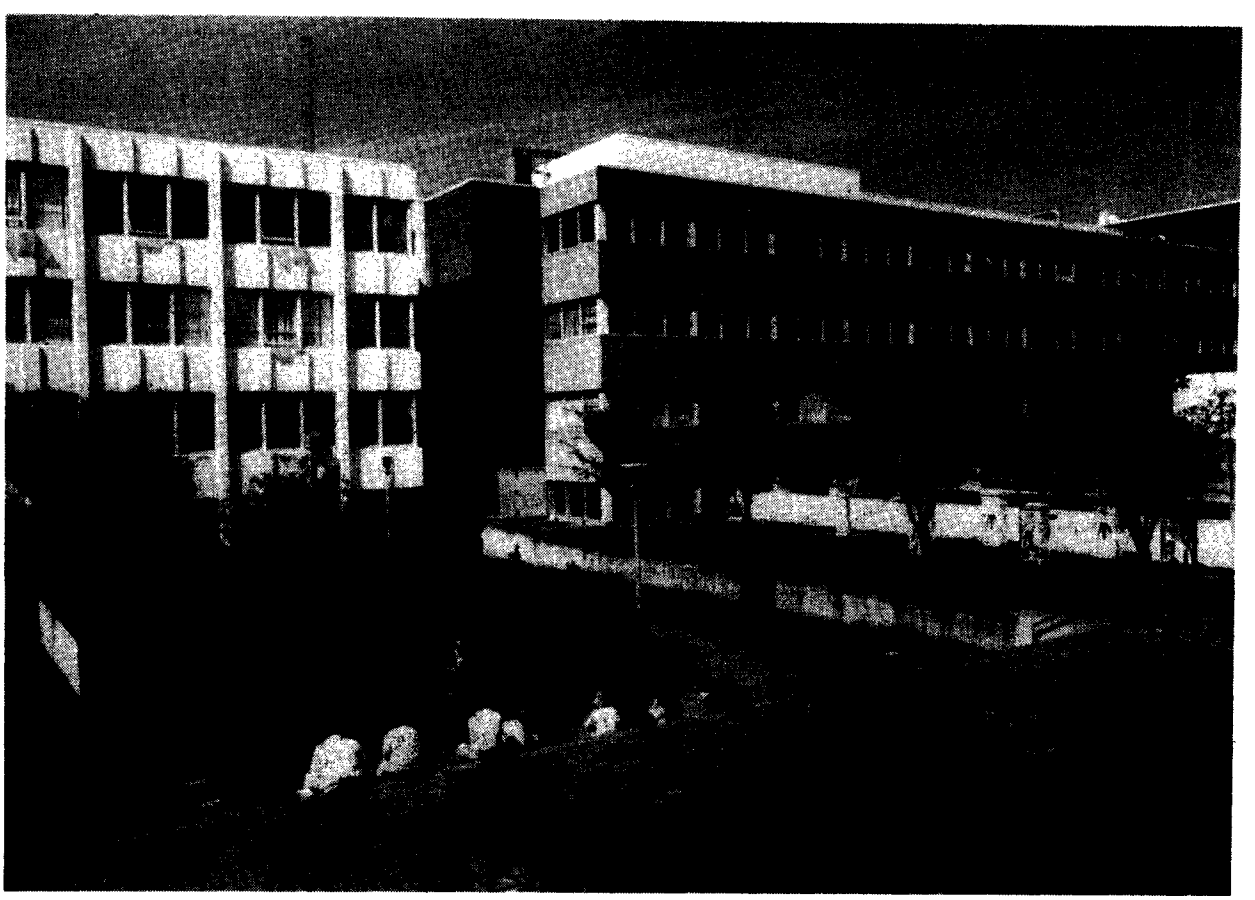
Brenda Walton, Supervisor
Application enquiries: 432-8419

Student Records

Jeri Fostvelt, Supervisor
General enquiries: 432-8478

Timetabling

George Brown, Supervisor
General enquiries: 434-5734 (5386)

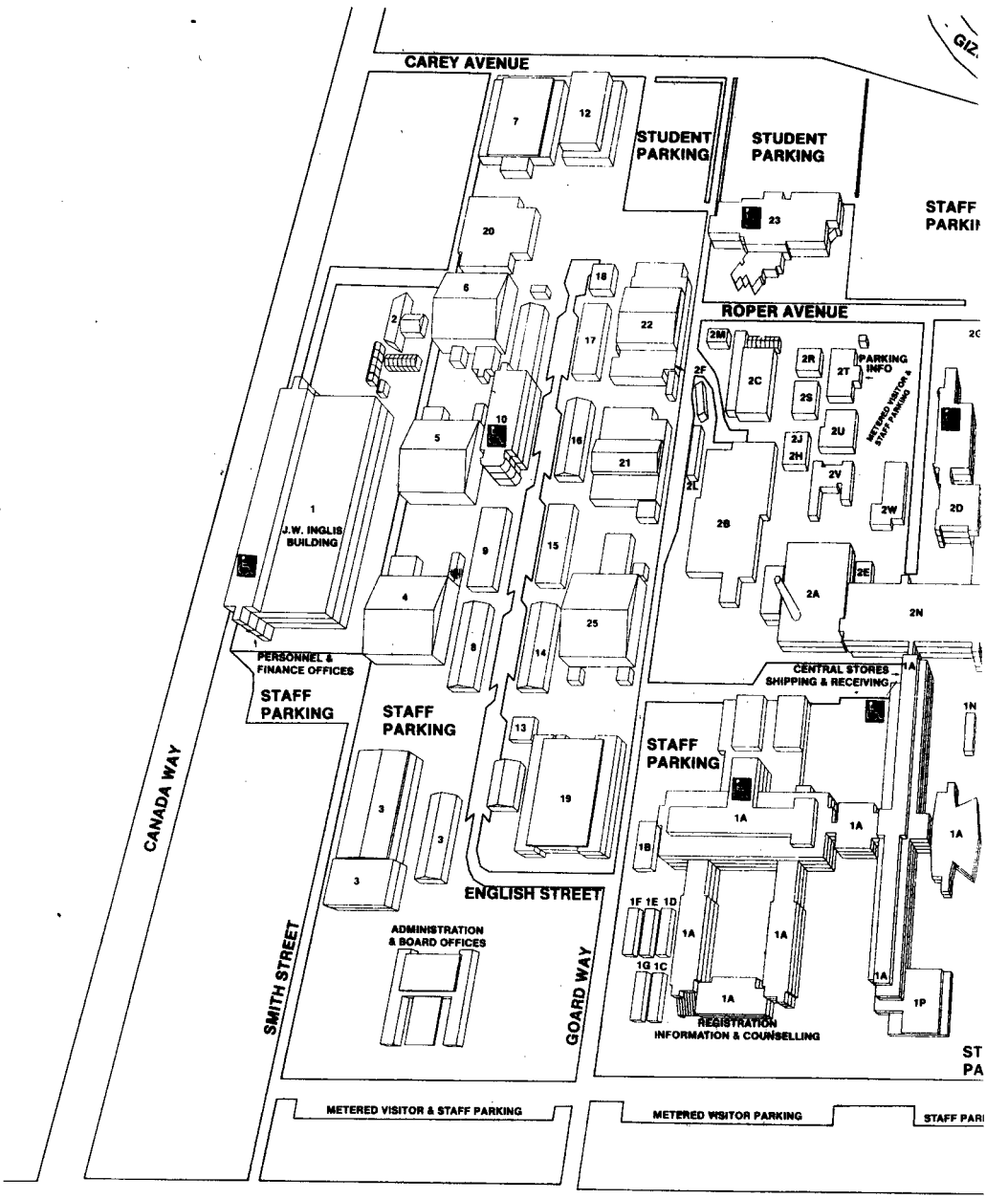


Campus Map

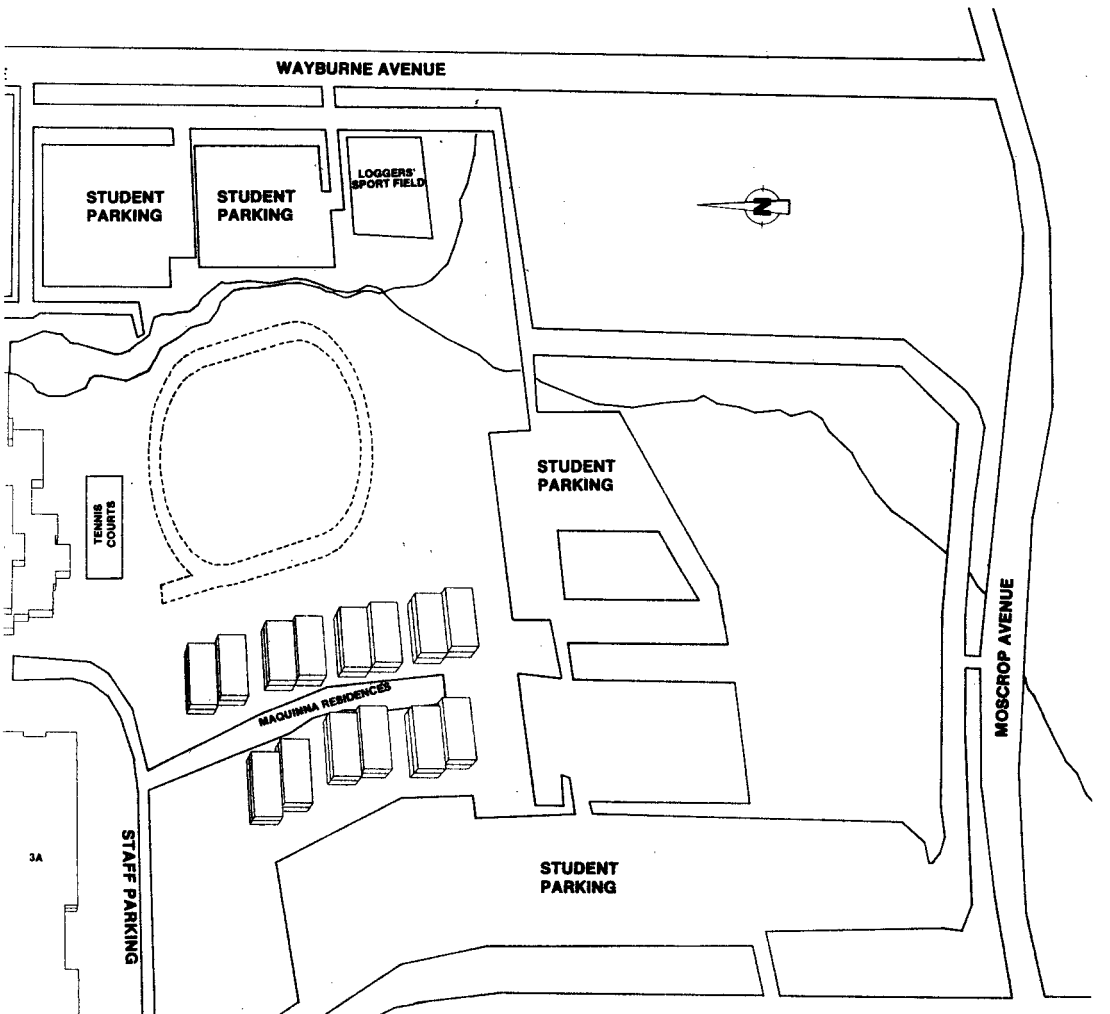
BRITISH COLUMBIA
INSTITUTE OF TECHNOLOGY
3700 Willingdon Avenue
Burnaby
British Columbia
Canada
V5G 3H2

Campus directory assistance: (604) 434-5734
Student services: (604) 434-3304
Full-time admission: (604) 432-8419
Student records: (604) 432-8478
Part-time registration: (604) 434-1610

Map produced by CAD/CAM department using the Institute's Intergraph System. A perspective with hidden lines removed was generated from a 3 dimensional surface model of the campus.



Administration/Board Offices
Administrative Systems Tech., 1A
Admissions, 1A
Alumni Association, 1D
Appliance Repair, 1
Applied Technology Centre, 10
Audiovisual, 1
Automotive, 21
Aviation, Sea Island
Bakery, 2B
Barber/Hairstylist, 1
Benchwork/Joinery, 4
Biomedical Engineering, 2N
Biotechnology, 1A
Boilermaking, 12
Bookstore, 2D
Broadcast Centre, 2D
Building Tech., 1
Business Part-time Studies, 2J, 2R
Business, School of, 2N
CAD/CAM, 1P
Cafeterias, 1, 1A, 2B, 23, 2N, 4A
Campus Cafe, 2N
Canada Employment Centre, 1A
Carpentry, 5
Central Stores, 2N
Chemical Sciences, 1A
Chemistry, 1A
Civil & Structural, 1A
Classrooms, 1, 1A, 2N, 3A, 2S, 2U, 2W
CNC, 19
Communication Dept., 1A
Computer Resources, 2N
Computer Systems, 2N
Construction Trades, 1
Counselling, 1A
Co-op Education, Admin. Bldg.
Cytogenetics Lab Tech., 1A
Diagnostic Medical Sonography, 1A
Drafting, 1
Electrical Training Centre, 23
Electronics Tech., 1A
Electrophysiology, 2N
Employment Action Centre, 1
Engineering Tech., School of (F/T), 1A
Engineering Part-time, 1B
Environmental Health, 1A
Financial Aid, 1A
Financial Management Technologies, 2N
Financial Services, 1
First Aid, 22
Fish & Wildlife, 1A
Food Processing Tech., 1A
Forestry, 1A
Food Trades, 2B
Food Training Centre, 2B
Forster's Cafeterias, 1, 23
Greenhouse, 2, 2C
Gymnasium, 4A
Health Informati
Health Sciences
Health Sciences
Health Technolo
Heavy Duty Mec
Horticulture, 2
Hospitality Admi
Housing Office,
Industrial Educa
Industrial Mainte
Information, 1A



Wheelchair Accessibility

), 1A
M, 1N

, 1
lences
lucation, 3A
ic, 19

Inglis Building, 1
International Education, 1A
Ironworking, 12
Landscape Horticulture, 1A, 2C
Learning Resources, 8
Library, 2D
Machine Shop, 19
Marketing Management Tech., 2
Math Dept., 1E, 1F
Mechanical Tech., 2A
Medical Imaging Tech., 1A
Medical Laboratory Tech., 1A
Medical Radiography, 1A
Medical Services, 4A
Microelectronics, 1P
Millwright, 1
Mining Tech., 1A
MOTH Transystems, 13
Natural Resources Mgmt., 1A
Nuclear Medicine, 2N
Nursing, 1K, 2N
Occupational Health & Safety, 1A

Painting & Decorating, 3
Parking Office, 2T
Personnel, 1
Petroluem Tech., 1A
Plumbing & Pipefitting, 6
Physics , 1A
Plastics, 3A
Power Engineering, 23
Process Technologies, 1A
Program Advising, 1A
Prosthetics and Orthotics, 1A
Pulp and Paper, 1A
QA and NDT, 1A
Racquetball, 4A
Recreational Services, 4A
Registration, 1A
Renewable Resources Technology, 1A
Retail Meat Outlet, 2B
Robotics, 1P
SAC (Student Activity Centre), 4A
Security, 2T
Security Alarm Installer, 23

Sheet Metal Working, 1
Squash, 4A
Steamfitting, 6
Steel Fabrication, 12
Student Association, 4A
Student Records, 1A
Student Services, 1A
Surveying and Mapping, 1A
Timetabling, 2V
TNT (This'n That Stores) 1, 1A, 2N
Tool and Die, 19
Tourism Technology, 2V
Trades Training, School of, 1
Upholstery, 1
Welding, 20
Wood Products Manufacturing, 1A

Admissions

Diploma Programs

Full-Time Technology Admissions Information

Burnaby is our main campus and primary location for processing applications and maintaining permanent student records. However, registration is possible at various campus sites including the Downtown Education Centre (549 Howe Street, Vancouver) and Surrey (Princess Margaret Senior Secondary School) for courses taking place at these sites.

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

Admissions Policy

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

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

All applicants must provide official documentary proof that they meet the necessary Institute and program prerequisites. Applicants lacking specific prerequisite courses or adequate grades will be referred for upgrading. Please note, candidates applying to BCIT are required to submit all documentation with English translations.

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

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

Policy Subject to Change

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

Academic Requirements for Admission

English 12 is required for general admission to the Institute as well as graduation from a senior secondary school with satisfactory grades as prescribed by the British Columbia Ministry of Education. Candidates must also meet special program prerequisites. See **Program Prerequisites** (page 17) and individual program sections.

English Language Proficiency

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

1. by scoring a minimum of 145 on the Vancouver Community College English Language Assessment Test; or
2. by scoring a minimum of 550 on the TOEFL; or
3. by successful completion of an Academic English 12 course or its approved equivalent; or
4. by successful completion of Communication 004 at BCIT; or
5. by individual assessment by the BCIT Communication Department (only when none of the above options are available to the applicant.)

To obtain an information bulletin which outlines world-wide test locations and application procedures, applicants should contact: Test of English as a Foreign Language, CN6151, Princeton, New Jersey, 08541-6151, U.S.A.

English 12 is required for general admission to the Institute. However, for those B.C. applicants who wish to complete the high school Communications program to meet BCIT's English requirement, the following combinations are acceptable for September 1989 admission only:

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

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

English 12 Minimum Essentials is not acceptable as a substitute for English 12.

Mature Students

A person not eligible for admission under any other category may apply as a mature student with the following provisions:

1. Must be 19 years of age or older at time of application;
2. Must meet the institute general admission requirement of English 12;
3. Admission under this category is at the discretion of the Registrar on the recommendation of individual Technology Associate Deans. The Associate Dean must be satisfied that the applicant has sufficiently clear objectives, and can provide evidence of probable success in the program of his/her choice. The Associate Dean may, at his/her discretion, require applicants to have an interview or take appropriate tests. Along with their application, applicants must submit a statement of intent outlining their reasons for applying. Enquiries regarding admission under this category should be directed to individual Associate Deans by the Registrar.
4. Mature students must submit all supporting official documents with their applications.

Second Year Regional College Transfer

BCIT offers program transfers for various technology programs from recognized regional colleges within British Columbia. Further information may be obtained from the Office of the Registrar.

Direct Entry

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

Readmission

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

Part-time Day 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, and 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 Office of the Registrar. All 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.

Technology Prerequisites

School of Business

Administrative Management: Algebra 11 and English 12 both with C+.

Broadcast Communications

Radio: Grade 12 Graduation from senior secondary school.

Television: All applicants must be able to type 25 wpm, and submit a short essay of approximately

Journalism: 500 words, detailing reasons for choosing their Broadcast Communications Option as a career.

Business Administration: A one year post-diploma program. Diploma of Technology in Health or Engineering, or equivalent.

Financial Management: Algebra 11 and English 12 both with C+.

Hospitality Administration: English 12 and Algebra 11 both with C+. Preference given to applicants with minimum 1,000 hours experience. Resumé required.

Human Resource Systems: Algebra 11 and English 12 both with C+.

International Trade: Algebra 11 with C+.

Marketing and Tourism Management: Algebra 11 and English 12 both with C+. Grade 11 and 12 Science courses are beneficial.

Operations Management: Algebra 11 with C+. Physics 11 is desirable.

Transportation/Distribution: Algebra 11 with C+. Physics 11 is desirable.

Note: Please refer to page 16, if you wish to be considered under the Mature Student category.

See program description pages for other program prerequisites.

School of Engineering Technology

Biological Sciences: Algebra 12 and Chemistry 11.

Building: English 12, Algebra 12 and Physics 11 with C.

CAD/CAM: Algebra 12, Physics 11 for first year applicants. Second year, direct entry applicants Dipl. Tech., departmental approval and CDCM 2201 (or equivalent).

Chemical Sciences: Algebra 12 and Chemistry 11 (Physics 11 recommended).

Civil and Structural: Algebra 12 and Physics 11.

Computer Aided Engineering
Spatial Information Systems: Diploma of Technology or equivalent.

Advanced Manufacturing: Diploma of Technology or equivalent.

Resource Processing: Diploma of Technology or equivalent.

CAD Programming: Diploma of Technology or equivalent or an engineering degree.

Computer Systems: Completion of at least six Grade 11 or 12 Academic courses (Arts & Sciences), including English 12 and Algebra 11 both with C+; an overall C+ average in Grade 12. Desirable, C+ average in a Computer Science course or equivalent. Algebra 12 is recommended for the Decision Systems Option. Physics 11 or 12 and Algebra 11 is recommended for the Engineering Systems Option.

For students who graduated more than 3 years ago: good command of oral and written English; working knowledge of algebra; at least one accredited computer literacy course or equivalent experience. In certain circumstances, applicants may be asked to undergo a programmer's aptitude test.

Electronics: Algebra 12, Physics 11 with C+. Chemistry 11 with a C for Instrumentation option.

Fish, Wildlife and Recreation: Algebra 11 with C+ and Biology 11 and one of the following: another Science 11, Science 12 or Algebra 12. Resume required with all applications.

Forestry: Algebra 11 with C+ plus two Science 11s or one Science 11 and one Science 12, or Algebra 12.

Mechanical: Algebra 12 and Physics 11.

Mechanical Systems: Algebra 12 and Physics 11.

Mining: Algebra 12, Physics 11 and Chemistry 11.

Natural Resources Management: A one-year post-diploma program. Graduation from a BCIT diploma program in an engineering or business technology. Degree in Bio-Science, Engineering, Geography or Geology will also be considered.

Petroleum: Algebra 12 and Chemistry 11 or Physics 11.

Plastics: Algebra 12 and Chemistry 11 or Physics 11.

Quality Assurance and Nondestructive Testing: A one-year post-diploma program. Diploma of Technology in Engineering or Operations Management or 2 year College Diploma in Science or a Bachelor's degree in Science or Engineering.

Robotics and Automation: Algebra 12 and Physics 11 both with C+.

Surveying and Mapping: Algebra 12 and Physics 11.

Wood Products Manufacturing: Algebra 12 and one Science 11 (Biology, Chemistry or Physics), Physics preferred.

Note: Please refer to page 16, if you wish to be considered under the Mature Student category.

See program description pages for other program prerequisites.

School of Health Sciences

Biomedical Engineering: Algebra 12, Physics 11 and Chemistry 11 all with C+. Interview required.

Cytogenetics Laboratory Technology: A one-year post-diploma program. B.Sc. in Cell Biology with emphasis on Genetics and Medical Genetics or current registration with the CSLT as a Medical Laboratory Technologist (R.T.) with relevant/recent working experience and appropriate academic background.

Diagnostic Medical Sonography: A one-year post-diploma program. Dipl. Tech in an allied health field such as Radiography, Nuclear Medicine or General Nursing, or a Bachelor of Science or equivalent in a appropriate health-related field. Based upon the documentation submitted, the most suitable applicants will be invited to an interview.

Electrophysiology: Algebra 12, Physics 11 and Chemistry 11 all with C+. Interview required.

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

General Nursing (R.N.): Over 23 years at time of entry: Senior secondary school graduation or equivalent with: Chemistry 11, either Chemistry 12 or Biology 12, all with C+, all completed within 2 years prior to enrolment. English 12 with C+ is desirable, English 100 (UBC) or equivalent preferred. The St. John Ambulance Standard First-Aid certificate is required. **Under 23 years at time of entry:** Senior secondary school graduation with: Chemistry 11, either Chemistry 12 or Biology 12 and English 12 all with C+, English 100 (UBC) or equivalent preferred; Algebra 11 with C; valid First-Aid Certificate.

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

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

Medical Laboratory Technology: 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 100
Mathematics	UBC 3 credits at the Math 100 level**

A complete First Year Science Program; 15 credits at UBC (or the equivalent at a Community College) are required for entry into the program. Applicants who do not have the appropriate courses and credits (or their equivalent) will not be considered eligible. All applicants who meet or are completing the academic entrance requirements will be interviewed in April (approximately).

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

Medical Radiography: Algebra 12, Physics 11, Biology 11, Physics or Biology 12 all with C+ are the minimum required prerequisites. Current CPR Level 1 Certificate required. Typing and Introduction to Computer Science required.

Nuclear Medicine: Algebra 12, Chemistry 11 and 12, and one other Science 11 Preference given to applicants who have Physics 11.

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

Prosthetics and Orthotics: Algebra 12 and Physics 11. Courses in metalwork and woodwork are recommended. Note that this program offers an entry once every two years only. The next session begins September, 1990.

Note: Please refer to page 16, if you wish to be considered under the Mature Student category.

See program description pages for other program prerequisites.

Industrial Education Teacher Education Program: In BCIT's Industrial Education Teacher Education (IETE) program students acquire the technical, basic pedagogical skills and knowledge to teach industrial education in B.C. junior and senior secondary schools. The program may also lead to trades teaching at the post-secondary level when combined with a trades qualification. See page 138 for full program description.

Basic Training for Skills Development Upgrading: Level 4

Experience has indicated that those students who have taken the five month upgrading program could not successfully compete with those students who have an academic level of achievement in Engineering, Health and certain Business programs. The mathematics and sciences which BCIT students are required to assimilate are too difficult for those who have had such limited exposure to these subjects. Students who have taken the upgrading program are still required to have Grade 11 or 12 program specific prerequisites.

General Educational Development Tests

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

Therefore, success in the General Educational Development Tests is considered to be equivalent to BCIT general prerequisites; that is, graduation from a senior secondary school with English 12 at a pass level. Applicants who are successful in these tests are required to achieve the special Grade 11 and 12 prerequisites specified by the program they have applied to.

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.

Technology Fundamentals

Technology Fundamentals is an upgrading program to assist full-time student applicants who lack some or all of the prerequisites for admission into BCIT programs.

Technology Fundamentals is a full-time, day school program (Monday through Friday) beginning in September and January, and running for 15 weeks.

For admission into Technology Fundamentals, applicants **must** indicate which BCIT technology program they are applying for and which session (September or January) of the Technology Fundamentals program they wish to enroll in. Applicants must attach all necessary supporting documents. Technology Fundamentals students may be guaranteed entry to their full-time technology programs, subject to successful completion of the Technology Fundamentals program and in some cases, nonacademic requirements. Participating technologies include:

- Biological Sciences
- Building
- Chemical Sciences
- Civil and Structural
- Electronics
- Forestry
- Health Information
- Mechanical
- Mechanical Systems
- Mining
- Occupational Health and Safety
- Petroleum
- Surveying and Mapping

For further information contact 434-3304.

How to Apply

Applications for admission to a program should be submitted as early as possible, as some programs at BCIT have a limited number of seats available. Application forms and additional information may be obtained from the Office of the Registrar. These forms should be completed and returned with the necessary **official** documents attached, and the application fee. See Document Requirements page 19.

Application Fee

A $15 non-refundable, non-transferable fee must accompany your application form. Applications without fees will be returned unprocessed.

When to Apply

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

Term Starting	Processing Date
September 1989 • All Programs including August/89 and January/90 Nursing.	October 1, 1988
January 1990 • Medical Radiography	January 4, 1989

January 1990	June 1, 1989
• Administrative Management	
• Computer Systems	
• Electronics	
• Financial Management	
• Marketing Management	
September 1990	October 1, 1989
• All programs including August/90 and January/91 Nursing	

Applicant Status Categories

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

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

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

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

Non-Acceptance – The applicant does not meet the requirements of the Institute and/or the program is full and closed.

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

Acceptance is non-transferable from term to term or program to program.

Document Requirements

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

1. A senior secondary school transcript showing graduation. Applicants who are presently attending high school must submit a statement of marks of grade 11 subjects, and first semester grade 12 marks from the principal's office. A statement showing courses currently attended is also required. All marks must be substantiated by a final secondary school transcript incorporating school marks and provincial exam marks.
2. If applicable, all official post-secondary school statements of marks indicating credits and grades achieved.
3. Applicants who are not Canadian citizens must submit official government documents indicating Landed Immigrant Status or Student Authorization. Transcripts and all other related academic documents must be translated into English and notarized at the applicant's expense.
4. School of Health Sciences applicants are required to complete a medical questionnaire and return it to the Medical Services Department at BCIT. Some health programs require students to present evidence of having had a recent chest x-ray as well as having completed an immunization program. You will be notified if this information is required from you. If, due to extenuating circumstances, supporting documentation is not available at the time, students will be required to complete the necessary procedures at Medical Services, at BCIT.
5. Students who have been selected for admission must have medical insurance coverage prior to registration. Non-Canadian students who have been selected for admission must apply in person to the Medical Services Department, for an Application for Student Medical and Hospital Plan, prior to attending BCIT. Payment for this medical coverage is to be made at the same time, either by personal cheque or money order, to the vendor of the policy. Proof of coverage will be required.
6. Applicants who voluntarily withdrew or were withdrawn from another Institute may be requested by the teaching department to provide a written report explaining the reason and/or written authorization to request a report from the previous Institute. These documents can be used to determine acceptance to the desired program.

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

Advanced Placement Categories

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. documented experiential learning validating mastery in a course based on approved academic evaluation criteria.
3. **Unassigned Credit**
   Where a course-to-course equivalent 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, 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.

   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 are reduced.

5. **Block Credit**
Consideration for granted block credit is determined by individual programs, however block credit is generally limited to first year equivalency in an approved 2 year Diploma 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

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 entering directly into second year at BCIT may apply for credit upon receiving full acceptance;
c. Students who are presently enrolled at BCIT may apply for credit at any time within the academic year.

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.

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 enrol 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.	BC & 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.	Honours 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.

Course Credit

A credit is defined as approximately one classroom hour per week over a 15 week term. Therefore, a course taught for three 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)

Certificates and Diplomas

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

Transfer from Full-time Studies to Part-time Studies

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

Examinations, Grading and Marks

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

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.

Determination of Standing

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

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

Failure:	%F	- less than 50% except for some course(s)/program(s) may have a failing grade greater than 50% as outlined in this calendar.
	F	- formal withdrawal after official term deadline.
	OF	- unofficial/unapproved withdrawal.
Withdrawal:	W	- approved official withdrawal from a course/program.
Satisfactory:	S	- course requirements fulfilled, no % mark assigned.
Unsatisfactory:	U	- course requirements not fulfilled, no % mark assigned.
Course Credit Granted:	C	- recognition of approved equivalent studies outside BCIT. - successful Challenge Exam.
Course Exemption:	EC	- recognition of previous course 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	- sta 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 for this course.
Outside Source Grade:	R	- refer to outside source for student achievement.

Note: On occasion, grades may be identified with an asterisk (*). These are not used when calculating weighted averages.

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. Neglect to withdraw will result with "OF" 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 from the whole program, will be allowed to do so until two-thirds of the way through the term and a "W" will show on the transcript. If withdrawing after the deadline, the transcript will show "F" for all courses dropped.

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 in writing.

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

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 that discussion, with the Technology 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.**

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

The Registrar will inform 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 of 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 8.

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 subject(s) to the Office of the Registrar prior to the end of the next term or before a Diploma of Technology is awarded, whichever condition is specified at the time or subsequent to the failure.

Student Research Reports

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

Diplomas and Certificates

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

The Diploma of Technology is awarded to a graduating student upon successful completion of a program of study approved by the Board of Governors.

A diploma of technology program is equivalent to at least two years of full-time study beyond high school graduation. Diploma programs for the training and education of technologists prescribe a balance of applied theory and skills as necessary for employment in technological or para-professional/ professional occupations, including some curriculum which draws from advanced professional courses. Admission to these programs may frequently require special course or experience prerequisites.

Students requiring less than the equivalent of one half-year of study within a BCIT program to meet the requirements of a diploma, double diploma or advanced diploma, must have their individual program approved by the Dean of the School and the Registrar of the Institute.

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

Honors Diploma

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

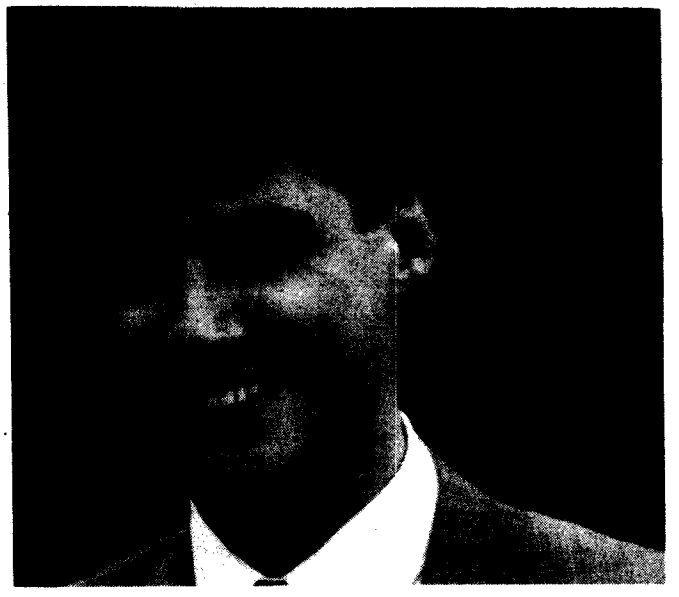
Students who receive credit/exemption in one or more courses must register in acceptable substitute course(s) in order to maintain a 75% course load within the program term structure. Courses for this purpose must be pre-approved in advance of term start by the Associate Dean.

Issuing of Diplomas

Upon successful completion of the requirements for a diploma program a graduating student must apply to the Registrar to be granted a diploma of technology. The Registrar is responsible for ensuring that all requirements for the diploma program have been fulfilled before issuing a diploma.

The Diploma of Technology 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 diploma will be issued free of charge to each graduate. Replacements for lost diplomas will be issued at cost, at the discretion of the Registrar.



Application for Certification and Graduation

Students must apply to receive their Certificate or Diploma by completing the Application to Graduate form, available in Student Records, 1A 101. This applies to all students who are currently enrolled in their final course(s).

Applications MUST BE received by Student Records by the 8th week of the final term or course(s). eg. June Graduates must apply by February which is 8 weeks into the final term.

For further information, please contact the Graduation Eligibility Officer in Student Records.

Fees and Expenses: Full-time Technology Programs

Full-time Tuition Fee Policy for Academic Year 1989/90 (Subject to Change)

Tuition expenses are reviewed annually and have been established by the Board of Governors of the British Columbia Institute of Technology and approved by the Ministry of Education for the academic year 1989/90 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 toward the tuition fees and is not transferable to part-time courses.
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 is required to pay the remainder of first level and fifth level fees 60 days before the commencement of classes.
4. An applicant accepted less than 60 days before the commencement of classes is required to pay tuition fees upon acceptance.
5. One-year Post-Diploma Program students pay according to two-level programs.
6. After the commencement of classes, students whose fees are outstanding will be excluded from classes and have their registrations cancelled. An additional $50 fee will be levied for reinstatement into classes.
7. Part-time day courses are assessed $54 per credit to a maximum tuition fee of $710 per level. These fees are subject to change for 1989/90.
8. **Second Year Students:** A student returning to begin the second year (third level) of a two-year program is required to pay full term fees 30 days before the commencement of classes.

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

International Students

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 triple the prevailing domestic tuition fees for that program (subject to change).

Annual Fees

Tuition fees and all related policies are under review for the 1989/1990 year by the British Columbia Institute of Technology Board of Governors and may be subject to change. Current 1988/89 fees are as follows:

	1st Year	2nd & 3rd Year
General Tuition	$ 1420	$ 1420
Student Activity (annual)	88	88
Graduation Convocation (mandatory)		15
Total	**$ 1,508**	**$ 1,523**

First Year Students – Subject to change for 1989/90

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

First Level – due 60 days before commencement of classes:

General tuition (includes $75 non refundable commitment fee)	$ 710
Student activity fee	44
Total	**$ 754**

Second Level – due first week of classes:

General tuition	$ 710
Student Activity	44
Total	**$ 754**

Second and third year students – Subject to change for 1989/90

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

Third Level – due 30 days before commencement of classes:

General tuition	$ 710
Student activity	44
Total	**$ 754**

Fourth Level – due first week of classes:

General tuition	$ 710
Student activity	44
Graduation fee	15
Total	**$ 769**

General Nursing

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

Two-level Programs – Subject to change for 1989/90

Health Record Technician and One-Year Post-Diploma Programs

First & Fifth Levels – due 60 days prior to the commencement of classes:

General Tuition (includes $75 non-refundable commitment fee)	$ 710
Student Activity	44
Total	**$ 754**

Second & Sixth Levels – due first week of classes:

General Tuition	$ 710
Student Activity	44
Graduation	15
Total	**$ 769**

Electronics Technology – Subject to change for 1989/90

All students must pay according to the fee schedule previously stated in the Calendar of Events for the School of Engineering Technology and the School of Trades Training on pages .... respectively.

NOTE: The only exception is the Co-op Program.

Co-op Program – due first week of classes:

General Tuition	$ 355
Student Activity	22
Total	**$ 377**

Miscellaneous Fees

Duplicate ID card	$10
Duplicate Diploma/Certificate	$50
Duplicate Tax Receipt	$10
Duplicate T2202A	$10
NSF Cheques	$15
Appeal Reassessment	$50 per course
Transcript of Marks	$ 5 for first copy and $1 for *each additional copy*
Challenge Exam Fee	cost of course
Graduation Fee	$15
Reinstatement Fee	$50
Application Fee	$15
Reassessment of Marks	$25 per course
Parking	$90 (2 terms)

Tax Receipts

An official 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 report.

Note: To ensure that the receipts are sent to the correct address, students should notify the Student Records Office immediately of any change of address.

Financial Obligation to the Institute

No Statement of Marks, transcripts, diploma or certificates will be issued until the student has cleared up all financial obligations to the Institute, such as tuition fees, library fines and rent.

Withdrawal and Refund Procedure – Subject to change for 1989/90

How to Withdraw

Students who wish to withdraw officially from BCIT must commence 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

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.

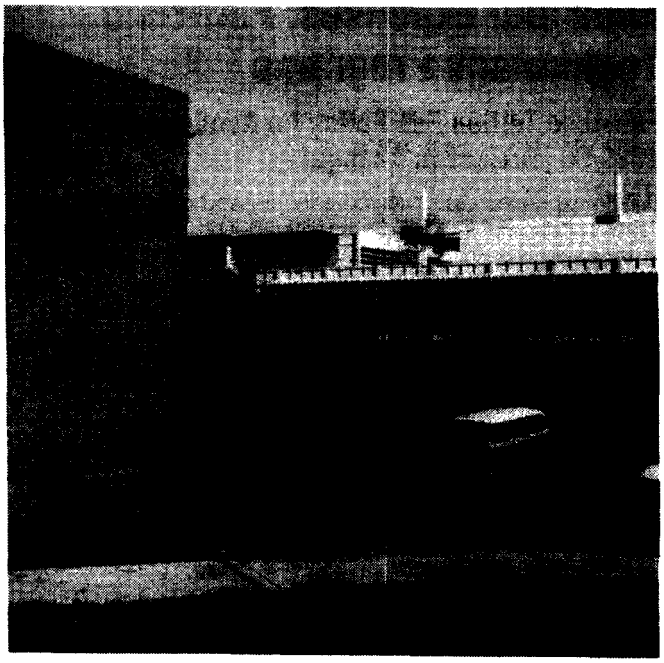
Student Activity: Complete refund.

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

General Tuition: No refund.

Student Activity: Appropriate student activity fee refunds will be issued by the Institute up to the designated "last day to withdraw to receive a refund".

After the last day of February, any student activity fee refund must be claimed in writing from the BCIT Student Association Office and BCIT library card turned in. Withdrawal verification will be made by the BCIT Student Association before processing the claim.



Calendar of Events
Full-time Technology Programs 1989-90

BCIT is open except on statutory holidays. See subsequent pages for Electronics Technology, General Nursing, Medical Laboratory and Diagnostic Medical Sonography.

1989

Mon	June 5	Level 2: Classes begin for Administrative Systems, Computer Systems, Financial Management, Marketing and Tourism Management
Thr	June 8	Level 2: Fee deadline for all the above Technologies
T-W	June 13,14	AWARDS
T-F	June 15,16	SPRING CONVOCATION
Mon	June 19	Last day to apply for course credit exemption
Mon	June 19	Last day to withdraw and receive full refund (less $75)
Mon	July 3	CANADA DAY
Fri	July 7	Level 1: Fee deadline for registering September 1989
Fri	July 28	Last day to withdraw in order to receive "W" on Transcript (June 5 term start)
Mon	Aug 7	BC DAY
Tue	Aug 8	Level 3: Fee deadline for September 5 term start
M-F	Aug 21-25	Level 2: Examinations for June 5 term start
Mon	Sep 4	LABOR DAY
Tue	Sep 5	Levels 1 & 3: Registration
Wed	Sep 6	Levels 1 & 3: Classes begin
Tue	Sep 19	Last day to withdraw to receive a full refund (less $75)
Tue	Sep 19	Last day to apply to course credit/exemption
Wed	Sep 20	SHINERAMA
Mon	Oct 9	THANKSGIVING
T-W	Oct 25-26	TECHNOLOGY SCHOLARSHIP CEREMONIES
Fri	Nov 3	Level 1:Fee deadline for programs registering January 3/90
Fri	Nov 3	Last day to withdraw in order to receive "W" on transcript for September 6 term start
Mon	Nov 13	REMEMBRANCE DAY (in lieu of)
Mon	Dec 4	Term 3: Fees due
M-F	Dec 11-15	Levels 1 & 3: Examinations (most technologies)
Mon	Dec 18	Start of CHRISTMAS BREAK for TECHNOLOGY students
Mon	Dec 25	CHRISTMAS DAY
Tue	Dec 26	BOXING DAY

1990

Mon	Jan 1	NEW YEARS DAY
Tue	Jan 2	Level 1: Registration for Administrative Systems, Computer Systems, Financial Management, Marketing and Tourism Management
Tue	Jan 2	All Technology classes begin
Fri	Jan 5	Levels 2 & 4: Term fee deadline
Tue	Jan 16	Last day to withdraw to receive full refund (less $75)
Tue	Jan 16	Last day to apply for course/credit exemption
T.B.A.		WINTER CONVOCATION
M-F	Mar 12-16	SPRING BREAK (All except Electronics Technology)
Mon	Apr 2	Last day to withdraw to receive "W" on transcript
Fri	Apr 13	GOOD FRIDAY
Mon	Apr 16	EASTER MONDAY
Mon	May 21	VICTORIA DAY
T-F	May 22-25	Levels 1, 2, and 4: Examinations
Mon	Jun 4	Level 2: Classes begin for Administrative Systems, Computer Systems, Financial Management, Marketing and Tourism Management
Thr	Jun 7	Level 2: Fee deadline
T-W	Jun 12-13	TECHNOLOGY GRADUATING AWARDS CEREMONIES
Thr-Fri	Jun 14-15	SPRING CONVOCATION
Mon	Jul 2	CANADA DAY

Electronics Technology 1989-90

1989

Mon	July 3	CANADA DAY
Fri	Jul 7	Term 1: Fee deadline for registering September 5 term start
Mon	Aug 7	B.C. DAY
Tue	Aug 8	Term 3: Fee deadline for registering September 1989
Mon	Sep 4	LABOR DAY
Tue	Sep 5	All levels: Registration; CO-OP 1 and 2 begin
Tue	Sep 5	Terms 1,2,3,4; CO-OP 1 & 2 classes begin
Fri	Sep 8	Terms 1,2,3,4: CO-OP 1 & 2 fees due
Fri	Sep 15	Last day to change sections
Mon	Sep 18	Last day to withdraw to receive full refund (less $75)
Mon	Sep 18	Last day to apply for course credit/exemption
Wed	Sep 20	SHINERAMA
Mon	Oct 9	THANKSGIVING
T-W	Oct 25-26	TECHNOLOGY SCHOLARSHIP CEREMONIES
Wed	Nov 1	Start of Term "B" courses
Fri	Nov 3	Last day to withdraw in order to receive "W" on transcript for September 5 term start
Mon	Nov 13	REMEMBRANCE DAY (in lieu of)
Thr	Nov 30	Term 1: Fee deadline for January 29 term start
Wed	Dec 20	START OF CHRISTMAS BREAK
Mon	Dec 25	CHRISTMAS DAY
Tue	Dec 26	BOXING DAY

1990

Mon	Jan 1	NEW YEARS DAY
Tue	Jan 2	Classes resume
M-F	Jan 8-12	Examinations: All levels
	T.B.A.	CONVOCATION (Winter)
M-F	Jan 22-26	Registration week for returning students
Mon	Jan 29	Terms 1,2,3,4: CO-OP 1 & 2 classes begin
Mon	Jan 29	Term 1: Registration
Fri	Feb 2	Terms 2,4; CO-OP 1 & 2 fee deadline
Thr	Feb 8	Last day to change sections
Fri	Feb 9	Last day to withdraw to receive full refund (less $75)
Fri	Feb 9	Last day to apply for course credit/exemption
Tue	Apr 3	Last day to withdraw to receive "W" on transcript
Fri	Apr 13	GOOD FRIDAY
Mon	Apr 16	EASTER MONDAY
Mon	May 21	VICTORIA DAY
T-F	May 22-25	Examinations: All Levels
T-W	Jun 12-13	TECHNOLOGY GRADUATING AWARDS CEREMONIES
Thr-Fri	June 14-15	SPRING CONVOCATION

Diagnostic Medical Sonography 1989-90

1989

Mon	Jul 3	CANADA DAY
Fri	Jul 7	Level 5: Fee deadline for registering September 1989
Mon	Aug 7	B.C. DAY
Mon	Sep 4	LABOR DAY
Tue	Sep 5	Level 5: Registration. Classes begin
Tue	Sep 19	Last day to apply for course credit exemption
Tue	Sep 19	Last day to withdraw to receive full refund (less $75)
Wed	Sep 20	SHINERAMA
Mon	Oct 9	THANKSGIVING DAY
Fri	Nov 3	Last day to withdraw to receive "W" on transcript
Mon	Nov 13	REMEMBRANCE DAY (in lieu of)
M-F	Dec 11-15	Examinations
Mon	Dec 18	START OF CHRISTMAS BREAK
Mon	Dec 25	CHRISTMAS DAY
Tue	Dec 26	BOXING DAY

1990

Mon	Jan 1	NEW YEARS DAY
Tue	Jan 2	Level 6: Clinical begins
Fri	Jan 5	Level 6: Term fee deadline
Mon	Jan 15	Last day to withdraw to receive "W" on transcript
Mon	Jan 15	Last day to apply for course credit/exemption
Fri	Apr 13	GOOD FRIDAY
Mon	Apr 16	EASTER MONDAY
M-F	Apr 30-May 4	SPRING BREAK
Mon	May 21	VICTORIA DAY
Tue	Jun 5	Last day to withdraw in order to receive "W" on transcript
Thr-Fri	June 14-15	SPRING CONVOCATION
Mon	Jul 2	CANADA DAY
Wed	Aug 1	B.C. DAY
M-T	Aug 27-28	EXAM DAYS

NOTE: There is no summer break for this program.

Medical Laboratory Technology 1989-90

1989

Fri	Jun 2	Level 1: Fee deadline for registering August
T-W	Jun 13-14	AWARDS
Thr-F	Jun 15-16	CONVOCATION
Mon	Jul 3	CANADA DAY
Tue	Aug 1	Level 1: Registration. Classes begin
Mon	Aug 7	B.C. DAY
Tue	Aug 15	Last day to withdraw to receive a full refund (less $75)
Tue	Aug 15	Last day to apply for course credit/exemption
Mon	Sep 4	LABOR DAY
Wed	Sep 20	SHINERAMA
Mon	Oct 9	THANKSGIVING
Fri	Oct 20	Last day to withdraw to receive "W" on transcript
Mon	Nov 13	REMEMBRANCE DAY (in lieu of)
T-W	Dec 12-13	Examinations
Mon	Dec 18	START OF CHRISTMAS BREAK
Mon	Dec 25	CHRISTMAS DAY
Tue	Dec 26	BOXING DAY

1990

Mon	Jan 1	NEW YEARS DAY
Tue	Jan 2	Level 2: Classes begin
Fri	Jan 5	Level 2: Fee deadline
Tue	Jan 16	Last day to withdraw to receive a full refund (Less $75)
Tue	Jan 16	Last day to apply for course credit/exemption
M-F	Mar 12-16	SPRING BREAK
Mon	Apr 2	Last day to withdraw to receive "W" on transcript
Fri	Apr 13	GOOD FRIDAY
Mon	Apr 16	EASTER MONDAY
Mon	May 21	VICTORIA DAY
T-W	May 22-23	Examinations
T-W	Jun 12-13	TECHNOLOGY GRADUATING AWARDS CEREMONIES
Fri	Jun 15	SPRING CONVOCATION

Medical Radiography 1990

1990

Mon	Jan 1	NEW YEARS DAY
Tue	Jan 2	Levels 1 & 3: Classes start
Tue	Jan 2	Orientation for Level 1 students
Fri	Jan 5	Levels 1 & 3: Term Fee deadline
	T.B.A.	WINTER CONVOCATION
Tue	Jan 16	Last day to withdraw to receive full refund (Less $75)
Tue	Jan 16	Last day to apply for course credit/exemption
M-F	Mar 12-16	SPRING BREAK
Mon	Apr 2	Last day to withdraw to receive "W" on transcript
Fri	Apr 13	GOOD FRIDAY
Mon	Apr 16	EASTER MONDAY
M-F	Apr 23-27	Level 3: Examinations
Tue	May 1	Level 4: Commences
Mon	May 21	VICTORIA DAY
T-F	May 22-25	Level 1: Examinations
Mon	Jun 4	Level 1: Practicum commences
T-W	Jun 12-13	TECHNOLOGY GRADUATING AWARDS CEREMONIES
Thr-Fri	June 14-15	CONVOCATION
Thr	Jun 28	Level 1: Practicum ends
Fri	Jun 30-	
Fri	Aug 31	SUMMER VACATION PERIOD
Mon	Sep 3	LABOR DAY
Tue	Sep 4	Level 2: Commences
Fri	Sep 7	Level 2: Fee deadline
Mon	Sep 17	Last day to apply for course credit/exemption
Mon	Sep 17	Last day to withdraw to receive full refund (less $75)
Wed	Sep 19	SHINERAMA
Mon	Oct 8	THANKSGIVING
Mon	Nov 5	Last day to withdraw in order to receive a "W" on transcript
Mon	Nov 13	REMEMBRANCE DAY (in lieu of)
M-F	Dec 12-16	Level 2: Exam week (tentative)

General Nursing 1989-90

1989

Mon	Jun 12	Level 1: Fee deadline for registering August 10
T-W	Jun 13-14	AWARDS
Thr-F	Jun 15-16	CONVOCATION
Mon	Jul 3	CANADA DAY
Fri	Jul 14	Level 3: Fee deadline for registering August 14
Tue	Aug 1	B.C. DAY
M-F	Aug 14-18	Level 1: Registration and orientation
Thr-F	Aug 17-18	Levels 2 and 5: Registration & orientation
Mon	Aug 21	Level 3: Registration
Mon	Aug 21	Classes begin for all levels
Mon	Sep 4	LABOR DAY
Tue	Sep 5	Last day to apply for course credit/exemption
Tue	Sep 5	Last day to withdraw to receive full refund (less $75)
Wed	Sep 20	SHINERAMA
Mon	Oct 9	THANKSGIVING
Wed-Thr	Oct 25-26	TECHNOLOGY SCHOLARSHIP CEREMONIES
Fri	Nov 3	Last day to withdraw to receive "W" on transcript
Thr	Nov 9	Level 1: Fee deadline for January 9/90 term start
Mon	Nov 13	REMEMBRANCE DAY (in lieu of)
Fri	Dec 8	Level 3: Fee deadline for registering January 9/90
M-F	Dec 11-15	Examinations: All levels
Mon	Dec 18	START OF CHRISTMAS BREAK
Mon	Dec 25	CHRISTMAS DAY
Tue	Dec 26	BOXING DAY

1990

Mon	Jan 1	NEW YEARS DAY
T-F	Jan 2-5	Level 1: Registration and orientation
Thr-F	Jan 4-5	Levels 2 and 5: Registration and orientation
Fri	Jan 5	Levels 1 to 5: Fee deadline
Mon	Jan 8	Levels 3 and 4: Registration
Mon	Jan 8	Levels 2,3,4 and 5: Classes begin
	T.B.A.	WINTER CONVOCATION
Mon	Jan 22	Last day to withdraw to receive refund (Less $75)
Mon	Jan 22	Last day to apply for course credit/exemption
M-F	Mar 5-9	SPRING BREAK
Tue	Apr 10	Last day to withdraw to receive "W" on transcript
Fri	Apr 13	GOOD FRIDAY
Mon	Apr 16	EASTER MONDAY
M-F	May 7-11	Examinations: All levels
Mon	May 21	VICTORIA DAY
T-W	Jun 12-13	TECHNOLOGY GRADUATING AWARDS CEREMONIES
Thr-Fri	Jun 14-15	SPRING CONVOCATION

BCIT Services

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 1A. Our offices are open from 0830 to 1630, Monday to Friday. For telephone enquiries, please call 434-3304.

Staff

Val Karpinsky, B.A.(Hons.), Director, Student Services
Sandie Mooney, Secretary
Mariana Rogic, Clerical Support
Muriel Shaw, Clerical Support
Jan Tucker, Clerical Support
Laurie Worth, Clerical Support

Program Advising

Program advisors provide information, through an interview process, about programs, learning opportunities and career opportunities for full and part-time studies.

Program advisors assist students in considering program choices and ultimate training programs; provide information about skill requirements and occupations, including Career Resource Centre resources. Students with undefined goals are referred by program advisors to counsellors for career planning. Program advisors acquaint students with institute/campus services and facilities and also participate in Secondary School Liaison visits.

Program advisors may be seen on a drop-in basis or by appointment, in addition to telephone enquiries. We look forward to hearing from you by Telephone: 434-3304, by mail, or in person in Student Services, 1A Building, 2nd floor. Students outside the Lower Mainland may reach us by using the **HOT LINE** 1-800-242-0676.

Program Advisors

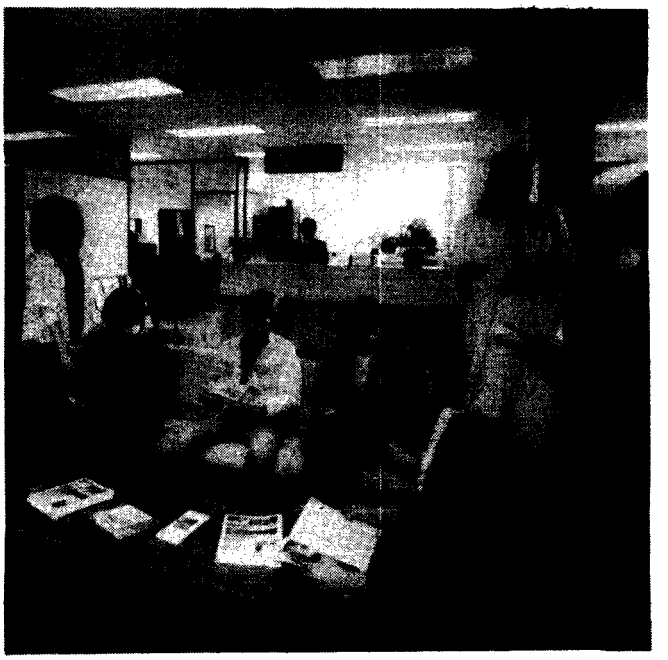
Raelene Rowe, B.A., Coordinator
Pat Awarau, B.A.
Katy Bobetsis, B.A.
Karen Cope, B.Ed.
Amanda Hill, B.A.
Ann McNaughton, Cert.

Program Advisors – Part-time Studies

Chris Lloyd, Dipl.T., Business Part-time Studies
Mandy Klepic, B.A., Acting, Engineering Technology and Trades Training, Part-time Studies

Career Resource Centre

Located in Student Services, 2nd floor, 1A Building, the Career Resource Centre will help you with career planning, occupational information, educational and training information, and student life. Video/slide tapes of career programs are also available. You may come in to browse through our material or to view career information. The Centre is open from 0830 to 1630 weekdays. Our program advisors are there to answer your questions and our career counsellors are available to help you develop your plans.



Counselling

Counselling Services offer a free and confidential career counselling service to all current and prospective BCIT students. Professionally trained counsellors will assist students in selecting a career, making a career change, re-entering the work force, or adjusting a career to fit a chosen lifestyle. In addition, group information sessions regarding Health, Business and Engineering career options are offered on a regular basis. Contact Student Services reception for details.

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

Counselling Services, in conjunction with Part-time Studies, offers several Career Search Workshops during the school year. These workshops are four sessions (12 hours) long and are designed primarily for prospective students who have been in the work force at least two years. Participants examine their career paths and lifestyles in terms of direction and personal satisfaction. Registration for Career Search Workshops is handled through Part-time Studies at 434-1610.

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

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

Group Workshops for BCIT students are offered from time-to-time throughout the year. Workshops include out-of-towner and adult-returning-student orientation, time management, stress management, coping with test anxiety, exam preparation and introduction to assertiveness.

For further information about Counselling Services at BCIT, contact Student Services reception in Building 1A, 2nd floor, or telephone 434-3304.

Counselling Staff

Shirley Coomber, M.Ed., A.R.W., Special Needs Counsellor
Stu Gibbs, B.A., M.S.Ed., Counsellor, Liaison Trades
Heather Hyde, B.A., M.A., R.Psych., Counsellor/Coordinator, Liaison Engineering
Howard Peto, B.S.A., M.Ed., Counsellor/Liaison Business
Jean Spence, B.A., M.Ed., Counsellor, Liaison Health

Financial Aid and Awards

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

How Much Will It Cost

The first step in determining your total financial picture is to calculate resources and expenses. In addition to tuition fees and book/supply costs, single students not living with their parents can expect to spend approximately $750 per month on living expenses. It is important that costs such as rent, food, utilities, transportation, clothing, laundry and entertainment are taken into account. To estimate total resources, you should consider such items as savings, parental contribution and part-time earnings while attending school.

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

B.C. Student Assistance Program

The new B.C. Student Assistance Program introduced by the British Columbia Government for 1987/88 proved to be a great encouragement to students.

The improved program generated the following increases in loan applications and related activities compared to 1986/87:

B.C. Student Assistance applications	+10%
B.C. Student Assistance reassessments/appeals	+27%
Part-time Student Loan applications	+39%
Students attending Financial Aid Workshops	+53%
Advisor interviews (Technologies)	+20%
Technical enquiries	+65%
Work Study Funds	+95%

Student assistance 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 1988/89 guidelines, the maximums are:

PROGRAM LENGTH (WEEKS)	WITHOUT DEPENDENTS	WITH DEPENDENTS
13	$2380	$3220
17	$3100	$4200
22	$4030	$5460
30	$5490	$7440
34	$6200	$8400
39	$7130	$8550
43	$7860	$9350
52	$8150	$9350

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

BCIT Bursaries

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

To be considered for a bursary, students must demonstrate financial need and have satisfactory academic standing. In some cases consideration is also given to the student's 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 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. A complete list of scholarships can be found in the BCIT Awards and Financial Aid booklet.

Emergency Loans

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

For further information, telephone 432-8555 or visit the Student Services Reception desk located at the northwest corner, second floor, Building 1A. Hours are 0830 to 1630, Mond[illegible] Friday.

Staff

Jennifer Orum, B.Ed., M.A., Coordinator
Jim Anderson, B.A., Senior Advisor
Cathy Schweers, Advisor, Trades
Hanne Logan, Financial Aid Assistant, Trades
Angie Chan, Advisor, Technologies
Avalon Tagami, Advisor, Technologies
Mary-Ann Moysiuk, Financial Aid Assistant, Technologies
Janice Budge, Financial Aid Assistant, Technologies

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 August and 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 both the Institute and 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 their program of studies. The following awards were presented at the June 1988 Graduating Awards Ceremony.

SCHOOL OF BUSINESS

Administrative Systems
The Bank of British Columbia, Division of Hongkong Bank of Canada, Award in Administrative Systems
The Personnel and Industrial Relations Administration Award
The Business Administration Double Diploma Award
The Vancouver Transportation Club Award in Transportation and Distribution Management
The Bank of British Columbia, Division of Hongkong Bank of Canada, Award in International Business
The Operations Management Award

Broadcast Communications
The British Columbia Association of Broadcasters Award

Financial Management
The Society of Management Accountants of British Columbia Award in Accounting
The Royal Bank Finance Award

Hospitality Administration
The British Columbia and Yukon Hotels Association Award in Hotel, Motel and Food Service Administration

Marketing and Tourism Management
The Real Estate Council of British Columbia Award in Real Estate Studies
Palmer Jarvis Advertising Award in Advertising and Sales Promotion
Mastel, Gillespie and Associates Award in Professional Sales
Rogers Cablevision Award in Advanced Technology Marketing
Federal Business Development Bank Award in Small Business Development
The Ryan Schlyecher Memorial Award in Tourism

SCHOOL OF ENGINEERING TECHNOLOGY

Applied Industrial Computing
Spatial Information Systems Graduating Award
Advanced Manufacturing Graduating Award

Biological Sciences
The B.C. Federation of Agriculture R.B. Stocks Award in Biotechnology
The B.C. Nursery Trades Association Award in Landscape Horticulture
The Fisheries Council of B.C. Award in Food Technology

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

CAD/CAM
Intergraph Systems Limited Award

Chemical Sciences
The Canadian Institute of Mining and Metallurgy Award in Metallurgy
The Canadian Pulp and Paper Association Award
The Chemical Sciences Award in Pollution Science

Civil and Structural
The Sandwell Swan Wooster Award

Computer Systems
The Finning Ltd. Award
The IBM Canada Ltd. Award
The Computer Systems Award in Information Systems
The Computer Systems Award in Microcomputer Systems
The Computer Systems Award in Expert Systems
The Computer Systems Award in Engineering Systems

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

Mechanical
The Canadian Manufacturers' Association Award in Production
The 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

Quality Assurance and Nondestructive Testing
Quality Assurance/NDT Graduating Award

Renewable Resources Technology
The Council of Forest Industries Award in Forestry
The Fish, Wildlife and Recreation Graduating Award

Surveying
The BCLS – George New Compass Award

Wood Products Manufacturing
The Council of Forest Industries Award in Wood Products Manufacturing

SCHOOL OF HEALTH SCIENCES

Biomedical Engineering Technology
The Biomedical Engineering Technology Graduating Award

Electrophysiology
The Electrophysiology Graduating Award

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

Medical Laboratory 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 Award
The Vancouver Women's ORT Award

Prosthetics and Orthotics
The Prosthetics and Orthotics Graduating Award

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

Achievement Awards

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

SCHOOL OF BUSINESS

Administrative Systems
The Westcoast Energy Inc. Awards
The Administrative Management Systems Students' Award
The Canadian Association for Production and Inventory Control, Vancouver Chapter Awards
The Canadian Materials Handling & Distribution Society Award in Transportation & Distribution

Broadcast Communications
The British Columbia Motion Picture Association, Jack Gettles Memorial Award for Creativity in Television
The Broadcast Communications Commercial Production Award of Excellence
The Rogers Cable T.V. Vancouver Award of Excellence in Broadcast Communications
The Canadian Broadcasting Corporation Award in Television
The Gastown Post and Transfer Award in Television

Financial Management
The Wolverton Securities Ltd. Award in Finance
The Certified General Accountants Association of B.C. Awards
The Financial Executives Institute, Vancouver Chapter Award
The Institute of Chartered Accountants of B.C. Award
The Canadian Life & Health Insurance Association Award
The Society of Management Accountants of British Columbia Award

Hospitality Administration
The White Spot Ltd. Awards in Hotel, Motel and Food Service Administration
The Columbia Association of Hospitality Accountants Award in Accounting
The Restaurant and Food Services Association of B.C., W. Fred Oldfield Memorial Award
The Sheraton Villa Hospitality Scholarship Award

Marketing and Tourism Management
The National Real Estate Service Awards
The Sunsational Vacations Limited Award in Tourism
The Century 21 Real Estate Canada Ltd., Peter Thomas and Gary Charlwood Awards
The Canadian Tire Award in Advertising and Sales Promotion

School Award
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. Award
The Isabel Verner Memorial Book Prize
Construction Specifications Canada (Vancouver Chapter) Special Projects Award

Chemical Sciences
The Canadian Pulp and Paper Association Award
The Can Test Limited Award in Industrial Chemistry
The Analytical Service Laboratories Limited Award in Pollution Science

Civil and Structural
The Dillingham Construction Ltd. Award
The Dominion Construction Co Ltd. Award
The Wright Engineers Ltd. Award
The Associated Engineering (B.C.) Ltd. Award
The Canada Scaffold Supply Co. Ltd. Formwork Design Prize
Bogdonov Pao Associates Ltd. Formwork Design Prize
UMACS of Canada Inc. Formwork Design Prize

Computer Systems
The UNISYS Corporation Award in Applied Artificial Intelligence

Electronics
The Teleglobe Canada Award in Telecommunications
The Western Canada Telecommunications Council, R.C. Eldridge Award in Technical Writing

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

Renewable Resources
The Canadian Institute of Forestry, Vancouver Section

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

Wood Products Manufacturing
C.W. Clasen Recruiting Services Awards
The Plant Forest Products Corporation Award

School Award
The BCIT Alumni Award

SCHOOL OF HEALTH SCIENCES

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

Environmental Health
The Environmental Health Achievement Award
The Herbison Award

Health Information
The Health Record Association of B.C. Professional Health Information Administrator Award
The Health Record Association of B.C. Professional Health Information Technician 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

Nuclear Medicine Technology
The Metro-McNair Clinical Laboratories Ltd. Award for Clinical Excellence

School Award
The BCIT Alumni Award

International Education

Life at BCIT has an international flavor with the increasing enrollment of international students. This year BCIT is host to nearly 90 students from other countries. The presence of international students on campus and the recent introduction of an International Student Club will continue to enhance an excellent opportunity for intellectual and cultural interaction.

Student Services provides information to international students wishing to attend BCIT. The office is located in the 1A building, 2nd floor, Telephone: 434-3304

The International Education Department coordinates international activities with industry, government agencies and other agencies in Canada and abroad. The department is involved in institutional linkage, project administration and contract educational training. Telephone: 432-8622

Cooperative Education

Martin Hendy, Ph.D., Director, Community & Corporate Liaison.
Telephone 432-8590

Valerie Perkio, Coordinator, Cooperative Education.
Telephone 432-8233

Gino Simeoni, M.Ed., Coordinator, Cooperative Education.
Telephone 432-8291

Ernst Wilmink, Coordinator, Cooperative Education.
Telephone 432-8499

Co-op Office, General Enquiries
Telephone 432-8753

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 Automation, and to trade students in Horticulture, 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 students to explore their career choices in a structured and purposeful manner. It gives them the opportunity 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. Selection is based upon academic performance and an interview. At the interview such factors as motivation, inter-personal 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 Director at the earliest opportunity.

Under Canada Immigration regulations relating to employment, only Canadian citizens and permanent residents are eligible to enter a cooperative education program.

Library Services

The BCIT library is one of the province's major centres for technological and trades information, serving curricular needs of the Institute and providing general support to business and industry in British Columbia. Library holdings include over 300,000 books, periodicals, pamphlets, and non print media. Major strengths are found in the collections of technical reports, standards, Statistics Canada including Census Canada, company annual reports, topographical and land use maps, legal and legislative materials, microcomputer software, films and videos. The ground floor microcomputer/audiovisual centre provides students with the convenience of bookable space and equipment. Preview booths and video viewing facilities are also located in the centre.

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

BCIT students use computer terminals to access DOBIS, the complete on-line catalog of holdings. This is the first integrated on-line library system in the province to serve an academic community. A courier service delivers library materials between the Main Library and the Sea Island Library.

Library Hours

September – 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, and library hours, phone 432-8370.

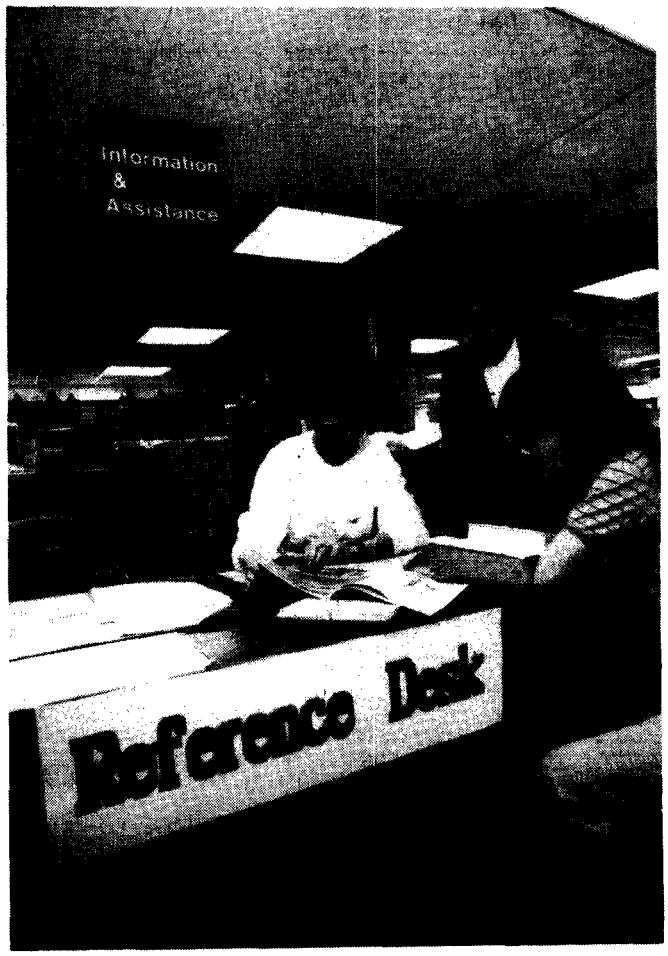
For reference assistance and library holdings, phone 432-8371.

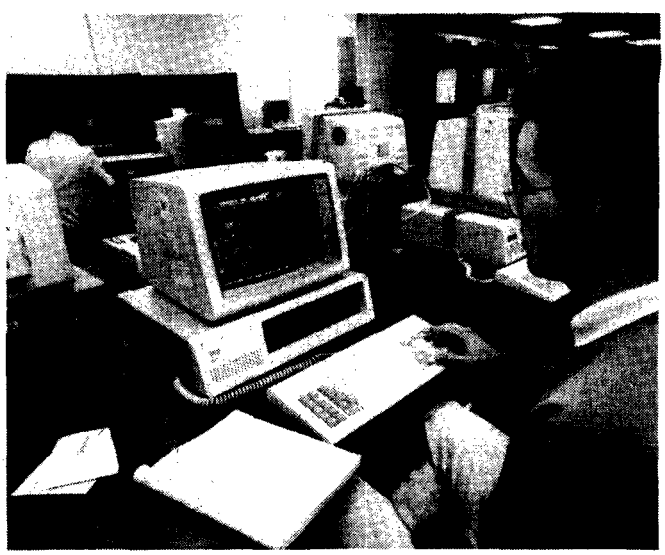
Overdues, Fines, and Replacement Policies

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 nonrefundable fee is levied for overdue material that is not returned. The 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 for overdue material. The rates are 50¢ per day; 50¢ per hour for reserve material.

Faculty and Staff

Robert A. Roy, B.A., M.A., B.L.S., Acting Institute Librarian
Margot Allingham, B.A., B.L.S., M.L.S., Reference Librarian Engineering and Acting Information Services Coordinator
Yu-Mei Choi, B.S.Sc., M.L.S., Cataloguer
Ana Ferrinho, B.A., M.L.S., Reference Librarian – Health
Anthony Kelly, B.A., M.L.S., Reference Librarian – Branch Coordinator
Frank Knor, Dipl.T., B.Ed., B.L.S., M.L.S., Reference Librarian - Current Awareness Coordinator
Merilee MacKinnon, B.A., M.L.S., Head Cataloguer/DOBIS Project Leader
Gerry Weeks, B.A., B.L.S., M.L.S.





Medical Services

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

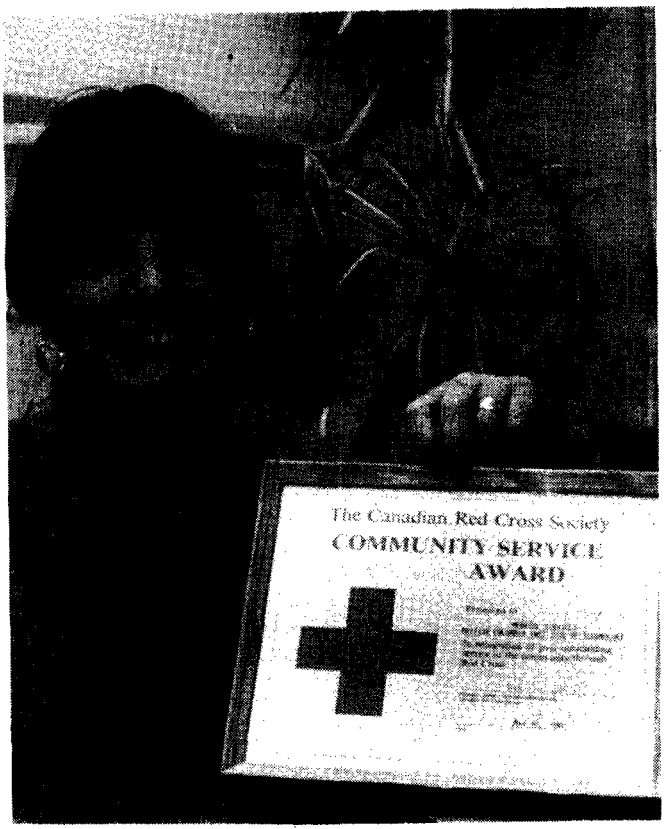
All patients who wish to see a doctor must have valid medical coverage and should bring their medical or insurance number with them on their first visit. Information and application forms regarding the Medical Services Plan of B.C. and private medical insurance coverage are available in Medical Services, 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

Barbara E. Copping, B.Sc., M.Sc., M.D., Director-Physician
David Mullard, M.B., B.S., Physician (part-time)
Jacqueline Hurst, B.Sc., M.D., Physician (part-time)
David Fung, M.B., B.Ch., F.R.C.P(C)., Psychiatrist (part-time)
Ralph Wyatt, B.A., B.S.R., Physiotherapist
Janis Poersch, R.N., Nurse
Louise Baker, R.N., Nurse (part-time)
Mahara Greymac, R.N., Nurse (part-time)
Lynda Gravel, Secretary
Carol Braden, Medical Office Assistant



First Aid

First aid attendants are on call as follows:
Monday - Friday 0600-2200
Saturday 0830-1530

Attendants are located in Bldg. #22.

Emergency: local 8820

Non Emergency: local 8872

Voice pager: 667-2052

When first aid attendants are on duty:

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

(b) If patient is mobile, escort to first aid 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

Housing

Once you have been officially accepted at BCIT, the BCIT Housing Office will help you to find housing. We urge you to begin your search immediately upon acceptance.

Maquinna Residence

If you are registered in a full-time BCIT program of four months duration or more, 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 houses. The houses consist of apartment blocks 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 apartments. Each house has a Resident Advisor who is there to provide help 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 1988 was $270 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. Contact the Housing Office as soon as possible – accommodation is limited.

Off Campus Housing

Since residence accommodation is limited, most BCIT students live off campus. The Housing Office maintains a register of suitable local accommodation. Maps, general information, accommodation listings and a telephone service are available.

Costs for off campus accommodation vary according to the type of accommodation and location you select. In 1988 average monthly costs were approximately:

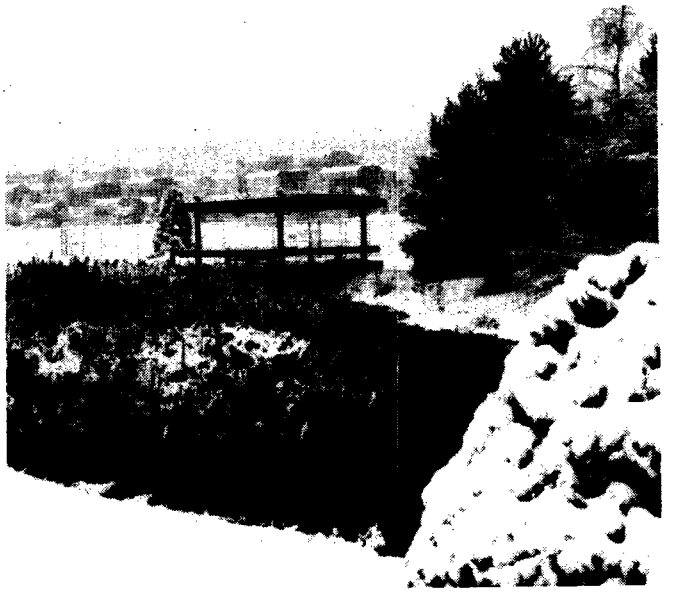
Room and board	$400
Sleeping room	$200
Room with cooking facilities	$250
Basement suites	$300
Apartments	$400
Shared accommodation (usually a rented house)	$250

The off campus housing service is available throughout the year. Weekend and evening service is available at certain times of the year. To check the hours of operation of the BCIT Housing Office, please contact 432-8677.

Due to the high turnover of off campus accommodation, preprinted lists of accommodation cannot be mailed out. Such lists would be out of date by the time you received them. Landlords and tenants prefer to meet each other before entering into an agreement. The Housing Office staff also assist 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.



Food Services on Campus

The Food Training Centre Building 2B

Food operations are mainly performed by students in the Professional Cook Training and Hospitality Administration programs. FTC service hours are as follows:

Snack Bar: Monday to Friday 0700 to 1330;
Cafeteria: Monday to Friday 0900 to 1900;
Dining Room Service: Tuesday and Thursday 1100-1300 (September to March)

Operated as a training service by Hospitality Administration students.

Bakery and Retail Meats Outlet

A variety of fresh baked goods is available from the commercial baking course for sale to staff, students and public. Choice depends on training but you're sure to get a good buy and FRESH products.

In the meat counters you'll find products from the Retail Meat Processing and Sausage Making and Smoked Meats programs. There's a wide variety of beef, veal, lamb, pork and deli products every day as well as ready-to-serve entrees. Again, choice depends on training. Freezer orders are also taken at the counter as well as special orders for cakes, pastry, meat and cheese trays.

The Campus Cafe

The Campus Cafe, Breezeway of Building 2N, is open **Monday through Thursday from 0700 to 1000** for breakfast cooked to order. Lunch is served from 1100 to 1330 and dinner from 1600 to 1930. At both lunch and dinner there's a choice of hamburgers made to order; pasta bar with choice of sauces and pastas; fresh fruit health bar; salad bar and the never-empty soup corner. The deli-bar offers sandwiches made to your order with seven kinds of bread, croissants and pita bread. In fine weather, the patio area has tables for eating outdoors. In the Campus Cafe there is a large non-smoking area and the surroundings are made pleasant by dozens of hanging plants. On **Friday** there is no evening service and **closing time is 1530.** On **Saturdays** the Campus Cafe opens for breakfast **from 0800 to 1000 and for lunch from 1100 to 1330;** coffee and snacks are available from opening to closing. The Campus Cafe is operated by Campus Food Services, BCIT. Questions may be addressed to the manager, Tony Spotzl, at local 8642.

Night School Service

Mobile coffee service is available in buildings 1A and 2N, Monday through Thursday from 1915 to 2015, for the convenience of those attending night classes. The Campus Cafe remains open until 2100 Monday through Thursday.

Forster's

Forster's operates two cafeterias on the north side of the campus. The J.W. Inglis building cafeteria is located on the second floor – at street level. It is open: Monday to Thursday 0630-2100, (the kitchen closes at 1900); Friday 0630-1500; Saturday 0800-1230. The Electrical Training Centre cafeteria is open every day at the same times, Monday-Friday, as the J.W. Inglis cafeteria and closed on Saturday. Both facilities offer a different entree everyday, all day; a grill, salad bar and hot soup as well as hot breakfasts.

Catering Service

Campus Food Services offers catering service for meetings, dinners and campus functions. Call local 5615 for information.

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.

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

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 at the parking office 0700-1600, Monday-Friday, year round. Sales of parking permits at other times will be announced in the campus media.

Parking for the Physically Challenged

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.

Canada Employment Centre

The Canada Employment Centre is located in Room 222 of building 1A, above the Bank of Commerce.

The office has two distinct functions. The first provides a placement service to certificate and diploma students in the technologies; this includes summer and part-time employment for undergrads as well as permanent work for alumni, who are welcome to use the service for two years after graduation. To assist new graduates, the Centre provides an on-campus recruiting program from January to June for employers to interview students for career positions, prior to graduation. The second function involves referral, documentation and maintenance of students into places purchased on their behalf by Employment and Immigration Canada.

The Centre is open throughout the year. Phone 432-8333 for more information.

Staff

Seann Lyncaster, Branch Manager

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 throughout the year, Monday through Friday. Extended hours of operation are offered at the beginning of each term. A schedule of dates and extended hours is posted in the bookstore prior to the commencement of each term.

Textbooks and educational material for courses at the Downtown Education Centre are available at the bookstore outlet at that location. This outlet is open at the start of the Fall and Winter terms. Telephone 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 Athletic Services

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 universal gym, free weights, exercise area, table tennis, ballet barre and much more. Four tennis courts, two sports fields, a fitness trail and exercise stations, as well as a 396 metre track offer excellent outdoor recreation. Complete shower facilities, change and locker rooms for both men and women are included.

Hours of Operation

September – May:
Monday-Thursday 0700-2300
Friday 0700-2100
Saturday 0900-1900
Sunday 0900-2100
June – August: to be announced.

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

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

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

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

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

Payment of Court Fees – All fees must be paid prior to court use. Current BCIT ID must be presented in order to get the student rate. Players are required to check in at the Equipment Office

prior to using the courts. A 10 minute grace period is provided for players to claim their courts. If left unclaimed, they may be resold to someone else, unless prepaid. Players must vacate their courts at the end of the specified booking period whether the game has ended or not. Failure to observe court courtesy rules will result in loss of playing privileges. Recreation and Athletic Services reserves the right to book court times for private lessons.

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

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

Intramurals – Leagues for volleyball, indoor soccer, ice 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.

Clubs – We organize activities such as trips or tournaments for weekends or midterm breaks. Some funding is available to assist in activity planning. Activities pursued by existing clubs include skiing, outdoor recreation, karate, scuba, sky-diving and photography.

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

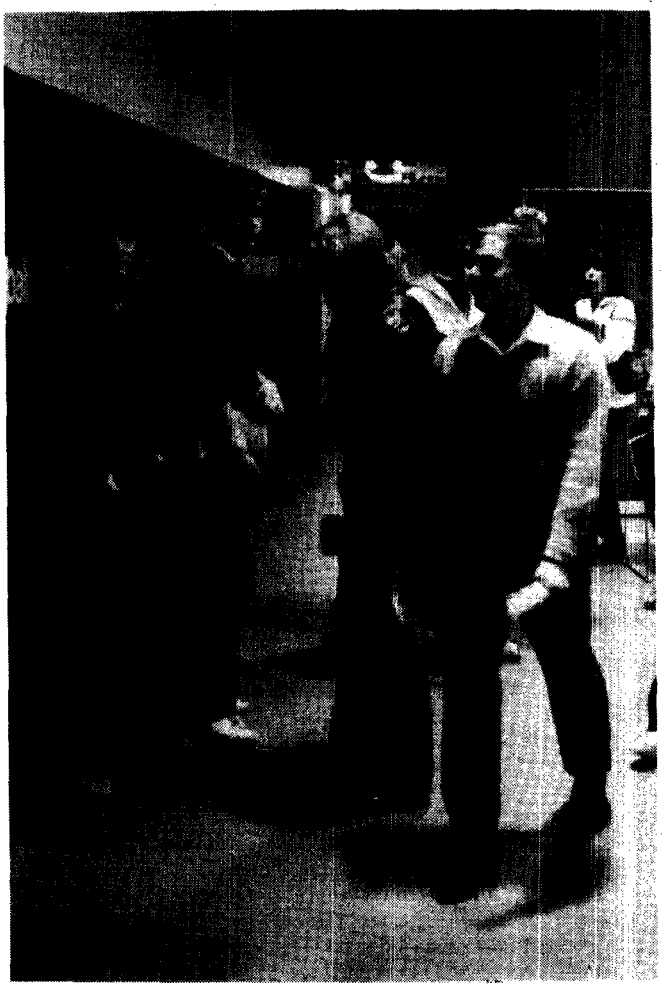
Aerobic Fitness Classes – A variety of classes are offered each term, mornings and afternoons, you can pay a per team fee or drop in at very reasonable rates.

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: $7 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 (Turkey Shoot, Challenge games, etc.), also recreational, low skill requirement, invitational and competitive tournaments with students and staff from UBC, SFU, Douglas College, etc. BCIT students are entitled to participate in any program. If you have any other interests that might attract students/staff, drop in or call the Recreation Programmer 432-8282.

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

Canada Games Pool (New Westminister)	10 tickets/$20.00
C.G. Brown Pool (Burnaby)	10 tickets/$13.00
Bonsor Pool (Burnaby)	10 tickets/$13.00



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

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

Intercollegiate Athletics – BCIT, in conjunction with funding assistance from the Student Association, will continue to embark on the gradual re-introduction of an intercollegiate athletic program for the 89/90 academic year.

- Badminton Men and Women
- Rugby Men
- Volleyball Men and Women
- Soccer Men and Women
- Basketball Men
- Hockey Men

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) 432-8287, 432-8613, 432-8282.

Equipment Office and Attendants (Racquet Court Bookings) 432-8612

Student Association

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

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

Another portion of the fee goes to pay for the SA's new Campus Centre, a multi-million dollar recreational and social complex organized and financed by the SA. Phase one, containing squash and racquetball courts, is now complete. Fund raising is under way for the new Campus Centre

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, known as "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.

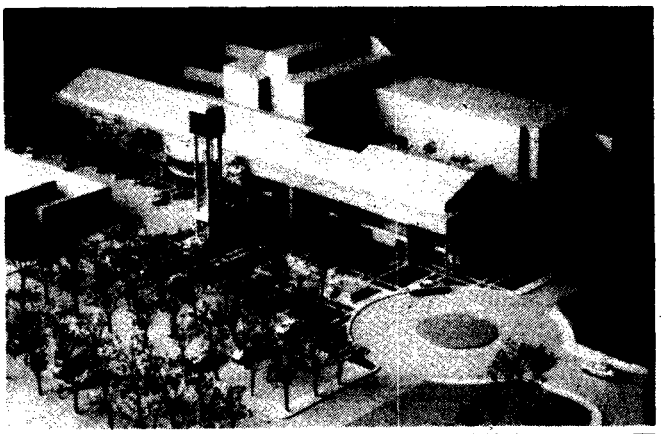
New ventures of the SA include Duke's Cookie and Coffee bar (in the SAC), an A&W restaurant in TAPS and Scholastic Insurance, an insurance company able to supply all your needs from car insurance (ICBC), renters/household insurance to full financial services. In addition, the SA now operates all vending copier machines on campus. New machines are installed in the library. Copies can also be obtained in the SAC. The SA is planning to open a travel service, located in the SAC, offering 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 across from "French Riviera's Sun Tanning Salon", also in the SAC. BCIT's SA deserves its reputation as "the best organized student union in western Canada".

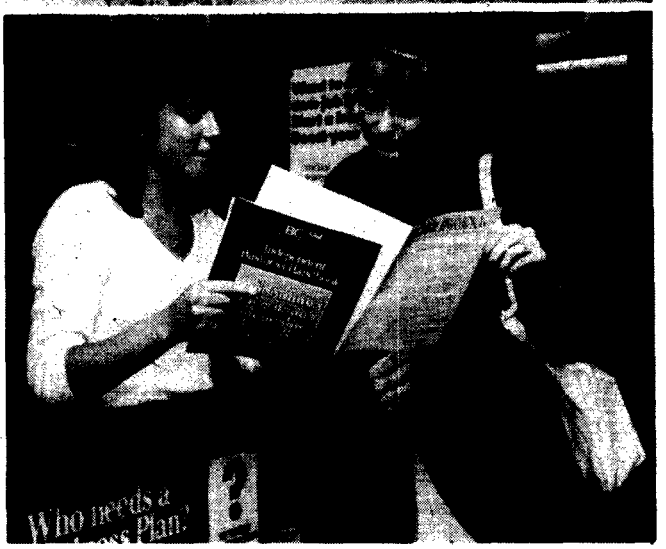
There are three "This 'n That" stores on campus. Store #1, on the ground level of the 2N Building, features school supplies, calculators, clothing, photo finishing, special class needs including tapes, floppy discs, technology jackets and drafting supplies; bus passes, newspapers, munchies, gift items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

A & W: The Student Association leases an A&W outlet at the SAC serving a variety of hot foods. Vending machines are located at several points around campus. These services are available from September to the end of June. The summer schedule is not confirmed at time of printing.

In the Inglis Building, there is an Employment Action Centre to assist trade students in their employment search.

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





The Executive and Council, in addition to managing the SA's internal affairs, are charged with representing BCIT 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 under the direction of Business Manager, Lorne Hildebrand. The managers for the various operations are: Linda Field – TNT Stores; Don Wright – Link; Janice Eden – Office; Ken Jack – Accounting; Betty McCallum – Employment Action Centre; Colleen Knox – Access Computers and Word Processing.

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. For skiers, the SA has access to a 24 bed chalet at Whistler Mountain, which is available year round to students at a reasonable nightly rent.

The 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. Students are also organized to help with the Variety Club Telethon each February. Over a quarter of a million dollars have been donated to charities in Vancouver by BCIT students.

Lost and Found

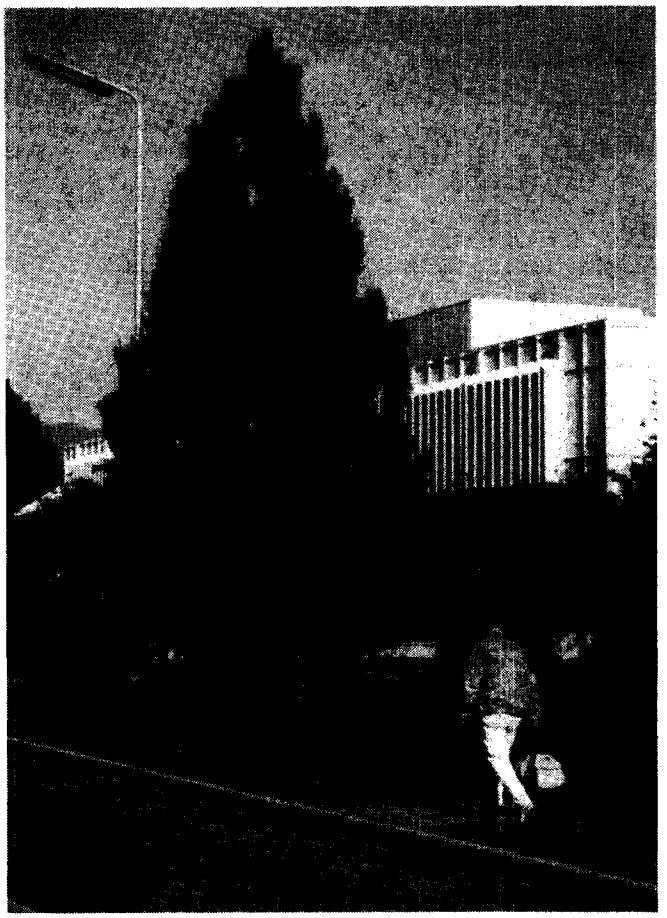
Please refer enquiries to Safety and Security at 432-8356. The Lost and Found is located in Building 1A, Room 130. Hours are 0800-0900 and 1200-1300, Monday to Friday.

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.

Banking

The Canadian Imperial Bank of Commerce provides an Instant Teller Machine with Interac Network, at the entrance to the 1A building.



Alumni Association

Alumni Executive:

President:	Robert Simons, (Marketing '72)
Vice President:	Tony Shelling, (Administrative Management '73)
Secretary:	Cinda Potter (Hospitality & Tourism '82)
Treasurer:	Grant Crittenden (Marketing Management '72)

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

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 memberships at the Alumni Office.

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

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

BCIT ALUMNI ASSOCIATION REGISTRATION FORM

NAME: _____ PHONE: Home _____

ADDRESS: _____ Work _____

_____ POSTAL CODE: _____

PROGRAM: _____ GRAD MONTH/YEAR: _____

Please return to: **BCIT ALUMNI ASSOCIATION** – 3700 Willingdon Avenue, Burnaby, B.C. V5G 3H2

DIVISION OF ACADEMIC SUPPORT

Kent Yakel, B.Sc.(Hons), M.Sc., Associate Dean, Academic Support
Camille Abel, Secretary
Judy Beresnak, Secretary

Chemistry Department
Mathematics Department
Physics Department
Communication Department
How to Make Up Course Deficiencies
Technology Fundamentals
Special In-House Communication Courses
English Language Proficiency
Pre-entry Courses

The Academic Support Division consists of the Chemistry, Communication, Mathematics and Physics departments. It offers courses and services to all students enrolled in technology programs offered by the Schools of Business, Engineering Technology, and Health Sciences as well as courses and services for trades and part-time students. It also offers non-credit, pre-entry courses to students who need to upgrade their academic prerequisites for admission to BCIT.

Courses taught by the Academic Support departments include the "core" of knowledge and skills, both theoretical and applied, which students need in order to understand and make the best use of their specialized technological training. Academic support courses are developed in conjunction with technology departments and advisory committees, and maintain an appropriate balance between applied and theoretical content.

Faculty and Staff

Kent Yakel, B.Sc.(Hons), M.Sc., Associate Dean

Department of Chemistry
C. Barnetson, B.Sc., Program Head
N. Abdurahman, B.Sc., M.Sc., Ph.D.
G.C. Anderson, M.I.Sc.T.(U.K.), M.C.I.C., A.Sc.T.
D.W. Conder, B.Sc., M.Sc.
C. Heady, Dipl.Tech.
T. Mepham, M.Sc., C.Chem., M.R.S.C.
M. Pickering, C.Tech., A.Sc.T.
S.M. Reynolds, B.A., M.Sc.
J. Salvo, B.Sc., B.Ed.
R. Tam, Dipl.Tech. M.C.S.C.T., M.A.C.S.
E.E. Tang, B.Sc.
L.V. Tolani, B.Sc., M.Sc., D.I.C., C.Chem., M.R.S.C.

Department of Mathematics
D. Sabo, B.Sc.(Hons.), Ph.D., Program Head
M.C. Bojadziev, Dip.Ing.
J.W. Brown, B.Sc.(Hons.), M.A.
A.K. Chu, B.A.Sc., P.Eng.
G. Cocksedge, B.Sc.For., M.Eng.
C.A. Copping, B.Sc.
A. Ellingsen, B.Sc.
E. Hiob, B.Sc., M.Sc., Ph.D.
P.M. Hobbins, B.Sc.
J. Kurz, B.Sc., M.S., Ph.D.
C.C. Lawrence, B.Sc.(Hons.)
E.R. Martin, B.Sc., M.Ed.
L. Routledge, B.A., B.Ed.
V. Sawadsky, B.A., B.Sc.(Hons.)
E.L. Toth, B.Sc.
B.L. Turner, B.Sc.

Department of Physics
D. MacDuff, B.Sc., Cert.Ed., Program Head
G. Bodnar
C. Deurzen, B.Sc., M.A., Ph.D.
F. DiSpirito, B.A.Sc, P.Eng.
L Greenwood, B.Eng., B.A., Cert.Ed.
H.D. Hecker, Dipl.Tech.
D.E.A. Kenyon, B.Sc.
A. Kshatriya, B.Sc., M.Sc., C.P.G.S.(Cantab.), M.Ed.
A. McArthur, B.Sc.(Hons.), Cert.Ed.(Cantab.)
U. Olcay, B.Sc.
W.V. Olson, B.Sc., M.Sc.
G.R. Paulson
J.R. Saunders, B.Sc., M.Sc.
G. Schellenberg, Dipl.Tech.
D.E. Thom, B.Sc.
L. Warren, B.A., M.A.
W.T. Withers

Communication Department
David Helgesen, B.A., M.B.A., Program Head
Patrick Burns, B.A., M.A.
Rider Cooey, B.A.(Hons.)
Grant Douglas, M.Ed.
Sue Fahey, B.A., M.A.
David Hamilton, B.Sc.
Douglas Horan, B.Journ., B.A.(Hons.)
Valda Johnston, B.A., B.Ed.
Wayne Kean, B.A., M.A.
David Kipling. F.E.T.C., A.L.A.(U.K.)
Ron Knott, B.A.(Hons.), M.Ed.
Richard Lund, B.A.(Hons.), M.A.
Jennifer Nachlas, B.A.(Hons.), M.A., Ph.D.
Bill Oaksford, B.A., M.A.
Michael Otte, B.A.(Hons.), M.A.
Lorraine Robson, B.A., M.A.
Barbara Schillinger, B.A., M.A.
Jean Scribner, B.A., M.A.
Rudy Spence, B.Comm., B.A., M.Ed.
Don Steele, B.A.(Hons.)
Eileen Stephens, B.A., M.A.
David Vale, B.A., B.Ed., M.Ed.
Kathy Vance, B.A.(Hons.), M.A., Ph.D.
Susan Woo, B.Sc.

On Leave
Greg Layton, B.A.
Rodney D. Lynn, B.Sc.(Hons.), M.S.B.A., F.I.M.A.
David McNeal, B.A., M.A., Ph.D.
Maureen Moore, B.A., M.A.
Dixie Stockmayer, B.A.(Hons.)
Walter Swetlishoff, B.Ed.
Patrick Thomas, B.A., B.Ed., M.A.
Anita Willson, B.A., M.A.

The Academic Support Division offers Communication, Chemistry, Mathematics and Physics course components for full-time and part-time programs.
Pre-entry courses are offered throughout the year to students needing entrance requirements for BCIT. These courses will be of interest to mature students who need refreshers, or to students who do not have the necessary prerequisites for entrance into BCIT programs.

Academic support courses are offered throughout the year in many forms:

- as 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 Technology Fundamentals, in both September and January)

Interested students are encouraged to call 432-8723 for further information.

How to Make Up Course Deficiences

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

Technology Fundamentals

Technology Fundamentals is an upgrading program to assist full-time student applicants who lack some or all of the prerequisites for admission into BCIT programs.

Technology Fundamentals is a full-time, day school program (Monday through Friday) beginning in September and January, and running for 15 weeks.

For admission into Technology Fundamentals, applicants **must** indicate which BCIT technology program they are applying for and which session (September or January) of the Technology Fundamentals program they wish to enroll in. Applicants must attach all necessary supporting documents. Technology Fundamentals students may be guaranteed entry to their full-time technology programs, subject to successful completion of the Technology Fundamentals program and in some cases, nonacademic requirements. Participating technologies include:

Biological Sciences
Building
Chemical Sciences
Civil and Structural
Electronics
Forestry
Health Information
Mechanical
Mechanical Systems
Mining
Occupational Health and Safety
Petroleum
Surveying and Mapping

For further information contact 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.

Pre-entry courses are offered in each of the BCIT terms: September, January, April and throughout the summer months. Check the Part-time Studies flyer for dates, or phone 432-8723.

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

Course Descriptions

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 and their 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 – Develops the basic skills needed for the business and technical writing at BCIT. This 24-hour course prepares you for the heavy writing requirements in day school programs. You will find it especially useful if you are uncertain of your skills in business and technical writing. Topics include organization, paragraph development and effective sentences in letter and memo writing. **non credit**

COMM 002 Independent Learning Skills – This course teaches you how to study on your own, manage your time, cope with heavy workloads and get the most from new instructional techniques. It includes textbook reading, learning from objectives, using computer-managed learning packages, reading efficiently, completing assignments, taking exams successfully and managing your time. Especially useful for students entering the Electronics options. **non credit**

COMM 003 Comprehensive Reading, Writing and Learning Skills – An integrated 80 hour course which emphasizes the reading, writing and study skills needed for entering a full-time program at BCIT. This course covers all the topics outlined in COMM 001 and COMM 002 as well as speed reading, reading comprehension, library research and short report formats. If your mark in B.C. English 12 does not meet BCIT's entrance requirement, 65% or better in this course will meet **BCIT's C in English 12 entrance requirement** for day school programs. **non credit**

COMM 004 Technical English as a Second Language – This 80-hour course is for students whose first language is not English, who have studied English, but need practice in applying their language skills to technical studies, or need to upgrade their English to meet the Institute's English language requirement. This integrated language course focuses on the reading, writing, listening and speaking skills required for technical communication and will include reading efficiency, vocabulary expansion, sentence and paragraph development. 65% or better in this course will meet BCIT's English language entrance requirement for day school programs. **non credit**

MATHEMATICS

MATH 001 Technical Mathematics – 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 Algebra 12 entrance requirements at BCIT. Students intending to enter a technology which requires an Algebra 12 grade of C+ or better, must achieve a final mark of 65% or higher in MATH 001. Prerequisite: C or better in Algebra 11 or approved equivalent math course. **non credit**

MATH 002 Technical Mathematics Introduction (Correspondence) – Flexible entry correspondence course that satisfies the Algebra 12 entrance requirement for BCIT. Students intending to enter a BCIT technology which requires an Algebra 12 grade of C+ or better must achieve a final mark of 65% or higher in MATH 002. Students who have difficulty with mathematics or those who have been away from school more than three years are advised to take the classroom course (see P/T offering – MATH 001). Prerequisite: a pass in Algebra 11 or an approved equivalent mathematics course. **non credit**

PHYSICS

PHYS 009 Pre-entry Physics – This course is designed for those students who lack the physics prerequisite to enter their chosen technologies or those who anticipate difficulty in passing the physics course associated with their technology. The course offers an introduction to physics, its basic principles and common applications. Approximately two-thirds of the course deals with mechanics, the remainder with heat and geometric optics. Problem-solving techniques are emphasized. Prerequisite: you are advised to have completed any necessary mathematics upgrading courses BEFORE taking PHYS 009. **non credit**

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

School of Business

Office of the Dean

Lorne A. Fingarson, B.Comm., Acting Dean

Lynne Larsson, Administrative Assistant/Executive Secretary
Lexi Leeson, Secretary

Technology Programs

ADMINISTRATIVE SYSTEMS

Management Systems
Human Resource Systems
Operations Management
Transportation and Distribution
International Trade
Business Administration

The Administrative Systems Technology offers five distinct diploma programs: Management Systems, Human Resource Systems, International Trade, Operations Management and Transportation/Distribution. The technology also offers a post-diploma program – Business Administration.

POTENTIAL STUDENTS SHOULD CONSIDER THESE PROGRAMS CAREFULLY TO DECIDE WHICH FIELD OF STUDIES THEY WISH TO PURSUE AND **MUST** APPLY FOR THE SPECIFIC PROGRAM OF THEIR CHOICE. (NOTE THE SPECIAL CONDITIONS FOR ACCEPTANCE TO THE HUMAN RESOURCE SYTEMS PROGRAM IN LEVEL 3).

Management Systems

This program is designed to enable managers to develop the knowledge and skills necessary to meet the continuing need for microcomputer applications in business. The student is provided with a solid core of instruction in management, finance, marketing and production, 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

The decentralization of office automation and decision support systems into the hands of individual users creates a need for people with managerial and microcomputer applications skills in all areas of a business organization. Graduates of the Management Systems program work in planning, banking, finance, production and marketing in companies of all sizes; many operate their own businesses.

The Program

School of Business programs are currently under review in light of BCIT's new mandate. As a result, modifications will be in effect for September 1989.

Following a year of core business courses, students specialize in Management Systems. They 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 190 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.

Prerequisites

Algebra 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.

Admission may be granted to mature students who can provide evidence of probable success in the program.

Direct Entry

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.

Post-graduation

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

PROGRAM: Management Systems

Level 1		Clrm hrs/wk
ADMN 100	Microeconomics	3.0
ADMN 110	Management 1	3.0
BCOM 102	Business Communication for Management Systems	3.0
COMP 100	Data Processing: Introduction	4.0
FMGT 101	Accounting 1	4.0
MKTG 102	Introduction to Marketing	3.0
OPMT 110	Business Mathematics	4.0

Level 2		Clrm hrs/wk
ADMN 190	Microcomputer Applications 1	4.0
ADMN 200	Macroeconomics	3.0
ADMN 211	Management 2	*3.0
ADMN 217	Workshop	2.0
ADMN 220	Organizational Behavior	*4.0
BCOM 202	Business Communication for Management Systems	3.0
COMP 120	Computers in Business	3.0
FMGT 201	Accounting 2	4.0
OPMT 130	Business Statistics	4.0
Level 3		
ADMN 310	Management Science	3.0
ADMN 330	Industrial Relations	4.0
ADMN 340	Personnel Administration	3.0
ADMN 360	Microcomputer Applications 2 (Data bases)	3.0
ADMN 385	Business Law	4.0
FMGT 304	Management Accounting	4.0
FMGT 307	Finance 1	4.0
MTKG 334	Applied Marketing and Selling	3.0
Level 4		
ADMN 410	Management Policy	3.0
ADMN 490	Directed Studies	6.0
FMGT 404	Finance 2	4.0
FMGT 418	Microcomputer Accounting	*4.0
OPMT 170	Management Engineering	4.0
TDMT 352	Transportation	*4.0

In addition students will take:

ADMN 460	Microcomputer Applications 3	4.0
or		
ADMN 421	Electronic Communications	*4.0
ADMN 462	Microcomputer Applications	*4.0

* Half term courses

If resources are not available to provide ADMN 460 to all students who opt for the course, student selection will be based on performance in previous microcomputer courses.

PROGRAM: Management Systems – January Intake

Level 1		Clrm hrs/wk
ADMN 110*	Management 1	*4.0
ADMN 191	Microcomputer Applications 1	4.0
ADMN 200	Macroeconomics	3.0
ADMN 217	Workshop	2.0
ADMN 219*	Organizational Behavior	*4.0
BCOM 108	Business Communication	3.0
COMP 106	Data Processing: Introduction	4.0
FMGT 115	Accounting 1L	4.0
OPMT 112	Business Mathematics	4.0
Level 2		
ADMN 100	Microeconomics	3.0
ADMN 211	Management 2	3.0
BCOM 208	Business Communication	3.0
COMP 125	Computers in Business	3.0
FMGT 215	Accounting 2S	4.0
MKTG 102	Introduction to Marketing	4.0
OPMT 132	Business Statistics	4.0

* Half term courses

Course Descriptions

ADMN 100 Microeconomics – The major areas studied are the product and resource market. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored.

ADMN 110 Management 1 – A study of the management functions of planning, organizing and staffing. Included are such topics as forms of business ownership, tactical and strategic planning, decision-making, structuring the organization and providing human resources. Emphasis is varied depending on the technology for which the course is provided. Students are given the opportunity to develop analytical and communication skills by analyzing and presenting solutions to typical business problems.

ADMN 190 Microcomputer Applications 1 – An introduction to microcomputers and software. Students become familiar with software programs to be used in other program areas. Prerequisite: COMP 100.

ADMN 191 Microcomputer Applications 1 – See ADMN 190.

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 211 Management 2 – A continuation of ADMN 110. The management functions of leading and controlling are emphasized. Topics include motivation, leadership, production planning and control, and budgeting. Prerequisite: ADMN 110.

ADMN 217 Workshop – Students working in small groups contact a business or service organization to gather complete information on the organization – its history, organizational structure, financial background, product/service, scope of operation, and marketing strategy. This information is presented to the class using audiovisual techniques. Benefits to the students are a better understanding of the application of management theory and organization, and practice in formal class presentation.

ADMN 219 Organizational Behavior – See ADMN 220.

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

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, OPMT 130.

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

ADMN 340 Personnel Administration – An introduction to the fundamentals of personnel management, including organization of the personnel function, salary administration, fringe benefits, training, management development and performance appraisal, constructive discipline, grievances and morale. Prerequisite: ADMN 220.

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 190 or 191.

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 Department 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 or 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.

BCOM 102 Business Communication for Management Systems – Students develop the skills required to write effective letters and memos used in business and industry. Students also receive instruction in preparing and presenting oral reports.

BCOM 108/208 Business Communication – See BCOM 102/202. The sequence of topics may differ.

BCOM 202 Business Communication for Management Systems – Gives further instruction and practice in the principles taught in BCOM 102. The course concentrates on more sophisticated forms of written communication: the job application package, informational and analytical reports, and research proposals. It also includes modules on graphics, questionnaires, telephone techniques, organizing and running meetings, and using word processors. Prerequisite: BCOM 102.

COMP 100 Data Processing: Introduction – Offers training in basic data processing principles to develop recognition of the application of these principles to industry. The principal functions of data processing are illustrated and practised with an H.P. minicomputer operating interactively. Elementary computer programs are written and tested on the computer. Use of flowcharting and elementary data processing systems design will illustrate the achievement of data processing objectives.

COMP 106 Data Processing: Introduction – See COMP 100.

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 100.

COMP 125 Computers in Business – See COMP 120.

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 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 inventory, long-lived assets, liabilities, forms of business organizations, cash-flow and working capital analysis, manufacturing accounting, management accounting, consolidated statements, analysis of financial statements and price level changes. Prerequisite: FMGT 101.

FMGT 215 Accounting 2S – Follow-up course to FMGT 115, enabling students to complete the last 12 weeks of the basic accounting course. See FMGT 201 for details. Prerequisite: FMGT 115.

FMGT 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 – Instructs students in raising 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 – 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.

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

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 preprogrammed calculator, and practical application from the field of Financial Management.

OPMT 112 Business Mathematics – See OPMT 110.

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 132 Business Statistics – See OPMT 130.

OPMT 170 Management Engineering – An industrial engineering approach to problem-solving with particular application to administrative management problems. Includes method study, charting and analysis, work measurement, facility layout. Also provides training in production and inventory management. 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.

Faculty and Staff

B.R.M. Morrow, B.Comm., Associate Dean
C. Clark, B.A., M.A.
M. Baxter, B.B.A., Dipl.Tech., CPHI(C)
G.E. Bissell, B.Comm., M.A..
D. Davis, B.A., M.A., LL.B.
C.J. Dickhoff, B.A., M.A., (Econ.), M.A. (Public Admin.)
H.G.J. Herron, B.A. (Cert. Public Admin.)
R.W. Hooker, B.A., B.Sc., M.A., LL.B., Senior Instructor
C.L.R. Jaques, B.A., M.A.
L.E. Johnson, B.B.A., M.B.A., Program Head
L. Jones, B.Sc., M.Sc.
T.P. Juzkow, B.A.Sc., M.B.A., P. Eng., Program Head
F. Mandl, B.Sc., M.B.A.
D. Schram, B.Comm., M.Sc. (Intn. Bus.)
R.M. Sharp, B.A.Sc., M.B.A., P.Eng.
G. Storey, B.A., M.Sc.
N.E. Stromgren, C.D., B.A., M.Ed. (Admin.), Program Head
B. van der Woerd, B.A., Program Head
F.C. Williams, B.A. (Hons), M.A.
R.A. Yates, LL.B., M.B.A.

Prerequisite Guide

Course:	Prerequisites required
	Level 1
	Acceptance into the program
	Level 2
ADMN 190	COMP 100
ADMN 191	None
ADMN 200	None
ADMN 211	ADMN 110
ADMN 217	None
ADMN 219/220	None
BCOM 202/208	BCOM 102/108
COMP 120	COMP 100
FMGT 201 or 215	FMGT 101 or 115
OPMT 130	None
	Level 3
ADMN 310	OPMT 110, 130
ADMN 330	None
ADMN 340	ADMN 219/220
ADMN 360	ADMN 190/191
ADMN 385	None
FMGT 304	FMGT 201 or 215
FMGT 307	FMGT 201 or 215
MKTG 334	MKTG 102
	Level 4
ADMN 410	All Level 1 through 3 courses or permission of the instructor
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 instructor
FMGT 404	FMGT 307
FMGT 418	FMGT 101 or 115
OPMT 170	OPMT 110
TDMT 352	OPMT 110 and ADMN 385

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Human Resource Systems

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, labor/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

School of Business programs are currently under review in light of BCIT's new mandate. As a result, modifications will be in effect for September, 1989.

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.

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.

Prerequisites

Algebra 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.

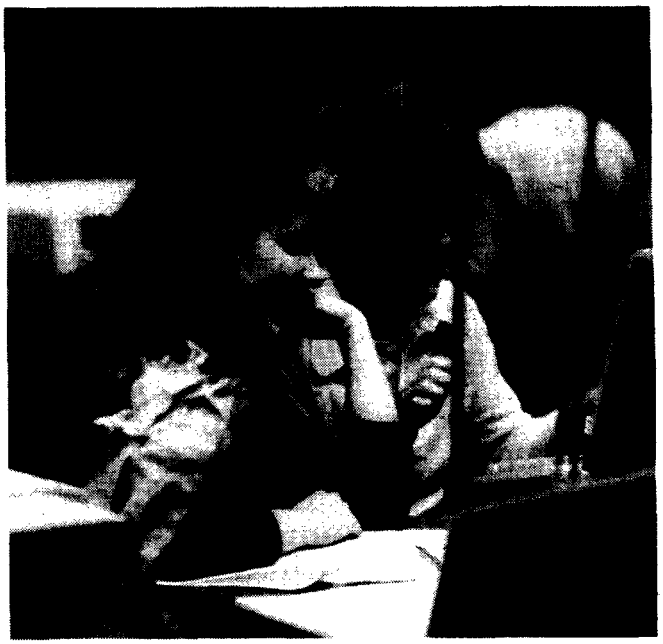
Admission may be granted to mature students who can provide evidence of probable success in the program.

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 scholastic 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 student's academic record and work experience. This review may identify courses to be completed prior to admission into the program.

Program: Human Resource Systems

		Clrm hrs/wk
Level 1		
ADMN 100	Microeconomics	3.0
ADMN 110	Management 1	3.0
BCOM 102	Business Communication for Management Systems	3.0
COMP 100	Data Processing: Introduction	4.0
FMGT 101	Accounting 1	4.0
MKTG 102	Introduction to Marketing	3.0
OPMT 110	Business Mathematics	4.0
Level 2		
ADMN 190	Microcomputer Applications 1	3.0
ADMN 200	Macroeconomics	3.0
ADMN 211	Management 2	*3.0
ADMN 217	Workshop	2.0
ADMN 220	Organizational Behavior	*4.0
BCOM 202	Business Communication for Management Systems	3.0
COMP 120	Computers in Business	3.0
FMGT 201	Accounting 2	4.0
OPMT 130	Business Statistics	4.0

* Half Term Courses

Level 3		
ADMN 310	Management Science	3.0
ADMN 321	Interpersonal Skills Development	2.0
ADMN 330	Industrial Relations	4.0
ADMN 341	Human Resource Planning and Analysis	4.0
ADMN 346	Compensation Management	3.0
ADMN 360	Microcomputer Applications 2 (Databases)	3.0
ADMN 385	Business Law	4.0
FMGT 307	Finance 1	4.0

Level 4		Clrm hrs/wk
ADMN 410	Management Policy	3.0
ADMN 430	Collective Bargaining	3.0
ADMN 440	Personnel Management Systems	4.0
ADMN 441	Interviewing Skills	*4.0
ADMN 442	Training and Development	*4.0
ADMN 447	Benefits Administration	*4.0
ADMN 490	Directed Studies	6.0
FMGT 404	Finance 2	4.0
OH&S 433	Occupational Health and Safety	*4.0

* Half term courses

Course Descriptions

ADMN 100 Microeconomics – The major areas studied are the product and resource market. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored.

ADMN 110 Management 1 – A study of the management functions of planning, organizing and staffing. Included are such topics as forms of business ownership, tactical and strategic planning, decision-making, structuring the organization and providing human resources. Emphasis is varied depending on the technology for which the course is provided. Students are given the opportunity to develop analytical and communication skills by analyzing and presenting solutions to typical business problems.

ADMN 190 Microcomputer Applications 1 – An introduction to microcomputers and software. Students become familiar with software programs to be used in other program areas. Prerequisite: COMP 100.

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 211 Management 2 – A continuation of ADMN 110. The management functions and practices of leading and controlling are emphasized. Topics include motivation, leadership, production planning and control, and budgeting. Prerequisite: ADMN 110.

ADMN 217 Workshop – Students working in small groups, contact a business or service organization to gather complete information on the organization – its history, organizational structure, financial background, product/service, scope of operation, and marketing strategy. This information is presented to the class using audiovisual techniques. Benefits to the students are a better understanding of the application of management theory and organization, and practice in formal class presentation.

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

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, OPMT 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 220.

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

ADMN 341 Human Resource Planning and Analysis – An introduction to the skills and concepts associated with employee data collection and analysis for strategic and human resource planning purposes. Employment planning models, job analysis techniques and statistical methods of measurement are addressed.

ADMN 346 Compensation Management – A review of contemporary compensation management issues such as pay equity, pay compression and confidentiality, and wage and salary administration techniques, including job analysis, job evaluation, compensation surveys, and pay-for-performance systems.

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 190 or 191.

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 Department Head.

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

ADMN 440 Personnel Management Systems – Develops competence in several key personnel practitioner areas, including job evaluation techniques, wage and salary administration functions, and performance appraisal techniques. Two hours a week of microcomputer applications laboratory time are included for preparation of course assignments that use microcomputer applications. Prerequisite: ADMN 341.

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 or training in industry. Prerequisite: ADMN 321.

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 and mandatory retirement. 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 102 Business Communication for Management Systems – Students develop the skills required to write effective letters and memos used in business and industry. Students also receive instruction in preparing and presenting oral reports.

BCOM 202 Business Communication for Management Systems – Gives further instruction and practice in the principles taught in BCOM 102. The course concentrates on more sophisticated forms of written communication: the job application package, informational and analytical reports, and research proposals, It also includes modules on graphics, questionnaires, telephone techniques, organizing and running meetings, and using word processors. Prerequisite: BCOM 102.

COMP 100 Data Processing: Introduction – Offers training in basic data processing principles to develop recognition of the application of these principles to industry. The principal functions of data processing are illustrated and practised with an H.P. minicomputer operating interactively. Elementary computer programs are written and tested on the computer. Use of flowcharting and elementary data processing systems design will illustrate the achievement of data processing objectives.

COMP 120 Computers in Business – Designed to give the student an understanding of business computer systems. Topics include computer hardware - types, usage, evaluation; systems development - feasibility studies, analysis, design, implementation; packaged software - use and evaluation. Emphasis will be placed on areas of particular interest to specific technologies. Prerequisite: COMP 100.

FMGT 101 Accounting 1 – Permits persons with little or no accounting background to come 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 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 Introduction to Marketing – Includes a detailed study of basic marketing functions, market research, product planning, selection of trade channels, merchandising, advertising, sales promotion and salesmanship. Marketing of consumer goods as well as industrial goods will be covered.

OH&S 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

Course:	Prerequisite required
	Level 1
	Acceptance into the program
	Level 2
ADMN 190	COMP 100
ADMN 191	None
ADMN 200	None
ADMN 211	ADMN 110
ADMN 217	None
ADMN 219/220	None
BCOM 202 or 208	BCOM 102 or 108
COMP 120	COMP 100
FMGT 201 or 215	FMGT 101 or 115
OPMT 130	None
	Level 3
ADMN 310	OPMT 110 and OPMT 130
ADMN 321	ADMN 220 or 219
ADMN 330	None
ADMN 340	ADMN 220 or 219
ADMN 341	None
ADMN 360	ADMN 190 or 191
ADMN 385	None
FMGT 307	FMGT 201 or 215
	Level 4
ADMN 410	All Level 1 through 3 courses or permission
ADMN 430	ADMN 330
ADMN 440	ADMN 341
ADMN 441	ADMN 321
ADMN 442	ADMN 321
ADMN 447	ADMN 346
ADMN 490	All Level 1 through 3 courses or permission
FMGT 404	FMGT 307
OH&S 433	None

Faculty and Staff

B.R.M. Morrow, B.Comm., Associate Dean
C. Clark, B.A., M.A.
M. Baxter, B.B.A., Dipl.Tech., CPHI(C)
G.E. Bissell, B.Comm., M.A.
D. Davis, B.A., M.A., LL.B.
C.J. Dickhoff, B.A., M.A., (Econ.), M.A. (Public Admin.)
H.G.J. Herron, B.A. (Cert. Public Admin.)
R.W. Hooker, B.A., B.Sc., M.A., LL.B.
C.L.R. Jaques, B.A., M.A.
L.E. Johnson, B.B.A., M.B.A.
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. Schram, B.Comm., M.Sc. (Intn. Bus.)
R.M. Sharp, B.A.Sc., M.B.A., P.Eng.
G. Storey, B.A., M.Sc.
N.E. Stromgren, C.D., B.A., M.Ed. (Admin.)
B. van der Woerd, B.A., Program Head
F.C. Williams, B.A. (Hons), M.A.
R.A. Yates, LL.B., M.B.A.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Operations Management

We offer our students a stimulating, practical 2-year program which combines engineering and business. Our graduates possess the sought after skills that help industry become more productive.

During your time with us, you will be taking courses in industrial engineering, human dynamics, materials management and computer systems. This program stresses productivity improvement so that, upon graduation, you will be prepared to solve business problems and become a valued member of the management team.

Operations Management Program graduates are excellent candidates to pursue professional membership in:

- The Institute of Industrial Engineers,
- The American Production and Inventory Control Society,
- Data Processing Management Association,
- Project Management Institute

School of Business programs are currently under review in light of the new BCIT mandate. As a result, modifications will be in effect for September 1989.

Job Opportunities

Graduates have found career opportunities in a variety of industries including manufacturing, service, distribution and government. They may work in a variety of dynamic, highly paid management positions such as: production scheduler, inventory manager, industrial engineer, systems analyst, production supervisor, data processing manager, management engineer, programmer analyst, inventory planner, quality control inspector, buyer, materials manager, purchaser, work study analyst, project planner, warehouse supervisor, terminal manager.

Students applying for admission to Operations Management program should ask themselves the following questions:

Do I want to be a manager?
Do I enjoy a challenge?
Do I like working with people?
Do I want to work with computers?
Do I welcome the opportunity to improve performance by changing present systems?
Do I want to develop systematic problem-solving ability?

If the the answer is yes-then apply to the Operations Management Technology program and start charting your future.

Prerequisites

Algebra 11 and English 12 both with C+ (Physics II is desirable). This requirement may be waived for mature students on approval by the Associate Dean. 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: Operations Management

Level 1		Clrm hrs/wk
BCOM 107	Business Communication	3.0
CHSC 122	Engineering Concepts	3.0
COMP 100	Data Processing Introduction	4.0
FGMT 101	Accounting 1	4.0
MECH 102	Drafting	2.0
OPMT 100	Applied Mathematics 1	5.0

OPMT 140	Introduction to Operations Management	3.0
OPMT 152	Introduction to Applied BASIC	3.0
OPMT 160	Method Study	3.0
PHYS 117	Basic Science for Operations Management	3.0

Level 2

ADMN 200	Macroeconomics	3.0
ADMN 221	Human Resource Management	2.0
BCOM 207	Business Communication for Operations Management	3.0
FMGT 201	Accounting 2	4.0
MECH 207	Engineering Concepts	3.0
OPMT 120	Applied Mathematics 2	4.0
OPMT 240	Applied Industrial Engineering 1	4.0
OPMT 250	Microcomputer Applications: Programming and Spreadsheets	3.0
OPMT 251	Systems and Procedures	3.0
PHYS 217	Basic Science for Operations Management	3.0

Level 3

ADMN 100	Microeconomics	3.0
ADMN 343	Human Resource Management	2.0
CDCM 323	CAD for Operations Management	2.0
FMGT 306	Cost Accounting-Operations Management	3.0
OPMT 244	Performance Measurement	4.0
OPMT 300	Quantitative Methods 1	5.0
OPMT 340	Applied Industrial Engineering 2	3.0
OPMT 348	Production and Inventory Management 1	5.0
OPMT 350	Microcomputer Applications: Database	3.0

Level 4		4A	4B
ADMN 330	Industrial Relations	3.0	3.0
OPMT 245	Quality Assurance (Manufacturing)	2.0	0.0
OPMT 400	Quantitative Methods 2	5.0	3.0
OPMT 441	Industrial Health and Safety	2.0	0.0
OPMT 442	Materials Handling and Distribution	3.0	0.0
OPMT 443	Applied Industrial Engineering 3	4.0	0.0
OPMT 448	Production and Inventory Management 2	5.0	2.0
OPMT 449	Applied Industrial Engineering 4	0.0	19.0
OPMT 450	Microcomputer Solutions for Business	3.0	0.0
OPMT 497	Business Evaluation Systems	3.0	3.0

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 understanding of the organization and operation of the Canadian Economy in an international setting. The theoretical tools of the economist are used to expand the concepts of national income employment, inflation, money and banking, international trade, and growth. An appreciation of the relationship between economic theory and economic policy is provided.

ADMN 221 Human Resource Management – Studies human behavior and attitudes in an organizational setting; the organization's effect on the person's perceptions, feelings and actions; and the person's effect on the organization, particularly how behavior affects the achievement of the organization's purposes. Concepts of leadership, communications, power, authority, change and conflict will be examined.

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

ADMN 343 Human Resource Management – An Introduction to the fundamentals of personnel management, including human resource planning; recruiting and selection techniques; job analysis, descriptions and evaluation; compensation administration; performance appraisal systems; training; employee safety and health. Includes a review of current employee legislation.

BCOM 107 Business Communication for Operations Management – An applied communication course for Operations Management students. it covers the basic writing and oral communication skills necessary in business and industry. Students learn how to write effective letters and memos and how to prepare and make oral presentations. The course also includes a unit on using word processors.

BCOM 207 Business Communication for Operations Management – Gives further instruction and practice in the skills learned in BCOM 107. In this term, the focus is on job application, functional reports, telephone techniques and meetings. Prerequisite: BCOM 107.

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 Engineering Concepts - Examines comparative properties of all classes of engineering materials including metals, alloys, polymers, concrete, wood and ceramics. Common causes of failure in service including fatigue, weathering, embrittlement and corrosion.

COMP 100 Data Processing Introduction - Lectures and practical exercises are used to present such topics as hardware (input, output, and storage devices), system software (DOS), application software (WordPerfect), data communications, mainframe computers, and networking.

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 202 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 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 202.

MECH 102 Drafting – Introduces students to engineering drawings as a method of communication. Student will learn how to read various types of blueprints and how to communicate using drawings. Emphasis is on visualization, dimensioning and freehand sketching.

MECH 207 Engineering Concepts – Through lectures and laboratory investigations, the course covers the basics of manufacturing processes such as welding, brazing, soldering; metal removal on lathes, milling and grinding machines; computer numerical controlled machine tools.

OPMT 100 Applied Mathematics 1 – Covers basic mathematics applied to industry and commerce. Topics include basic algebra, trigonometry, break-even analysis, simple and compound interest, annuities and methods of evaluating alternatives in industrial investments.

OPMT 120 Applied Mathematics 2 – Cover 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 140 Introduction to Operations Management – Provides an introduction to the role of business in the British Columbia economy. It considers the management of business and emphasizes the types of careers available to Operations Management graduates in B.C. business.

OPMT 152 Introduction of Applied BASIC – BASIC programming in an Operations Management context. Topics include the systematic approach to programming, BASIC commands, arithmetic operations, input and output, branching and looping.

OPMT 160 Method Study – This introductory course in industrial engineering presents a six step systematic approach to methods improvement. The student will learn specific industrial engineering techniques.

OPMT 240 Applied Industrial Engineering 1 – Builds on OPMT 160 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 160.

OPMT 244 Performance Measurement – Designed to provide the student with an appreciation of work measurement in an industrial setting. Topics include performance rating, time study and predetermined motion time systems such as M.T.M. 2, M.O.S.T. and computerized M.O.S.T. Prerequisite: OPMT 160.

OPMT 245 Quality Assurance (Manufacturing) – 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 programs.

OPMT 250 Microcomputer Applications: Programming and Spreadsheets – Part 1: A continuation of OPMT 152. The use of advanced BASIC to solve problems common to specific programs. Topics include arrays, functions, random numbers and simulation. Part 2: Introduction to spreadsheets. The use of Lotus 1-2-3 to solve problems common to specific programs. Prerequisite: COMP 100, OPMT 152.

OPMT 251 Systems and Procedures – An introduction to a variety of techniques for analyzing and improving administrative and support systems within organizations. Topics include the systematic approach to problem-solving, workload measurement, charting information flow, forms analysis and design, and development of policy and procedure manuals. Prerequisite: OPMT 160.

OPMT 300 Quantitative Methods 1 – Applications of mathematical and computer modelling to decision-making in business and industry. Topics include model building, break-even analysis, decisions theory, decision support systems, linear programming, queuing theory, simulation models, demand analysis, forecasting methods and computer applications.

OPMT 340 Applied Industrial Engineering 2 – 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, group technology and computer integrated manufacturing are explored. Prerequisite: OPMT 240, 251.

OPMT 348 Production and Inventory Management 1 – The emphasis of this course and the continuing course (OPMT 448) 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 (Certification in Production and Inventory Management). The two exams are Inventory Management and Master Planning. Project planning and scheduling is also covered.

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, 152; COMP 100.

OPMT 400 Quantitative Methods 2 – A continuation of OPMT 300. Prerequisite: OPMT 300.

OPMT 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 442 Materials Handling and Distribution – Introduction to materials handling. Basic uses and applications of conveyors, trucks and cranes.

OPMT 443 Applied Industrial Engineering 3 – Presentation to the board. Specific oral presentation design and delivery. This course is intended as practice for fourth term projects. Mini projects: In preparation for fourth term projects, students are required to negotiate a management level project of their own choosing within BCIT. Students are required to develop working terms of reference with BCIT staff and faculty and complete the project consistent with the terms of reference. Prerequisite: Successful completion of Level 1 and 2 courses.

OPMT 448 Production and Inventory Management 2 – A continuation of OPMT 348. This course 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 348.

OPMT 449 Applied Industrial Engineering 4 – BCIT's Operations Management technology requires that each of its second year students successfully conducts and completes 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 finding and recommendations. Prerequisite: Successful completion of all Level 1, 2, 3 and 4 courses.

OPMT 450 Microcomputer Solutions for Business – 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 350.

OPMT 497 Business Evaluation Systems – Presents a compilation of statistical, marketing production and financial factors that can be used to evaluate a firm's operation and expansion activities.

PHYS 117 Basic Science for Operations Management – An introductory course dealing with basic science concepts and techniques, especially in Physics: mechanics, temperature and heat. Technology applications are emphasized. Problem solving skills and data gathering techniques are stressed in lectures and labs. Computers are used for data analysis.

PHYS 217 Basic Science for Operations Management – The second course deals with thermodynamics, sound, light, electricity and magnetism and nuclear physics. The lab component provides practical experience with instruments to reinforce the lecture material. Computers continue to be used whenever possible. Prerequisite: PHYS 117.

Faculty and Staff

B.R.M. Morrow, B. Comm., Associate Dean
C. Chan, M.B.A.
B. Curtis, M.B.A.
S. E. Dudra, B.Comm., M.B.A.
F.L. Gruen, B. Mgt. Eng., M.A. Sc.
P.R. Harrison, M.B.A., P.Eng., M.I. Mech. E
K.C. Hartley, B.A. Sc., P. Eng., C.P.I.M.
A. S. Lee, B. Eng., P. Eng., M.Ed.
J. E. Lloyd, M.Ed., P. Eng., Chief Instructor
D.W. Malcolm, B.Sc., A.Sc.T.T.
D.J. Mallory, B.A.Sc., M.A., Ph.D.
J.A.I. Millette, B.A., M.Ed.
G.W. Murray, Dipl.T., Program Head
J. Ribic, B.I.E.
G. Sagar, B.A.Sc., M.B.A.
W.J. Sheriff, B.A., B.Sc., Chief Instructor
C.V. Spong, Dipl.T
J. Young, B.Sc., M.B.A., P.Eng

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Transportation and Distribution

In today's changing world, managers must be flexible and well equipped with the skills necessary to appreciate and understand rapidly developing technologies. The Transportation and Distribution Program emphasizes systematic analysis for cost reduction and control within an organization while increasing customer service and strengthening market position through a more effective distribution system.

Transportation and Distribution students study both the "buying" (distribution and management) of a service for the movement of goods and people, and the "selling" or supplying of transportation facilities for the movement of goods within Canada, or to and from Canada.

School of Business programs are currently under review in light of the new BCIT mandate. As a result, modifications will be in effect for September 1989.

Job Opportunities

Transportation and Distribution graduates become involved with the buying and selling of transportation services and can choose from a variety of dynamic, highly paid management careers in marine shipping, airlines, railroads, trading, customs brokering, freight forwarding, poolcar operating, manufacturing, etc.

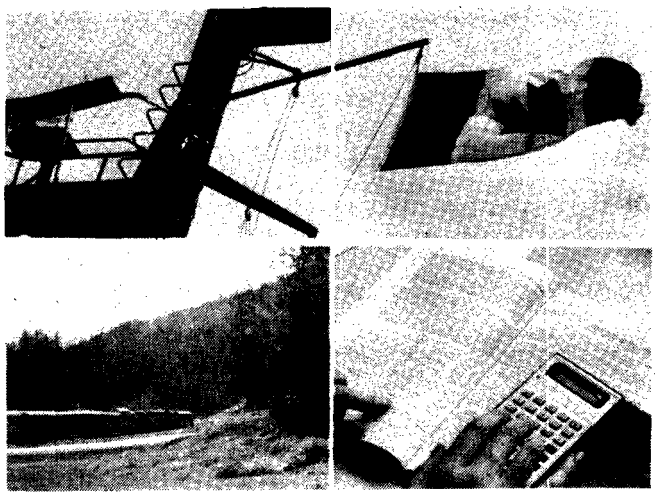
Prerequisites

Algebra 11 and English 12 both with C+. This requirement may be waived for mature students on approval by the Associate Dean. If your mathematical skills are in doubt, it is recommended that you take Preparatory Business Math OPMT 099. It is also recommended that potential students acquire basic typing skills due to the extensive use of computer input terminals in the program.

PROGRAM: Transportation/Distribution

Level 1		Clrm hrs/wk
ADMN 100	Microeconomics	3.0
ADMN 385	Business Law	4.0
BCOM 107	Business Communication for Operations Management	3.0
COMP 100	Data Processing Introduction	4.0
FGMT 101	Accounting 1	4.0
MKTG 102	Introduction to Marketing	3.0
OPMT 101	Business Mathematics	5.0
OPMT 152	Introduction to Applied BASIC	3.0
TDMT 101	Geography of Trading 1	2.0

Level 2		2A	2B
ADMN 200	Macroeconomics	3.0	3.0
BCOM 207	Business Communication for Operations Management	3.0	3.0
FMGT 201	Accounting 2	4.0	4.0
MKTG 103	Sales Skills	3.0	3.0
OPMT 121	Business Statistics	4.0	4.0
OPMT 241	Systems Analysis and Design	3.0	3.0
OPMT 250	Microcomputer Applications: Programming and Spreadsheets	3.0	3.0
TDMT 100	Transportation Methods (Distribution 1 C.I.T.T.)	4.0	0.0
TDMT 201	Geography of Trading 2	0.0	4.0
TDMT 204	Integrated Purchasing	3.0	3.0



Level 3		Clrm hrs/wk
ADMN 382	International Law	3.0
OPMT 143	Management Engineering	4.0
OPMT 301	Quantitative Methods/Computer Applications 1	4.0
OPMT 350	Microcomputer Applications: Database	3.0
TDMT 202	Transportation Regulations	4.0
TDMT 203	Transportation Economics	4.0
TDMT 305	International Trade	3.0
TDMT 309	Marine Shipping and Insurance	3.0
TDMT 310	Introduction to Political Science	2.0

Level 4		4A	4B
ADMN 331	Industrial Relations	3.0	0.0
ADMN 449	Human Resources Management	2.0	0.0
FMGT 442	Domestic and International Corporate Finance	3.0	3.0
OPMT 401	Quantitative Methods/Computer Applications 2	4.0	4.0
OPMT 445	Quality Assurance (Services)	2.0	0.0
OPMT 498	Business Evaluation Systems	3.0	3.0
TDMT 300	Traffic and Transportation Management	4.0	0.0
TDMT 409	Exporting and Importing	2.0	2.0
TDMT 410	Logistics	4.0	4.0
TDMT 411	Industry Project	0.0	15.0

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 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 331 Industrial Relations – An introductory analysis of the fundamental issues and facts of labor–management relations. Special emphasis is given to collective agreement content and interpretation, bargaining and basic labor economics.

ADMN 382 International Law – This course will examine conflicts of law, international sale of goods contracts, international arbitration, etc. Provides the student with an overview of central legal issues which arise from conducting business across national boundaries.

ADMN 385 Business Law – A one–term, condensed course which acquaints the business student with basic knowledge of Canadian law including the legal system, contracts, torts, sale of goods and consumer protection, secured transactions and creditors' remedies, employment law and agency, business organizations, negotiable instruments, real estate and administrative law.

ADMN 449 Human Resources 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.

BCOM 107 Business Communication for Operations Management – An applied communication course for Operations Management students. It covers the basic writing and oral communication skills necessary in business and industry. Students learn how to write effective letters and memos and how to prepare and make oral presentations. The course also includes a unit on using word processors.

BCOM 207 Business Communication for Operations Management – Gives further instruction and practice in the skills learned in BCOM 107. In this term, the focus is on job application, functional reports, telephone techniques and meetings. Prerequisite: BCOM 107.

COMP 100 Data Processing Introduction – Lectures and practical exercises are used to present such topics as hardware (input, output, and storage devices), system software (DOS), application software (WordPerfect), data communications, mainframe computers, and networking.

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 202 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 442 Domestic and Internation Corporate Finance – Familiarizes students with the role finance plays in business and industry. Students will obtain a basic understanding of the interrelationships of finance with the other functional aspects of business. Teaches students common decision-making tools in finance to enable them to react intelligently under varying conditions within a business environment of ever increasing complexity. Special emphasis will be given to the services provided by financial institutions to firms that take part in international trade.

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

MKTG 103 Sales Skills – Introduction to professional selling. Emphasizes practical problems of locating and qualifying prospects, use of depth approach, and improving sales preparation and organization. Examines improving interpersonal communications in non-selling situations.

OPMT 101 Business Mathematics – Covers the basic mathematics applied to industry and commerce. Topics include basic algebra, break-even analysis, simple and compound interest, annuities, and methods of evaluating investments in business.

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 143 Management Engineering – A basic productivity engineering course for transportation and distribution students. Course covers the basic industrial engineering approach to productivity improvement including work measurement and facility layout. Examples and projects are oriented to the TND side of the economy.

OPMT 152 Introduction to Applied BASIC – BASIC programming in an Operations Management context. Topics include the systematic approach to programming, BASIC commands, arithmetic operations, input and output, branching and looping.

OPMT 241 Systems Analysis and Design – In business, systems analysis and design refers to the process of examining a business situation with the intent of improving it through better procedures and methods. The course includes: problem definition, the project proposal, procedure analysis, forms and reports analysis, interviewing, system design, procedure and writing implementation planning.

OPMT 250 Microcomputer Applications: Programming and Spreadsheets – Part 1: A continuation of OPMT 152. The use of advanced BASIC to solve problems common to specific programs. Topics include arrays, functions, random numbers and simulation. Part 2: Introduction to spreadsheets. The use of Lotus 1-2-3 to solve problems common to specific programs. Prerequisite: COMP 100, OPMT 152.

OPMT 301 Quantitative Methods/Computer Applications 1 – Following basic training in mathematics of finance and statistics, students are introduced to the solution of more complex business problems by mathematical processes. Forecasting methods are examined with computerized analysis of data. Some aspects of management science that are particularly useful in the transportation business are examined manually and through the computer. These include linear programming, the transportation model, simulation, and waiting line analysis. The major emphasis is in interpretation of results and preparation of management oriented reports.

OPMT 350 Microcomputers 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.

OPMT 401 Quantitative Methods/Computer Applications 2 – A continuation of OPMT 301 with discussions on inventory control methods and network techniques.

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.

OPMT 498 Business Evaluation Systems – Presents a compilation of statistical, marketing production and financial factors that can be used to evaluate a firm's operation and expansion activities.

TDMT 100 Transportation Methods (Distribution 1 C.I.T.T.) – Introduces students to the various ways of moving commodities, including air, highway, pipeline, rail and water carriers. Economic costs of operation and selection of equipment are also covered.

TDMT 101 Geography of Trading 1 – Transportation is the basis of all economic systems including agricultural production, industrial location, settlement patterns, marketing systems and consumer shopping. This course studies in detail the role of transportation, major trading routes and ports and other factors in the development of resources for the world and Canada. Emphasis is placed on Canada as a major resource producer, particularly in the emerging Pacific Rim.

TDMT 201 Geography of Trading 2 – Designed to give students a basic understanding of world resource industries – agriculture, raw materials, energy sources as well as the flow of commodities, trade routes, trading patterns and the degree of inter-dependence among the nations. As well, the course will cover the characteristics of each mode of transport on the six continents.

TDMT 202 Transportation Regulations – Familiarizes the student with transportation regulations at federal, provincial, and regional levels. The Acts governing intra and inter-provincial transportation, and regulation of common, contract and private carriers, including their rights and responsibilities, and the deregulated U.S. and Canadian transportation industry.

TDMT 203 Transportation Economics – Covers a variety of transportation services and their cost factors including carrying capacity, load factors, fuel cost, etc., concluding with profit-oriented rate-making. Costing methods relating to various modes of transportation are discussed considering distance, flow of goods and backhaul.

TDMT 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, 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 300 Traffic and Transportation Management – Acquaints the student as either the supplier or receiver of transportation services.

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 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.

TMDT 309 Marine Shipping and Insurance – This course is designed to familiarize the student with the basics of the principles and problems of ships, navigation and cargo, trends in shipping, containerization/unitization and the port as a sea transport interface. Marine Insurance will deal with the types of policies, the fundamentals of coverage, the analysis of the policy and claim handling.

TDMT 310 Introduction to Political Science – An historical overview of the development of OECD, DC, NIC and LDC countries.

TDMT 409 Exporting and Importing – This documentation course teaches the new, global **harmonized** system which came into effect January 1, 1988.

TDMT 410 Logistics – An overview of the total distribution concept. Adding to previously learned information the course examines distribution facility location analysis, information systems, control systems and distribution economics and profitability. With heavy emphasis on customer services and profitability, the course prepares the student to conduct a transportation audit, customer service audit and a complete distribution audit.

TDMT 411 Industry Project – The course is an opportunity to apply the knowledge from the program to a specific industry project at the client's place of business.

Faculty and Staff

B.R.M. Morrow, B.Comm., Associate Dean
H. Pevecz, Program Head
G. Johnston, B.A., C.I.T.T.
P. McSorley, B.Comm.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

International Trade

To complement Canada's export drive, this option was created to supply industry with the skilled personnel needed to perform technical tasks, to research new markets, their regulations and restrictions, and to negotiate improved rates for cost-effective transportation, tariff classification, documentation, banking, collections, etc.

Students of the International Trade option are trained in foreign market research to develop and sustain demand for Canadian products abroad. Studies in Geography of Trading, International Economics, Purchasing and International Law and Finance enable graduates to adapt to rapidly changing conditions in foreign exchange, non-tariff barriers, the use of Free Trade zones, etc. Extensive training in logistics, transportation economics and regulation/deregulation allows graduates to deal effectively with problems arising from alternative routing, freight consolidation and intermodalism.

School of Business programs are currently under review in light of the new BCIT mandate. As a result, modifications will be in effect for September 1989.

Job Opportunities

International Trade graduates can immediately contribute to the profitability of the employer while learning about the commodity involved.

Because of the versatility of this technical training, graduates are suited to a variety of positions with trading houses, exporting manufacturers, importers, customs brokers, foreign freight forwarders, etc., leading to highly paid management careers.

Prerequisites

Algebra 11 and English 12 both with C+. This requirement may be waived for mature students on approval by the Associate Dean. 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		Clrm hrs/wk
ADMN 100	Microeconomics	3.0
ADMN 385	Business Law	4.0
BCOM 107	Business Communication for Operations Management	3.0
COMP 100	Data Processing Introduction	4.0
FGMT 101	Accounting 1	4.0
MKTG 102	Introduction to Marketing	3.0
OPMT 101	Business Mathematics	5.0
OPMT 152	Introduction to Applied BASIC	2.0
TDMT 101	Geography of Trading 1	2.0

Level 2		Clrm hrs/wk 2A	2B
ADMN 200	Macroeconomics	3.0	3.0
BCOM 207	Business Communication for Operations Management	3.0	3.0
FMGT 201	Accounting 2	4.0	4.0
MKTG 103	Sales Skills	3.0	3.0
OPMT 121	Business Statistics	4.0	4.0
OPMT 250	Microcomputer Applications: Programming and Spreadsheets	3.0	3.0
OPMT 251	Systems and Procedures	3.0	3.0
TDMT 100	Transportation Methods	4.0	0.0
TDMT 201	Geography of Trading 2	0.0	4.0
TDMT 204	Integrated Purchasing	3.0	3.0

Level 3		
ADMN 382	International Law	3.0
MKTG 301	Quantitative Methods/Computer Applications 1	3.0
MKTG 309	Marketing Research 1	4.0
OPMT 350	Microcomputer Applications: Database	3.0
TDMT 202	Transportation Regulations	4.0
TDMT 203	Transportation Economics	4.0
TDMT 305	International Trade	2.0
TDMT 309	Marine Shipping and Insurance	3.0
TDMT 310	Introduction to Political Science	2.0

Level 4		4A	4B
ADMN 331	Industrial Relations	3.0	3.0
ADMN 449	Human Resources Management	2.0	0.0
FMGT 442	Domestic and International Corporate Finance	3.0	3.0
MKTG 401	Marketing Planning	4.0	0.0
MKTG 409	Marketing Research 2	3.0	3.0
OPMT 446	Quality Assurance	2.0	0.0
TDMT 300	Traffic and Transportation Management	4.0	0.0
TDMT 409	Exporting and Importing	2.0	2.0
TDMT 410	Logistics	4.0	4.0
TDMT 411	Industry Project	3.0	12.0

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 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 331 Industrial Relations – An introductory analysis of the fundamental issues and facts of labor-management relations. Special emphasis is given to collective agreement content and interpretation, bargaining and basic labor economics.

ADMN 382 International Law – This course will examine conflicts of law, international sale of goods contracts, international arbitration, etc. Provides the student with an overview of central legal issues which arise from conducting business across national boundaries.

ADMN 385 Business Law – A one-term, condensed course which acquaints the business student with basic knowledge of Canadian law including the legal system, contracts, torts, sale of goods and consumer protection, secured transactions and creditors' remedies, employment law and agency, business organizations, negotiable instruments, real estate and administrative law.

ADMN 449 Human Resources 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.

BCOM 107 Business Communication for Operations Management – An applied communication course for Operations Management students. It covers the basic writing and oral communication skills necessary in business and industry. Students learn how to write effective letters and memos and how to prepare and make oral presentations. The course also includes a unit on using word processors.

BCOM 207 Business Communication for Operations Management – Gives further instruction and practice in the skills learned in BCOM 107. In this term, the focus is on job application, functional reports, telephone techniques and meetings. Prerequisite: BCOM 107.

COMP 100 Data Processing Introduction – Lectures and practical exercises are used to present such topics as hardware (input, output, and storage devices), system software (DOS), application software (WordPerfect), data communications, mainframe computers, and networking.

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 201.

FMGT 442 Domestic and International Corporate Finance – Familiarizes students with the role finance plays in business and industry. Students will obtain a basic understanding of the interrelationships of finance with the other functional aspects of business. Teaches students common decision-making tools in finance to enable them to react intelligently under varying conditions within a business environment of ever increasing complexity. Special emphasis will be given to the services provided by financial institutions to firms that take part in international trade.

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

MKTG 103 Sales Skills – Introduction to professional selling. Emphasizes practical problems of locating and qualifying prospects, use of depth approach, and improving sales preparation and organization. Examines improving interpersonal communications in non-selling situations.

MKTG 301 Quantitative Methods/Computer Applications 1 – An examination of decision support systems utilizing mathematical modeling methods, data bank access, and computer based information.

MKTG 309 Marketing Research 1 – Examines the basic approaches to marketing research. It discusses the techniques and tools of this research and relates these tools to the decision-making process. Emphasis is placed on the use of marketing research in the total marketing decision concept. Special applications of marketing research to simulated real-life situations are examined.

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.

OPMT 101 Business Mathematics – Covers the basic mathematics applied to industry and commerce. Topics include basic algebra, break-even analysis, simple and compound interest, annuities, and methods of evaluating investments in business.

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 152 Introduction to Applied BASIC – BASIC programming in an Operations Management context. Topics include the systematic approach to programming, BASIC commands, arithmetic operations, input and output, branching and looping.

OPMT 250 Microcomputer Applications: Programming and Spreadsheets – A continuation of OPMT 152. The use of advanced BASIC to solve problems common to specific programs. Topics include arrays, functions, random numbers and simulation. Introduction to spreadsheets. The use of Lotus 1-2-3 to solve problems common to specific programs.

OPMT 251 Systems and Procedures – An introduction to a variety of techniques for analyzing and improving administrative and support systems within organizations. Topics include the systematic approach to problem-solving, workload measurement, charting information flow, forms analysis and design, and development of policy and procedure manuals.

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.

OPMT 401 Quantitative Methods/Computer Applications 2 – A continuation of OPMT 301 with discussions on inventory control methods and network techniques.

OPMT 446 Quality Assurance – International Quality Assurance with emphasis on international-level planning for Quality Control in Pacific Rim countries.

TDMT 100 Transportation Methods – Introduces students to the various ways of moving commodities, including air, highway, pipeline, rail and water carriers. Economic costs of operation and selection of equipment are also covered.

TDMT 101 Geography of Trading 1 – Transportation is the basis of all economic systems including agricultural production, industrial location, settlement patterns, marketing systems and consumer shopping. This course studies in detail the role of transportation, major trading routes and ports, and other factors in the development of resources for the world and Canada. Emphasis is placed on Canada as a major resource producer, particularly in the emerging Pacific Rim.

TDMT 201 Geography of Trading 2 – Designed to give students a basic understanding of world resource industries – agriculture, raw materials, energy sources as well as the flow of commodities, trade routes, trading patterns and the degree of inter-dependence among the nations. As well, the course will cover the characteristic of each mode of transport on the six continents.

TDMT 202 Transportation Regulations – Familiarizes the student with transportation regulations at federal, provincial, and regional levels. The Acts governing intra and inter-provincial transportation, and regulation of common, contract and private carriers, including their rights and responsibilities, and the deregulated U.S. transportation industry.

TDMT 203 Transportation Economics – Covers a variety of transportation services and 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, 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 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 307/308 Traffic and Transportation Management – Acquaints the student as either the supplier or receiver of transportation services.

TMDT 309 Marine Shipping and Insurance – This course is designed to familiarize the student with the basics of the principles and problems of ships, navigation and cargo, trends in shipping, containerization/unitization and the port as a sea transport interface. Marine Insurance will deal with the types of policies, the fundamentals of coverage, the analysis of the policy and claim handling.

TDMT 310 Introduction to Political Science – An historical overview of the development of OECD, DC, NIC and LDC countries.

TDMT 409 Exporting and Importing – Practical application of previously learned theories acquaints students with the terminology and interpretation of the Customs Act, customs tariff, excise tax, and Antidumping Act. Gives the student thorough understanding of fair market value, dumping, countervailing duty, the GATT, tariffs and the increasing use of non-tariff barriers including present new devices. Documentation for importing and exporting, entries, drawbacks, refunds, appeals and classification is covered.

TDMT 410 Logistics – An overview of the total distribution concept. Adding to previously learned information the course examines distribution facility location analysis, information systems, control systems and distribution economics, and profitability. With heavy emphasis on customer services and profitability, the course prepares the student to conduct a transportation audit, customer service audit and a complete distribution audit.

TMDT 411 Industry Project – The course is an opportunity to apply the knowledge from the program to a specific industry project at the client's place of business.

Faculty and Staff

B.R.M. Morrow, B.Comm., Associate Dean
H. Pevecz, Program Head
G. Johnston, B.A., C.I.T.T.
P. McSorley, B.Comm.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Business Administration

Post-diploma Program

Following some experience in the work force, engineering and health technologists 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 fullfill this training need, BCIT has developed a full-time Diploma Program in Business Management for graduates from health and engineering technologies or their equivalent.

College, Institute, or University graduates, or people with equivalent qualifications, who are interested in human resource management should consider direct entry to the second year of the Human Resource Systems program. See the calendar entry for that program.

The Program

School of Business programs are currently under review in light of BCIT's new mandate. As a result, modifications will be in effect for September, 1989.

The 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.

Prerequisites

Diploma of Technology in Health or Engineering, 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

Graduates of this diploma program may work towards accreditation as a Certified Administrative Manager through the Administrative Management Society.

PROGRAM: Business Administration

Level 1		Clrm hrs/wk
ADMN 100	Microeconomics	3.0
ADMN 361	Microcomputer Software Systems	3.0
ADMN 511	Management Science	3.0
ADMN 620	Organizational Behavior	3.0
BCOM 302	Advanced Communication for Business Administration	4.0
FMGT 519	Financial Management 1	4.0
OPMT 510	Business Mathematics	4.0
Level 2		
ADMN 200	Macroeconomics	3.0
ADMN 342	Human Resource Management	3.0
ADMN 385	Business Law	3.0
ADMN 461	Microcomputer Software Applications	3.0
ADMN 611	Management Policy	4.0
COMP 213	Computers and Information Systems	4.0
FMGT 619	Financial Management 2	4.0
MKTG 113	Introduction to Marketing	3.0

Course Descriptions

ADMN 100 Microeconomics – The major areas studied are the product and resource market. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored.

ADMN 200 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 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, labor contract negotiations, training and development programs, grievance and collective agreement administration, and reviews relevant employment law.

ADMN 361 Microcomputer Software Systems – An introduction to the use of applications software on the microcomputer. Topics 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 Microcomputer Software Systems, with emphasis on the solution of practical problems. Students will become familiar with data base and other programs on the IBM-PC system. Familiarity with the programs is developed 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. It is designed to train 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 Policy – An analysis of business policy formulation designed to give the student practice, experience and confidence in handling business situations, including those of a complex nature where basic policy decisions are necessary to assist in problem-solving. Comprehensive business cases will be selected covering such fields as finance, control, personnel, production, marketing and general management, for study and discussion. The course is designed to acquaint the student with the role of top management and the interrelationships between these fields. Prerequisite: All level 5 courses or permission of the instructor.

ADMN 620 Organizational Behavior – The study of factors that either influence or are influenced by people at work. The course will focus on macro factors such as organizational structure, technology and environment; group factors such as conflict and decisions-making; and micro or individual factors such as attitudes, perception and motivation.

BCOM 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 improving 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 goods, as well as 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

B.R.M. Morrow, B.Comm., Associate Dean
M. Baxter, Dipl.T., B.B.A.
C. Clark, B.A., M.A.
C.L.R. Jaques, B.A., M.A.
T.P. Juzkow, B.A.Sc., M.B.A., P.Eng., Program Head
G. Storey, B.A., M. Sc.
R.A. Yates, LLB., M.B.A.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

BROADCAST COMMUNICATIONS

Radio
Television
Broadcast Journalism

The Broadcast Communications programs were initiated through the combined efforts of the private sector of the industry and the Canadian Broadcasting Corporation in this province. The need for trained personnel continues to grow in 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: **Radio**, **Television**, or **Broadcast Journalism**.

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.

The Programs

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. 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.

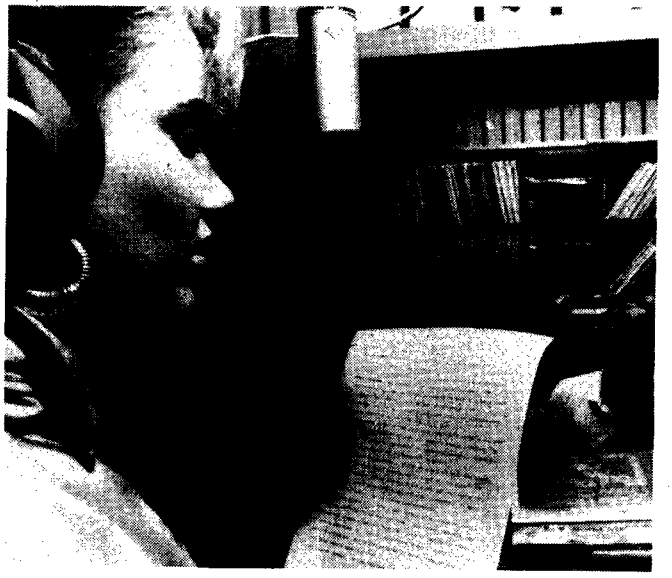
Broadcast Journalism

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 the students' experience in news judgement, reporting and presentation.

General Information

Applicants must pass appropriate audition and aptitude 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.



Prerequisites

Graduation from senior secondary school is a general prerequisite. Broadcast Communications programs are in high demand and only a limited number of students can be accepted each year. Applicants should apply early and ensure that their application file is complete in order to have it processed. **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 Room 129, just off the north foyer in Building 1A. (Where the **first** Monday of a month is a holiday, the meeting is held on the **second** Monday.)

Normally, all **qualified** applicants will be interviewed. 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. However, all Broadcast Communications programs are oversubscribed and while these actions may enhance an applicant's chances of acceptance, no guarantees are made or implied. No waiting list is established.

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: Radio

Level 1		Clrm hrs/wk
ADMN 320	Interpersonal Relationships	3.0
BCOM 101	Communication for Broadcasters	3.0
BCST 100	Industry Organization	2.0
BCST 101	Technical Introduction	3.0
BCST 103	Copywriting	3.0
BCST 110	Radio Operations	9.0
BCST 111	Radio Announcing	6.0
BCST 112	Contemporary Issues	2.0
BCST 113	Introduction to Broadcast Journalism	2.0
Level 2		
ADMN 381	Broadcast Law	3.0
BCOM 201	Communication for Broadcasters	3.0
BCST 203	Copywriting	3.0
BCST 209	Practicum	35.0
BCST 210	Radio Operations	8.0
BCST 211	Radio Announcing	6.0
BCST 212	Contemporary Issues	2.0
COMP 112	Computers in Broadcasting	3.0
Level 3		
ADMN 101	Economic Issues	3.0
BCOM 301	Advanced Communication for Broadcasters	3.0
BCST 310	Radio Operations	16.0
BCST 312	Radio Sales and Management	2.0
BCST 313	News and Contemporary Issues	2.0
BCST 314	Music and Programming	2.0
BCST 315	Feature Program Production	2.0
BCST 316	Audio Production	4.0
OPMT 319	Statistics for Broadcasters	2.0
Level 4		
BCOM 401	Business Communication for Broadcasters	3.0
BCST 409	Practicum	35.0
BCST 412	Radio Operations	27.0
BCST 415	Feature Program Production	2.0

PROGRAM: Television

Level 1		
ADMN 101	Economic Issues	3.0
ADMN 320	Interpersonal Relationships	3.0
BCOM 101	Communication for Broadcasters	3.0
BCST 100	Industry Organization	2.0
BCST 101	Technical Introduction	3.0
BCST 103	Copywriting	3.0
BCST 120	Television Introduction	10.0
BCST 121	Visual Fundamentals for Television	2.0
BCST 223	Television Production Planning	3.0
Level 2		
ADMN 381	Broadcast Law	3.0
BCOM 201	Communication for Broadcasters	3.0
BCST 203	Copywriting	3.0
BCST 209	Practicum	35.0
BCST 220	Television Introduction	17.0
BCST 221	Visual Fundamentals for Television	2.0
BCST 222	Theory of Color Television Systems	3.0
Level 3		
BCOM 301	Advanced Communication for Broadcasters	3.0
BCST 320	Television Production	18.0
BCST 322	Television News	4.0
BCST 325	ENG Production	4.0
COMP 112	Computers in Broadcasting	3.0
Level 4		
BCOM 401	Business Communication for Broadcasters	3.0
BCST 409	Practicum	35.0
BCST 420	Television Production	18.0
BCST 422	Television News	4.0
BCST 425	ENG Production	4.0
MKTG 100	Marketing 1	3.0

PROGRAM: Broadcast Journalism

Level 1		Clrm hrs/wk
ADMN 101	Economic Issues	3.0
BCOM 101	Communication for Broadcasters	3.0
BCST 100	Industry Organization	2.0
BCST 130	Introduction to News Reporting	3.0
BCST 131	Introduction to Announcing	3.0
BCST 132	Introduction to Radio	3.0
BCST 134	News Writing	4.0
BCST 135	Municipal Government	2.0
BCST 137	Visual Fundamentals for Journalists	2.0
Level 2		
BCOM 201	Communication for Broadcasters	3.0
BCST 209	Practicum	35.0
BCST 230	News Reporting	2.0
BCST 231	Announcing for Journalists	3.0
BCST 232	Radio News	6.0
BCST 233	Television News	4.0
BCST 331	Media Law	2.0
COMP 112	Computers in Broadcasting	3.0
Level 3		
BCST 235	Government and Politics	4.0
BCST 332	Radio News	10.0
BCST 333	Television News	10.0
BCST 336	Advanced News Writing	2.0
BCST 435	History and Social Issues	2.0
Level 4		
BCST 409	Practicum	35.0
BCST 430	Investigative Reporting	2.0
BCST 431	Labor and Business	2.0
BCST 432	Radio News	10.0
BCST 433	Television News	10.0

Alterations in course offerings and hours may occur because of adaptations to changing industry conditions and demands.

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 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 speed reading, time management and advanced research techniques.

BCOM 401 Business Communication for Broadcasters – Emphasis is on skills needed to sell writing to broadcasters and to sell students' abilities and training to employers. Skills will be developed through units on covering letters, resumes and job interview techniques; copyright law; writing effective proposals, queries and sales presentations, and translating students' work into several media. Students will be required to produce broadcast material written to professional industry standards.

BCST 100 Industry Organization – This introduction to the organization and management of the Canadian broadcasting system incorporates a series of guest lecturers from a variety of specialized areas in the industry. Topics include broadcast history, regulatory agencies, industry structure, associations, audience measurement, AM/FM/TV/Cable regulations, music licensing, social issues, broadcast legal issues, etc. The aim is to achieve a better understanding of the broadcast industry from a regional, national and international perspective.

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 broadcast 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 and sports information and will make them more aware of the importance of information programming in the broadcast industry.

BCST 120 Television Introduction – Understand the basic components of a television production and how each interrelates with the other. Equipment explanations include cameras, switchers, audio equipment, video tape recording, and EFP/ENG usage. Manual dexterity is developed in the operation of studio and control room production equipment. The course is divided into approximately 8 hours lab (orientation/practical) and 3 hours lecture. This may fluctuate from time-to-time.

BCST 121 Visual Fundamentals for Television – Covers the fundamentals of picture taking, including the practical aspects of focus, lighting, etc., and creative aspects – how to tell stories with pictures. The course provides the conceptual base for later work in electronic news gathering (ENG) techniques.

BCST 130 Introduction to News Reporting – Introduces the student to the basic principles of radio and television news gathering and dissemination. The course will give 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 133 Introduction to Television – Introduces broadcast journalism students to television educational techniques, preparing for future work in this industry by providing an understanding of television operations that occur while they are "on camera".

BCST 134 News Writing – Trains and prepares students to write radio and television news copy. Two hours per week are devoted to lecture and basic writing theory. Two hours are directed at "in-class" writing and re-writing practice for both media. The course relies heavily on "in-class" practice and critique. Occasionally, students will 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 Journalism- Students examine the language of pictures and their use to convey information. Topics include the history of pictorial communications, social context, the relationship between picture making technologies, picture communications and picture use in television news. The course objective is conceptual stimulation rather than "button pushing". While some familiarity with 35mm photography is assumed, there are ample opportunities to learn "the basics".

BCST 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.

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, upgrading 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 35 mm photography in TV stations where the production of slides for news and commercial use is often extensive. Students learn how to take good pictures and to develop and print them.

BCST 222 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 labor, 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 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 133.

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.

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.

BCST 320 Television Production – Upon successful completion of this course, students will be able to demonstrate their professional competency as members of a television production team as they rotate through all respective positions. Studio, field and post-production activities will be assigned to meet the production of a variety of program formats. Students will assume all managerial, production and support function responsibilities. Prerequisite: BCST 120, BCST 220.

BCST 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 several newscasts throughout the term.

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

BCST 332 Radio News – Students now begin 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. Assignments are generated by students and the completed work is critiqued in class.

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 and 3 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 co-operative education program, eligible students may enter full-time, paid positions in industry while continuing their studies via correspondence assignments. The course concludes in mid-April, at which time students commence practicum assignments. Industry practices and standards prevail throughout the course. Prerequisite: BCST 110, 210, 310.

BCST 415 Feature Program Production – See BCST 315. Prerequisite: BCST 315.

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

BCST 422 Television News – Regular television newscasts are produced by Television and Broadcast Journalism students. ENG stories produced by these students are used in the production of studio newscasts. Prerequisite: BCST 322.

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 Labor and Business – As students approach graduation, it is important that they have a good understanding of labor unions and the management structure. This course explains the structure of unions as well as the labor laws of BC and Canada. The second part of the course explores the complexities of business, finance and the stock market. Prerequisite: BCST 332 or BCST 333.

BCST 432 Radio News – This is the advanced course in newsroom operations. 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.

BCST 435 History and Social Issues – Students are introduced to concepts from the social sciences – especially group membership, society, culture, ethnicity, alienation and deviance. Topics are related to recent or current news stories from British Columbia and Canada, and include B.C. history, ethnic groups, Canadian regional economic development and issues in Canadian society. Class time is divided between lectures, discussions and student presentations.

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.

MKTG 100 Marketing 1 – A customized marketing course providing a study of the foundations and principles of marketing with emphasis on broadcast media applications. Covers basic marketing functions, research, distribution, promotion, etc.

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
J.W. Ansell, Dipl. T., Program Head – Radio
H. Dorfman, B.A. (on leave)
Y. Eamor
T. Garner, B.A.
T. Handel, Dipl. T., Dipl. Adult Ed., Program Head – Television
J.R. Jonasson
J.J. Kemp
R. Leipert
G. Macdonald, B.A., Program Head – Broadcast Journalism
K.J. Mitchell
P. Munoz (on leave)
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.
R. Taylor
J. Yount (on leave)

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

FINANCIAL MANAGEMENT

Professional Accounting
Finance

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. Students may specialize in accounting or finance.

Job Opportunities

Specialists in accounting commonly enter middle management positions in financial accounting, cost accounting, internal audit and budget preparation. Many find employment with professional accounting firms.

Graduates in finance are placed in a variety of positions – in banks, trust companies, insurance companies and finance companies, as well as in the finance departments of businesses, industries and government. After gaining appropriate experience, finance specialists may rise to the managerial level and beyond.

The Programs

School of Business programs are currently under review in light of BCIT's new mandate. As a result, modifications will be in effect for September, 1989.

Following a year of general business studies, students move into a specialized program in second year. At the time of writing, there are two programs — Professional Accounting and Finance — but additional specialized programs are being developed. Information on new programs will be mailed to applicants as it becomes available.

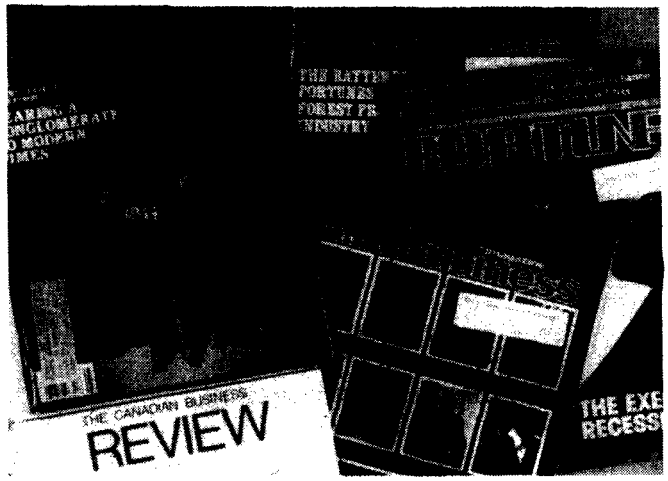
Financial Management offers unique, in-depth courses in Advanced Accounting, Advanced Finance, Auditing, Money and Banking, Security Analysis and Taxation.

The Professional Accounting Program is concerned with accounting systems and financial reporting. The second year courses in this program build upon the accounting and computer fundamentals introduced in the first year, with increased concentration on financial accounting, managerial accounting, auditing, taxation and microcomputer applications.

The Finance Program is concerned with the financial implications of business decisions. In addition to a thorough grounding in accounting, economics and finance, students in this program are introduced to the study of securities markets, portfolio management, interest rate movements and sources of entrepreneurial capital.

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 either the Professional Accounting Program or the Finance Program. Those applicants who have completed the equivalent of our first-year program may also be eligible for direct entry to second year. All applicants are encouraged to contact the department directly to clarify their opportunities.



Prerequisites

Algebra 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.

Professional Accreditation

The accounting profession, through its professional bodies, recognizes a wide variety of accounting subjects offered in the program. The Canadian Institute of Chartered Accountants, the Canadian Certified General Accountants' Association, the Society of Management Accountants and the Canadian Credit Institute give credit for various subjects.

In addition to the professional bodies, universities will give credit for subjects taken in the program where students wish to continue their training and qualify for a university degree. For example, graduates of the Financial Management Diploma program are eligible to transfer to the Open Learning Institute Bachelor of Arts in Administrative Studies program to continue their studies toward a degree.

TECHNOLOGY: Financial Management

Level 1		Clrm hrs/wk
ADMN 100	Microeconomics	3.0
ADMN 110	Management 1	3.0
BCOM 104	Business Communication for Financial Management	3.0
COMP 100	Data Processing Introduction	4.0
FMGT 101	Accounting 1	4.0
MKTG 102	Introduction to Marketing	3.0
OPMT 112	Business Mathematics	4.0

Level 2		Clrm hrs/wk
ADMN 200	Macroeconomics	3.0
ADMN 211	Management 2 (Term B)	3.0
ADMN 222	Organizatonal Behavior (Term A)	3.0
BCOM 204	Business Communication for Financial Management	3.0
COMP 120	Computers in Business	3.0
FMGT 106	Credit and Collections	3.0
FMGT 201	Accounting 2	4.0
FMGT 291	Financial Reports (Term B)	2.0
FMGT 292	Computerized Accounting (Term A)	2.0
OPMT 132	Business Statistics	4.0

PROGRAM: Professional Accounting

Level 3

ADMN 385	Business Law	4.0
FMGT 301	Cost and Managerial Accounting 1	4.0
FMGT 302	Financial Accounting 1	5.0
FMGT 307	Finance 1	4.0
FMGT 310	Auditing 1	3.0
FMGT 313	Taxation 1	4.0
FMGT 318	Microcomputer Systems	4.0

Level 4

FMGT 401	Cost and Managerial Accounting 2	4.0
FMGT 402	Financial Accounting 2	5.0
FMGT 404	Finance 2	4.0
FMGT 406	Auditing 2	4.0
FMGT 407	Microcomputer Applications	4.0
FMGT 409	Taxation 2	4.0
FMGT 411	Projects in Industry (Term B)	*4.0
FMGT 412	Security Fundamentals (Term A)	*4.0
FMGT 415	Advanced Accounting	*4.0

* Students may be permitted to take FMGT 411 and 412 **OR** FMGT 415.

PROGRAM: Finance

Level 3

ADMN 385	Business Law	4.0
FMGT 301	Cost and Managerial Accounting 1	4.0
FMGT 302	Financial Accounting 1	4.0
FMGT 307	Finance 1	4.0
FMGT 308	Security Analysis 1	4.0
FMGT 313	Taxation 1	3.0
FMGT 318	Microcomputer Systems	4.0

Level 4

FMGT 401	Cost and Managerial Accounting 2	4.0
FMGT 402	Financial Accounting 2	5.0
FMGT 404	Finance 2	4.0
FMGT 405	Security Analysis 2 (Term A)	4.0
FMGT 407	Microcomputer Applications	4.0
FMGT 409	Taxation 2	3.0
FMGT 414	Advanced Finance (Term B)	4.0
FMGT 430	Money and Banking	4.0

TECHNOLOGY: Financial Management (January Intake)

Level 1		Clrm hrs/wk
ADMN 200	Macroeconomics	3.0
ADMN 112	Management 1L	3.0
BCOM 108	Business Communication	3.0
COMP 106	Introduction to Data Processing	4.0
FMGT 106	Credit and Collections	3.0
FMGT 115	Accounting 1L	4.0
FMGT 291	Financial Reports (Term B)	4.0
MKTG 102	Introduction to Marketing	3.0
OPMT 112	Business Mathematics	4.0

Level 2

ADMN 100	Microeconomics	3.0
ADMN 220	Organizational Behavior	3.0
BCOM 208	Business Communication	3.0
COMP 125	Computers in Business	3.0
FMGT 215	Accounting 2S	4.0
FMGT 292	Computerized Accounting (Term A)	2.0
OPMT 132	Business Statistics	4.0

Course Descriptions

ADMN 100 Microeconomics – The major areas studied are the product and resource market. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored.

ADMN 110 Management 1 – An orientation to the nature of business in the private enterprise system, embracing forms of business ownership, production, management principles and techniques, as well as the functions of planning, organizing and staffing. Students are given an opportunity to develop their analytical skills by analyzing, deliberating upon and proposing solutions to typical case problems.

ADMN 112 Management 1L – An orientation to the nature of business in the private enterprise system embracing forms of business ownership, organization, leadership, management techniques and business elements of production. Typical cases taken from industry are studied to encourage students to think and decide for themselves.

ADMN 200 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 211 Management 2 – Follows on from Management 1 to give further insight into the functions and practice of management. Areas covered include the main functions of directing, controlling, and strategic planning, as well as decision-making and a brief introduction to industrial relations. The student will be expected to create a business plan as part of this course. Prerequisite: ADMN 110.

ADMN 222 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 104 Business Communication for Financial Management – Prepares students to meet the business communication demands of financial management positions. They learn to plan, organize and write effective business letters and memos. They will also prepare and present oral reports.

BCOM 108/208 Business Communication – January Intake for Financial Management – This course covers the topics from BCOM 104/204 but in a different sequence.

BCOM 204 Business Communication for Financial Management – Gives further instruction and practice in the principles taught in BCOM 104. In this term, instruction will concentrate on how to write short and long reports, prepare more complex oral presentations and conduct meetings and interviews. Prerequisite: BCOM 104.

COMP 100 Data Processing: Introduction – Training in basic data processing principles to develop recognition of the application of these principles to industry. The principal functions of data processing are illustrated and practised with an H.P. minicomputer operating interactively. Elementary computer programs are written and tested on the computer. Use of flow-charting and elementary data processing systems design will illustrate the achieving of data processing objectives.

COMP 106 Introduction to Data Processing – This course combines all of the topics included in COMP 100 together with the business systems analysis topics from COMP 120. (The remaining topics from COMP 120 are covered in COMP 125.)

COMP 120 Computers in Business – Designed to give the student an understanding of business computer systems. Topics include computer hardware – types, usage, evaluation; systems development – feasibility studies, analysis, design, implementation; packaged software – use and evaluation. Emphasis will be placed on particular areas of interest to the specific technologies. Prerequisite: COMP 100.

COMP 125 Computers in Business – The follow-up course to COMP 106. Topics from COMP 120 which were not covered in COMP 106 will be covered in this course.

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 106 Credit and Collections – A detailed examination of credit granting, collection techniques and credit philosophy in all levels of business prepares the student to assist the credit manager of a large or small business in any area of the subject. Topics include determining consumer credit risk; credit instruments and collateral security; types of consumer credit and credit cards; sources of consumer credit information; collections; credit department management. Mercantile credit management includes: risk analysis; sources of information; terms of sale and credit limits; collections; management; financial statement analysis; accounting for receivables; credit legislation.

FMGT 115 Accounting 1L – Enables students to start the basic accounting course in January. It is the equivalent of FMGT 101 and the first part of FMGT 201. The balance of FMGT 201 material is covered in FMGT 215. For a description of the course content see FMGT 101/201.

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 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 291 Financial 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 the ability to handle modern accounting software packages on the microcomputer. Prerequisite: FMGT 101 or 115.

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 judgmental 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 favorable 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 receive instruction and practice in the use of commercially available microcomputer software systems and will use these systems to solve business problems. Typical programs will involve word processing, electronic worksheets, data base management and business graphics. Prerequisite: COMP 120 or 125.

FMGT 401 Cost and Managerial Accounting 2 – Emphasizes relevant costing for decision-making, cost behavior, 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 Term 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 Advanced 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 covered 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 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.

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

OPMT 112 Business Mathematics – Review of basic mathematics applicable to business and industry, 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., R.I.A., F.C.M.A., Associate Dean
R.C. Bell, B.A. (Econ.), C.G.A.
C.M. Briscall, B.Com., M.B.A., R.I.A., F.C.M.A., Technology Head
D.K. Chan, B.Comm., M.B.A., C.A.
R.A. Cradock, B.Comm., M.B.A., R.I.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, R.I.A.
K.M. Hamm, B.Com., R.I.A., Chief Instructor
S.M. Hatten, Dipl.T., R.T., C.G.A.
E.M. Iannacone, B.Com., M.B.A., R.I.A., F.C.M.A.
R.W. Jackson, M.C.I.
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., R.I.A.
R.C. Nichols, B.Com., R.I.A., Chief Instructor
J.F. Porteous, R.I.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

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

HOSPITALITY ADMINISTRATION

The Hospitality and Tourism industry is fast becoming the number one industry in British Columbia. It is already the industry which has the most employment opportunities. The demand for professionally educated and trained people who will lead B.C. into new and dynamic economic growth gets stronger each day. British Columbia will continue to build on the legacy of Expo 86 and to firmly entrench itself as a desirable tourist destination.

Job Opportunites

Hospitality Administration graduates are employed in hotels, motels, restaurants, department store food services, golf and country clubs, tourist facilities such as ski resorts, private and industrial catering firms, and in a wide variety of other organizations involved in food services and housing such as hospitals, schools and universities. Graduates also operate their own hospitality businesses such as restaurants, hotels, private catering and convention planning firms.

The Program

In the first year of the two year program, students will study general business management courses applied to a hospitality and tourism industry setting. Introductory courses in Hospitality Administration will also be taught. Some of the general business courses are creditable for university transfer.

The second year program consists of hospitality management courses which include food, beverage, labor cost controls, human relations, marketing for the hospitality industry, and a directed study course.

All students are required to complete 500 hours of work practicum in some aspect of the hospitality and tourism industry between the date of registration and graduation.

School of Business programs are currently under review in light of BCIT's new mandate. As a result, modifications will be in effect for September 1989.

Prerequisites

English 12 and Algebra 11, both with C+ are course requirements for this program. High School graduates who have successfully completed the Career Preparation Program (C.P.P.) in Hospitality and Tourism should so indicate on their BCIT application, for possible special consideration. A second language is also an asset.

Applicants should be reasonably familiar with the components and careers available in the hospitality and tourism industry. Preference will be given to applicants with a minimum of 6 months (1,000 hours) of industry-related practical work experience. Resumé required.

Applicants should be good communicators and people-oriented, with a willingness to relate harmoniously and effectively with the public and fellow workers. Upon entering the industry, they should be prepared to work long and irregular hours.

Informational meetings about the program and career opportunities in the hospitality and tourism fields, are offered from February through May. Applicants may also be invited to an interview with a faculty member and an industry representative, and may be required to outline their reasons for applying to the Hospitality Administration Technology.

The Program (Subject to revision)

		Clrm hrs/wk
Level 1		
ADMN 100	Microeconomics	3.0
BCOM 105	Business Communication for Hospitality	3.0
COMP 100	Introduction to Data Processing	4.0
FMGT 101	Accounting 1	4.0
HOSP 100	Beverage Operations Management	3.0
HOSP 111	Hospitality Communications	2.0
HOSP 126	Rooms Division Operations	3.0
OPMT 111	Business Mathematics	4.0
	Life Skills (non credit)	
Level 2		
ADMN 200	Macroeconomics	3.0
BCOM 205	Business Communication for Hospitality	3.0
COMP 120	Computers in Business	3.0
FMGT 201	Accounting 2	4.0
HOSP 200	Food Operations Management	3.0
HOSP 209	Front Office Accounting	2.0
HOSP 225	Introduction to Marketing	3.0
HOSP 226	Rooms Division Operations	3.0
HOSP 232	Leisure Time Management	2.0
Level 3		
HOSP 302	Food and Beverage Management	1.0
HOSP 305	Food and Beverage Practicum	5.0
HOSP 313	Food, Beverage and Labor Cost Controls	4.0
HOSP 316	Labor Relations	3.0
HOSP 325	Marketing and Sales Promotion	4.0
HOSP 330	Facilities Design and Property Management	3.0
HOSP 375	Practicum in Industry	
OPMT 131	Business Statistics in Hospitality	4.0
OPMT 165	Management Engineering	3.0
Level 4		
ADMN 385	Business Law	3.0
HOSP 402	Food and Beverage Management	1.0
HOSP 405*	Food and Beverage Practicum	5.0
HOSP 413	Hospitality Management Accounting	4.0
HOSP 416	Human Resources Management	3.0
HOSP 420	Organizational Behavior	3.0
HOSP 425	Marketing	4.0
HOSP 431**	Cultural Awareness	2.0
HOSP 450	Directed Studies	5.0
	**Risk Management (Professional Seminars)	

* Ends at Spring break

** Begins after Spring break

Course Descriptions

ADMN 100 Microeconomics – The major areas studied are the product and resource market. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored.

ADMN 200 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 385 Business Law – A one-term condensed course to acquaint the business student with a basic knowledge of Canadian law including the legal system, contracts, torts, sale of goods and consumer protection, secured transactions and creditors' remedies, employment law and agency, business organizations, negotiable instruments, real estate and administrative law.

BCOM 105 Business Communication for Hospitality – An applied writing course concentrating on effective letters and memos. Topics and case assignments are selected to develop the skills necessary for successful management communication in the hospitality and tourism industries.

BCOM 205 Business Communication for Hospitality – Adds report design techniques to the skills learned in BCOM 105. Students write several types of informational, periodic and analytical reports designed to meet specific management needs. Prerequisite: BCOM 105.

COMP 100 Introduction to Data Processing – Offers training in basic data processing principles to develop recognition of the application of these principles to industry. The major functions of data processing will be illustrated and practised with a minicomputer operating interactively. Elementary programs will be written and tested on the computer. Use of flow-charting and elementary data processing systems design will illustrate the achievement of data processing objectives.

COMP 120 Computers in Business – Designed to give the student an understanding of business computer systems. Topics include computer hardware – types, usage, evaluation; systems development – feasibility studies, analysis, design, implementation; packaged software – use and evaluation. Emphasis will be placed on areas of particular interest to Hospitality and Tourism Industries.

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.

HOSP 100 Beverage Operations Management – Covers the basic requirements needed to operate a bar or lounge. Subject areas include bar layout and design. B.C. Liquor Act, liquor classification and manufacture of spirits, wine and beer. Practical mixology in preparation of cocktails, pouring techniques, garnishes, mixes and setting up the bar. Wine and Beer Seminars.

HOSP 111 Hospitality Communications – An introduction to the principles of effective public speaking. The course allows students to develop confidence and to practice various types of public speaking: narrative, descriptive, persuasive, demonstrative, meeting and debate. The course also explores industry communication including resume development, letters of transmittal, practice with interview techniques and preparation of an interview.

HOSP 126/226 Rooms Division Operations – An introduction to the terminology and fundamental procedures used in hotel front office operations. The course explores front desk design and location, check-in/check-out procedures, reservation systems, guest services, cash and credit, psychology in dealing with guests, fellow employees and management; guest history systems, form designs and how they are used, equipment and materials, rooms salesmanship and handling complaints.

HOSP 200 Food Operations Management – Covers the basic skills required in preparing food, and lays the ground work for more advanced skills in the 2nd year. Enables participants to operate kitchen equipment safely, apply sanitation procedures, read, follow and prepare recipes, classify and prepare soups, stocks, sauces, fish and shellfish, meat, poultry, vegetable and egg dishes.

HOSP 209 Front Office Accounting – Takes the student through hotel front office accounting from the initial setting up of guest accounts, posting procedures and corrections, to settling accounts and night audit procedures. The student will first be instructed in the manual system followed by demonstrations on mechanical and electronic systems. Finally, students will examine computer applications.

HOSP 225 Introduction to Marketing – Includes a detailed study of basic marketing functions, marketing research, product planning, selection of trade channels, merchandising, advertising, sales promotion and salesmanship. Marketing of consumer goods as well as industrial goods will be covered.

HOSP 232 Leisure Time Management – An introduction to the new phenomenon of increased market 'leisure time', how this new time can be managed and how the Travel, Tourism and Hospitality Industries play a vital role in leisure time management. Growing trends in domestic and international markets will be studied; functions and inter-relationships of the various industry sectors; infra-structure organization of tourism; major organizations and associations and their influence on tourism and leisure time; exploration of career opportunities in all facets of leisure time management; economic and governmental impact on leisure time; current trends in travel; social, cultural and environmental impacts on leisure time.

HOSP 302/402 Food and Beverage Management – Covers the theoretical application of food service management through lectures, assignments and seminars. Topics include the elements of management, training, personnel management, menu making, purchasing requirements for food service systems; various types of restaurants (specialty, fast food, dining rooms, etc.) payroll systems, catering establishments, merchandising and promotional techniques.

HOSP 305/405 Food and Beverage Practicum – Applies theory from the lectures to practical laboratory sessions in a public dining room. Areas covered include serving, cashiering, hosting, bartending and food preparation. Includes rotation of various stations in a kitchen: short order, meats, fish, shellfish, vegetables, salads, soups, stocks and sauces.

HOSP 313 Food, Beverage and Labor Cost Controls – Fundamentals of internal controls and information systems for food and beverage operations. The course covers techniques of effective purchasing, receiving and production; sales controls; food and beverage cost calculations; the sales mix and its effect on costing. Course emphasis is on interpretation of data for effective and profitable decision-making. Labor cost controls methods are explained and discussed.

HOSP 316 Labor Relations – Addresses the labor relations process within the hospitality industry. Develops a solid appreciation of issues commonly found in collective bargaining and why labor and management behave as they do. Topics range from the historical evolution of Canadian unionism, the impact of trade unions on the hospitality sector, collective bargaining and labor-management relations, to existing labor legislation, mediation and arbitration.

HOSP 325 Marketing and Sales Promotion – Develops students' ability to apply the fundamentals of marketing to the hospitality, tourism and food service industry. Market segmentation, analysis and trend projection, market research, product strategy, real estate, leases, franchise agreements are all addressed. The course builds an understanding of all of the forces that impact the marketing mix and leads to the development of the market plan.

HOSP 330 Facilities Design and Property Management – A study of the building and construction trades as they relate to the needs of the hospitality, tourism and food services industry. The ability to read and interpret blue prints, building codes, renovation cost estmates, zoning and city bylaws are studied. The fundamentals of building, sound maintenance practices, room design, functional planning, space requirements are all addressed as are the aesthetics of light, sound, themes and atmospheres.

HOSP 375 Practicum in Industry – During the first month of Term 1, Year 1, each student will receive a "Career Passpost of Hospitality and Tourism Experience" in which practical work experience will be recorded. The objective of the practicum is to provide each student with a minimum of 500 hours of proven work experience in the industry prior to graduation. Some credit may be given for work experience prior to registering at BCIT. No grade is assigned to this practicum.

HOSP 413 Hospitality Management Accounting – Preparation interpretation and analysis of balance sheets and profit and loss statements; ratio analysis, budgeting and forecasting; feasibility studies; financing and cash-flow; cost-volume-profit analysis; investment decision-making as applied to the Hospitality Industry.

HOSP 416 Human Resources Management – Addresses human resource management concepts with specific reference to recruitment and selection, employment equity, job descriptions, job specifications, job analysis, performance appraisal, training and development, human rights and employment standards, and quality of working life as they apply to the hospitality industry.

HOSP 420 Organizational Behavior – Develops an understanding of the concepts that either influence or are influenced by people in the hospitality sector. The course focuses on micro and macro factors such as organizational structure, technology and environment, group dynamics and behavior, leadership, conflict resolution, power, politics, values and attitudes, perception, stress and personality theory and motivation.

HOSP 425 Marketing – Continues with the application and implementation of the marketing plan: product repositioning, setting up the sales office, development of sales tools and brochures, advertising, promotions, public relations, in house sales, external sales, sales planning, media planning and budgeting. These topics are addressed in detail and, through practicum and case study, are applied directly to the hospitality, tourism and food service product. The inter-relationships of tourism industry components: carrier, wholesaler, agent, ground and transfer packages, are addressed as they apply to the hospitality sector.

HOSP 431 Cultural Awareness – British Columbia is host to tourists and business people from all over the world. To give B.C. the marketing edge, this course is designed to identify the market segments, and then to study the unique cultural requirements of our visitors.

HOSP 450 Directed Studies – Students will pick a project that is related to the Hospitality Industry and, under the guidance and tutelage of their chosen faculty member, research, study and report in the form of a thesis or other means previously agreed upon. Students are expected to utilize and demonstrate knowledge, skills, and understanding gained from other courses in this two year program.

OPMT 111 Business Mathematics – Provides a review of basic mathematics applicable to business and industry and enables the student to acquire skills involving practical financial and mathematical problems encountered in business. Topics in the area of Mathematics of Finance will emphasize retail operations, discounts, simple and compound interest and annuities.

OPMT 131 Business Statistics in Hospitality – Major emphasis on descriptive statistics, including survey planning, questionnaire design, numerical and graphical presentation of data. Measures of central tendency and dispersion. Introduction to statistical inference through sampling, confidence intervals, hypothesis testing, linear regression. Emphasizes managerial applications in industry.

OPMT 165 Management Engineering – Management Engineering is concerned with achieving business goals through the most effective use of resources by objective decision-making. It is a general management course designed to supplement the specialized management courses given in the Hospitality Program. The course covers the decision-making process in four areas of application; time management, productivity improvement, project management and facility planning.

Life Skills – A short course on time management, stress management, attitude development and business attire to prepare students for entry into the hospitality industry.

Risk Management – Professional seminars to be presented by industry representatives, e.g. from Workers' Compensation Board, Fire Department, Health Department, Insurance Companies, St. John's Ambulance.

Faculty and Staff

J. Bateman, Associate Dean
C. Morelli, Acting Program Head
R. Agon (Leave of absence)
S. Ayinde
E.J. Cooke
B.J. Fernandes
R. Oliver
M. Stefanek

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

MARKETING AND TOURISM MANAGEMENT

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

Marketing is the task of making available the service a firm or organization can offer to satisfy the needs of its customers or patrons. This means that people with marketing skills are needed in a wide range of organizations to perform many different functions. Manufacturers, professional services and non-profit institutions depend on marketing to sustain a viable, efficient operation.

Marketing managers concentrate on product development, market research, sales and promotion or they may find their jobs require the broad skills of all these areas.

The Marketing and Tourism 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

The **Advanced Technology Marketing** program leads to career positions in manufacturing, wholesale and retailing firms, with emphasis on those that are exploiting new or rapidly changing technologies.

Advertising and Sales Promotion graduates are employed in advertising agencies, broadcasting companies, publishing firms and in-house promotion operations.

The **Professional Sales** program prepares individuals for positions in distribution companies that sell their products and services to commercial buyers and purchasing agents.

The **Real Estate Studies** program prepares the graduate for sales, agent, mortgage brokerage, appraisal, property management, investment analyst positions. Graduates may choose to pursue either licenced or non-licenced positions within the Real Estate industry.

The **Small Business Development** program is ideally suited to individuals planning to start their own businesses or becoming general managers in an established small firm.

The **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 Program

In the first year, all Marketing and Tourism 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. **Professional Sales and Advanced Technology Marketing** emphasize sales skills, new product development and entrepreneurship. **Tourism Management** focuses on the operational and marketing aspects of a wide variety of tourism facilities and services. **Small Business Development** addresses the startup and growth planning needs of entrepreneurial firms.

School of Business programs are currently under review in light of BCIT's new mandate. As a result, modifications will be in effect for September, 1989.

Prerequisites

Algebra 11 and English 12 both with C+ are entry requirements for this technology. Completion of grade 11 and 12 science courses enhances 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 and Tourism Management Technology. Business experience and/or other successful post-secondary education is an asset. Admission may be granted to mature students provided they have completed high school at least 2 years prior to date of entry, 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		Clrm hrs/wk
ADMN 100	Microeconomics	3.0
ADMN 102	Management Marketing Technology	3.0
BCOM 106	Business Communication for Marketing	3.0
COMP 100	Data Processing Introduction	4.0
FMGT 101	Accounting 1	4.0
MKTG 100	Marketing 1	3.0
OPMT 110	Business Mathematics	4.0

Level 2		Clrm hrs/wk
ADMN 200	Macroeconomics	3.0
BCOM 206	Business Communication for Marketing	3.0
COMP 120	Computers in Business	3.0
FMGT 201	Accounting 2	4.0
MKTG 103	Sales Skills	4.0
MKTG 200	Marketing 2	3.0
OPMT 130	Business Statistics	4.0

PROGRAM: Advanced Technology Marketing

Level 3		
FMGT 303	Marketing Management Accounting	4.0
MKTG 203	Sales Management	4.0
MKTG 301	Quantitative Methods/Computer Applications in Marketing	4.0
MKTG 304	Market Strategies	4.0
MKTG 308	Advertising and Sales Promotion	4.0
MKTG 309	Marketing Research 1	4.0

Level 4		
ADMN 385	Business Law	3.0
MKTG 305	International Marketing	4.0
MKTG 401	Marketing Planning	4.0
MKTG 404B	Information Systems Practicum	4.0
MKTG 406A	Product Development	4.0
MKTG 409	Marketing Research 2	3.0
MKTG 418	Directed Studies	4.0
MKTG 430	Distributive Systems	3.0

PROGRAM: Advertising and Sales Promotion

Level 3		
FMGT 303	Marketing Management Accounting	4.0
MKTG 203	Sales Management	4.0
MKTG 301	Quantitative Methods/Computer Applications in Marketing	4.0
MKTG 309	Marketing Research 1	4.0
MKTG 316	Principles of Advertising	4.0
MKTG 317	Promotional Marketing	4.0

Level 4		
ADMN 385	Business Law	3.0
MKTG 318	Introduction to Media	6.0
MKTG 401	Marketing Planning	4.0
MKTG 409	Marketing Research 2	3.0
MKTG 416	Advertising Internship	9.0
MKTG 417	Design Production	6.0

PROGRAM: Professional Sales

Level 3		
FMGT 303	Marketing Management Accounting	4.0
MKTG 203	Sales Management	4.0
MKTG 301	Quantitative Methods/Computer Applications in Marketing	4.0
MKTG 302	Business to Business Marketing	4.0
MKTG 308	Advertising and Sales Promotion	4.0
MKTG 309	Marketing Research 1	4.0

Level 4		Clrm hrs/wk
ADMN 385	Business Law	3.0
MKTG 305	International Marketing	4.0
MKTG 401	Marketing Planning	4.0
MKTG 402A	Advanced Sales Techniques	4.0
MKTG 403B	Industrial Sales Practicum	4.0
MKTG 409	Marketing Research 2	3.0
MKTG 418	Directed Studies	4.0
MKTG 430	Distributive Systems	3.0

PROGRAM: Real Estate Studies

Level 3		
FMGT 329	Managerial Accounting for Real Estate and Small Business Management	4.0
MKTG 309	Marketing Research 1	4.0
MKTG 311	Real Estate Management 1	4.0
MKTG 312	Economics of Real Estate Markets	4.0
MKTG 313	Introduction to Real Estate Analysis	4.0
MKTG 333	Real Estate Marketing	4.0

Level 4		
ADMN 387	Law for Real Estate Marketing	4.0
MKTG 330	Real Estate Practice	2.0
MKTG 409	Marketing Research 2	3.0
MKTG 411	Real Estate Management 2	4.0
MKTG 412	Intro to Real Estate Appraisal and Investment Analysis	4.0
MKTG 413	Mortgage Finance	4.0
MKTG 418	Directed Studies	4.0

PROGRAM: Small Business Development

Level 3		
FMGT 329	Managerial Accounting for Real Estate and Small Business Management	4.0
MKTG 203	Sales Management	4.0
MKTG 301	Quantitative Methods/Computer Applications in Marketing	4.0
MKTG 306	Principles of Small Business Management	4.0
MKTG 308	Advertising and Sales Promotion	4.0
MKTG 309	Marketing Research 1	4.0

Level 4		
ADMN 385	Business Law	3.0
MKTG 305	International Marketing	4.0
MKTG 401	Marketing Planning	4.0
MKTG 407A	Case Studies/Entrepreneurship	4.0
MKTG 408B	Business Planning Practicum	4.0
MKTG 409	Marketing Research 2	3.0
MKTG 418	Directed Studies	4.0
MKTG 430	Distributive Systems	3.0

PROGRAM: Tourism Management

Level 1		
ADMN 100	Microeconomics	3.0
ADMN 102	Management Marketing Technology	3.0
BCOM 106	Business Communication for Marketing	3.0
COMP 100	Data Processing: Introduction	4.0
FMGT 101	Accounting 1	4.0
MKTG 100	Marketing 1	3.0
OPMT 110	Business Mathematics	4.0
TOUR 160	Introduction to Tourism	3.0

Level 2		Clrm hrs/wk
ADMN 200	Macroeconomics	3.0
BCOM 206	Business Communication for Marketing	3.0
COMP 120	Computers in Business	3.0
FMGT 201	Accounting 2	4.0
MKTG 103	Sales Skills	4.0
MKTG 200	Marketing 2	3.0
OPMT 130	Business Statistics	4.0
TOUR 260	Issues in Tourism	3.0
Level 3		
FMGT 303	Marketing Management Accounting	4.0
MKTG 306	Principles of Small Business Management	4.0
MKTG 309	Marketing Research 1	4.0
TOUR 310	Passenger Transportation 1	3.0
TOUR 320	Organizational Behavior 1	3.0
TOUR 325	Tourism Product Development	4.0
TOUR 330	Community Tourism and Planning Attractions	4.0
Level 4		
ADMN 385	Business Law	3.0
MKTG 409	Marketing Research 2	3.0
TOUR 410	Passenger Transportation 2	3.0
TOUR 420	Organizational Behavior 2	3.0
TOUR 430	Convention Conference and Group Services	4.0
TOUR 418	Directed Studies	4.0
TOUR 444	Destinations: World Geography	4.0

Course Descriptions

ADMN 100 Microeconomics – The major areas studied are the product and resource market. Students analyze supply and demand, how production costs vary and how prices are determined in various market structures. In addition, resource allocation and economic policy implications are explored.

ADMN 102 Management Marketing Technology – An orientation to the nature of business in the private enterprise system embracing forms of business ownership, organization, leadership, management techniques and business elements of production. Typical cases taken from industry are studied to encourage students to think and decide for themselves.

ADMN 200 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 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 106 Business Communication for Marketing – Introduces students to the fundamentals of business writing. Students study various marketing communications including letters, memos, questionnaires and news releases.

BCOM 206 Business Communication for Marketing – Extends the material covered in BCOM 106 and deals with both written and oral presentations. Short and long reports, job application packages, research techniques and graphic techniques are covered. Emphasis is on practical aspects of professional marketing communication. Prerequisite: BCOM 106.

COMP 100 Data Processing: Introduction – Offers training in basic data processing principles to develop recognition of the application of these principles to industry. The principal functions of data processing are illustrated and practised with an H.P. minicomputer operating interactively. Elementary computer programs are written and tested on the computer. Use of flowcharting and elementary data processing systems design will illustrate the achievement of data processing objectives.

COMP 120 Computers in Business – Designed to give the student an understanding of business computer systems. Topics include computer hardware: types, usage, evaluation; systems development: feasibility studies, analysis, design, implementation; packaged software: use and evaluation. Emphasis will be placed on areas of particular interest to specific technologies. Prerequisite: Comp 100.

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 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 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 Management – 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 behavior, product pricing and relevant costs, as well as cost planning and control, are covered. Prerequisite: FMGT 201 or 215.

MKTG 100 Marketing 1 – A comprehensive study of the foundations and principles of marketing intended for those students pursuing a concentrated marketing program. Covers basic marketing functions, marketing research, product planning, distribution activities, sales and promotion activities. Examines marketing in relation to all types of consumer, industrial and service firms.

MKTG 103 Sales Skills – Introduction to professional selling. Emphasizes practical problems of locating and qualifying prospects, use of depth approach and improving sales preparation and organization. Also examines improving interpersonal communications in non-selling situations.

MKTG 110 Marketing 1L – Enables students to start the basic course in marketing in January. It is the equivalent of MKTG 100 and the first six weeks of MKTG 200. The balance of the course, MKTG 210, must be taken in the summer term commencing in May.

MKTG 200 Marketing 2 – A continuation of MKTG 100. Prerequisite: MKTG 100.

MKTG 203 Sales Management – General principles of sales management. Emphasis is given to the human resource, with stress placed on selection, assimilation, training and supervision. Examination of sales research, planning, organization and analysis is made. Computer applications in sales management are also covered. Prerequisite: ADMN 100, ADMN 110, ADMN 200, BCOM 207, COMP 120, FMGT 201, MKGT 103, MKGT 200.

MKTG 210 Marketing 2S – Is the follow-up course to MKTG 110 enabling students to complete the last 12 weeks of the basic marketing course as described under MKTG 200. Prerequisite: MKTG 110.

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: ADMN 100, ADMN 110, ADMN 200, BCOM 207, COMP 120, FMGT 201, MKTG 200, OPMT 110, OPMT 130.

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: ADMN 100, ADMN 200, BCOM 207, MKTG 200.

MKTG 304 Market Strategies – The development of strategies suited to high technology products and services to achieve productivity improvement. Prerequisite: ADMN 100, ADMN 200, BCOM 207, MKTG 200.

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: ADMN 100, ADMN 200, BCOM 207, MKTG 200.

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: ADMN 100, ADMN 110, ADMN 200, BCOM 207, FMGT 201, MKTG 200.

MKTG 308 Advertising and Sales Promotion – Covers fundamentals of mass communications, media characteristics, message design and campaign planning. Prerequisite: BCOM 207, MKTG 200.

MKTG 309 Marketing Research 1 – Examines the basic approaches to marketing research. It discusses the techniques and tools of this research and relates these tools to the decision-making process. Emphasis is placed on the use of marketing research in the total marketing decision concept. Special applications of marketing research to simulated real-life situations are examined. Prerequisite: ADMN 100, ADMN 200, BCOM 207, COMP 120, MKTG 200, OPMT 110, OPMT 130.

MKTG 311 Real Estate Management 1 – The real estate function includes law, estates and interests in land, and the personal and business management decision process. The economic characteristics of urban real estate and the market, city growth and development, locational factors in influencing the determination of land use and ownership, institutional lenders, the mortgage market and the functions of the real estate agency, salesman and appraiser are covered. This is a credit course recognized by the Real Estate Council of British Columbia and the Department of Real Estate Studies at UBC. It exempts graduates of the program entering the real estate brokerage business from the salesman's pre-licensing course. Prerequisite: ADMN 100, ADMN 200, BCOM 207, COMP 120, MKTG 200, OPMT 130.

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: ADMIN 100, ADMIN 200.

MKTG 313 Introduction to Real Estate Analysis – Presents the tools and techniques for analysis that assist decision-making in specific real estate problems including investment (purchase or sale), financing, development or redevelopment, leasing, income and property taxation and property management. In each of these areas, the use of mathematics of finance is central to analysis of the situation, the analysis of alternative courses of action and the comparison of costs/benefits, both today and in the future. Prerequisite: ADMN 100, ADMN 200, BCOM 207, COMP 120, MKTG 200, OPMT 110, OPMT 130.

MKTG 316 Principles of Advertising – Examines the evolution and function of advertising and sales promotion within the contexts of society and the business system. The topic is surveyed rigorously, with consideration being given to its application in the fields of retailing, wholesaling, manufacturing, professional and industrial activities. Prerequisite: ADMN 100, ADMN 200, BCOM 207, MKTG 200, OPMT 110, OPMT 130.

MKTG 317 Promotional Marketing – 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: ADMN 100, ADMN 200, BCOM 207, MKTG 200, MKTG 316, MKTG 318.

MKTG 318 Introduction to Media – 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: BCOM 207, COMP 120, MKTG 200, OPMT 110, OPMT 130.

MKTG 330 Real Estate Practice – Designed to apply the principles learned in MKTG 311 Real Estate Management on a practical basis. Students will learn to complete contracts required in real estate transactions; the forms of legal documentation concerning interests in land; land registration procedures; and how to search a title of real property at a land title office. Prerequisite: ADMN 100, ADMN 200, BCOM 207, MKTG 311, MKTG 200, OPMT 110, OPMT 130.

MKTG 333 Real Estate Marketing – 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: MKTG 200 or 201, or 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: ADMN 100, ADMN 200, BCOM 207, COMP 120, FMGT 201, MKTG 103, MKTG 200, MKTG 301, MKTG 309, OPMT 110, OPMT 130.

MKTG 402A Advanced Sales Techniques – Professional selling skills utilizing buyer behavior, product knowledge, time management and sales call planning tools. Prerequisite: MKTG 103, MKTG 200, MKTG 203, MKTG 302, MKTG 308.

MKTG 403B Industrial Sales Practicum – Field work experience with the sales force of a sponsoring firm. Full evaluation of on-the-job performance is included. Prerequisite: MKTG 103, MKTG 203, MKTG 402A.

MKTG 404B Information Systems Practicum – Examines the hardware/software systems, data sources, and resources available to marketers of high-tech products in gathering and dispensing needed information. Prerequisite: MKTG 301, MKTG 304, MKTG 309, MKTG 406.

MKTG 406A Product Development – A study of effective processes for generating product ideas, design planning, performance evaluation and market testing. Commercialization of highly innovative products is emphasized. Prerequisite: MKTG 301, MKTG 304, MKTG 309.

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, MKTG 407.

MKTG 409 Marketing Research 2 – Examines the basic approaches to marketing research. The course discusses the techniques and tools of this research and relates these tools to the decision-making process. Emphasis is placed on the use of marketing research in the total marketing decision concept. Special applications of marketing research to simulated real-life situations are examined. Prerequisite: MKTG 309.

MKTG 411 Real Estate Management 2 – See MKTG 311. Prerequisite: MKTG 311.

MKTG 412 Introduction to Real Estate Appraisal and Investment Analysis – Designed for use by appraisers, real estate brokers, lenders, builders, 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 covered will include such topics as principles of real estate, elements of urban land economics, nature and principles of real estate value, appraising as applied economics analysis, feasibility studies, which includes 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, MKTG 312, MKTG 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: MKGT 311, MKTG 312, MKTG 313.

MKTG 416 Advertising Internship – An assigned work experience position with a lower mainland advertising, promotion, broadcasting, print or graphic services operation. On-the-job performance is fully evaluated. Prerequisite: MKTG 316, MKTG 317, MKTG 318, MKTG 417.

MKTG 417 Design Production – Creative advertising starts with a powerful idea built upon a sound business strategy. The execution of the strategy can polish effective advertising into brilliance. This is a practical "how-to" course that starts with business direction and finishes with actual print and broadcast advertising. It examines computer graphics, laser separations as well as basic art design techniques. Of interest to those in advertising positions, media sales and graphic/printing sales as well as those with a general interest in the area. Prerequisite: MKTG 316.

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: ADMN 100, ADMN 200, BCOM 207, COMP 120, FMGT 201, MKTG 103, MKTG 200, MKTG 203, MKTG 309, OPMT 110, OPMT 130.

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: ADMN 100, ADMN 200, BCOM 207, COMP 120, FMGT 210, MKTG 103, MKTG 200, MKTG 203, OPMT 110, OPMT 130.

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 Introduction to Tourism – An overview of the tourism industry structure and impacts. Course topics examine the industry sectors; common industry terminology; sector interrelationships; British Columbia tourism regions; markets and economic impacts 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 British Columbia development, and provides students with a broad view of the total industry and its opportunities.

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 British Columbia 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. Students may also be invited to participate in Superhost and/or Encore workshops. Prerequisite: TOUR 160

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 BC is also included. Prerequisite: TOUR 160, TOUR 260, MKTG 100, MKTG 200.

TOUR 320/420 Organizational Behavior 1 and 2 – Examines personnel issues involved in all aspects of the Tourism Industry. The two major themes are human resource management and organizational behavior. Topics for discussion and practise include human resource recruitment, selection, induction, orientation and training; role of government and unions; management and labor 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: ADMN 102

TOUR 325 Tourism Product Development – Designed to familiarize the student with tourism product development. Examines general demand factors, travel motivations, 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 100, MKTG 200, TOUR 160.

TOUR 330 Community Tourism and Planning Attractions – Designed as a "how to" study in generating positive economic and social impacts on British Columbia 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 British Columbia 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: TOUR 160, 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 418 Directed Studies

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. Subjects covered in lectures, discussion seminars and practical exercises include accommodation and hospitality, transportation planning, audio-visual 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: TOUR 160, TOUR 260, MKTG 100, MKTG 200.

TOUR 444 Destinations: World Geography – Develops an appreciation of world tourism markets, competitive factors and diverse cultural heritages. The course objective is to provide an understanding of the backgrounds of touring publics as they are encountered in local business environs, and insights to share with the outbound travelling public. Begins with British Columbia, then Canada, the United States, and then all 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 160, TOUR 260.

Faculty and Staff

R.W. Vandermark, B.A., Associate Dean
G.H. Abbott, B.Comm., M.B.A.
R.A. Brett, Program Head, Tourism
D.K.N. Chowdhury, B.Sc., M.B.A., Ph.D.
B. Ellsworth
M. Gerber, B.A., M.B.A.
J.O. Hicks, R.I.(B.C.), F.R.I., C.R.F., C.M.R., Program Head, Real Estate Studies
G.T. Jacobs, B.A. (Hist. & Econ.), B.A., (Bus. Admin.), M.B.A.
S. Mudd, B.A., Program Head, Advertising and Sales Promotion
C.G. Nelson, B.A., M.B.A.
N. Osborne, M.B.A., P.Eng., C.M.R.
M.D. Powley, B.Ed., M.B.A.
L. Rapchuk, B.Comm.
G.S. Rees, M.B.A.
M.I. Shacker, B.B.A., Program Head, Professional Sales and Advanced Technology Marketing and Small Business Development
G. Urbshadt, B.Comm.
R.A. Venne, B.Comm., (Hons. Econ.), M.B.A.
W.A.E. Walley, B.A.
T. Winder, B.A., M.B.A.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

School of Engineering Technology

Office of the Dean

D.K.N. Chowdhury, B.Sc., M.B.A., Ph.D., Dean (Acting)

Loraleigh Smith, Administrative Assistant/Executive Secretary to the Dean

Technology Programs

CIVIL TECHNOLOGIES

Building
- **Architectural Major**
- **Economics Major**

Civil and Structural
- **Geotechnical/Highways**
- **Water Resources**
- **Construction**
- **Structures**

Surveying and Mapping
- **Surveying**
- **Technician's Program**
- **Photogrammetry**

The Construction Industry is one of Canada's major industries and major employers. In 1986 it accounted for 14% of national gross domestic product, approximately $64 billion. It dwarfs other economic sectors – agriculture, mining, forestry and fisheries. It plays a similar major role in the British Columbia provincial economy and has enjoyed rapid expansion over the last several years.

The Construction Industry affects all Canadians where they play, live and work. It provides the basic infrastructure essential for modern civilized life, including roads, bridges, municipal works such as water mains, storm and sanitary sewers, street lights and traffic control systems as well as industrial, commercial and residential buildings. The Industry is also involved in the design and construction of power developments, dams, canals, docks and harbours. The products of the Construction Industry represent a significant capital investment for Canada. It is in the country's best interest to ensure that the industry utilizes the best technology and know-how.

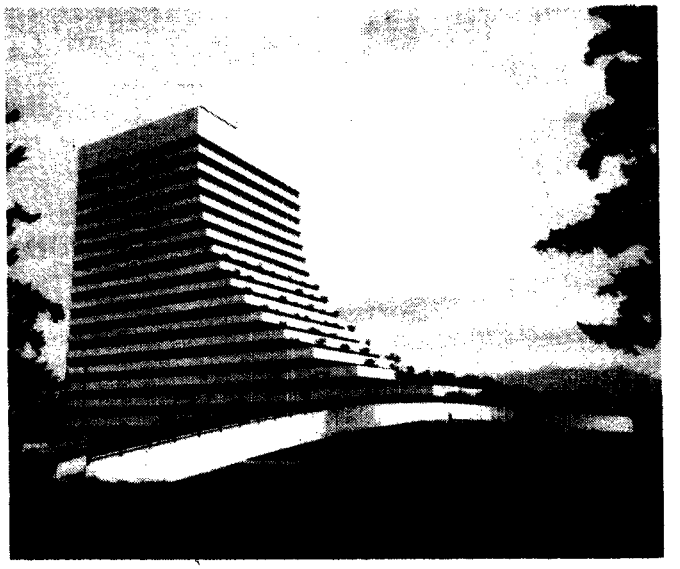
In association with professional engineers, architects, land surveyors and quantity surveyors, graduates of the Civil Group of Technologies work as design detailers, construction supervisors, inspectors, lab technicians, instrument men, photogrammetry operators, mapping technologists, estimators, senior drafting personnel and specification writers. Many of these positions require an equal amount of time spent outdoors as indoors.

Building

Spiralling advances in technology have increased the public's expectation of their communities and the buildings constructed within them. Structures are expected to be designed and constructed to rigorous standards of workmanship and safety while at the same time incorporating all the features which contribute to speed of erection, financial efficiency and user satisfaction. These two factors, high public expectation of the industry and the dynamic nature of the industry, present both a challenge and an opportunity – attractive criteria for any career.

Job Opportunities

Graduates of Building Technology fill the technological positions which lie between the professional architect, engineer and contractor on the one hand, and the skilled tradesman on the other. Graduates have the advantage of understanding buildings from several perspectives – the architectural and structural



elements; the mechanical, plumbing, drainage, and electrical systems; the cost implications and the contractual and managerial processes.

Graduates of Building Technology become senior drafting personnel, job captains, specification writers, estimators or contracts managers, building inspectors, officials in property management departments, appraisers and assessors, partners in construction organizations and technical representatives for building 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

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

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

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

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

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

Post-graduation

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

Prerequisites

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

TECHNOLOGY: Building

Level 1		Clrm hrs/wk
BLDG 101	Drafting	3.0
BLDG 102	Building Construction 1	5.0
BLDG 103	Materials and Methods	2.0
BLDG 104	Construction Site Processes	3.0
BLDG 108	Introduction to Computers	2.0
BLDG 109	Computer Basics	2.0
CIVL 135	Building Structures 1	3.0
MATH 140	Basic Technical Mathematics for Building	5.0
MSYS 101	Plumbing	3.0
TCOM 102	Technical Communication	4.0
Level 2	**(Term 2A 10 weeks)**	
AICO 213	AutoCAD 1	3.0
BLDG 105	Construction Contracts 1	2.0
BLDG 201	Planning	3.0
BLDG 202	Building Construction 2	6.0
CIVL 236	Building Structures 2	3.0
MATH 240	Calculus and Analytic Geometry	6.0
MSYS 202	Heating and Ventilating 1	4.0
OPMT 185	Project Management	2.0
PHYS 219	Physics for Building	4.0
Level 2	**(Term 2B 10 weeks)**	
BLDG 201	Planning	4.0
BLDG 202	Building Construction 2	6.0
BLDG 206	Construction Estimating 1	4.0
CIVL 236	Building Structures 2	3.0
ELEC 150	Illumination	3.0
MATH 240	Calculus and Analytic Geometry	5.0
PHYS 219	Physics for Building	4.0
TCOM 201	Technical Communication	3.0

PROGRAM: Architectural Major

Level 3		
BLDG 302	Building Construction 3 for Architectural Major 1	6.0
BLDG 306	Construction Estimating 2	4.0
BLDG 309	Architectural Major 1	6.0
CIVL 337	Building Structures 3	3.0
ELEC 250	Electrical Systems	4.0
OPMT 260	Management Engineering 1	2.0
PHYS 319	Physics for Building	4.0
Level 4	**(Term 2A 10 weeks)**	
BLDG 305	Construction Specifications	2.0
BLDG 402	Construction 4 for Architectural Major 2	6.0
BLDG 406	Construction Estimating 3	4.0
BLDG 409	Architectural Major 2	6.0
BLDG 413	Codes and Regulations	2.0
BLDG 419	Building Acoustics	3.0
CIVL 438	Building Structures 4 for Architectural	3.0
OPMT 360	Management Engineering 2	2.0
TCOM 301	Advanced Technical Communication	2.0
Level 4	**(Term 2B 10 weeks)**	
BLDG 205	Construction Contracts 2	2.0
BLDG 305	Construction Specifications	2.0
BLDG 402	Construction 4 for Architectural Major 2	6.0
BLDG 406	Construction Estimating 3	4.0
BLDG 409	Architectural Major 2	6.0
CIVL 438	Building Structures 4	3.0
MECH 412	Space Conditioning	3.0
SURV 120	Introduction to Survey for Building	3.0

PROGRAM: Economics Major

Level 3		
BLDG 306	Construction Estimating 2	4.0
BLDG 312	Construction 3 for Economics 1	6.0
BLDG 316	Economics Major 1	6.0
CIVL 337	Building Structures 3	3.0
ELEC 250	Electrical Systems	4.0
OPMT 260	Management Engineering 1	2.0
PHYS 319	Physics for Building	4.0
Level 4	**(Term 2A 10 weeks)**	
BLDG 305	Construction Specifications	2.0
BLDG 406	Construction Estimating 3	4.0
BLDG 412	Construction 4 for Economics 2	6.0
BLDG 416	Economics Major 2	6.0
CIVL 439	Building Structures 4 for Economics	3.0
MATH 440	Mathematical Methods and Computing for Building	4.0
OPMT 360	Management Engineering 2	2.0
TCOM 301	Advanced Technical Communication	2.0
Level 4	**(Term 2B 10 weeks)**	
ADMN 311	Industrial Management	4.0
BLDG 205	Construction Contracts 2	2.0
BLDG 305	Construction Specifications	2.0
BLDG 406	Construction Estimating 3	4.0
BLDG 412	Construction 4 for Economics 2	6.0
BLDG 413	Codes and Regulations	2.0
BLDG 416	Economics Major 2	6.0
SURV 120	Introduction to Survey	3.0

Course Descriptions

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

AICO 213 AutoCAD 1 – 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 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 103 Materials and Methods – Physical and chemical properties of common construction materials. Standards and gradings for materials. Construction methods and building procedures. Field studies and examination of sample products. Filing and retrieval of technical literature.

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

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

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

BLDG 109 Computer Basics – Students are introduced to AT computer components. Basic computer skills are taught through hands-on learning. Disk Operating System (DOS) commands, such as directories, sub-directories, copy commands and other structures, are covered in this course.

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

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

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

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

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

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

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

BLDG 309 Architectural Major 1 – Short history of contemporary architecture and building. Conceptualization and planning. Theory, aesthetics and structure as integral parts of design. Prerequisite: Completion of first year program.

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

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

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

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

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

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

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

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

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

CIVL 135 Building Structures 1 – Basic theory of statics including the calculation of loads acting on structures, and the calculation of support reactions and internal axial and shear forces and bending moments due to the applied loads. Students will be expected to 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 tutorial problem solving sessions.

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

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

CIVL 438 Building Structures 4 for Architectural – Architectural students study elementary reinforced concrete design including an appreciation of its variations such as prestressed concrete and reinforced masonry, followed by an introduction to soils engineering including compaction, foundation systems and retaining walls design. Prerequisite: CIVL 337.

CIVL 439 Building Structures 4 for Economics – Economics students take an introduction to soils engineering including soil classification, soil strength, compaction, lateral soil pressure, foundation systems and retaining walls. Optional topics such as prestressed concrete, concrete formwork, etc. may be discussed. Prerequisite: CIVL 337.

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

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

MATH 140 Basic Technical Mathematics – 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 – 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 – Spreadsheet usage including IF and THEN statement and Macros. Database and Graphs. Linkage amongst the above three functions.

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

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

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

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

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

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

PHYS 219 Physics 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 319 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 – In this course students learn the basic techniques and applications of written and spoken communication. Assignments are related as closely as possible to the practical careers of Building Technology students, including direct and persuasive requests, informational memos, job application letters and resumes.

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

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

Faculty and Staff

E. Hull, B.Sc., P.Eng., Associate Dean
F.A.A. Alfeld, Dipl.Eng., Instructor
G. Berkenpas, Senior Instructor, 1st year
R. Guerin, A.Sc.T., Seminar Co-ordinator, Program Head
D.C. Hale, Dipl.T., Assistant Instructor
G.M. Hardie, M.Ed., F.R.I.C.S., Program Head
H.E. Kuckein, M.A.I.B.C., M.R.A.I.C., Senior Instructor, 2nd year
M. Kuzych, B.Arch., M.R.A.I.C., M.A.I.B.C., Instructor
J. Lancaster, B.Comm., M.C.I.Q.S., Instructor
J.A. McInnes, P.Eng., Instructor
A. Maharajh, B.A., Dipl.T., A.Sc.T., M.C.I.Q.S.,
Part-time Studies Co-ordinator

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Civil and Structural

Civil and Structural technologists are involved in the design and construction of highways, bridges, airports, railways, municipal works, power developments, dams, canals, docks and harbors. The field has enormous creative potential and offers the technologist involvement in all phases of a project, from design stage to finished job.

Job Opportunities

Graduates find employment as inspectors, construction supervisors, testing lab technicians, design detailers and investigation and construction technologists, in government and in private industry. A number of graduates have founded their own consulting or construction businesses. Others are placed in engineering, contracting, surveying or architectural firms as project managers or supervisors, or to work in design or analysis.

The Program

The diverse and stimulating program includes field trips to assist students in developing their creativity, ingenuity and critical abilities, as well as major projects in which the student develops, in consultation with professionals, appropriate methods of approach and solution. In the second year, students may choose their options to provide a degree of specialization in varying areas of the civil and structural technology. These include Geotechnical/Highways, Water Resources, Construction and Structures.

The program has been accredited at the technologist level by the Applied Science Technologists and Technicians of B.C. and, upon completion of the BCIT diploma program, graduates are eligible for membership in the Society.

Prerequisites

Algebra 12 and Physics 11 are course requirements for this program.

Exemption from the academic requirements may be made in the case of mature applicants with applicable practical experience.

Transfer

Graduates of the Civil and Structural Program with a sufficiently high standing are granted full credit for their work at BCIT by the University of Lakehead Civil Engineering Department. After taking summer school they are then eligible to enter fourth year engineering directly and graduate with an accredited degree in two years. Students with a high academic standing also obtain good transfer credits to other Canadian Universities such as the University of Waterloo and the University of Calgary.

TECHNOLOGY: Civil and Structural

Level 1		Clrm hrs/wk
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 and Structural	5.0
PHYS 107	Physics for Civil and Structural	5.0
SURV 130	Surveying for Civil and Structural	3.0
TCOM 101	Introduction to Technical Communication	3.0

Level 2A	(10 weeks)	Clrm hrs/wk
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	5.0
PHYS 207	Physics for Civil and Structural	5.0
SURV 230	Surveying for Civil and Structural	3.0
TCOM 203	Technical Communication	3.0
Level 2B	**(10 weeks)**	
CIVL 203	Elementary Structural Design	6.0
CIVL 207	Hydraulics 1	3.0
CIVL 211	Civil Computer Applications	3.0
MATH 242	Calculus 1 and 2 for Civil and Structural	5.0
PHYS 207	Physics for Civil and Structural	5.0
SURV 230	Surveying for Civil and Structural	3.0
TCOM 203	Technical Communication	3.0

Second Year Program

Options

Set A – Geotechnical/Highways
Set C – Water Resources
Set D – Construction
Set E – Structures

Set A: Geotechnical/Highways

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	Matrix Methods (Civil and Structural)	4.0
SURV 330	Surveying for Civil and Structural	3.0
TCOM 302	Advanced Technical Communication	2.0

Level 4A	(10 weeks)	Clrm hrs/wk
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 432	Construction Estimating	4.0
MATH 442	Statistics for Civil and Structural	3.0
OPMT 180	Construction Management 1	3.0
SURV 430	Surveying for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	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 436	Construction Planning	4.0
MATH 442	Statistics for Civil and Structural	3.0
PHOT 127	Photo Interpretation (Civil and Structural)	3.0
SURV 430	Surveying for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	2.0

Set C: Water Resources

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	Matrix Methods (Civil and Structural)	4.0
SURV 330	Surveying for Civil and Structural	3.0
TCOM 302	Advanced Technical Communication	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 432	Construction Estimating	4.0
MATH 442	Statistics for Civil and Structural	3.0
OPMT 180	Construction Management 1	3.0
SURV 430	Surveying for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	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 436	Construction Planning	4.0
MATH 442	Statistics for Civil and Structural	3.0
PHOT 127	Photo Interpretation (Civil and Structural)	3.0
SURV 430	Surveying for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	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	Matrix Methods (Civil and Structural)	4.0
SURV 330	Surveying for Civil and Structural	3.0
TCOM 302	Advanced Technical Communication	2.0
Level 4A	**(10 weeks)**	
CIVL 325	Soil Mechanics 1	6.0
CIVL 412	Municipal Services	3.0
CIVL 423	Structures 2	6.0
CIVL 432	Construction Estimating	4.0
MATH 442	Statistics for Civil and Structural	3.0
OPMT 180	Construction Management 1	3.0
SURV 430	Surveying for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	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 436	Construction Planning	4.0
MATH 442	Statistics for Civil and Structural	3.0
OPMT 280	Construction Management 2	3.0
SURV 430	Surveying for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	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	Matrix Methods (Civil and Structural)	4.0
SURV 330	Surveying for Civil and Structural	3.0
TCOM 302	Advanced Technical Communication	2.0
Level 4A	**(10 weeks)**	
CIVL 325	Soil Mechanics 1	6.0
CIVL 423	Structures 2	6.0
CIVL 432	Construction Estimating	4.0
CIVL 434	Structural Detailing	3.0
MATH 442	Statistics for Civil and Structural	3.0
OPMT 180	Construction Management 1	3.0
SURV 430	Surveying for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	2.0
Level 4B	**(10 weeks)**	
CIVL 410	Asphalt Technology	3.0
CIVL 424	Structures 3	6.0
CIVL 426	Soil Mechanics 2	6.0
CIVL 436	Construction Planning	4.0
MATH 442	Statistics for Civil and Structural	3.0
OPMT 280	Construction Management 2	3.0
SURV 430	Surveying for Civil and Structural	3.0
TCOM 401	Advanced Technical Communication	2.0

Course Descriptions

CIVL 101 Statics – Vectors, force systems, graphical analysis, resultants, components, moments, equilibrium laws, force polygons, funicular polygons, frames and trusses, stress diagrams, Bowes' notation, flexible tension members, load shear and bending moment curves. Closely supervised problem sessions are used to provide the student with practice in common analytical and graphical solutions to problems of static load on statically determinate structures.

CIVL 103 Hydrology – This introductory course presents the basic concepts and techniques of small watershed analysis and the type of work involved in the design, supervision and construction of drainage facilities. The course will present the fundamentals of practical hydrology including: the hydrologic cycle; precipitation types and measurement; snowmelt, runoff and streamflow; basic frequency analysis and open channel flow. Lectures, assigned problems and two design projects will be used to demonstrate the principles involved.

CIVL 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 and their connections are used as examples. Prerequisite: CIVL 202.

CIVL 207 Hydraulics 1 – Through problem sessions and lectures, the student learns to determine the hydrostatic forces exerted by water on a variety of structures, gates, tanks and dams. As part of a project, the student analyzes a complex tank full of water to determine the forces and centres of pressure. Special problems of hydrostatic pressures produced in accelerated or rotated fluids are given. Further problem sessions lead to the understanding of energy transfers and losses in pipe systems and the significance of friction losses in waterworks systems. In this part of the course, the student analyzes a simple pump-driven circulation system and graphs all energy gradients in profile along the system. Evaluation is by individual interview, problems and quizzes.

CIVL 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 data bases. Highway terminology – horizontal/vertical curves. Introduction to Canadian Standards.

CIVL 304 Structural Design General – Designed for students taking Civil options. Through analysis and design projects, students are introduced to reinforced concrete as a structural material. The effects of continuity with structures are discussed in lectures and connection details for all structural components in basic building materials are developed. Prerequisite: CIVL 203.

CIVL 308 Hydraulics 2 – Lectures and assignments on open and closed channel flow including distribution of flow pipe networks, water-hammer, and stresses in pipes. Hydraulic element chart and specific energy in open channel and culvert flow. Prerequisite: CIVL 207.

CIVL 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 – Heavy emphasis is placed on statically indeterminate structures in this, the first of three second year structures courses. In addition to determining the design criteria for continuous beams and frames by the use of moment distribution, reinforced concrete designs for one way slabs, continuous beams and columns, as well as retaining walls, are investigated. The designs are "drafted" and "reinforced" with site visits. Prerequisite: CIVL 203.

CIVL 325 Soil Mechanics 1 – Through lectures and laboratory work the principles of basic soil me hanics 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.

CIVL 383 AutoCAD 1 for Civil Engineering – (1) Basic CADD commands for controlling elements, views, drawings and files. (2) Project using above 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 211.

CIVL 410 Asphalt Technology – After successfully completing this introductory course, a student will have the knowledge to select suitable materials for asphaltic concrete design using the Marshall method. Topics include plant and paving quality control, asphaltic cement testing, calculation for asphaltic design.

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 sewers and storm sewers and their design with full plans and profile drawings for each service. Through preparatory lectures and discussions, the student is introduced to municipal road standards, crown and drainage, street geometry, street appurtenances, paving methods, domestic fire and industrial water demands, water distribution design methods, distribution reservoirs and pressure control, pumping, sewer flows and sewer design, sewage pumping stations and loads on buried conduits. Field trips are made to municipal operations. Prerequisite: CIVL 207, CIVL 206.

CIVL 416 Water Resources – Lectures and problem sessions present the analysis of surface runoff by the rational formula and unit hydrograph, mass curves for water supply storage, flood routing and detention storage. The use of the computer in predicting water resources and quality (mathematics modelling) is covered. Prerequisite: CIVL 207 or CIVL 105.

CIVL 417 Highway Design – Students will complete the preliminary design of a section of rural highway in B.C. Working in groups, students will establish curve radii, spiral lengths, curve data, stations, curve superelevation, superelevation development, centre line profile, vertical curve lengths, typical section details, drainage details, culvert sizes. Using an earthwork computer program students will optimize earthworks by manipulating input files on vertical alignment, typical section and superelevation and by analysis of resulting mass haul. Preliminary working drawings will also be prepared. Prerequisite: CIVL 206, CIVL 207, CIVL 211.

CIVL 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 analysed. 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 computer aided structural analysis and design, and on formwork design. Students will acquire the ability to present calculations, sketches and drawings in a clear, concise, professional manner, and to solve problems within a specified time limit. A field trip to inspect a structure under construction is included. Prerequisite: CIVL 322.

CIVL 424 Structures 3 – An existing bridge is chosen in consultation with the instructor, and the student designs, aligns and details an alternative crossing to the original. The student learns about layout, moving loads, influence lines, continuous girders, trusses, arches, deflections of spans, bridge deck floor systems, sway bracing, deck slabs, joint details, piers and abutments, and piling. Prerequisite: CIVL 423.

CIVL 426 Soil Mechanics 2 – This course applies the knowledge learnt in CIVL 325 to a variety of geotechnical, foundation and drainage design problems. Projects include seepage studies and stability analysis of soil slopes, earth pressures and retaining structures, foundation design. Prerequisite: CIVL 325.

CIVL 427 Soil Mechanics 3 – Lectures, laboratory and project work and guest lectures cover the following topics: geotechnical aspects of tailings dam design, construction and maintenance; triaxial soil testing; maintenance and operation of laboratory/field electronic equipment; reinforced earth; elementary rock mechanics. Prerequisite: CIVL 426.

CIVL 432 Construction Estimating – The student is involved in construction estimate preparation both as an individual and as a member of a team. Lectures illustrate the procedures for taking off quantities, establishing productivity forecasts and unit costs, and accounting and job control methods.

CIVL 433 Construction Detailing – Introduction to the practical aspects of taking-off, fabrication, and the placing and inspecting of reinforcing steel in concrete structures. Field trips to fabricating plants and construction sites augment classroom instruction.

CIVL 434 Structural Detailing – Students are required to design and detail connections, and draw solutions to detailing problems taken from structures used in other related courses, i.e. timber, steel and reinforced concrete. Includes bill of materials and reinforcing bar lists.

CIVL 436 Construction Planning – Introduction to the time-value of money and the application of sound economic principles to comparison of construction alternatives, and acquisition and maintenance of equipment. A major construction project is analyzed by the student emphasizing critical path planning and the optimum use of resources. Planning for construction projects involving repetitive operations is demonstrated by worked examples. Construction industry guests lecture on current projects and the responsibility of the technologist.

MATH 142 Basic Technical Mathematics for Civil and Structural – Quadratic equation and systems of linear equations. Radian measure. Trigonometric functions, solution of triangles, 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 and Structural – Conic sections and polar/rectangular transformations. Limits, the derivative, differentiation rules for algebraic, trigonometric, logarithmic and exponential functions; curve sketching, implicit differentiation, higher order derivatives, applied maxima/minima, related rates and differentials. Antidifferentiation, the indefinite integral and the definite integral including area, volume, centroid and moment of inertia.

MATH 342 Matrix Methods for Civil and Structural – Matrix theory and operations, types of matrices, determinants, matrix inversion, elementary matrix transformations and solution of systems of linear equations. Linear programming using the Simplex method. Network analysis.

MATH 442 Statistics for Civil and Structural – Organization and graphical presentation of data, frequency distributions and measures of central tendency, variation and other measures. Probability theory and laws. Random variables, discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Method of least squares, regression and correlation. Time series analysis. Control chart concepts and application, acceptance sampling.

OPMT 180 Construction Management 1 – An introduction to the fundamentals of the Critical Path Method (CPM) as it applies to project planning, scheduling, control and management. This course includes arrow diagrams, precedence diagrams, resource allocation, time-cost analysis, PERT, bid determination, project management and the role of the computer. The course is designed to meet the needs of the civil engineering student.

OPMT 280 Construction Management 2 – The study of problem-solving in industry, with particular emphasis on heavy construction and manufacturing problems. The course includes method study, process charting, activity sampling, work measurement, motion economy and productivity. Special emphasis is placed on the human problems associated with change. The course is particularly slanted towards civil engineering.

PHOT 127 Photo Interpretation for Civil and Structural – Covers the fundamentals of aerial photo interpretation, basic photo interpretation equipment, geologic and soil mapping, air photo interpretation for terrain evaluation, engineering applications of aerial photo interpretation including site evaluation and route location. The fundamentals of photogrammetry and the applications of photogrammetric equipment to highway engineering are also covered.

PHYS 107 Physics for Civil and Structural – This is a general level physics course emphasizing the application of physical principles to the Civil and Structural Technology. A section on the application of geophysical exploration techniques used in the technology is included. Topics 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 and Structural – see PHYS 107. Prerequisite: PHYS 107.

SURV 130 Surveying for Civil and Structural – Fundamental concepts of surveying; measurement of distances, use of compasses, theodolites, plane tables, levels and chains, site surveys. Calculations relating to traverses, triangulations, areas and volumes; obtaining, recording and plotting topographic detail. Care, maintenance and adjustment of equipment.

SURV 230 Surveying for Civil and Structural – see SURV 130.

SURV 330 Surveying for Civil and Structural – see SURV 130.

SURV 430 Surveying for Civil and Structural – see SURV 130.

TCOM 101 Introduction to Technical Communications – This course cover 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 and Structural – Students will write job application letters and resumes and learn about job interviews. They write short progress, incident, trip reports and inspection reports common to the Civil and Structural field. They also practice oral reporting. Prerequisite: TCOM 101.

TCOM 302 Advanced Technical Communication for Civil and Structural – Students analyze and write problem-solving, analytical and recommendation reports typical of the civil engineering field. They also learn small group communication theory, write management letters, organize staff and site meetings and participate in role-plays. Prerequisite: TCOM 101, TCOM 203.

TCOM 401 Advanced Technical Communication for Civil and Structural – In this course, students continue practising advanced communication skills such as using word processing to write specifications, how to handle complaints on the telephone, persuasive presentations and technical proposals. The focus of the course is on selling engineering ideas. Prerequisite: TCOM 101, TCOM 203, TCOM 302.

Faculty and Staff

E. Hull, B.Sc., P.Eng., 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. Stuct 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.A. Payne, B.A.Sc., M.A.Sc., P.Eng.
E. Reid, M.I.C.E., C.Eng., P.Eng.
B. Samson, B.A.Sc., M.A.Sc.
R.C. Starr, B.Eng., M.A.Sc., P.Eng., Chief Instructor
C.E. Wade, B.Sc., M.I.T.E., P.Eng., on leave

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Surveying and Mapping

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

The Program

BCIT offers both two-year and specialized one-year programs. In conjunction with 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 student 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 Term One 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-term course of studies specializing in production photogrammetry. Employment in surveying during the summer break is considered desirable.

Post-graduation

Following completion of the two-year diploma program, students are eligible for membership in the Applied Science Technologists and Technicians of 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

Algebra 12 and Physics 11 are course requirements for this program. Good health is also important because of the physical demands of survey work. Photogrammetry students must have good stereo vision.

PROGRAM: Surveying

		Clrm hrs/wk
Level 1		
CIVL 108	Graphical Communication 1	2.0
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 Surveying 1	8.0
SURV 165	Surveying Instrumentation 1	1.0
SURV 172	Computer Applications 1	2.0
TCOM 101	Introduction of Technical Communication	3.0
Level 2		
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 3		
MATH 351	Matrix Methods for Survey	4.0
PHOT 367	Photogrammetry 3	2.0
SURV 361	Plane Survey Computations 3	2.0
SURV 362	Geodetic Surveying 1	3.0
SURV 363	Adjustments of Surveying Measurements	3.0
SURV 364	Field Surveying 3	5.0
SURV 365	Drafting and Survey CAD	2.0
SURV 367	Earth Sciences	3.0
SURV 369	Hydrographic Surveying	2.0
SURV 372	Computer Applications 3	2.0
SURV 378	Mining Surveying	2.0

Level 4	(January to mid-April)	Clrm hrs/wk
MATH 451	Statistics for Survey	5.0
PHOT 467	Photogrammetry 4	4.0
SURV 461	Plane Survey Computations 4	3.0
SURV 462	Geodetic Surveying 2	4.0
SURV 463	Mathematical Cartography	4.0
SURV 465	Surveying Cartography	3.0
SURV 468	Cadastral Studies	3.0
SURV 469	Planning and Land Utilization	3.0
SURV 472	Engineering Surveying	1.0
Level 4	**(Mid-April to late May)**	
SURV 464	Field Surveying 4	140.0 (4 x 35)

PROGRAM: Technician's Program

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

PROGRAM: Photogrammetry

Level 3

MATH 351	Matrix Methods for Survey	4.0
PHOT 365	Cartography: Photogrammetry	2.0
PHOT 367	Photogrammetry 3	2.0
PHOT 377	Photogrammetry	11.0
SURV 361	Plane Survey Computations 3	2.0
SURV 362	Geodetic Surveying 1	3.0
SURV 363	Adjustments of Surveying Measurements	3.0
SURV 372	Computer Applications 3	2.0
SURV 374	Field Surveying for Photogrammetry	3.0
Level 4	**(January to mid-April)**	
MATH 451	Statistics for Survey	5.0
PHOT 465	Cartography: Photogrammetry	3.0
PHOT 467	Photogrammetry 4	4.0
PHOT 477	Photogrammetry	6.0
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
Level 4	**(Mid-April to May)**	
PHOT 477	Photogrammetry	18.0
SURV 474	Field Surveying for Photogrammetry	14.0

Course Descriptions

CIVL 108 Graphical Communication 1 – Graphical communication requires the ability to sketch and knowledge of civil engineering technology. 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 cover site work, excavations, profiles, cut and fill sections, topographical features, open channel flow, drainage facilities, survey layout and calculations.

MATH 151 Basic Technical Mathematics for Survey – Quadratic equation 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 sold 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 focussing on the elements of matrix operations used in least squares adjustments. Included are vectors and coordinate transformations, matrix calculus, eigenvalues and eigenvectors, quadratic forms and ellipses.

MATH 451 Statistics 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 – Drafting principles as applied to photogrammetric compilation and cartography; inking and scribing techniques; surround detail, lettering and scales; production procedures.

PHOT 367 Photogrammetry 3 – The compilation of a flight plan and detailed specifications for a photogrammetric project. Photographic measurements and refinements using a comparator and other instruments. The elements of exterior orientation expressing the space position and angular orientation of a tilted photograph. Use of direct optical projection 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.

PHOT 377 Photogrammetry – The geometry and physical nature of the photograph. Optics for photogrammetry. Principles of photography. Dark room procedures. Aerial cameras. Stereoscopy. The spatial model. Comparator measurements of photocoordinates. Planning aerial photography. Plotting instruments. Classification and operation of stereoplotters. Aerial triangulation. Photogrammetric control extension, coordinate transformation. Use of electronic computers: Photo-interpretation. Terrestrial and oblique photogrammetry. Map compilation. Cartography. Remote sensing. Photogrammetric refinement. General specifications.

PHOT 465 Cartography: Photogrammetry – Drafting principles as applied to photogrammetric compilation and cartography; inking and scribing techniques; surround detail, lettering and scales; production procedures.

PHOT 467 Photogrammetry 4 – Review of geometric projections, inner, relative and absolute orientation. Three dimensional similarity transformation, projective transformation, collinearity transformation, projective transformation, collinearity and coplanarity equations. Restitution instruments – analogue and analytical types. Accuracy of photogrammetric measurement. Aerial triangulation. Photogrammetric products – topographic maps. Orthophoto maps and digital elevation models (DEM).

PHOT 477 Photogrammetry – Coordinate transformations. Colinearity and coplanarity equations. Accuracy of coordinate determination. Aerial triangulation – preparation, measuring and adjustment. Applications of photogrammetry to survey and mapping projects. Introduction to digital mapping.

PHYS 123 Physics 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. Applications of the general topics are relevant 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 angular gross errors; area computations by coordinate and DMD methods; UTM traverse computations; missing parts. See SURV 261.

SURV 164 Field Surveying 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 adjusting, 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 260 Computational Methods for the Field Technician – Review of important geometry theorems and their application to survey. Computations of simple circular curves and symmetric vertical curves. The solution of problems related to the subdivision of land. The reduction of field acquired measurements.

SURV 261 Plane Survey Computations 2 – Missing parts: different techniques of computation problems on subdivision of land; prismodal and trapezoidal rules of area computations; geometry and elements of circular and compound curves; various methods of curve layout; vertical curve; calculations of areas of cross-sections and earthworks volumes; slope staking; control surveys: intersection and resection; inaccessible base.

SURV 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.

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.

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.

SURV 272 Computer Applications 2 – A continuation of SURV 172. Topics include BASIC programming for strings, For-next, loops, subroutines, data files, introduction to MS-DOS, introduction to word processing, serial communication for hand held computers.

SURV 361 Plane Survey Computations 3 – Geometric spaces in surveying, surveying measurements, propagation of errors, computers and numerical approaches in surveying; computations of control surveys; triangulation, trilateration, traversing, reduction of eccentric measurements, intersection, resection, inaccessible base; transformation of coordinates, partitioning of land, horizontal and vertical curves; integrated surveying; deformations; three dimensional surveying systems.

SURV 362 Geodetic Surveying 1 – Properties of the ellipse and the ellipsoid of revolution; calculation of radii of curvature; spherical excess; Legendre's theorem, method of addends. Field tests; triangle closures, side equations, sine consistency checks; reduction to sea level. Convergence of meridians, computation of geodetic position, foreward and inverse. Trigonometric leveling; reciprocal, non-reciprocal, refraction, intervisibility problems.

SURV 363 Adjustments 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.

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.

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.

SURV 372 Computer Applications 3 – Students will study the FORTRAN language and achieve a moderate proficiency in writing programs for survey computations and graphics. Topics include features of the IBM mainframe, CMS terminal operating systems, XEDIT (Editing Utility), use of the WATFIV compiler, fundamentals of the FORTRAN language, FORTRAN 77 compiler, CALCOMP calls, file handling and transfers, IBM PC, FORTRAN compilers.

SURV 374 Field Surveying for Photogrammetry – Control surveys by triangulation, trilateration and traversing. Indirect optical distance measurement. Electro-magnetic distance measurements. The gyro-theodolite. Trigonometrical and barometric levelling.

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.

SURV 461 Plane Survey Computations 4 – See 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.

SURV 463 Mathematical Cartography – Concepts and properties of maps; classifications of maps; theory of distortions; conformality; equivalency; Tissot's indicatrix, conical projections; cylindrical projections; perspective projections; polyconic projection of British Columbia; UTM projection; stereographic projection of New Brunswick.

SURV 464 Field Surveying 4 – A four-week, 35 hour per week, spring camp. Students execute the following survey projects – a control scheme of triangulation and trilateration; astronomic 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.

SURV 465 Surveying Cartography – 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 Studies – 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.

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, SURV 378.

SURV 474 Field Surveying for Photogrammetry – See SURV 374.

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.

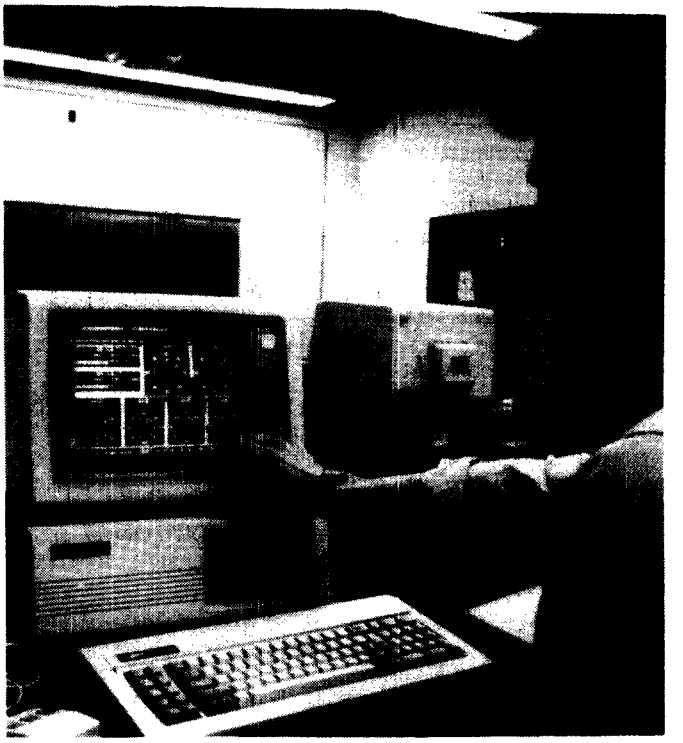
Faculty and Staff

E. Hull, B.Sc., P.Eng., Associate Dean
K.Bracewell, Dipl.T.
R. Bremner, Dipl.T., A.Sc.T.
D. Conroy, Dipl.T.
D.C. Deans, B.A., Program Head
K. Errington, B.C.L.S., Cert.Min.Surv., Senior Instructor
K.Frankich, Dipl.Ing., M.A.Sc., Ph.D.
K. Gysler, B.Eng., M.Eng., D.L.S., P.Eng. Chief Instructor
D. Jarvos, Dipl.T.
G. Kehoe, B.A.Sc., B.C.L.S.
D.S. Martens, Dipl.T., B.C.L.S.
R.G. Miller, Dipl.T., B.A. (on leave)
W.A. Tupper, Dipl.Ing., Senior Instructor
N. Wong, Dipl.Ing., A.R.I.C.S.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

COMPUTER SYSTEMS TECHNOLOGY

Decision Systems
Engineering/Communications and Networking Systems
Expert Systems
Information Systems
Microcomputer Systems



The computer has made it possible to store, manipulate, analyze and display vast quantities of information in unlimited combinations of text, images and sound. This new information technology is increasingly used in science, engineering, medicine, geology, business, the arts, etc., as a creative and analytical tool. Application areas include artificial intelligence, forecasting and simulation, engineering and scientific data management and calculation, decision support, communications, accounting, billing, sales analysis, transaction processing (airlines reservations, banking systems). Large mainframe computers, medium-sized minicomputers, and desktop personal computers are commonly used tools of business, industry and government, and increasingly connect with communications networks spanning vast distances. For the computer to do its job, a systems analyst must define the problem to be solved, design a solution, and give the computer a detailed set of instructions (called a program) to solve the problem. These functions are often combined into one job – the analyst/programmer. Thus the human element determines the degree of success in 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; some advance into management in these fields. Other career opportunities exist in such areas as: software and hardware sales, technical writing, training others on computers, consulting, knowledge engineering, software development, and technical support. Still others seek an entrepreneurial role in the computer world as independent business owners, software authors, consultants, and systems and equipment suppliers.

The Computer Systems curriculum is constantly under review, and course content is subject to change. New course information may be obtained from the Computer Systems Technology Office or from Student Services.

The Program

The first year of the program is comprised of a mix of computer-related and general business courses. The computer-related courses use mainframe, mini and microcomputers to introduce the standard techniques of programming using Pascal, Assembler, BASIC and COBOL languages; the use of software packages covering word processing, spreadsheets and databases, and systems analysis and design. The general business courses include accounting, economics, mathematics and statistics, communications and computer law. In the second year, students specialize in one of the following options. Most options are limited in size to about 20 students. Where the number of applications exceeds the option limit, students are selected using a weighted average of first year marks.

Decision Systems: Specializes in quantitative approaches to managerial decision making. Topics include computer simulation, linear/dynamic programming, computer graphics and decision support systems.

Engineering or Communications and Networking Systems: The Engineering Systems offers specialized courses in CAD/CAM and computer graphics as well as traditional training in computer programming and systems analysis. Specialized courses in the rapidly expanding data communications and computer networking field are currently being planned and may be offered as alternatives.

Expert Systems: 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: In addition to business systems and programming, students receive additional instruction in MIS and management skills.

Microcomputer Systems: Specializes in microcomputer technology, digital logic and hardware, microcomputer systems programming, micro-based systems design and micro applications software.

We encourage applications from all interested persons.

The following prerequisites should ensure acceptance into the program, provided space is available.

Prerequisites for First Year Entry

For Recent High School Graduates:

Completion of at least 6 grade 11 or 12 academic courses (Arts and Sciences), including English 12 and Algebra 11 both with C+, an overall C+ grade for Grade 12, a C+ average in a Computer Science course (or equivalent) is desirable. We specifically recommend Algebra 12 for the Decision Systems Option, and Physics 11 or 12 and Algebra 11 for the Engineering Systems Option.

For Students who graduated from Grade 12 more than 3 years ago: good command of oral and written English, working knowledge of Algebra, at least one accredited computer literacy course or equivalent experience. In certain circumstances, applicants may be required to pass a programmer's aptitude test.

Prerequisites for Second Year Direct Entry

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

Additional Information

Applicants should enjoy using a logical and systematic approach in solving problems. Because students spend many hours at computer terminal keyboards, we recommend that they be able to touch type. Ownership of an IBM-PC or compatible computer will reduce the time a student must spend on campus and will increase the chance of success.

Note: The School of Engineering Technology, through its Department of Part-time Studies and Industry Services, offers a wide range of Computer Systems part-time courses and programs.

Level 1		**Clrm hrs/wk**
ADMN 101	Economic Issues	3.0
BCOM 103	Business Communication for Computer Systems	3.0
COMP 153	Programming and Systems Methodologies: Pascal	7.0
COMP 174	Computer Applications Fundamentals	6.0
FMGT 101	Accounting 1	4.0
MKTG 102	Introduction to Marketing	3.0
OPMT 113	Applied Math	4.0
Level 2		
ADMN 483	Computers and the Law	3.0
BCOM 203	Business Communication for Computer Systems	4.0
COMP 252	Computer Organization and Architecture	4.0
COMP 257	Programming 2 C	6.0#
COMP 258	Programming 2 COBOL	6.0#
COMP 270	Systems Analysis and Design	5.0
FMGT 201	Accounting 2	4.0
OPMT 133	Statistics in Industry	4.0

Each runs sequentially for 1/2 term.

Level 3		**Info**	**Dec**	**Micro**	**Eng**	**Exp**
ADMN 220	Organizational Behavior	3	–	–	3	–
COMP 280	Introduction to Decision Systems	3	–	3	3	3
COMP 350	Application Programming COBOL, ASSEMBLER	6	6	6	–	6
COMP 351	Microcomputer Systems and Applications 2	–	–	5	–	–
COMP 352	Software Support Systems 1	3	3	3	3	3
	Elective chosen from courses in CAD/CAM	–	–	–	4 *	–
COMP 356	Applications Programming – FORTRAN, C,	–	–	–	6	–
COMP 357	LISP and Expert Systems	–	–	–	–	5
COMP 370	File Organization Methods	4	4	4	4	4
COMP 381	Decision Systems 1	–	8	–	–	–
COMP 392	Computer Projects 1	5	5	5	5	5
FMGT 305	Cost Accounting	4	4	4	–	4
FMGT 309	Financial Management 1	–	–	–	4	–
OPMT 168	Management Engineering 1	3	–	–	–	–
		31	30	30	32	30

* eg. AICO 503, or AICO 508 or AICO 510

Level 4		**Info**	**Dec**	**Micro**	**Eng**	**Exp**
ADMN 402	Entrepreneurship and Management	3	3	3	3 *	3
AICO 605	Isues In Networking or Elective in Industrial Computing	–	–	–	3	–
COMP 252	Computer Organization and Architecture	–	–	–	4	–
COMP 450	Applications Programming – PL/1, CICS, 4th Generation Languages	6	6	6	6	6
COMP 451	Microcomputer Systems and Applications	–	–	8	–	–
COMP 452	Software Support Systems 2	3	3	3	3	3
COMP 453	Selected MIS topics	4	–	–	–	–
COMP 455	CAD/CAM 2 or					
COMP 457	PROLOG and Expert Systems	–	–	–	–	8
COMP 470	Advanced Systems Analysis and Design	4	4	4	4	4
COMP 481	Decision Systems 2	–	8	–	–	–
COMP 492	Computer Projects 2	5	5	5	5	5
COMP 493	Practicum	–	–	–	4	–
AICO 605	Issues in Networking or Elective in Industrial Computing	–	–	–	3	–
OPMT 268	Management Engineering 2	4	–	–	–	–
		29	29	29	29	29

* Engineering Systems students take ADMN 402 if they have previously taken COMP 252.

Course Descriptions

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

ADMN 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 402 Entrepreneurship and Management – Deals with entrepreneurship in a larger company. Topics include assessing market opportunity, market planning, financing, human resource planning, legal and tax consideration, managing change and innovation, and other management issues.

ADMN 483 Computers and the Law – Acquaints students with the legal system of Canada and British Columbia, with an emphasis on understanding how to deal with 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. Students learn 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 course on 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 for a new system to clients. Prerequisite: BCOM 103.

COMP 153 Programming and Systems Methodologies: 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 Application 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 nine key operations and standard financial applications. Introduces the student to advanced productivity tools: time management, project planning, desktop publishing, power programming tools. 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 and COMP 174.

COMP 257 Programming 2 C – Studies C as a second language. The philosophy of C is examined 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 and COMP 174.

COMP 258 Programming 2 COBOL – Introduces the COBOL language. The structured, modular programming techniques developed in COMP 153 are used to solve practical business problems. Topics include subroutines, record and file processing, tables, business reports, and data validation. Prerequisite: COMP 257.

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, COMP 174, FMGT 101, BCOM 103, and 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 C programming language. Students write several programs incorporating a variety of programming techniques. Prerequisite: COMP 258.

COMP 351 Microcomputer Systems and Applications 2 – Hardware topics include digital logic, Micro Processing Unit (MPU) and MPU support chip sets, interfacing techniques and current real life microcomputer systems and peripherals. Software topics include several MPU instruction sets, microcomputer operating systems, and common microcomputer programming languages such as PASCAL, C, advanced BASIC, and various ASSEMBLY languages. Prerequisite: COMP 252 and COMP 257.

COMP 352 Software Support Systems 1 – Covers technical topics in hardware and software related to operating systems and other software support systems. Topics include hardware and software architecture, operating systems, resource management (memory processor, I/O device, data, etc.), utility functions and programming language issues. Prerequisite: COMP 252 and COMP 258.

COMP 356 Applications Programming FORTRAN, C – Covers more advanced C programming beyond COMP 257. Upon successful completion of this course, the student will be able to design and code advanced FORTRAN programs using structured style and top down design, and use subprograms. Prerequisite: COMP 252, COMP 257 and COMP 258.

COMP 357 LISP and 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 File Organization Methods – Covers characteristics of magnetic tape and disk storage devices; techniques for data caches, compression, encryption, external sorting, multikey processing, and file backup; file organization methods for sequential, indexed, direct and VSAM; introduction to data base management systems along with a major project. 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 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 direction from a faculty member assigned 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: COMP 257 and COMP 258.

COMP 450 Application Programming PL/I, CICS, 4th Generation Languages – Includes accelerated PL/I, the chief programmer team approach and on-line programming using CICS. In addition, students use FOCUS to set up and report from a data base. Considerable time is spent on a large multi-program system designed in COMP 470. Prerequisite: COMP 350 or COMP 356.

COMP 451 Microcomputer Systems and Applications 3 – Includes systems software (assemblers, compilers, operating systems, editors); applications software (spreadsheet, data base, communications, word processing, etc.); microcomputer networks; microcomputer management and control. Students conceive, design and implement a systems software project (e.g. language interpreter, cross assembler, communications package, etc.). The impact of microcomputer technology on organizations and its relation to traditional data processing is also emphasized. Prerequisite: COMP 351.

COMP 452 Software Support Systems 2 – see COMP 352. Prerequisite: COMP 352.

COMP 453 Selected MIS Topics – Gives an overview of current topics of interest to the Management Information Systems practitioner. Professional journals and articles are used to explore such themes as: trends and controversies in MIS; ethical issues; career paths and professionalism; future directions for MIS. Students analyze and lead discussions on relevant material. Prerequisite: COMP 350 and COMP 370.

COMP 455 CAD/CAM 2 – Uses lectures and demonstrations to present topics on CAD/CAM hardware, CAD filing systems, CAD software algorithms, 2D and 3D applications, practical applications of CAD/CAM, robotics and computer aided manufacturing. Prerequisite: AICO 503 or AICO 508 or AICO 510.

COMP 457 PROLOG and 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 470 Advanced Systems Analysis and Design – Covers structured systems analysis; relational data base concepts; design of on-line systems; data communications and networking. Includes analysis, design and specifications of a major project which is programmed in COMP 450. Also includes a series of special computer related topics of current interest. Prerequisite: COMP 370.

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

COMP 492 Computer Projects 2 – see COMP 392. Prerequisite COMP 257 and COMP 258.

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 370.

FMGT 101 Accounting 1 – Familiarizes students who have little or no accounting background 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, includes 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 – The follow-up to FMGT 115, enables students to complete the last 12 weeks of the basic accounting course. See FMGT 201 for details. Prerequisite: FMGT 115.

FMGT 305 Cost Accounting – Covers direct costing and the contribution approach; cost-volume-profit analysis; cost analysis for managerial planning and decisions; inventory planning, control and valuation; budgeting and profit planning; standard costs; cost and price variance analysis; capital budgeting. Prerequisite: FMGT 201 or 215.

FMGT 309 Financial Management 1 – Includes 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.

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

OPMT 113 Applied Math – Involves positional numbering systems, binary arithmetic and an introduction to Boolean Algebra as it relates to operation of digital computers in the first portion of course. 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.

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

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

Faculty and Staff

K. Takagaki, B.A. (Hons.), R.I.A., C.D.P., Acting Associate Dean
P. Abel, B.A. (Hons.)
R. Coolidge, Dipl. T., Co-ordinator, Service Courses
D.L. Gervin, B.A., B.Ed., Dipl. T., C.D.P.
K.E. Holden, R.I.A.
H. Holst, C.D.P., C.S.P., Program Head, Information Systems Option
G.T. Kidd, B.Sc.
M.W. Lo, B.Sc.(Hons.), M.Sc., Program Head, Microcomputer Systems Option
R.B. Long, C.G.A., Manager, Information Technology Programs (P.T.S.)
F.J. Martin, B.A. (Hons.), M.Sc., F.L.M.I., C.D.P., Program Head, Expert Systems Option.
V.A Nagel, Dipl. T., C.D.P.
J.L. Parry, B. Math.
M. Ramkay, B.Sc.
M. Scriabin, M.B.A., Ph.D., Head, Laboratory for Applied Research in Computer Systems
C.P. Simmons, C.G.A.
M.E. Turner, M.B.A., P.Eng., Ph.D., Program Head, Decision Systems Option
A.Y.W. Wong, B.A.Sc., M.Eng., P.Eng., Program Head, Engineering/Communications Systems Option

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

ELECTRONICS TECHNOLOGY

Control Electronics
Power
Process Automation and Instrumentation
Telecommunications
Microelectronics

Electrical energy, industrial automation and control, telecommunications and microchips form the base of modern high technology. These disciplines and related systems and equipment are essential to the factory, the industrial process, the office, the small business, the hospital and the home. There is a need for persons trained in the principles and applications of electronics to take their places in the technical team. The positions held by these persons are found in design, development, production, installation, sales and maintenance. The positions may be with commercial companies, government agencies, or educational institutions. The technologist graduate of the Electronics program is an essential member of the team.

The Electronics Technology program is accredited by the Applied Science Technologists and Technicians of British Columbia.

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 each 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.

Cooperative Education 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 for a full description of the Cooperative Education program.

The Programs

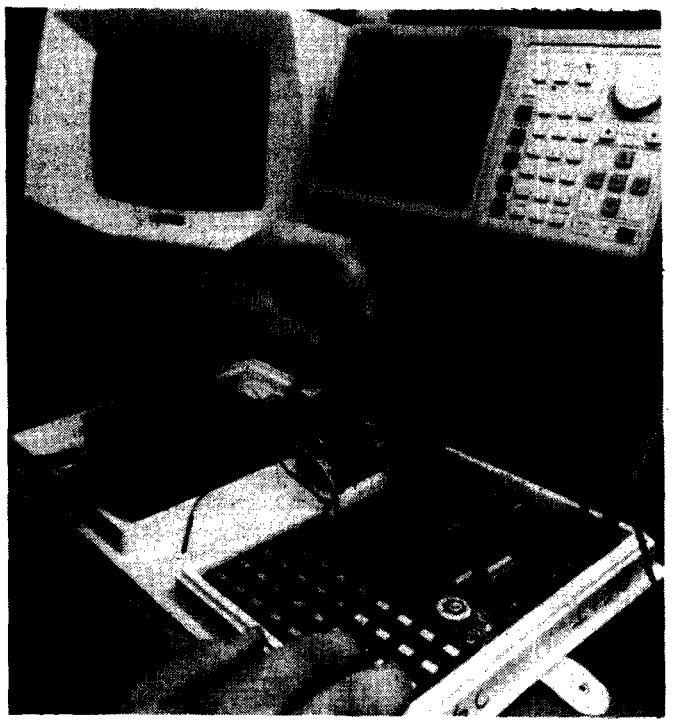
Five options are offered in the Technology; Control Electronics, Process Automation and Instrumentation, Power, Telecommunications, and Microelectronics

The first two terms of the technology program are common to all five options. Terms 3 and 4 for all five options are practically oriented, being primarily related to specific industrial practices.

Throughout Terms 3 and 4, students spend a good portion of their time in laboratories and workshops carrying out practical, applied assignments.

Transfer credits from the Electronics Technology program to British Columbia universities are possible on an individual basis.

The Control Electronics Option, presents a broad-based electronics program with special emphasis on 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.); tele-



communication principles; troubleshooting and design of microprocessor and microcontroller systems; real time systems; inter CPU networking and protocols; industrial electronics and PLC's; video fundamentals and applications; programmable logic devices, logic simulation and ASIC design.

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. Offered January-May and September-January.

The Power Option. Students enter the option in the 4th term after having completed the 3rd term of the Control Electronics 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 on to 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 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.

The Microelectronics Option deals with the miniaturization and integration of electronic circuitry; and with the application of computer tools used in the design (CAD) and engineering (CAE) of electronic circuitry. The curriculum includes hands-on usage of commercial CAD/CAE systems. Students will employ simulation techniques as an aid in the design of complex digital and analog circuitry. Basic training will be given in the layout of both hybrid and monolithic integrated circuits using modern CAD methods. Logic design, based on gate arrays, and microcomputer architecture with lab activities based on Motorola's 32 bit 68000 microprocessor chip form part of the curriculum. To emphasize the practical industrial situation, projects requiring design, circuit assembly, and circuit testing are assigned and completed by students.

Prerequisites

Algebra 12 and Physics 11, both with C+. Chemistry 11 with a C for Instrumentation Option.

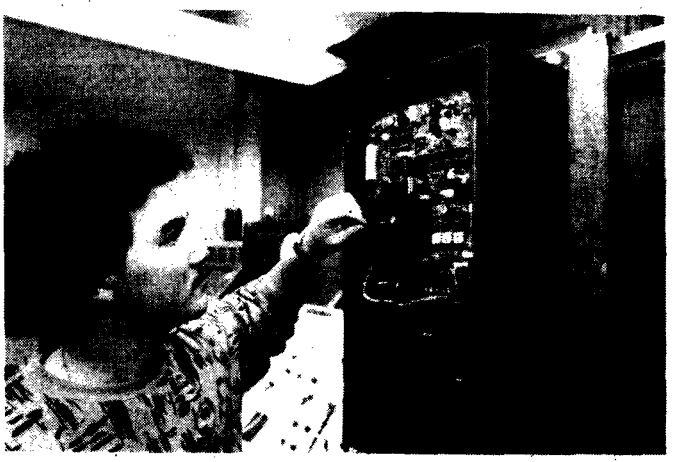
The prerequisites for entry into individual courses are listed with the course descriptions. In addition to these, the student must have completed TCOM 114 before entering any Term 3 or Term 4 course, or before entering the Coop program.

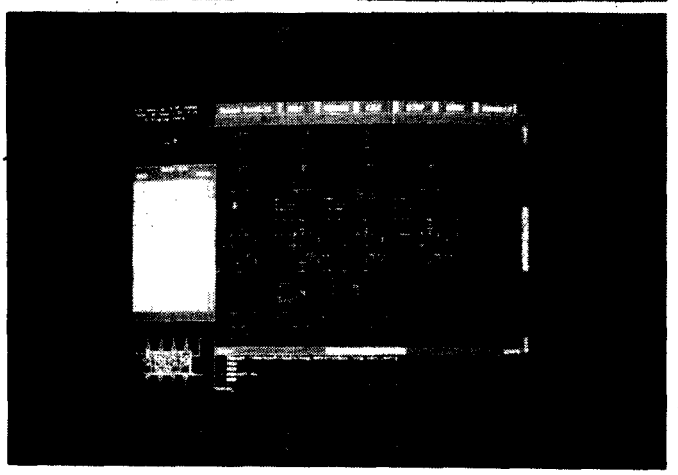
TECHNOLOGY: Electronics

Term 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 Mathematics for Electronics	7.0
PHYS 106	Physics for Electronics	6.0
TCOM 114	Technical Writing for Electronics	3.0
	Library, Research, Evaluation	3.0
Term 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	4 0
	Library, Research, Evaluation	3.0
COOP 1		
ELEX 390	Coop 1	

OPTIONS: Control Electronics and Power

		Clrm hrs/wk	Clrm hrs/wk
Term 3		**3A**	**3B**
ELEX 302	Digital Systems	6.0	6.0
ELEX 303	Electronic Circuits 2	6.0	6.0
ELEX 307	Pulse Techniques	5.0	5.0
ELEX 309	Professional Practice	4.0	0.0
ELEX 311	Applications Software	5.0	5.0
ELEX 325	Electrical Equipment	5.0	0.0
ELEX 334	Telecommunication Principles	0.0	5.0
MATH 343	Transform Calculus for Electronics	0.0	4.0
OPMT 149	Small Business Fundamentals	4.0	0.0
	Library and Research	4.0	4.0
Term 4	**Control Electronics**	**4A**	**4B**
ELEX 406	Data Communication	6.0	6.0
ELEX 411	Programmable Logic Devices	4.0	0.0
ELEX 412	Computer Systems	6.0	0.0
ELEX 413	Industrial Computer Applications	0.0	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 Electronics)	0.0	4.0
TCOM 214	Technical Writing for Electronics	3.0	3.0
	Library and Research	2.0	4.0





		Clrm hrs/wk	Clrm hrs/wk
Term 4	**Power**	**4A**	**4B**
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)	0.0	4.0
TCOM 214	Technical Writing for Electronics	3.0	3.0
	Library and Research	2.0	1.0

OPTION: Microelectronics

Term 3		3A	3B
ELEX 302	Digital Systems	6.0	6.0
ELEX 303	Electronic Circuits 2	6.0	6.0
ELEX 307	Pulse Techniques	5.0	5.0
ELEX 309	Professional Practice	0.0	4.0
ELEX 352	CAD/CAE for Microelectronics	6.0	6.0
ELEX 353	Hybrid Microelectronics	6.0	6.0
MATH 343	Transform Calculus for Electronics	4.0	0.0
OPMT 149	Small Business Fundamentals	0.0	4.0
	Library and Research	2.0	2.0
Term 4		**4A**	**4B**
ELEX 406	Data Communication	6.0	6.0
ELEX 456	Analog Integrated Circuit Design	6.0	6.0
ELEX 457	ASIC's and VLSI Design	6.0	6.0
ELEX 458	Microelectronic Applications	5.0	5.0
ELEX 459	Computer Architecture	6.0	6.0
TCOM 214	Technical Writing for Electronics	3.0	3.0
	Library and Research	3.0	3.0

OPTION: Process Automation and Instrumentation

		Clrm hrs/wk	Clrm hrs/wk
Term 3		**3A**	**3B**
CHEM 302	Electronic Sensors for Analytical Measurements	4.0	4.0
CHSC 343	Thermodynamics and Fluid Mechanics	4.0	0.0
ELEX 302	Digital Systems	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	0.0	4.0
	Library and Research	3.0	3.0
Term 4		**3A**	**3B**
ELEX 441	Microprocessors for Measurement and Control	6.0	6.0
ELEX 442	Analyzers for Process Automation	6.0	6.0
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	5.0	5.0
TCOM 214	Technical Writing for Electronics	3.0	3.0
	Library and Research	3.0	3.0

OPTION: Telecommunications

Term 3		**3A**	**3B**
ELEX 302	Digital Systems	6.0	6.0
ELEX 307	Pulse Techniques	5.0	5.0
ELEX 309	Professional Practice	0.0	4.0
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	0.0
OPMT 149	Small Business Fundamentals	0.0	4.0
	Library and Research	4.0	4.0
Term 4		**3A**	**3B**
ELEX 406	Data Communications	6.0	6.0
ELEX 412	Computer Systems	6.0	0.0
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
TCOM 214	Technical Writing for Electronics	3.0	3.0
ELEX 439	Technical Project (Telecom)	0.0	3.0
	Library and Research	3.0	3.0

COOP 2

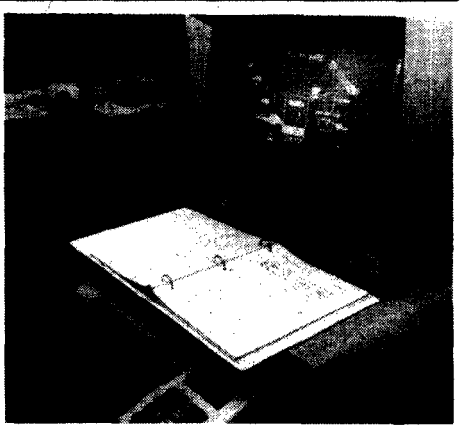
(For all Options after completion of Term 3)

ELEX 490 Coop 2

COOP 3

(For all Options, if desired)

ELEX 495 Coop 3



Course Descriptions

CHEM 302 Electronic Sensors for Analytical 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 followed by the binary (two states or levels) concept followed by 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. 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, impedance, admittance, voltage, current and power 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, 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 200* (*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. Interfacing techniques to discrete devices, analog and digital data multiplexing, bus structures and techniques, and an introduction to solid state memory devices. Successful completion will lead to entry in ELEX 302. Prerequisite: ELEX 102, 203*, TCOM 114 (*may be taken concurrently).

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; oscillator circuits; power amplifiers; DC power supplies; heat sink calculations and characteristics, and application of switching devices. Prerequisite: ELEX 200*, MATH 143, PHYS 106 or 108, TCOM 114 (*may be taken concurrently).

ELEX 302 Digital Systems – 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 its 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 waveforms. Prerequisite: ELEX 201, 202, 303* or 333*, 341* (*may be taken concurrently).

ELEX 303 Electronic Circuits 2 – 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; three terminal regulator based power supplies; and SCR phase control circuits. 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 309 Professional Practice – The Canadian legal system: business organizations; tort liability; proof; contracts; offers and acceptance; intent; consideration; capacity; legality; fraud; misrepresentation, duress and undue influence; mistakes; contract interpretation; discharge of contract; breach of contract; client-professional agreement; concurrent liability; honesty; construction contracts; arbitration; mechanics lien legislation; Combines Investigation Act; engineering legislation and statutes; industrial property, patents, trademarks, copyright, industrial design, trade secrets, federal and provincial laws relating to labor. Engineering technology organizations in Canada: development; legal status; professional designations; codes of ethics; discipline; errors and omissions, and operation. Prerequisite: TCOM 114.

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, 302* (*may be taken concurrently).

ELEX 325 Electrical Equipment – Begins as a continuation of circuit analysis then studies motors, generators, transformers and rectifiers. Topics include a review of phasor diagrams,

power factor, three-phase power and circuit analysis, single and three-phase power distribution systems, DC motors and generators, induction motors, synchronous motors and generators, motor control circuits, transformers (single and three-phase), and three-phase rectification. Prerequisite: ELEX 200, MATH 243, PHYS 106.

ELEX 331 Telecommunications Circuits and Systems 1 – Introduces the principles of telecommunications and defines the telecommunication system. Various modulation systems are explained including amplitude modulation, single-sideband, and frequency and phase modulation. A typical transmitter and receiver are examined first in block form then the various component circuits are examined in more detail. Frequency synthesis is also covered. 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; tuned power amplifiers; stability of tuned amplifiers; wideband amplifiers; operational amplifiers; active filters; parameter systems and their use in small-signal analysis. Prerequisite: ELEX 200 or 208, 203, MATH 243.

ELEX 334 Telecommunication Principles – Introduces students in the 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 principles. Prerequisite: ELEX 200 or 208, 203, MATH 243.

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 lab exercises and projects. Prerequisite: ELEX 200, 203, MATH 243.

ELEX 342 Sensors for Measurement and Control – Examines techniques used in industrial control systems for the measurement of flow, pressure, level, density and temperature. Flow measuring devices such as orifice plates, turbine flowmeters, magnetic flowmeters and ultrasonic flowmeters are investigated. Various pressure sensors are examined and their application to level, density and flow measurements are demonstrated. Industrial applications of thermo-resistive and thermo-electric temperature sensors are examined. Labs consist of the configuration, calibration and testing of various industrial measurement devices. 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 of 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 is also included. 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 352 CAD/CAE for Microelectronics – Offers an introductory treatment of logic simulation techniques, schematic capture and CMOS integrated circuit layout. This laboratory oriented course trains students in the use of current electronic CAD/CAE systems. In the first third of the course, the principles of logic simulation are covered and computer simulation exercises (IBM PC's) acquaint students with the use of TTL libraries, ROM's, ALU's and PLA's. Next, students learn to use Mentor Graphics workstations to create schematics and simulate circuits. The final third of the course is an introduction to CMOS mask level design using interactive graphics and a descriptive language. The fundamentals of MOS operation and manufacture are presented. Students develop small full-custom and standard-cell layouts up to the point where the data base could be used to manufacture parts. Prerequisite: ELEX 201, 202, 302* (*may be taken concurrently).

ELEX 353 Hybrid Microelectronics – An introductory course covering the design, fabrication, and application of hybrid (thick film) microcircuits. The course begins with an overview of the thick film production process, the properties and characteristics of thick film materials, and the resulting thick film design guidelines. Students are introduced to IC-GRAPH and IBM PC software tools for the interactive layout of microelectronic production process masks. Active RC filters are an application area that can take advantage of the precision resistor capabilities of custom thick film circuits. Students are introduced to procedures for generating the modern filter expressions (Butterworth, Chebyshev, Optimum, Bessel, etc.) and active RC circuits that are capable of synthesizing these filters. Lowpass, highpass, bandpass and band reject filters are investigated. Signal Flow Graphs are introduced as a circuits analytic tool and the computer software tool MICRO-CAP II is employed for predicting proposed design theoretical performance. Students perform a complete thick film active filter design project. Prerequisite: ELEX 201, 303*, MATH 343* (*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) protocols, as well as networking schemes. 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. Custom circuit (ASIC) design alternatives and techniques will be explored. Prerequisite: ELEX 302, 311.

ELEX 412 Computer Systems – Examines the techniques used in troubleshooting and design of microprocessor systems including memory systems, extended memory, dynamic memories, bus buffering, relocatable and modular software, EPROM burning, support chips, display and keyboard interface, and direct memory access. These topics introduce the student to the hardware and software concepts and strategies that are essential for the continued operation and development of computer systems. Prerequisite: ELEX 302, 307.

ELEX 413 Industrial Computer Applications – Examines several microprocessors and microcontrollers and their use in industrial microprocessor systems. Applications studied include data acquisition, alarm and binary control, analog control, inter CPU networking and real time systems. Processors are compared for their suitability in each of these applications. Prerequisite: ELEX 406*, 412, 414* (*may be taken concurrently).

ELEX 414 Applied Electronic Circuits – Applies electronic circuit concepts to industrial applications. 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. The light pen, 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 a small single board computer to create graphic displays. Other topics include position control and data sampling, collection and handling. Prerequisite: ELEX 302, 303, 307, 412* (*may be taken concurrently).

ELEX 415 Industrial Electronics and PLC's – Enables students to construct and test common industrial transistor and thyristor power control circuits. Students will be able to calculate appropriate values for circuit components used in linear and switching power supplies and to predict and calculate circuit conditions throughout switching power supply circuits; to draw and explain schematics for typical variable frequency thyristor and transistor power supply configurations; to explain how feedback is used to stabilize and improve the performance of electronic power control systems. Students will gain hands on experience programming industrial programmable controllers. Prerequisite: ELEX 303, 307.

ELEX 419 Technical Project (Control Electronics) – 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 may also be required. 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 will learn how to apply the Canadian Electrical Code to the design of lighting and power distribution systems for commercial and industrial buildings. Prerequisite: ELEX 311, 325.

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.

ELEX 425 Electrical Equipment and PLC's – A continuation of ELEX 325. Students will receive hands on experience with programmable controllers. The course commences with a review and expansion of topics on fuses and circuit breakers and the nature of short circuit faults. Other topics include a more detailed study of AC motors and their applications, motor starting equipment, electrical protective devices such as instrument transformers, protective relays and lightning arresters. Prerequisite: ELEX 325.

ELEX 429 Technical Project (Power) – See ELEX 419 for description. Prerequisite: El EX 302, 303, 307, 325, 415*, 425*, TCOM 214* (*may be taken concurrently).

ELEX 431 Telecommunication Circuits and Systems 2 – There are three major topics in this course. The first is complete transmitting and receiving systems, with emphasis on mobile communications. Sub-topics include: system performance; frequency control; AGC systems; squelch and muting; noise and emphasis; tone-controlled signalling; antenna coupling systems; digital and microprocessor system control. The second topic is video systems. Sub-topics include the video signal (both B/W and color); NTSC, SECAM and PAL systems; video transmitting and receiving systems; and an introduction to video recording. The third topic is radio-navigation systems including Loran-C, RDF, and VHF Omni-range. Prerequisite: ELEX 302, 331, 332, 333, 437* (*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 and detectors and 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 lowpass, highpass, bandpass 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 wideband 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 Technica 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 may also be required. Prerequisite: ELEX 406*, 412*, 431*, 438*, TCOM 214* (*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 – Covers a variety of analytical measurement applications. Techniques to measure humidity, dew point (psychrometers, hygrometers, vapor equilibrium and chilled mirror devices), gas composition (chemical absorption, thermal conductivity, heat of combustion, zirconium oxide analyzers and gas chromatography), conductivity and pH are investigated. In the lab exercises, students will operate, calibrate and analyze typical industrial measuring analyzers. 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 boiler systems, energy management systems, evaporators, distillation columns and pH systems. These processes will be used to demonstrate the application of the most common multivariable control strategies: 3-mode feedback, cascade, selective, ratio, adaptive, non-linear and feedforward systems. Prerequisite: ELEX 343, 442*, CHSC 343 (*should 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* (*should be taken concurrently).

ELEX 445 Industrial Control Projects and Computer-Aided Design – 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*, CHSC 343, TCOM 214 (*may be taken concurrently).

ELEX 456 Analog Integrated Circuit Design – An introduction to the analysis and design of analog integrated circuits. The course starts with a review of basic MOS and BJT, transistor operation and signal transistor linear circuits. Circuit design techniques specific to IC design are then introduced and the course proceeds to techniques needed for combining stages into a complete operational amplifier. The course includes an introductory treatment of frequency response, compensation, pole splitting and slewing. Students design complete CMOS and BJT op-amps using both algebraic and computer simulation techniques, then implement their designs using transistor arrays in the laboratory. Prerequisite: ELEX 303, 353.

ELEX 457 ASIC's and VLSI Design – A continuation of ELEX 352 which includes more advanced topics in logic design, analysis and simulation. MOS chip layout and simulation concepts are further developed with emphasis on the CMOS process and the circuit simulator SPICE. Both full-custom layouts and design with gate arrays (ULA's) are explored. Design projects are taken to the stage where they could be sent out for manufacture. Both static and dynamic logic structures are discussed and simulated. Programmable logic devices (PAL's, FPLA's, EPLD's) are also covered including their structure, application and design, using software such as PALASM, AMAZE and logic simulation. Laboratory work is done on Mentor Graphics workstations and IBM PC's. Prerequisite: ELEX 201, 302, 307, 352.

ELEX 458 Microelectronic Applications – A continuation of ELEX 353 stressing analog filter design employing custom CMOS monolithic integrated circuits. The course begins with the design of doubly terminated lossless ladder networks. Switched-capacitor equivalent circuits are then introduced and explained allowing the realization of switched-capacitor equivalent ladder networks. The Z-Transform is introduced to allow a more general approach to discrete time (sampled) filter circuit design. Through the aid of Bilinear Transform and Z-Plane mapping procedures, students learn to convert any analog (continuous time) filter expression into its equivalent discrete time lowpass, highpass, bandpass, or band reject form and ultimate synthesis, via a cascade of monolithic switched-capacitor biquad circuits. Students design, assemble, and test a switched-capacitor filter. The course terminates by returning to the thick-film hybrid circuit and investigating its potential in the area of high frequency and very high frequency circuit design. Prerequisite: ELEX 353.

ELEX 459 Computer Architecture – An introduction to both macro-architecture (design of computer systems from chips) and micro-architecture (internal chip design). The micro-architecture part of the course examines architectural concepts, logical design, chip layout design, timing, data path and control circuitry architecture. The micro-architecture of the Motorola M68000 microprocessor is taken as an illustrative example. Topics in macro-architecture include microprocessor control lines, data and bus lines, interfacing of EPROM and RAM, interfacing of UARTS, exceptions and interrupts, assembly language and programming techniques, polled I/O, interrupt driven I/O, task synchronization and semaphores. Additional peripheral device interface techniques are discussed as time permits. Students design a small M68000 based computer and a suitable operating system and implement and test their designs as an ongoing project in the laboratory. Prerequisite: ELEX 302.

MATH 143 Basic 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 – 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 – 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 – This course emphasizes clear, correct, concise technical writing in the electronics field. Students learn how to organize technical information, illustrate documents, define and describe technical objects and processes, write routine letters, memos and instructions, and summarize technical articles. Students also write a resume and application letter for Coop.

TCOM 214 Technical Writing – In this course students prepare a professional job search package, practise interviewing skills, and write informal reports. They also learn techniques and formats for writing documentation. Students also do technical briefings. Prerequisite: TCOM 114.

Cooperative Education

***ELEX 390 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 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 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

J.H. Casimir, B.A.Sc., P.Eng., Associate Dean
R. Bailey, Dipl.T., A.Sc.T.
R. Beketa, Dipl.T.
U.R. Bottcher
L.Boyle, Dipl.T., B.Sc., A.Sc.T.
T.W. Coghlan, Dipl.T., A.Sc.T.
N. Cousins, B.Sc., P.Eng.
A. Dunlop, Dipl.T.
P. Fenske, Dipl.T.
D. Finlayson, Dipl.T.
K. Gandham, B.Sc., M.Sc.
J. Gascoyne, Dipl.T.
T.J. Glave, B.Sc. (Eng.), P.Eng., Program Head (Telecommunication)
C.F. Glazier, B.Sc. (Eng.), P.Eng.,
E.G. Hancock, Dipl.T., B.Eng., P.Eng., Program Head (Power and Part-time Studies)
L.C. Hannah, Dipl.T.
J. Hayes, Dipl.T., A.Sc.T.
R. Hunter, Dipl.T.
M. Inch, B.A.Sc., P.Eng.
R. Jones, P.Eng., Program Head (Control Electronics)
K. Kajiwara, Dipl.T., A.Sc.T.
E. Kenward, B.Sc.
M. Lane, Dipl.T.
J. Leibel
J. McLarnon, B.Sc., M.Sc., Ph.D.
J. Maidens, Dipl.T.
W.F. Miklas, Dipl.T., A.Sc.T.
A. Miller
D. Miluch, B.Sc., P.Eng.
A.R. Murdoch, B.A.Sc., P.Eng.
E. Murru, B.A.Sc., P.Eng
G. Pellegrin, B.Sc., P.Eng.
M.G.R. Phillips, B.Sc., Ph.D., Program Head (Microelectronics)
R. Randall, B.Eng., M.S.
D. Rees-Thomas, B.Sc., A.Sc.T.
R. Riches, B.Sc., M.Sc.
I. Ross, B.Sc. (Hons.)
R.T. Russell
J.W. Schoonover, Dipl.T., A.Sc.T.
E.W. Scratchley, B.A.Sc., M.A.Sc., P.Eng.
C. Shaw, Dipl.T., B.B.A.
S. Smolar, B.A., A.Sc.T.
J.N. Tompkin, B.Sc. (Eng.), P.Eng., Program Head (Terms 1 & 2)
E.A. Upward, Dipl.T., A.Sc.T., Program Head (Instrumentation)

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

MECHANICAL DESIGN TECHNOLOGIES

CAD/CAM
Computer Aided Engineering
- **Spatial Information Systems**
- **Advanced Manufacturing**
- **Resource Processing**
- **CAD Programming**

Mechanical
- **Design**
- **Manufacturing**

Mechanical Systems
Plastics
Robotics and Automation
Industrial Education Teacher Education

CAD/CAM Technology

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

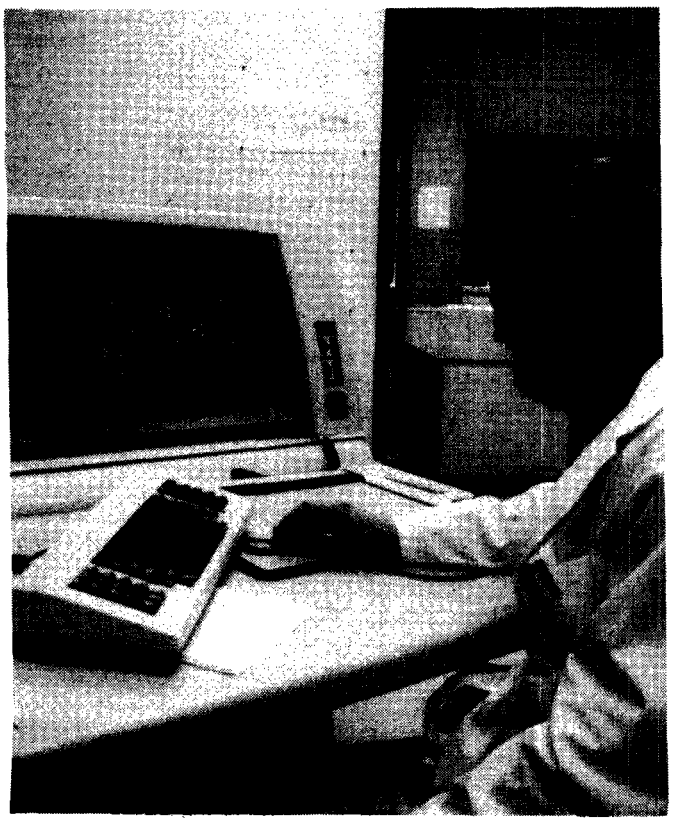
CAD/CAM has important applications in the production, supervision, distribution and storage of computerized drawing. CAD/CAM design tools are used in the development of machines, tools, buildings, structures and maps. Associated non-graphic information can be stored and retrieved affecting a wide range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

Job Opportunities

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

The Program

Two streams are currently available to students. Graduated engineering technologists and engineers are offered the opportunity of upgrading their current skill-set through a direct entry program. This program offers intense one year training in CAD/CAM. Students with a strong mechanical background are encouraged to enter the Advanced Manufacturing option of Computer Aided Engineering; students with an earth/science background are encouraged to enter the Spatial Information systems option of Computer Aided Engineering. Regular students are offered a two year program with a first year emphasizing traditional engineering discipline training.



Prerequisites

For first year applicants: Algebra 12, Physics 11.

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

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

TECHNOLOGY: CAD/CAM

		Clrm hrs/wk
Level 1		
CDCM 101	Computer Sciences 1	3.0
CHSC 105	Engineering Materials	4.0
MATH 149	Basic Technical Mathematics for Mechanical	5.0
MECH 100	Mechanical Drafting 1	3.0
MECH 104	Statics	4.0
MECH 106	Manufacturing Processes 1	4.0
MECH 107	Thermal Processes	3.0
TCOM 109	Technical Communication	4.0
	Library, Research and Field Trips	5.0
Level 2		
CDCM 201	CADraft 1	4.0
ELEC 209	Electrical Principles and Applications	4.0
MATH 249	Calculus for Mechanical	4.0
MECH 200	Mechanical Drafting 2	3.0
MECH 205	Dynamics	4.0
MECH 206	Mechanics of Materials	4.0
MECH 240	Manufacturing Processes 2	4.0
TCOM 210	Technical Communication	4.0
	Library, Research and Field Trips	4.0

Level 3		Clrm hrs/wk
AICO 501	Graphics Programming in FORTRAN 77	6.0
AICO 502	Systems Analysis	3.0
CDCM 311	3D CAD Drafting (Term A)	7.0
CDCM 312	Graphics Programming Language (Term B)	7.0
MATH 349	Numerical Methods for Mechanical	4.0
MECH 301	Machine Design 1	4.0
MECH 320	Fluid Power 1	3.0
ROBT 411	Computer Integrated Manufacturing	5.0
	Library, Research and Field Trips	3.0

Level 4		
AICO 214	AutoCAD 2 (Term A)	4.0
AICO 313	AutoLISP Programming (Term A)	4.0 (4B)
AICO 601	File Handling and Data base	6.0
AICO 602	Systems Management (Term A)	3.0
AICO 603	Systems Acquisitions (Term B)	3.0
CDCM 303	Computer Aided Manufacture	4.0
CDCM 402	CAD/CAM Projects (Term A)	2.0 (4A)
CDCM 402	CAD/CAM Projects (Term B)	10.0 (4B)
CDCM 404	CAD Design	3.0
MATH 460	Mathematics for CAD/CAM	4.0
	Library, Research and Field Trips	4.0

Course Descriptions

AICO 214 AutoCAD 2 – A continuation of AutoCAD 1. Topics covered are annotations, dimensioning; screen menu creation, plotting and digitizing. Class assignments may be tailored to one of four discipline areas: mechanical, architectural, survey or electronics depending on student's background. Prerequisite: AutoCAD 1 or equivalent.

AICO 313 AutoLISP Programming 1 – Introduction to AutoLISP. Upon completion students will be able to obtain and display user information in an AutoCAD work session, perform math calculations using AutoLISP, use the logic control structures of AutoLISP, access and change system-wide AutoCAD settings, and write elementary graphic programs in AutoLISP.

AICO 501 Graphics Programming in FORTRAN 77 – Introduction to FORTRAN 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 and CDCM 201 or equivalent.

AICO 502 Systems Analysis – Introduction to standard problem analysis tools: flow charting, Nassi-Schneidermann, decision tables, systems analysis, flow graphs, structure charts and data flow analysis, scheduling and CP methodology.

AICO 601 File Handling and Data base – Sequential, direct and keyed indexed file handling. Introduction to data base 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 501.

AICO 602 Systems Management – Issues related to the management of computer systems: backup strategies, security issues, system utilization measures, system accounting, vendor liaison, preventative maintenance scheduling. Stress on micro and minicomputer support.

AICO 603 Systems Acquisitions – Documentation required for the acquisition of automating equipment. Cost/benefit analysis. Analysis of organizational issues. Identifying scope of automation. Impact of implementation on existing structures.

CDCM 101 Computer Sciences 1 – Introduction to computer science and programming using the BASIC language. Emphasis will be on engineering problems using structured problem solving techniques.

CDCM 201 CADraft 1 – VAX based CADD using INTERGRAPH software. The course includes an introduction to CAD machine components, architecture, logon procedures and displays. INTERGRAPH functions including: windows, views, measuring, element placement, annotations, dimensioning, screen menu creation, plotting and digitization. Class assignments may be tailored to one of four discipline areas: mechanical, architectural, electronics or survey.

CDCM 303 Computer Aided Manufacture – Introduction to computer aided manufacturing, computer integrated manufacturing and automated process control. Generation of machine instructions from computerized 3D models. Prerequisite: CDCM 311, ROBT 411.

CDCM 311 3D CAD Drafting – A continuation of CADraft 1. Elementary 3D modeling, auxiliary, isometric and perspective projections using a computer. Prerequisite: CDCM 201 or equivalent.

CDCM 312 Graphics Programming Language – Graphics programming using INTERGRAPH's User Command Language (UC). Upon completion, students will be able to obtain and display user information in an INTERGRAPH work session, perform math calculations using UC, use the logic control structures of UC, access and change system-wide INTERGRAPH settings, and write elementary graphics programs in UC.

CDCM 402 CAD/CAM Projects – Student managed projects with applications in student's area of interest. Projects integrate programming in graphics, data base practice and engineering problem solving. Prerequisite: permission of the department.

CDCM 404 CAD Design – Understanding how computers can help in the design process. Interaction with software packages using surface and/or solids modeling. Prerequisite: CDCM 311.

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

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

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 460 Mathematics for CAD/CAM – Geometric modeling 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 modeling. Overview of finite element method. Selected algorithms from cartography. Interactive computer graphics concerns.

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

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

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

MECH 107 Thermal Processes – Introduction to heat and fluid processes, steam tables, first law of thermodynamics. Basic steam power and refrigeration cycles.

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

MECH 205 Dynamics – Kinematics: basic equation of motion, motion diagrams, trajectories. Kinetics: Newton's Laws, inertia, rectilinear and rotational kinetics, systems of bodies. Work, energy, power, efficiency.

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 240 Manufacturing Processes 2 – Machine tool operation, production processing and economics; evaluation of production features, maintenance. Metal joining processes and equipment, production costs and design applications.

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 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 covered.

ROBT 411 Computer Integrated Manufacturing – Teaches the use of a microcomputer based Computer Aided Design system. Programming the operation of Computer Numerical Control 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 skills to become effective writers and speakers in the mechanical industry. They learn the layout, content and graphic skills of technical writing, research, and employment application techniques. They write technical memos, letters and descriptions, and give an oral report.

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

Faculty and Staff

R.A. Sterne, B.A.Sc., M.A.Sc., F.I.M.A., P.Eng., Associate Dean
C. Goodbrand, B.A., Program Head
P. Dollan, H.N.C.
G. Johnson, B.A.(Geog.)
J. Read, Dipl.Tech.
P. Morrison, B.Eng., Dipl.Tech.
P. Maschak, Dipl.Tech.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

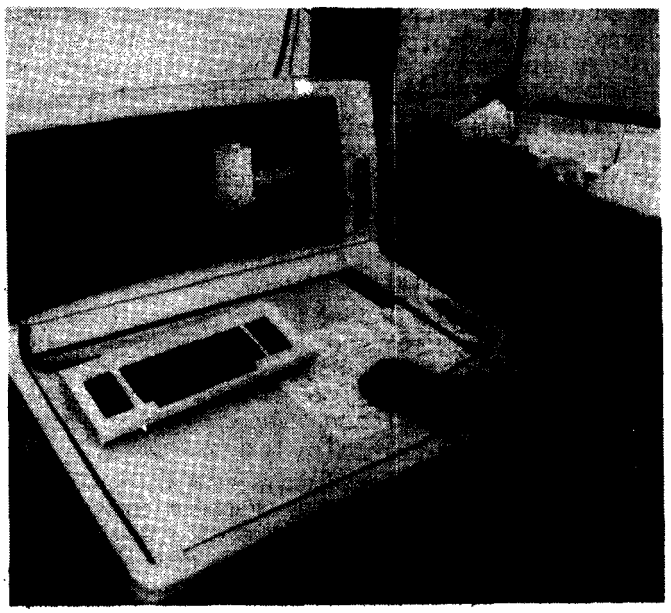
Computer Aided Engineering

Computer Aided Engineering (CAE) embraces a diverse field of engineering disciplines. Programs in CAE have in common the use of emerging computer technology to solve traditional problems. All of these programs mix courses of interest to discipline specialists with general courses in new technologies.

The foundation courses in computers include Computer Aided Design (CAD), Computer Aided Manufacturing (CAM), Spatial Information Systems (SIS), Geographical Information Systems (GIS), Computer Numerical Control (CNC), and Direct Numerical Control (DNC). Programming languages, file handling and database systems, theory and practice of networking, distributed systems, are used where relevant.

These programs are of interest to the practicing technologist and engineer, recent graduates from technology level programs, and others with relevant engineering backgrounds. Four one year post-diploma level programs are currently offered:

Spatial Information Systems
Advanced Manufacturing
Resource Processing
CAD Programming



Spatial Information Systems

Post-diploma Program

Computers are affecting all engineering practice, but nowhere is the technology more exciting than in the creation and maintenance of earth models. With the computer, our traditional flat, deformed representations of the earth are being transformed into fully informative models with a myriad of applications. The development of Spatial Information Systems has been accelerated by advances in computer hardware, software and space technology.

The objectives of this one year post-diploma program are to upgrade the skills of those students already in possession of a relevant National Diploma and/or equivalent experience in the Surveying, Photogrammetry, Civil and Structural, Mining and Forestry Technologies; to provide these graduate technologists with the tools to perform advanced computerized analysis specific to their respective technologies; to have the graduate technologist develop competence in the use of micro/mini and mainframe computers, as well as systems networking; for the graduate technologists to become proficient in mathematical skills to a level where they will be able to solve modeling and simulation problems; to allow the graduate technologist to acquire the knowledge and practical aspects of remote sensing and digital image processing and finally, to provide the graduate technologist with the fundamentals of digital terrain mapping through analytical photogrammetry.

SIS have important applications in the production, supervision, distribution and storage of computerized maps. SIS tools include the processing of remotely sensed data used in the development of source manuscripts. Associated nongraphic information can be stored and retrieved affecting a wide range of corporate data bases. SIS also includes the production of local digital terrain, subterrain and submarine models of earth features. These models have extensive applications in the resource industries. It is to be noted that interesting applications of this technology exist outside of the earth based sciences, particularly in medicine.

This challenging program offers exciting opportunities for the technologist already trained in an earth based science.

Job Opportunities

Since SIS graduates will already have completed a curriculum of study at the National Diploma level or higher in a traditional engineering discipline, they will make ideal "facilitators" of the new technology. They will be able to assist moderate sized engineering firms to select CAM technology and position it successfully within the corporate structure. In addition, graduates should be able to direct training programs, provide system management services, develop new software applications and use the system as a drafting and design tool.

The Program

Graduated engineering technologists and engineers are offered the opportunity of upgrading their current skill-set through a one year post-diploma level program. The program offers intense one year training in computing.

Emphasis is placed on the practical use of graphics systems for the solution of mapping problems, use of the graphics system as a design tool, and projects in SIS selected from the student's field of interest. Several software packages will be sampled. Data base concepts and applications, systems management, and acquisition studies are addressed.

Prerequisites

Applicants must have attained a Diploma of Technology equivalent to BCIT or better, or approval by the Associate Dean.

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

PROGRAM: Spatial Information Systems

Level 1		Clrm hrs/wk
AICO 501	Graphics Programming in FORTRAN 77	6.0
AICO 502	Systems Analysis	3.0
AICO 503	CAD and Graphics (Term A)	4.0
AICO 504	Data Structures in "C"	6.0
AICO 505	Spatial Information Systems 1	3.0
AICO 507	Applied Mathematics 1	4.0
CDCM 312	Graphics Programming Language (Term B)	3.0
	Library, Research and Field Trips	5.0
Level 2		
AICO 601	File Handling and Data base	6.0
AICO 602	Systems Management (Term A)	3.0
AICO 603	Systems Acquisitions (Term B)	3.0
AICO 605	Issues in Networking	3.0
AICO 607	Projects	5.0
AICO 608	Natural Resources and Engineering Mapping	4.0
AICO 618	Remote Sensing	3.0
AICO 619	Spatial Information Systems 2	3.0
AICO 620	Spatial Information Systems 3	3.0
AICO 621	Applied Mathematics 2	3.0
	Library, Research and Field Trips	2.0

Course Descriptions

AICO 501 Graphics Programming in FORTRAN 77 – Introduction to FORTRAN 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 and CDCM 201 or equivalent.

AICO 502 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 503 CAD and Graphics – This concentrated CAD course is intended to give the student extensive hands-on practice on leading edge CAD equipment. Students will be given exposure to both 2D and 3D graphics with examples drawn from the earth sciences.

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 505 Spatial Information Systems 1 – Gives the student a broad overview of hardware, software systems and capability measuring. The course establishes the perspective for subsequent courses in Spatial Information Systems.

AICO 507 Applied Mathematics 1 – Gives students expertise in numerical methods. Floating point computations, matrices, and simultaneous linear equations, interpolation methods, approximation methods, numerical integration, solutions to non-linear equations, random number generation.

AICO 601 File Handling and Data base – Sequential, direct and keyed indexed file handling. Introduction to data base 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 501.

AICO 602 Systems Management – Issues related to the management of computer systems: backup strategies, security issues, system utilization measures, system accounting, vendor liaison, preventative maintenance scheduling. Stress on micro and minicomputer support.

AICO 603 Systems Acquisitions – Documentation required for the acquisition of automating equipment. Cost/benefit analysis. Analysis of organizational issues. Identifying scope of automation. Impact of implementation on existing structures.

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 607 Projects – Affords students the opportunity to work on a comprehensive project with an industry mentor, or on a project of their own choosing. Students will have an internal advisor. The project is intended to demonstrate the student's practical grasp of SIS.

AICO 608 Natural Resources and Engineering Mapping – Informs students of the fundamental operations involved in the process of digital base mapping through analytical photogrammetry, and how to compile, transform, edit and store data sets in a form equivalent to government standards for this type of information.

AICO 618 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.

AICO 619 Spatial Information Systems 2 – Defines the components of a GIS; gives system functions and capabilities; examines weaknesses and strengths of GIS, DEM's, raster vs polygon systems, micro vs minicomputer implementations. Various applications are addressed.

AICO 620 Spatial Information Systems 3 – Examines a variety of data structures used in SIS. Develops a number of the common algorithms used in GIS development and gives the student an appreciation of the internals of a GIS. Students will understand the reasons for the strengths and weaknesses of the different systems.

AICO 621 Applied Mathematics 2 – A continuation of AICO 507.

CDCM 312 Graphics Programming Language – Graphics programming using INTERGRAPH's User Command language (UC). Upon completion, students will be able to obtain and display user information in an INTERGRAPH work session, perform math calculations using UC, use the logic control structures of UC, access and change system wide INTERGRAPH settings, and write elementary graphics programs in UC.

Faculty and Staff

R.A. Sterne, B.A.Sc., M.A.Sc., F.I.M.A., P.Eng., Associate Dean
C. Goodbrand, B.A., Program Head
D.C. Deans, B.A.
P. Dollan, H.N.C.
K. Frankich, Dipl.Ing., M.A.Sc., Ph.D.
G. Johnson, B.A.
D.S. Martens, Dipl.Tech., B.C.L.S.
P. Maschak, Dipl.Tech.
R.G. Miller, Dipl.Tech., B.A.
P. Morrison, Dipl.Tech., B.Eng.
J. Read, Dipl.Tech.

Advanced Manufacturing

Post-diploma Program

It is now a widely recognized fact that Canadian industrial and engineering practices are being radically transformed by the introduction of automation into the workplace. Nowhere is this transformation in greater evidence than in the area of manufacturing techniques. A variety of tools – CAD (Computer Aided Design), CAM (Computer Aided Manufacturing), CIM (Computer Integrated Manufacturing), are available to the manufacturing technologist which, if properly exploited, lead to productivity increases.

The objectives of this one year post-diploma program are to upgrade the skills of those students already in possession of a relevant National Diploma and/or equivalent experience; to develop competence in the use of manual parts programming; to develop competence in the use of NC/CNC (Numerical Control/ Computerized Numerical Control) techniques; to develop competence in at least one higher level parts programming language; and to familiarize the student with emerging technological advances in CIM.

Graduates from this program will be able to provide technical assistance in introducing this technology into a traditional shop; undertake cost/benefit analyses; perform feasibility studies; develop implementation plans; develop training programs for other employees; and be competent users of the technology.

This challenging program offers exciting opportunities for the technologist already trained in a relevant engineering discipline.

Job Opportunities

Since graduates will already have completed a curriculum of study at the National Diploma level or higher in a traditional engineering discipline, they will make ideal "facilitators" of the new technology. They will be able to assist moderate sized engineering firms to select CAM technology and position it successfully within the existing corporate structure. In addition, the graduate should be able to direct training programs, provide system consultation services, develop new parts programs and use CAD as a drafting and design tool.

The Program

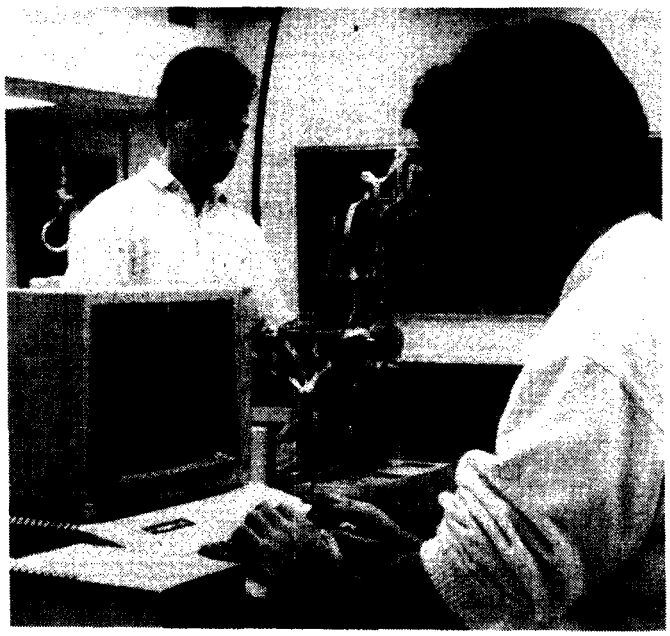
Graduated engineering technologists and engineers are offered the opportunity of upgrading their current skill-set through a one year post-diploma level program. The program offers intense one year training in Computer Aided Manufacturing.

The emphasis is placed on the practical use of computer systems for the solution of manufacturing production problems. Projects will be selected from the student's field of interest. Several software packages will be sampled.

Prerequisites

Applicants must have attained a Diploma of Technology equivalent to BCIT or better, or approval of the Associate Dean.

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



PROGRAM: Advanced Manufacturing

		Clrm hrs/wk
Level 1		
AICO 501	Graphics Programming in FORTRAN 77	6.0
AICO 502	Systems Analysis	3.0
AICO 508	CNC Programming	9.0
AICO 510	3D Graphics and Design	8.0
AICO 512	Manufacturing Management	4.0
	Library, Research and Field Trips	5.0
Level 2		
AICO 601	File Handling and Data Base	6.0
AICO 605	Issues in Networking	3.0
AICO 611	Advanced Manufacturing Projects (Term B)	6.0
AICO 613	Quality Control (Term A)	3.0
AICO 614	Interactive Graphics NC Programming	8.0
AICO 615	Robot Applications	4.0
AICO 616	Computer Integrated Manufacturing	3.0
	Library, Research and Field Trips	5.0

Course Descriptions

AICO 501 Graphics Programming in FORTRAN 77 – Introduction to FORTRAN 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 and CDCM 201 or equivalent.

AICO 502 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 508 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 1/2 axis milling machines.

AICO 510 3D Graphics and Design – This concentrated CAD course provides the student with extensive hands-on practice on leading edge, micro-based CAD equipment. Both the AutoCAD system and ComputerVisions Microcad packages will be used. 2D drafting, 3D wire frame models, and surface modeling.

AICO 512 Manufacturing Management – At the completion of this course students will be familiar with techniques, models, procedures and philosophies for managing a manufacturing process.

AICO 601 File Handling and Data base – Sequential, direct and keyed indexed file handling. Introduction to data base 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 501.

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 611 Advanced Manufacturing Projects – At the completion of this course the student will be able to analyze the causes of a CIM related problem in an industrial setting and prepare a written report describing a feasible solution to the problem.

AICO 613 Quality Control – Provides the student with a concentrated applications-focused overview of the fundamentals of statistical process control.

AICO 614 Interactive Graphics NC Programming – Automatic tool path takeoff from a CAD model. Exposure to production model CNC milling machines and lathes. Software tools will be popular microbased systems.

AICO 615 Robot Applications – Theory and practice in automated manipulators and servers. Multi-axis arms, painters, welding units, pick and place devices. Programming methodologies. Effective selection of devices.

AICO 616 Computer Integrated Manufacturing – This course 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.

Faculty and Staff

R.A. Sterne, B.A.Sc., M.A.Sc., F.I.M.A., P.Eng., Associate Dean
C. Goodbrand, B.A., Program Head
P. Dollan, H.N.C.
G. Johnson, B.A.
P. Maschak, Dipl.Tech.
P. Morrison, Dipl.Tech., B.Eng.
J. Read, Dipl.Tech.

Resource Processing

Computers are changing the way we do business. One of the major areas of automation has been in the means used for the processing of our natural resources.

In the past, this area of automation has been left in the hands of computer experts and automation specialists. The end users of the technology: forestry, mining and mechanical production technologists and engineers, have been hard pressed to stay current with these techniques. The program will attempt to address this problem by allowing these technologists to upgrade their existing skills with a comprehensive understanding of how computer techniques can be applied to many phases of natural resource processing.

The objective of the program is to produce facilitators of this technology who are familiar with the production issues in forestry, mining and mechanical production, who are also capable of selecting and implementing computers for specific production tasks: inventory control, process control, modeling and simulation, and optimization. In complex process control environments, the graduate should be able to liaise knowledgeably with process control specialists.

This challenging program offers exciting opportunities for the technologist already trained in a production science.

Job Opportunities

Since all students will already have completed a curriculum of study at the National Diploma level or higher in a production engineering discipline, they will make ideal "facilitators" of the new technology. They will be able to assist moderate sized engineering firms to select this technology and position it successfully within the existing corporate structure. In addition, the graduate should be able to direct training programs, provide system management services and develop new software applications.

The Program

Graduated engineering technologists and engineers are offered the opportunity to upgrade their current skill-set through a one year post-diploma program. The program offers intense one year training in computing.

Emphasis is on the practical use of computer systems for the solution of production problems and as a design tool, and production projects selected from the student's field of interest. Several software packages will be sampled. Data Base concepts and applications, systems management, and acquisition studies are addressed.

Prerequisites

Applicants must have attained a Diploma of Technology equivalent to BCIT or better, or approval of the Associate Dean.

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

PROGRAM: Resource Processing

Level 1		Clrm hrs/wk
AICO 501	Graphics Programming in FORTRAN 77	6.0
AICO 502	Systems Analysis	3.0
AICO 504	Data Structures in "C"	6.0
AICO 506	Linear Algebra with Computer Applications	4.0
AICO 509	Technical Aspects of Process Control	5.0
AICO 511	Programmable Controllers	5.0
	Library, Research and Field Trips	5.0
Level 2		
AICO 601	File Handling and Data Base	6.0
AICO 602	Systems Management (Term A)	4.0
AICO 603	Systems Acquisitions	4.0
AICO 604	Real Time Systems	6.0
AICO 605	Issues in Networking	3.0
AICO 606	Advanced Software Systems	6.0
AICO 610	Systems Projects	6.0
	Library, Research and Field Trips	5.0

Course Descriptions

AICO 501 Graphics Programming in FORTRAN 77 – Introduction to FORTRAN 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 and CDCM 201 or equivalent.

AICO 502 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 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 506 Linear Algebra with Computer Applications – Stress on techniques required for modeling and simulation. Transformations and projections. Practical applications implemented on computers. Discrete and stochastic models. Modeling packaged software versus modeling programs. Practical examples from the mining, petroleum, pulp and paper and manufacturing environments. Projects will be completed in higher level languages and/or a variety of simulation packages.

AICO 509 Technical Aspects of Process Control – Introduction to process control. Applications of process control in petrochemical and forestry industries. Hardware and software issues involved in process control.

AICO 511 Programmable Controllers – Introduction for the non-electronic specialist to PLC's. Ladder diagrams, electronic theory and programming. Discussion of selection criteria.

AICO 601 File Handling and Data base – Sequential, direct and keyed indexed file handling. Introduction to data base 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 501.

AICO 602 Systems Management – Issues related to the management of computer systems: backup strategies, security issues, system utilization measures, system accounting, vendor liaison, preventative maintenance scheduling. Stress on micro and minicomputer support.

AICO 603 Systems Acquisitions – Documentation required for the acquisition of automating equipment. Cost/benefit analysis. Analysis of organizational issues. Identifying scope of automation. Impact of implementation on existing structures.

AICO 604 Real Time Systems – Fundamentals of Real Time Systems development. Signal interpretation. Peripheral and sensor interfaces. Integrity checks. Audit trails.

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 606 Advanced Software Systems – Point of entry systems. Integrated process control systems. Inventory control. Students will attempt the design and development of large software systems. Examples drawn from engineering and industrial systems with emphasis on integration with Management Information Systems.

AICO 610 Systems Projects – Students working in small groups will propose and develop projects relevant to their disciplines. Groups will be interdisciplinary and will act under the guidance of selected faculty and/or industrial experts. Presentations, documentation and development will be to industry standards.

Faculty and Staff

R.A. Sterne, B.A.Sc., M.A.Sc., F.I.M.A., P.Eng., Associate Dean
C. Goodbrand, B.A., Program Head
P. Dollan, H.N.C.
G. Johnson, B.A.
P. Maschak, Dipl.Tech.
P. Morrison, Dipl.Tech., B.Eng.
J. Read, Dipl.Tech.

CAD Programming

Post-diploma Program

CAD (Computer Aided Design) is becoming a commonplace tool in the offices of general engineering companies, architects and mapping agencies. This program has as its objective the development of a computer skill-set that will allow engineers and technologists to take full advantage of this emerging technology.

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

Job Opportunities

CAD programmers will work in disciplines as diverse as general engineering, drafting/designing, as CAD facilitators or system management; manufacturing and software development. Students have started their own consulting and service companies. Finally, opportunities exist in technical sales and training.

The Program

Graduated engineers and technologists are offered the opportunity of upgrading their current skill-sets through this program. Students will be exposed to mini and micro based CAD systems, programming languages, graphics programming languages, systems management and acquisitions, file handling and data base systems.

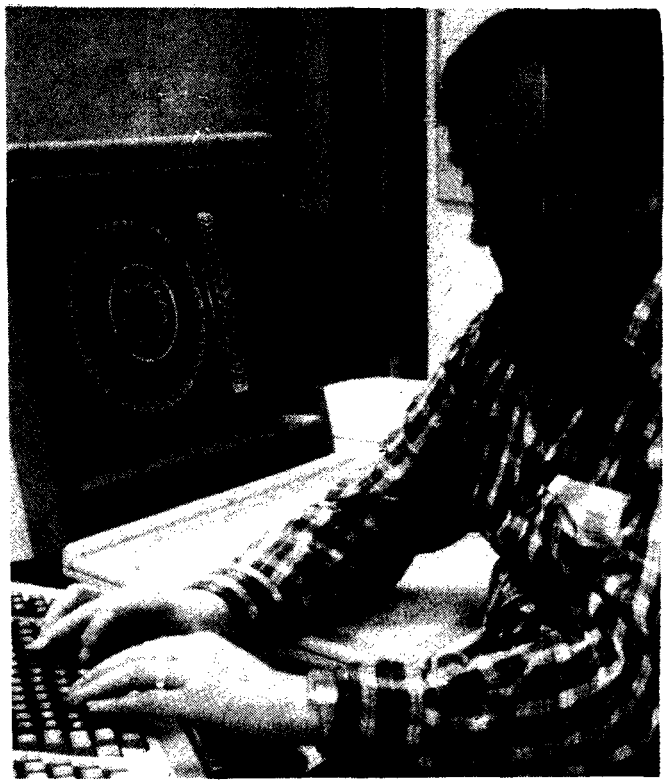
Prerequisites

A National Diploma of Technology in a relevant engineering discipline (mechanical, C&S, building, mining, geology, etc), or an engineering degree.

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

PROGRAM: CAD Programming

		Clrm hrs/wk
Level 1		
AICO 501	Graphics Programming in FORTRAN 77	6.0
AICO 502	Systems Analysis	3.0
AICO 503	CAD and Graphics (Term A)	7.0
AICO 504	Data Structures in "C"	6.0
AICO 506	Linear Algebra with Computer Applications	4.0
AICO 510	3D Graphics and Design	8.0
CDCM 312	Graphics Programming Language (Term B)	7.0
	Library, Research and Field Trips	1.0
Level 2		
AICO 214	AutoCAD 2 (Term A)	4.0
AICO 313	AutoLISP Programming (Term A)	4.0
AICO 601	File Handling and Data Base	6.0
AICO 602	Systems Management (Term A)	3.0
AICO 603	Systems Acquisitions (Term B)	3.0
AICO 605	Issues in Networking	3.0
AICO 622	CAD Project (Term B)	11.0
CDCM 404	CAD Design	3.0
MATH 460	Mathematics for CAD/CAM	4.0
	Library, Research and Field Trips	5.0



Course Descriptions

AICO 214 AutoCAD 2 – A continuation of AutoCAD 1. Topics include annotations, dimensioning, screen menu creation, plotting and digitizing. Class assignments may be tailored to one of four discipline areas: mechanical, architectural, survey or electronics depending on student's background. Prerequisite: AutoCAD 1 or equivalent.

AICO 313 AutoLISP Programming 1 – Introduction to AutoLISP. Enables students to obtain and display user information in an AutoCAD work session, perform math calculations using AutoLISP, use the logic control structures of AutoLISP, access and change system-wide AutoCAD settings, and write elementary graphic programs in AutoLISP.

AICO 501 Graphics Programming in FORTRAN 77 – Introduction to FORTRAN 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 and CDCM 201 or equivalent.

AICO 502 Systems Analysis – Introduction to standard problem analysis tools: flow charting, Nassi-Schneidermann, decision tables, systems analysis, flow graphs, structure charts and data flow analysis, scheduling and CP methodology.

AICO 503 CAD and Graphics – 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 with examples drawn from the earth sciences.

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 506 Linear Algebra with Computer Applications – Stress on techniques required for modeling and simulation. Transformations and projections. Practical applications implemented on computers. Discrete and stochastic models. Modeling packaged software versus modeling programs. Practical examples from the mining, petroleum, pulp and paper and manufacturing environments. Projects will be completed in higher level languages and/or a variety of simulation packages.

AICO 510 3D Graphics and Design – This concentrated CAD course gives the student extensive hands-on practice on leading edge micro based CAD equipment. Both the AutoCAD system and ComputerVisions MicroCAD packages will be used. 2D drafting, 3D wire frame models, and surface modeling.

AICO 601 File Handling and Data base – Sequential, direct and keyed indexed file handling. Introduction to data base 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 501.

AICO 602 Systems Management – Issues related to the management of computer systems: backup strategies, security issues, system utilization measures, system accounting, vendor liaison, preventative maintenance scheduling. Stress on micro and minicomputer support.

AICO 603 Systems Acquisitions – Documentation required for the acquisition of automating equipment. Cost/benefit analysis. Analysis of organizational issues. Identifying scope of automation. Impact of implementation on existing structures.

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 622 CAD Project – Student managed projects with applications in student's area of interest. Projects integrate programming in graphics, data base practice and engineering problem solving. Prerequisite: permission of the department.

CDCM 312 Graphics Programming Language – Graphics programming using INTERGRAPH's User Command language (UC). Upon completion, students will be able to obtain and display user information in an INTERGRAPH work session, perform math calculations using UC, use the logic control structures of UC, access and change system-wide INTERGRAPH settings, and write elementary graphics programs in UC.

CDCM 404 CAD Design – Understanding how computers can help in the design process. Interaction with software packages using surface and/or solids modeling. Prerequisite: CDCM 311.

MATH 460 Mathematics for CAD/CAM – Geometric modeling 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 modeling. Overview of finite element method. Selected algorithms from cartography. Interactive computer graphics concerns.

Faculty and Staff

R.A. Sterne, B.A.Sc., M.A.Sc., F.I.M.A., P.Eng., Associate Dean
C. Goodbrand, B.A., Program Head
P. Dollan, H.N.C.
G. Johnson, B.A.
P. Maschak, Dipl.Tech.
P. Morrison, Dipl.Tech., B.Eng.
J. Read, Dipl.Tech.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Mechanical Technology

Design and Manufacturing Options

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

Job Opportunities

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

The Program

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

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

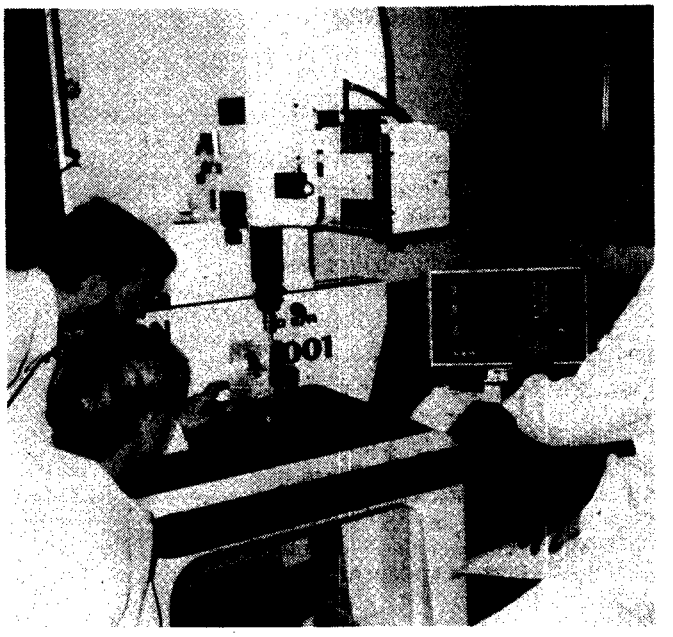
This program is accredited by the Applied Science Technologists and Technicians of B.C.

Prerequisites

Algebra 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 in practical situations and be able to work effectively with people in a team situation.

TECHNOLOGY: Mechanical
PROGRAM: Design

Level 1		Clrm hrs/wk
CDCM 101	Computer Science 1	3.0
CHSC 105	Engineering Materials	4.0
MATH 149	Basic Technical Mathematics for Mechanical	5.0
MECH 100	Mechanical Drafting 1	3.0
MECH 104	Statics	4.0
MECH 106	Manufacturing Processes 1	4.0
MECH 107	Thermal Processes	3.0
TCOM 109	Technical Communication for Mechanical	4.0



Level 2		Clrm hrs/wk
CDCM 201	CADraft 1	4.0
CHSC 205	Engineering Materials	4.0
MATH 249	Calculus for Mechanical	4.0
MECH 200	Mechanical Drafting 2	3.0
MECH 206	Mechanics of Materials	4.0
MECH 208	Dynamics	3.0
MECH 240	Manufacturing Processes 2	4.0
PHYS 216	Physics for Mechanical Technology	4.0
Level 3		
CDCM 311	3D CAD Drafting	4.0
ELEC 257	Electrical Equipment 1	4.0
MATH 349	Numerical Methods for Mechanical	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
Level 4		
ELEC 255	Instrumentation for Mechanical	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)	4.0
MECH 463	Computer Aided Design Projects	5.0
MECH 466	Fluid Systems (Term 4B)	4.0
TCOM 210	Technical Communication for Mechanical	4.0

TECHNOLOGY: Mechanical
PROGRAM: Manufacturing

Level 1		Clrm hrs/wk
CDCM 101	Computer Science 1	3.0
CHSC 105	Engineering Materials	4.0
MATH 149	Basic Technical Mathematics for Mechanical	5.0
MECH 100	Mechanical Drafting 1	3.0
MECH 104	Statics	4.0
MECH 106	Manufacturing Processes 1	4.0
MECH 107	Thermal Processes Introduction	3.0
TCOM 109	Technical Communication for Mechanical	4.0
Level 2		
CDCM 201	CADraft 1	4.0
CHSC 205	Engineering Materials	4.0
MATH 249	Calculus for Mechanical	4.0
MECH 200	Mechanical Drafting 2	3.0
MECH 206	Mechanics of Materials	4.0
MECH 208	Dynamics	3.0
MECH 240	Manufacturing Processes 2	4.0
PHYS 216	Physics for Mechanical Technology	4.0
Level 3		
CDCM 311	CAD Drafting 2	4.0
ELEC 257	Electrical Equipment 1	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 413	Tool Design	4.0
Level 4		
MATH 449	Statistics and Quality Control for Mechanical	4.0
MECH 420	Fluid Power 2	3.0
MECH 444	Metrology	3.0
MECH 445	CNC Projects	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 for Mechanical	4.0

Course Descriptions

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

CDCM 201 CADraft 1 – VAX based CADD using INTERGRAPH software. The course includes an introduction to CAD machine components, architecture, logon procedures and displays. INTERGRAPH functions including: windows, views, measuring, element placement, annotations, dimensioning, screen menu creation, plotting and digitization. Class assignments may be tailored to one of four discipline areas: mechanical, architectural, electrical or survey.

CDCM 311 3D CAD Drafting – A continuation of CADraft 1. Elementary 3D modeling, auxiliary, isometric and perspective projections using a computer. Prerequisite: CDCM 201 or equivalent.

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 257 Electrical Equipment 1 – 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 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 and 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 Models, 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 Mechanical Drafting 1 – Techniques of producing and reading mechanical drawings using standard format, and the development of basic skills in applying these techniques. Use of instruments, line work, lettering, geometric constructions, isometrics, with emphasis placed on orthographic projection, auxiliary views, sections, dimensions and working drawings.

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

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

MECH 107 Thermal Processes Introduction – Introduction to heat and fluid processes. Steam tables, first law of thermodynamics. Basic steam power and refrigeration cycles.

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

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.

MECH 240 Manufacturing Processes 2 – Machine tool operations, production processing and economics, evaluation of production features, maintenance. Metal joining processes and equipment, production costs and design applications.

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 S.I. and British 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 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 vibrations, with emphasis on critical speeds of rotating bodies. An introductory treatment of bulk materials handling systems is also included. Problems are handled in both S.I. and British units.

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

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

MECH 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 CNC Projects – 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 with an opportunity to do drawing and design projects on a CAD system. It is anticipated that students will utilize design application 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.

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

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, plant location and layout, production control, maintenance management, production planning, job design and time standards.

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

ROBT 402 Computer Integrated Manufacturing – Teaches the use of a microcomputer based Computer Aided Design system. Programming the operation of Computer Numerical Control 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 for Mechanical – In this course students learn the basic skills to become effective writers and speakers in the mechanical industry. They learn the layout, content and graphic skills of technical writing, and research and employment application techniques. They write technical memos, letters and descriptions, and give an oral report.

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

Faculty and Staff

Ron Sterne, B.A.Sc., M.A.Sc., P.Eng., F.I.M.A., Associate Dean
A.P. Adamo, B.Sc.
E.B. Barry, B.Sc.
O.C. Edwards, B.A.Sc., M.A.Sc., P.Eng.
D.C. Gerlitz, B.Sc., M.S., P.Eng., Program Head
A. Graham, H.N.C.
R.G. Graham, B.Sc., M.A.S.H.R.A.E., P.Eng., Program Head
G. Henderson, Dipl.T., A.Sc.T.
B.E. Horlacher, Dipl.T.
G.D. Johnson, M.I.Mech.E., C.Eng., M.I.Prod.E., P.Eng., Program Head,
E.H. Labounty, M.A.S.H.R.A.E.
P. Morrison, Dipl.T. B.Eng., A.Sc.T.
E. Morse, B.Sc., B.Eng., P.Eng.
H. Rienks, Dipl.T., A.Sc.T.
V.M. Strijack, B.Sc., P.Eng.
S.C. Todd, M.I.Mech.E., C.Eng., F.I.E.D., P.Eng.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Mechanical Systems Technology

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

Job Opportunities

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

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

The Program

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

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

Prerequisites

Algebra 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

Level 1		Clrm hrs/wk
CDCM 101	Computer Science 1	3.0
CHSC 105	Engineering Materials	4.0
MATH 149	Basic Technical Mathematics	5.0
MECH 100	Mechanical Drafting 1	3.0
MECH 104	Statics	4.0
MECH 106	Manufacturing Processe 1	4.0
MECH 107	Thermal Processes Introduction	3.0
TCOM 109	Technical Communication	4.0

Level 2		Clrm hrs/wk
MATH 249	Calculus for Mechanical	4.0
MECH 206	Mechanics of Materials	4.0
MECH 208	Dynamics	4.0
MSYS 103	Plumbing	3.0
MSYS 200	Systems Drafting 2	3.0
MSYS 212	Heating and Ventilating 1	4.0
PHYS 216	Physics for Mechanical	4.0
TCOM 210	Technical Communication	4.0
Level 3		
BLDG 112	Building Construction 1	3.0
CDCM 349	CAD Drafting 1	4.0
ELEC 256	Instrumentation for Mechanical	5.0
ELEC 257	Electrical Equipment	4.0
MATH 349	Numerical Methods for Mechanical	4.0
MECH 302	Thermal Engineering 1	4.0
MECH 303	Fluid Mechanics	4.0
MSYS 301	Heating and Ventilating 2	3.0
Level 4		
MECH 404	Thermal Engineering 2	4.0
MECH 410	Mechanical Estimating (Term 4B)	4.0
MECH 460	Engineering Economy (Term 4B)	3.0
MECH 466	Fluid Systems (Term 4A)	3.0
MSYS 400	Air Conditioning Systems	6.0
MSYS 403	System Noise Control (Term 4A)	4.0
MSYS 404	Mechanical Equipment	4.0
MSYS 405	Maintenance (Term 4B)	4.0
MSYS 406	Fire Protection (Term 4A)	4.0
OPMT 460	Industrial Engineering	4.0

Course Descriptions

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

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

CDCM 349 CAD Drafting 1 – Rudiments of computer aided drafting. Machine log-on procedures, simple 2-D drawings orthographic projection, dimensioning, annotations.

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

ELEC 256 Instrumentation for Mechanical – Topics include basic devices used for measuring pressure, temperature, level, density and flow. Instrument static and dynamic performance. Instrument application to industrial processes. Design of pneumatic and hydraulic measurement and control equipment using high-gain amplifiers and negative feedback. Basic principles of automatic control, process, dynamic behavior and controllability. On/off, proportional, integral and derivation control. Control strategy. Ratio, cascade, multivariable and feedforward systems, introduction to computer control.

ELEC 257 Electrical Equipment – An introduction to industrial electrical equipment. Topics include AC and DC motors and their 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 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 Mechanical Drafting 1 – Techniques of producing and reading mechanical drawings using standard format and the development of basic skills in applying these techniques. Use of instruments, line work, lettering, geometric constructions, isometrics, with emphasis placed on orthographic projection, auxiliary views, sections, dimensions and working drawings.

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

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

MECH 107 Thermal Processes Introduction – 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.

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

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

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

MSYS 103 Plumbing – Topics include codes, basic engineering principles and graphic presentations related to plumbing systems design, load calculations, piping methods, sizing of system components for storm and sanitary drainage and water distribution. Some drafting skill will be required.

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

MSYS 212 Heating and Ventilating 1 – Covers the principles involved with heat loss in buildings and practises of heating and ventilating, encompassing a study of system components and design procedures. These will then be applied to the preparation of heat loss calculations and working drawings for a heating/ventilating system.

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

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

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

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

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

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

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

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

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

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

Faculty and Staff

Ron Sterne, B.A.Sc., M.A.Sc., P.Eng., F.I.M.A., Associate Dean
A.P. Adamo, B.Sc.
E.B. Barry, B.Sc.
O.C. Edwards, B.A.Sc., M.A.Sc., P.Eng.
D.C. Gerlitz, B.Sc., M.S., P.Eng., Program Head
A. Graham, H.N.C.
R.G. Graham, B.Sc., M.A.S.H.R.A.E., P.Eng., Program Head
G. Henderson, Dipl.T., A.Sc.T.
B.E. Horlacher, Dipl.T.
G.D. Johnson, M.I.Mech.E., C.Eng., M.I.Prod.E., P.Eng., Program Head,
E.H. Labounty, M.A.S.H.R.A.E.
H. Rienks, Dipl.T., A.Sc.T.
V.M. Strijack, B.Sc., P.Eng.
S.C. Todd, M.I.Mech.E., C.Eng., F.I.E.D., P.Eng.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

89-90

Plastics

This two-year diploma program commenced September 1987. The program is designed to provide practical and theoretical training in production processes used in the manufacture of plastic products in a variety of applications: packaging, coatings and adhesives, construction, electronics, electrical, consumer and automotive, to name but a few.

Job Opportunities

It is noteworthy that the plastics industry in Canada, and particularly in B.C., is the fastest growing secondary manufacturing industry. 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 compression molding, injection molding, blow molding, extrusion and 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 polymer chemistry, mathematics, technical communication, mechanical design and computer aided drafting. It is anticipated that this program will be accredited by the Applied Science Technologists and Technicians of British Columbia.

Prerequisites

Algebra 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
CHEM 120	General Chemistry for Plastics Technology 1	4.0
MATH 149	Basic Technical Mathematics for Mechanical	5.0
MECH 100	Mechanical Drafting 1	3.0
MECH 104	Statics	4.0
MECH 162	Manufacturing	3.0
PLAS 100	Plastics Technology 1	4.0
TCOM 109	Technical Communication	4.0
Level 2		
CHEM 220	General Chemistry for Plastics Technology 2	4.0
CHSC 262	Engineering Materials for Plastics	3.0
MATH 249	Calculus for Mechanical	4.0
MECH 200	Mechanical Drafting 2	3.0
MECH 206	Mechanics of Materials	4.0
PHYS 215	Physics for Plastics	4.0
PLAS 200	Plastics Technology 2	4.0
TCOM 210	Technical Communication	4.0

Level 3		Clrm hrs/wk
CDCM 349	CAD Drafting 1	4.0
CHEM 320	Polymer Chemistry and Technology	4.0
ELEC 256	Instrumentation for Mechanical	4.0
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
Level 4		
MATH 449	Statistics and Quality Control for Mechanical	4.0
MECH 420	Fluid Power 2	3.0
MECH 460	Engineering Economics for Mechanical (4A)	4.0
MSYS 405	Maintenance (4B)	4.0
OPMT 411	Production Engineering Management	4.0
PLAS 400	Plastics Technology 4	8.0
PLAS 401	Fiber Reinforced Plastics	4.0
PLAS 402	Plastic Products and Mold Design	3.0

Course Descriptions

CDCM 101 Computer Science 1 – Introduction to computer science and programming using the BASIC language. Emphasis will be on engineering problems using structured problem-solving techniques.

CDCM 349 CAD Drafting 1 – Rudiments of computer aided drafting. Machine log-on procedures, simple 2-D drawings orthographic projection, dimensioning, annotations.

CHEM 120 General Chemistry for Plastics Technology 1 – 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 included is solution chemistry (mechanism preparation acid-base and redox), corrosion and the behavior of gases, liquids and solids. Laboratory exercises are designed to teach safe working techniques, correct attitude and include analysis and aqueous reactions.

CHEM 220 General Chemistry for Plastics Technology 2 – 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 behavior. 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 – 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 Mechanical – Topics include basic devices used for measuring pressure, temperature, level, density and flow. Instrument static and dynamic performance. Instrument application to industrial processes. Design of pneumatic and hydraulic measurement and control equipment using high-gain amplifiers and negative feedback. Basic principles of automatic control, process, dynamic behavior and controllability. On/off, proportional, integral and derivation control. Control strategy. Ratio, cascade, multivariable and feedforward systems, introduction to computer control.

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 and 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 models, 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 Mechanical Drafting 1 – Techniques for producing and reading mechanical drawings using standard format. The development of basic skills in applying these techniques. Use of instruments, line work, lettering, geometric construction isometrics, with emphasis on orthographic projection, auxiliary views, sections, dimensions and working drawings.

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

MECH 162 Manufacturing – A brief survey of metal removal operations in manufacturing. Calculations of metal removal rates and power requirements for lathes, mills and drilling machines are carried out in this hands-on, lab oriented course.

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

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 301 Machine Design 1 – The theory in prerequisite courses is covered plus combined stresses with emphasis on solution by Mohr's Circle; theories of failure; stress concentration; fatigue phenomena; welded connections, bolted and 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. Prerequisite: Mech 219.

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 Economics for Mechanical – 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 405 Maintenance – The elements of this course are: basic systems, preventive maintenance and budget costs, maintenance planning, estimating, scheduling, measurement and inventory.

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.

PHYS 215 Physics for Plastics – 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 plastic 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 plastic 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.

PLAS 400 Plastics Technology 4 – Takes the student from basic through ancillary processes and post-manufacture assemblies, including: material handling of both raw and finished product, including material balance; heat removal and control; detailed maintenance procedures, and reprocessing or recycling.

PLAS 401 Fiber Reinforced Plastics – General review of fiber reinforced manufacturing processes from fiberglass to more exotic composite materials. Included are resin systems, cure cycles, materials handling and safety; repair and finishing procedures.

PLAS 402 Plastic Products and Mold Design – A detailed study of molds and dies, their components and functions, with the end product in mind. Design aspects are discussed along with mold care and maintenance. Lab work is project oriented.

TCOM 109 Technical Communication – In this course, students learn the basic skills to become effective writers and speakers in the mechanical industry. Layout, content and graphic skills of technical writing are examined, and research and employment application techniques. Students write technical memos, letters and descriptions, and deliver an oral report.

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

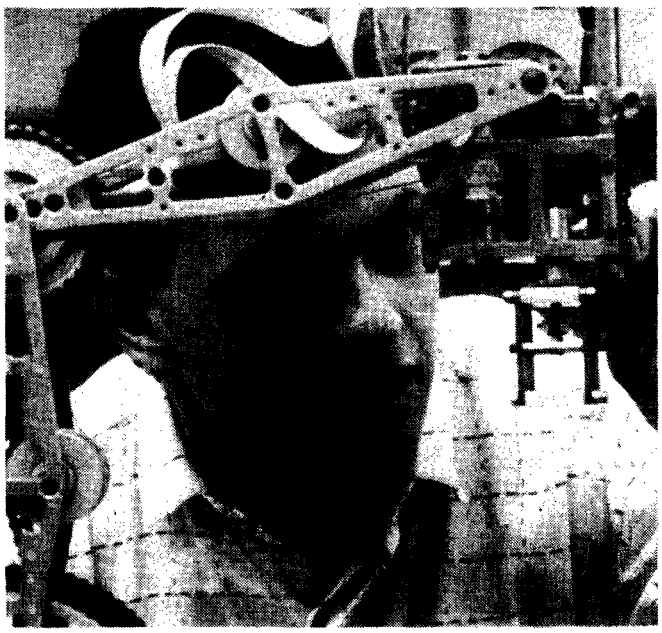
Faculty and Staff

Ron Sterne, B.A.Sc., M.A.Sc., P.Eng., F.I.M.A., Associate Dean
D.F. Wilson, Ph.D., Program Head
J.E. Pretzlaff, Dipl.T.
M. Thompson, B.Sc., A.A.
C.E. Robertson, B.Eng., P.Eng.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Robotics and Automation

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

The program 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.

Cooperative Education is an integral part of the Robotics and Automation Technology. During this portion of the program, students can be placed in an industrial automation environment. These Coop placements are developed after consultation between industry and BCIT. Benefits to the student are:

1. The student receives training in the classroom and the workplace, a need expressed by industry due to accelerating changes occurring in technology.
2. Valuable experience is gained in the automation industry, making the student much more employable upon graduation.

Transfer credit from the Robotics and Automation Technology to Universities is possible, on an individual basis.

Prerequisites

Algebra 12 and Physics 11, both with C+ or better are required for this program.

PROGRAM: Robotics and Automation

Level 1	(September – January)	Clrm hrs/wk
ELEX 100	Circuit Analysis 1 (DC circuits)	6.0
ELEX 102	Digital Techniques 1	5.0
ELEX 201	PASCAL	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 114	Technical Writing for Robotics	5.0
	Library and Research	3.0
Level 2	**(February – May)**	
ELEX 200	Circuit Analysis 2 (AC circuits)	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 2	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 and Interfacing	6.0
	Library and Research	
Level 4	**(February – May)**	**Clrm hrs/wk**
ELEX 460	Feedback Systems	7.0
MECH 421	Fluid Power 2	4.0
OPMT 183	Industrial Engineering for Robotics	4.0
ROBT 401	Robot Sensors	5.0
ROBT 402	Computer Integrated Manufacturing	5.0
ROBT 403	Design Project	4.0
TCOM 214	Technical Writing for Robotics	3.0
	Library and Research	

Course Descriptions

ELEX 100 Circuit Analysis 1 (DC Circuits) – 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. 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. Then introduces the Binary (two states or levels) concept followed by 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 log 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 (AC Circuits) – 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 LAC 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, amplifiers and dual trace oscilloscopes.

ELEX 201 PASCAL – 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 – Studies the utilization of logic circuits. TTL family specifications including noise margins, loading and propagation delays. Interfacing of various digital circuits. encoding and decoding of numbering systems and digital arithmetic, sequential logic, flip flops, counters and shift registers. Also included are frequency counters, digital multiplexing and memories.

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 filed-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 application, 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 behavior 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 are issued 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 electronics 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 2 – 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 – 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.

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 general 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: electric fields, electric 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 general course emphasizes topics of special relevance to robotics. Part 1: covers magnetics and electromagnetics with applications to robotic pickup systems and sleeping motors. Part 2: thermal energy and thermodynamics. Part 3: advanced mechanics with special emphasis on mechanical properties of matter, 3-D force systems, stress and vibrations. Prerequisite: PHYS 108.

ROBT 301 Robot Applications – Discusses various robot configurations, the coordinate systems in which they operate and the 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 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 used 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 402 Computer Integrated Manufacturing – Teaches the use of a microcomputer-based Computer Aided Design system. Programming the operation of Computer Numerical Control machine tools using manual and computer assisted methods is also covered in depth. The integration of Computer Aided Design and Manufacturing is investigated.

ROBT 403 Design 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.

TCOM 114 Technical Writing for Robotics – Emphasizes clear, correct, concise technical writing in 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 write a resume and application letter for Coop.

TCOM 214 Technical Writing for Robotics – In this course students prepare a professional job search package, practise interviewing skills, and write informal reports. They also learn techniques and formats for writing documentation and prepare and deliver technical briefings.

Faculty and Staff

Ron Sterne, B.A.Sc., M.A.Sc., P.Eng., F.I.M.A., Associate Dean
D. Lewis, B.A.Sc.(Mech.), P.Eng., Program Head
P. Paleologou, M.Eng.(Elec.)
G. Thiessen, Dipl.T.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Industrial Education Teacher Education

In BCIT's Industrial Education Teacher Education (IETE) program students acquire the technical, basic pedagogical skills and knowledge to teach industrial education in B.C. junior and senior secondary schools. The program may also lead to trades teaching at the post-secondary level when combined with a trades qualification.

Regular Program

IETE is a two-year program that provides the student with the content qualifications to teach the five industrial education areas in the B.C. curriculum at the junior secondary level, and one or two of these areas plus Technology 11/12 at the senior secondary level. The five areas are drafting, woodworking, metalworking, electronics and power mechanics/automotive.

In addition to the two-year BCIT program, students intending to teach in secondary schools will also be required to obtain a B.Ed. degree which, under an agreement with UBC, will normally take an additional three years. The first of these years consists of first-year general university courses, which the applicant is encouraged to take before applying to BCIT; the final two consist of senior level university academic and education courses. Applicants should contact the Admissions Office at UBC regarding admissibility to that institution.

The BCIT program is open to graduates of secondary schools with good English and Mathematics skills. Preference will be given to applicants with trades/technology experience and/or first year university transfer courses completed.

Accelerated Program

The accelerated program allows applicants to begin teaching with provisional certification after two years training. Requirements for the B.Ed. degree and professional certification would be completed through part-time studies.

To qualify for entrance to the Accelerated Program, an applicant must have journeyman standing or technology certification or equivalent, in an area related to the IE curriculum, plus a course equivalent to UBC's English 100.

FIRST YEAR COURSES

COMM 594 Communication – A first-year course covering practical communication skills with emphasis on "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 technology 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 Introduction to Teaching 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 the Technology of Production – 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 the adolescent student. Management of individually produced student projects.

INED 650 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.

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 technology education programs. Electrical shop control, planning and safety. Effective use of equipment and materials.

SECOND YEAR COURSES

* **INED 575 Materials Science** – The properties of all materials commonly used in secondary school industrial and technology education and their educational uses; materials testing, safe use of materials in the shop. Specific application to teaching technology courses at the secondary level.

* **MATH 594 Mathematics for Technology Teachers** – A first-year math course covering skills necessary for teaching mechanical, electronics and technology science courses at the secondary level.

INED 675 Materials and Technology – The use of new materials and technology to solve technological and engineering problems, with emphasis on student projects for technology education programs. Includes the properties and uses of synthetic, composite and special purpose materials, and applications of technologies such as lasers and fiber optics.

* Taken in first year by accelerated program students.

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 Teaching Advanced Drafting and Design – Applied problems in design and drafting for technology education.

INED 730 Teaching Advanced Construction – The equipment, materials and skills necessary to teach wood and related materials at the senior secondary level. Management of large and mass-produced student projects. Prerequisite: INED 535.

INED 740 Teaching Advanced Metalworking – The equipment, materials and skills necessary to teach metal materials at the senior secondary level: casting, forging and other work in light and heavy metals, advanced machining and NC/CNC machining. 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 in 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 and 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.

Technical Electives – Students will select 6 units of technical electives in consultation with the Program Head of IETE.

Faculty and staff

Ron Sterne, B.A.Sc., M.A.Sc., F.I.M.A., P.Eng., Associate Dean
David McNeal, B.A., M.A., Ph.D., Program Head
Angus Fraser, B.Ed., M.Ed.
Robert Merriam, B.Ed., M.Ed.
Peter Trant, B.Ed., M.A.

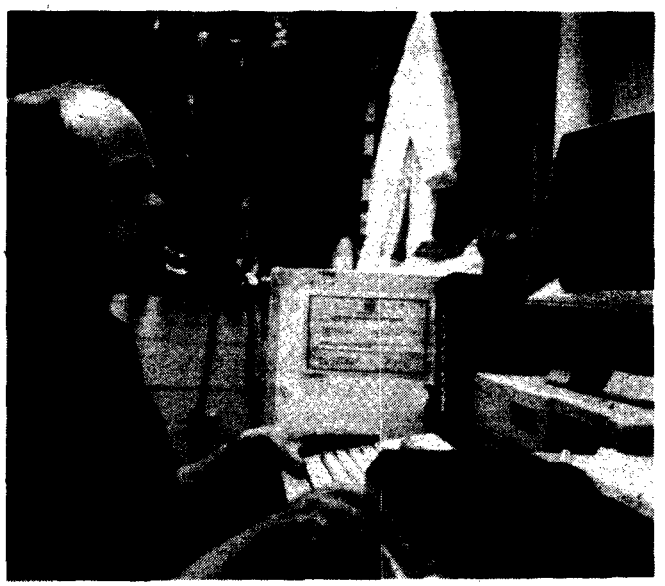
BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

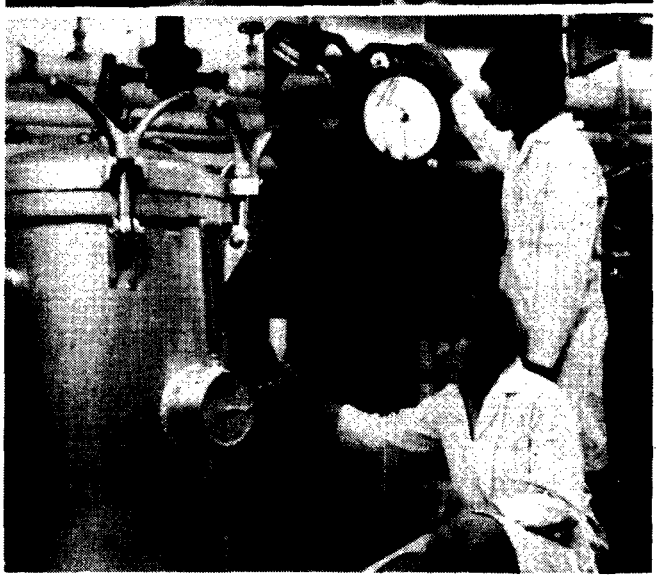
PROCESS TECHNOLOGIES

Biological Sciences Technology
- **Biotechnology**
- **Food Technology**
- **Landscape Horticulture**

Chemical Sciences
- **Environmental and Industrial Chemistry**
- **Metallurgy**
- **Pulp and Paper**

Mining
Petroleum
Quality Assurance and Nondestructive Testing
Wood Products Manufacturing





Biological Sciences Technology

Biological Sciences Technology offers secure and worthwhile career possibilities in a wide variety of settings. **Food Technology** offers stable employment, even during unsettled economic conditions, since this industry is tied to population growth. Those with a concern for their environmental surroundings may gravitate towards landscape horticulture. Others may be interested in biotechnology, an important and challenging breakthrough in the twentieth century, which makes use of such modern tools as gene splicing, protein engineering and cell fusion.

The Programs

The first term of the Biological Sciences Program provides students with a general background before they proceed to one of three options: Biotechnology, Food Technology, or Landscape Horticulture. Programs in the Biological Sciences Technology are accredited by the Applied Science Technologists and Technicians of B.C. (Application for accreditation of Biotechnology has been submitted.)

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 in the **Food Technology Option** find employment in the food manufacturing industry where they may perform chemical, physical and bacteriological tests on food materials during processing and on packaged goods, or they may supervise manufacturing processes within the plant. Other opportunities are found in government laboratories and inspection services.

Landscape Horticulture Option graduates are employed with landscape maintenance and installation companies, greenhouses, garden centres, ornamental and forest tree seedling nurseries and parks departments,.

Prerequisite

Algebra 12 and Chemistry 11 are course requirements for the Biological Sciences programs.

PROGRAM: Biotechnology

		Clrm hrs/wk
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 for Biological Sciences	5.0
TCOM 101	Introduction to Technical Communication	3.0
Level 2		
BISC 220	Microbiology for Biotechnology	6.0
BISC 221	Biotechnology Fundamentals	5.0
CHEM 203	Applied Chemical Principles 2	6.0
MATH 244	Statistics 1 and 2	5.0
PHYS 202	Physics for Biological Sciences	5.0
TCOM 205	Technical Communication	3.0
Level 3		
BISC 305	Engineering Principles for Bio Sciences	4.0
BISC 321	Laboratory Operation	3.0
BISC 322	Molecular Genetics	6.0
BISC 323	Applied Botany	6.0
BISC 324	Biochemistry	6.0
CHEM 311	Instrumental Analytical Methods	5.0
Level 4		
BISC 402	Process Systems for Bio Sciences	5.0
BISC 420	Industrial Microbiology	6.0
BISC 421	Enzyme Technology	4.0
BISC 422	Cell and Tissue Culture	4.0
BISC 423	Biotechnology Applications	4.5
BISC 424	Directed Studies	2.0
CHEM 403	Instrumental Analysis 2 **or**	2.0
OPMT 444	Operations Management	3.0

PROGRAM: Food Technology

		Clrm hrs/wk
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 Math	6.0
PHYS 102	Physics for Biological Sciences	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	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 Bio Science	4.0
CHEM 311	Instrumental Analytical Methods	5.0
OPMT 162	Management Engineering 1	3.0
Level 4		
ADMN 103	Fundamentals of Management	4.0
BISC 401	Food Processing	5.0
BISC 402	Process Systems for Bio Sciences	5.0
BISC 403	Quality Control	4.0
BISC 404	Food Analysis	5.0
BISC 406	Sanitation	4.0
ELEC 253	Instrumentation for Biological Sciences	6.0
MATH 444	Introduction to Computing	4.0

PROGRAM: Landscape Horticulture

		Clrm hrs/wk
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 for Biological Sciences	5.0
TCOM 101	Introduction to Technical Communication	3.0
Level 2		
ADMN 103	Fundamentals of Management	3.0
BISC 205	Introductory Botany and Soils	6.0
BISC 206	Horticulture 1	5.0
BLDG 117	Landscape Drafting	3.0
CHEM 217	Applied Chemical Principles	3.0
PHYS 202	Physics for Biological Sciences	5.0
SURV 125	Introduction to Survey	3.0
TCOM 205	Technical Communication	3.0
Level 3		
BISC 306	Horticulture 2	6.0
BISC 310	Landscape Mechanics	5.0
BISC 311	Nursery Crop Production	6.0
BISC 312	Landscape Technqiues	5.0
BISC 313	Advanced Plant Identification	3.0
BLDG 217	Landscape Drafting	3.0
TCOM 303	Advanced Technical Communication	2.0
Level 4		
BISC 410	Plant Protection	6.0
BISC 411	Soil Technology	5.0
BISC 412	Landscape Techniques	6.0
BISC 413	Landscape Field Practices	6.0
BISC 414	Supervisory Practices	2.0
BISC 417	Silviculture and Forest Nurseries	2.0
CIVL 442	Land Engineering	3.0

Course Descriptions

ADMN 103 Fundamentals of Management – Gives students an appreciation of the application of management principles and business techniques. Stuents are given an opportunity to develop their skills, using lecture material, by analyzing typical business problems and proposing and discussing problem solutions. Subjects covered include planning, organizing, leadership, control and financial management.

BISC 102 Introductory Microbiology – Designed to train students in the basic microbiological procedures employed in a laboratory: use and care of the microscope, staining methods, aseptic techniques, methods of identifying micro-organisms.

BISC 103 Biology – A study of the principles underlying living phenomena including the organizational attributes of living matter. Evolutionary development is traced from one-celled organisms to higher plants and animals. The economic importance of various classes of plants and animals is included.

BISC 201 Food Processing – An introduction to the principles and processes of canning, freezing, dehydrating and fermentation of foods. The use of salt, sugar and additives to preserve food. The importance of packaging of foods. Experimental portions of food will be preserved by various methods during lab periods. Prerequisite: BISC 102, CHEM 103.

BISC 202 Microbiology for Food Processing – The application of microbiology to food manufacturing. The isolation of microorganisms significant to food processing for the purposes of differentiation and classification. Maintaining high bacteriological standards in processed foods. Shelf-life studies, spoilage control, food fermentations. Assessing microbiological test results and report writing to management. Prerequisite: BISC 102.

BISC 205 Introductory Botany and Soils – Plant morphology and physiology, with particular reference to ornamental and horticultural plants, soil types and introduction to soil testing. Culture and management of ornamental and recreational turf grass. Prerequisite: BISC 103.

BISC 206 Horticulture 1 – The principles of environmental control and plant response. Basic greenhouse and plant propagation techniques. Principles of plant taxonomy and nomenclature. Recognition and use of woody species found in the landscape. Prerequisite: BISC 103.

BISC 220 Microbiology for Biotechnology – Covers aspects of microbiology applicable to biotechnology. Topics include microbial physiology, bacterial genetics, recombinant DNA, and industrial microbiology. Prerequisite: BISC 102.

BISC 221 Biotechnology Fundamentals – A survey of all aspects of biotechnology including the ethical and legal implications of this technology. Topics include fermentation, bioreactors, single cell protein, recombinant DNA, monoclonal antibodies and enzymology.

BISC 301 Food Processing – The study of food manufacturing processes in the fish, meat, fruit and vegetable, cereal, dairy, beverage and confectionery industries. Principles and techniques of proper handling and preservation of products in these industries will be emphasized. The use of ingredients such as sweeteners, flavorings, coloring and preservatives will be discussed. Prerequisite: BISC 201.

BISC 302 Nutrition for Food Processing – A study of the nutrients found in food, their importance, metabolic function and dietary requirements. The selection of diets to meet varied nutritional needs. The relationship of nutrition and health. Nutritional labelling. The effect of processing on the nutritional quality of foods. Prerequisite: BISC 201, CHEM 103, 203.

BISC 303 Quality Control – An assessment of food quality. Responsibilities and organization of a quality control department in the food industry. Statistical procedures for sampling. Federal and provincial government regulations. An introduction to tristimulus colorimetry and measurement of color in foods. Prerequisite: 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.

BISC 305 Engineering Principles for Bio Science – The acquisition of process materials, heat transfer, mixing, bioreactor/fermenter design. Product separation systems used in biotechnology and food processing systems will be discussed. Prerequisite: PHYS 202.

BISC 306 Horticulture 2 – Diverse methods of plant propagation are covered including seed collection, extraction and stratification. Seed bed preparation and growing media. Asexual propagation of selected species by cuttings, grafting and budding. Micropropagation and tissue culture. Hydroponic culture systems. Prerequisite: BISC 205, 206.

BISC 310 Landscape Mechanics – A study of basic engineering principles as applied to landscape construction and maintenance equipment, irrigation and drainage systems, nursery and greenhouse systems. The application of microcomputers to landscape and greenhouse systems. Prerequisite: PHYS 102, 202.

BISC 311 Nursery Crop Production – Field and container culture of nursery plants. Nursery stock specifications. Site selection and layout. Growing structures and equipment. Prerequisite: BISC 103, 206.

BISC 312 Landscape Techniques – History and principles of landscape design. Inventory of client requirements. Site analysis. Preparation of working drawings, bidding and contract documents. Prerequisite: BLDG 217.

BISC 313 Advanced Plant Identification – A continuation of the plant identification studies begun in BISC 206, with particular reference to the species and cultivar level. The use of plants in the landscape. Students must present a plant collection as part of the course requirement. Prerequisite: BISC 103, 206.

BISC 321 Laboratory Operation – Laboratory safety procedures for biohazardous and chemical agents. Procedures for ordering and analyzing laboratory supplies and equipment. Inventory control.

BISC 322 Molecular Genetics – Introduction to genetics at the molecular level. Topics include Mendel's Laws, genetic mapping, recombinant DNA technology, regulation of gene expression, and the applications of molecular genetics in medicine, agriculture, and food. Prerequisite: BISC 203, 220, MATH 144.

BISC 323 Applied Botany – Plant processes and their manipulation by environmental factors. Plant physiology. Application of various plant propagation and culture techniques with reference to representative crops. Prerequisite: BISC 103.

BISC 324 Biochemistry – Aspects of Biochemistry relevant to Biotechnology. The structure and properties of biomolecules (proteins, lipids, hormones, etc.), will be examined as well as their role in metabolism. Principles will be applied to problems in biotechnology. Prerequisite: BISC 220, CHEM 203.

BISC 401 Food Processing – See BISC 301. Prerequisite: BISC 301.

BISC 402 Process Systems for Bio Science – Dehydration, packaging, fluid and solids handling systems, utilities. Plant layout and design. Waste management. Instrumentation for process control. 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 – Microbial aspects of industrial sanitation. Properties of good detergents and sanitizers. Government regulation. The use and storage of toxic materials. Approved water supply. Industrial practicums. Prerequisite: BISC 102, 202.

BISC 410 Plant Protection – The morphology and identification of weeds, diseases and insects. Life histories of representative species. Strategy of control by cultural, biological and chemical means. Currently recommended pesticides are reviewed. Pesticide safety, pest and pesticide legislation. Students are examined under the provisions of the "Pesticides Control Act" for pesticide applicator and pesticide dispenser certificates. Prerequisite: BISC 103, CHEM 217.

BISC 411 Soil Technology – The origin, formation and classification of soils; use of survey reports, map interpretation. Components of soils, soil colloids, cation exchange, reactions, soil acidity, phosphorus, nitrogen, the crop as an indicator of fertility, soil organic matters, fertilizers. Soil sampling procedures, extraction methods used in soil analysis. Prerequisite: BISC 205.

BISC 412 Landscape Techniques – See BISC 312. Prerequisite: BISC 312.

BISC 413 Landscape Field Practices – Arboricultural techniques and practices. Pruning, transplanting, tree values, maintenance schedules. Prerequisite: BISC 306, 312, 313.

BISC 414 Supervisory Practices – This course provides an understanding of effective supervisory practices and of organizational behavior. Knowledge of labor laws, legal and tax information and government regulations is gained as well as management of resources for improved performance.

BISC 417 Silviculture and Forest Nurseries – An introduction to silviculture as practised in B.C., with emphasis on artificial regeneration of disturbed sites using planting stock. A review of stock types used in the regeneration process, their characteristics and methods of production and an analysis of the field conditions under which each might be used. Prerequisite: BISC 306, 311.

BISC 420 Industrial Microbiology – The use of micro-organisms to produce marketable products. Bioreactors and other systems for alcoholic beverages, milk products, organic chemicals, pharmaceuticals, etc., will be discussed. Biomass as raw material for production of alcohol, methane, etc., used for fuel. Prerequisite: BISC 220, 305.

BISC 421 Enzyme Technology – Enzyme classification and properties. Selection and purification of enzymes. Immobilized enzyme systems. Enzyme probes. Industrial applications. Laboratories focus on separation and isolation of enzymes and will employ the use of enzymes including the ELISA method to perform determination of a variety of biological constituents with great sensitivity and specificity. A U-V spectrophotometer is used in this course for reading results.

BISC 422 Cell and Tissue Culture – Micropropagation of plants by tissue culture and in vitro techniques. Animal cell culture and the production of monoclonal anti-bodies.

BISC 423 Biotechnology Applications – Specific applications of biotechnologies to various industries such as pharmaceuticals, chemical processing, food and agriculture, mining, forestry, etc. Prerequisite: BISC 322, 324, CHEM 311.

BISC 424 Directed Studies – Students select topics in biotechnology or work in industry under faculty supervision, and present reports. Students will take CHEM 403 or BISC 424. Prerequisite: BISC 423, CHEM 311.

BLDG 117 Landscape Drafting – Fundamentals of drafting. Development of drafting skills using projects based on landscape structural details such as concrete slabs, steps, retaining walls and planters, as well as wood benches, fences and walls.

BLDG 217 Landscape Drafting – Continuation of BLDG 117. Further development of drafting skills using projects based on masonry, post and beam, and concrete deck construction.

CHEM 103 Applied Chemical Principles 1 – An introductory course 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 the bio-science technology are discussed in detail. Laboratory exercises consist of quantitative and qualitative analysis and organic separations. Prerequisite: CHEM 103.

CHEM 217 Applied Chemical Principles – A continuation of CHEM 103 with emphasis on application to landscape horticulture. Topics discussed include soil chemical structures, ion-exchange, PH, solubility and redox effects, soil amenders, fertilizers and pesticides. Basic organic chemistry is introduced. Prerequisite: CHEM 103.

CHEM 311 Instrumental Analytical Methods – 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.

CHEM 403 Instrumental Analysis 2 – Specialized instrumentation used for biotechnology will be taught to small groups. Prerequisite: CHEM 311.

CIVL 442 Land Engineering - An introduction to the behavior of earth and land surfaces and engineering materials under various natural conditions. Included are foundation loads, settlements and bank stability of various soil types and the occurrence and flow of water under and above ground. By means of a project, the student learns to assess runoff flows through hydrological methods, designs a retaining dam for a recreational site complete with inlet and outlet flood-control structures, and estimates quantities for construction purposes. Prerequisite: PHYS 102.

ELEC 253 Instrumentation for Bio Sciences – An orientation course for the food processing option covering the principles and practices of instrumentation, measurement of pressure, level, temperature and flow, and an introduction to negative feedback and automatic control systems.

MATH 144 Basic Technical Mathematics – Exponential/logarithmic theory and transformations, common and natural logarithms, logarithmic/semilogarithmic graphs. Variation, straight line equation, curve fitting. Delta-process, the derivative, differentiation rules, curve sketching, applied maxima/minima, the differential, anti-derivatives, indefinite integral, definite integral with area under a curve. Introduction to computing using BASIC.

MATH 244 Statistics 1 and 2 – Organization and graphical presentation of data, frequency distributions and measures of central tendency, variation and other measures. Probability theory and laws. Random variables, discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Method of least squares, regression and correlation including related estimation and hypothesis tests.

MATH 444 Introduction to Computing – BASIC formatted output, arrays, subroutines, plot routines and files. Spreadsheets and case study.

OPMT 162 Management Engineering 1 – The techniques of management problem-solving and work simplification, with particular application to engineering and industrial organization. Includes method study, some measurement technique, layout, planning and scheduling. The course emphasizes practical applications to the field of biological sciences.

OPMT 444 Operations Management for Bioengineering – The use of the computer with data base, spreadsheet and integrated programs. The use of computers in the laboratory for data acquisition and control. Interpersonal relationships and management in the laboratory.

PHYS 102 Physics for Biological Sciences – 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. Measurements, data analysis, experimental techniques and report writing are stressed.

PHYS 202 Physics for Biological Sciences – See PHYS 102.

SURV 125 Introduction to Survey – Introduction to the theory of engineering survey, practical application of linear measurements, introduction to and theory of the theodolite, bearings and traverse computations, introduction to and theory of levelling, computation of areas and volume.

TCOM 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 205 Technical Communication – In this course, students apply the skills learned in the first term to write resumes, job application letters and occurrence, incident, inspection, field trip, progress, recommendation, comparison, feasibility, performance appraisal and evaluation reports. Prerequisite: TCOM 101.

TCOM 303 Advanced Technical Communication – In this course, students practice typical kinds of engineering communication such as persuasive and technical letters, incident and trip reports, proposals and executive summaries. They update resumes and job application letters and learn how to participate in meetings. Prerequisite: TCOM 101, 205.

Faculty and Staff

R.B. Hyde, B.S.A., M.Sc., P.Ag., Associate Dean
P.A. Barran, B.Sc., M.Sc., Ph.D., Program Head
K.G. Cummings
R.N.E. Hargreaves, Dipl.T., A.Sc.T.
R.N. Hitchman, B.S.A., P.Ag.
W. Hooge, B.S.A., P.Ag.
V.J. Martens, B.S.A., M.Sc., P.Ag., Program Head
P.V. Molund, B.Sc., B.S.A., M.Sc., Ph.D.
J.H. Muir, B.S.A., P.Ag.
S.M. Murray, B.S.A., M.Sc., P.Ag., Program Head
B.E. Rothe
J.K. Soutter, H.D.F.T., A.Sc.T.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Chemical Sciences

Chemical principles and processes form the base of modern industrial society. Whether in the research laboratory or industrial chemical plant, the chemical analyst and chemical process technologist are in great demand. Their skills find challenges on many fronts, including solving environmental pollution problems. Because chemical principles are so universally used, graduates of the Chemical Sciences program find employment in almost every major industrial and research activity in B.C.

Job Opportunities

Graduates are employed as chemists and analysts in research facilities and commercial and industrial labs; engineering assistants in consulting firms; production supervisor trainees in production plants; analysts in environmental and chemical laboratories; assayers or mineral processing technicians in extractive metallurgy plants; process technologists in pulp mills and as materials testing specialists.

The Program

The Chemical Sciences Program offers the student grounding in general science and technology courses in the first year of studies, with the opportunity for 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 programs are offered: **Environmental and Industrial Chemistry**, **Metallurgy**, **Pulp and Paper**.

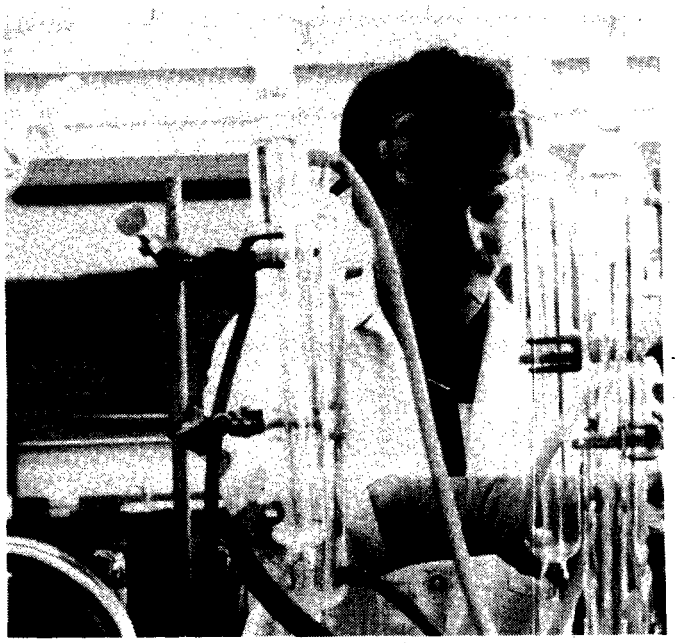
Prerequisites

Chemistry 11 and Algebra 12 are course requirements for this program.

Physics 11 and Chemistry 12 are recommended.

TECHNOLOGY: Chemical Sciences

		Clrm hrs/wk
Level 1		
CHEM 101	Applied Chemical Principles 1	6.0
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	Drafting	2.0
PHYS 114	Physics for Chemical Sciences	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 241	Statistics 1 and Calculus 1 for Chemical Sciences	5.0
PHYS 214	Physics for Chemical Sciences	5.0
TCOM 202	Technical Communication	3.0



PROGRAM: Environmental and Industrial Chemistry

		Clrm hrs/wk
Level 3		
CHEM 309	Organic Chemistry for Chemical Sciences 1	6.0
CHEM 310	Physical Chemistry	5.0
CHEM 314	Analytical Chemistry	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	6.0
CHSC 420	Unit Project	3.0
CHSC 448	Industrial Chemistry	2.0
Plus 4 Electives:		
Elective 1:	CHSC 411 Pollution Science and Microbiology	
or	CHSC 441 Unit Operations	6.0
Elective 2:	CHSC 412 Waste Management	
or	CHSC 408 Ore Analysis	3.0
Elective 3:	CHEM 416 Analytical Instrumentation 1	
or	ELEC 254 Process Measurement	2.0
Elective 4:	CHSC 413 Environmental Analytical Methods	
or	PETR 403 Process Dynamics	3.0

PROGRAM: 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		Clock hrs/wk
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
MINE 454	Mining Industry for Extractive Metallurgy	2.0

Plus 1 Elective:

ELEC 254	Process Measurement **or**	
CHEM 416	Analytical Instrumentation	2.0

PROGRAM: 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 Method and BASIC for Chemical Sciences	5.0

Level 4

CHEM 414	Analytical Chemistry 2	6.0
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

Plus 1 Elective:

CHSC 412	Waste Management **or**	
CHSC 413	Environmental Analytical Methods	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 in industrial processes is emphasized. The lab work includes gravimetric and volumetric analysis as well as 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.

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.

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.

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.

CHEM 314 Analytical Chemistry 1 – The course covers the theory and practice of conventional methods of inorganic analysis and includes methods of sample decomposition, sampling, treatment of analytical data, precipitation and complex formation titration, solvent extraction and ion exchange methods, and fire assaying. Laboratory exercises include the ore analysis for iron, chromium, tin, copper, arsenic, zinc, sulphur and silica, as well as fire assaying for gold and silver.

CHEM 409 Organic Chemistry for Chemical 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, infra-red, ultraviolet and gas chromatography.

CHEM 414 Analytical Chemistry 2 – Introduces the basic principles of analytical instruments and their application to a variety of analyses. Major topics include analytical absorption methods (visible, ultraviolet, infrared and atomic absorption), emission methods (flame, spectrographic, ICP), x-ray flourescence and diffraction methods, chromatographic methods (gas and HPLC), electrochemical methods (pH, specific ion, polarography) and trace analysis (electrothermal atomization, hydride generation, etc.).

CHEM 416 Analytical Instrumentation 1 – Covers the construction of electrodes and the use of operational amplifiers in the following analytical methods: constant current coulometric titration, amperometric, potentiometric and polarographic methods. Phototransducers and photometric circuits.

CHSC 100 Computer Applications for Chemical Sciences – An introduction to microcomputer software packages including electronic spread sheets, data bases 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 sold/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.

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.

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 241 Statistics 1 and Calculus 1 for Chemical Science – Organization and graphical presentation of data, frequency distributions, measures of central tendency and variation, probability theory, random variables, theoretical distributions, sampling and estimation. Delta-process, the derivative, differentiation rules, implicit differentiation, related rates and applied maxima/minima. The indefinite and definite integrals with applications. Trapezoidal and Simpson's rules for numerical integration. Related rate problems with functions of several variables.

MATH 341 Numerical Method 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 Drafting – An introductory course for persons with little or no experience in graphics. (Students are required to purchase drafting equipment and supplies on the first night of class.) Students learn to produce and read simple drawings. Topics include scales, geometric constructions, basic orthographics detail interpretation, line visibility, dimensioning, auxiliary views, true shape, inclined and skew surfaces, sections, pictorials, working drawings and freehand sketches.

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 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 202 Technical Communication for Chemical Sciences – Students will write a resume and job application letter, and prepare for job interviews. They will do library research, write several short reports, give an oral report, and practice effective meeting strategies and telephone techniques. Prerequisite: TCOM 101.

Faculty and Staff

R. Hyde, B.S.A., M.Sc., P.Ag., Associate Dean
S. Berghold
J. Berry, B.Sc., Ph.D.
W.J. Bogyo, B.C.L.Ass., Senior Instructor
R. Drouin, Dipl.T.
W.R. Irvine, B.A., M.Sc., P.Eng., Program Head
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.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Mining

Technologists have an important role to play in the exploration, development and extraction of mineral resources. Up-to-date technology such as computer applications are vital to B.C. and Canadian mining due to narrow profit margins. Gross profits and total numbers employed indicate the mining industry is still commanding a major position in B.C. Coal, industrial mineral and precious metal sectors have expanded to major roles. The technology is many-faceted, and the opportunities are similarly wide-ranging.

Job 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 (eg. water control, road construction), rock mechanics, diamond drilling, blasting, equipment sales and computer applications. After an initial training period, one can expect varied, creative, and often independent work with considerable responsibility. Advancement to supervisory positions is possible to graduates with initiative, ability and leadership.

Mining communities tend to have well-supported entertainment, sport, and outdoor recreation facilities. These and other benefits often permit the young family to start budgets on a more positive note.

The Program

Courses reflect the wide range of applications and include the following: geology and mining topics in all terms, mineral processing and assaying, 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.

BCIT Mining students enjoy an unusually high level of student financial assistance.

There are good transfer arrangements with several universities and approximately 25% of our students ultimately continue to engineering degrees. Placement of graduates is in the 90% range.

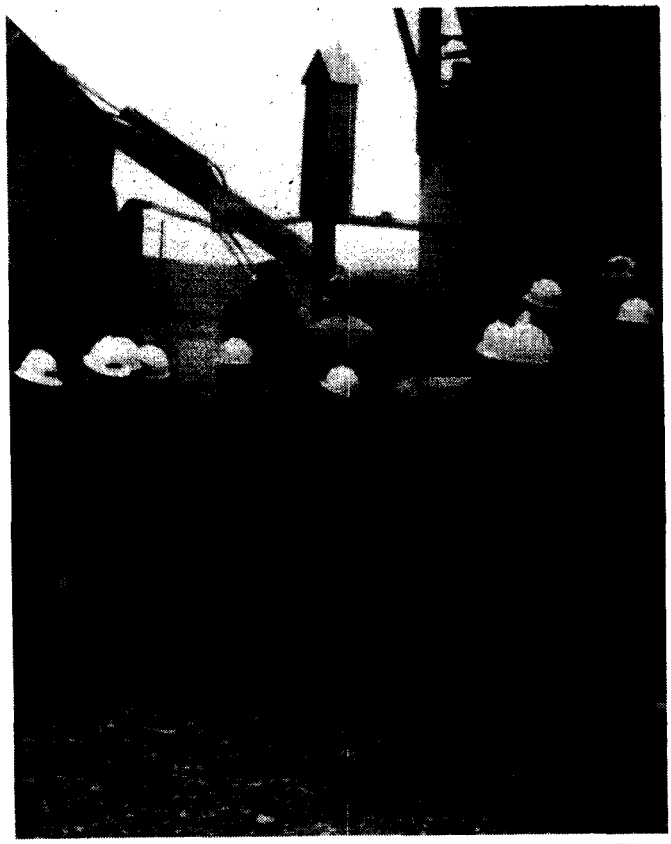
The program is accredited by the Applied Technologists and Technicians of British Columbia.

Prerequisites

Algebra 12 and Physics 11 or Chemistry 11, are course requirements for this program.

TECHNOLOGY: Mining
PROGRAM: Mining

Level 1		Clrm hrs/wk
CHEM 101	Applied Chemical Principles 1	6.0
CIVL 108	Graphical Communication 1	2.0
MATH 150	Basic Technical Mathematics for Mining	5.0
MINE 101	Geology	3.0
MINE 102	Mining	2.0
MINE 142	Handheld Computer Techniques	1.0
PHYS 101	Physics for Mining	6.0
SURV 140	Surveying	3.0
TCOM 101	Introduction to Technical Communication	3.0



Level 2		Clrm hrs/wk
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
PHYS 201	Physics for Mining	3.0
PHYS 204	Introductory Geophysics	3.0
SURV 240	Surveying	3.0
SURV 265	Survey Drafting and Computer Graphics	2.0
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	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	3.0
TCOM 306	Advanced Technical Communication for Mining	2.0
Level 4		
CHSC 405	Assaying	4.0
CHSC 414	Mineral Processing	3.5
CIVL 440	Statics and Strength of Materials	3.0
CIVL 441	Hydraulics	3.0
MATH 450	Numerical Methods for Mining	5.0
MINE 401	Geology: Mineral Deposits	3.5
MINE 402	Mining	4.0
SURV 440	Surveying	3.0
TCOM 404	Advanced Technical Communication for Mining	2.0

Course Descriptions

CHEM 101 Applied Chemical Principles 1 – Provides the necessary background for chemical calculations and analysis. Included are stoichiometry, atomic structure, bonding, solution preparation and acid-base and oxidation-reduction reactions and titrations. Simple chemical equilibrium leads to a good working knowledge of pH, buffer solutions, solubility product, selective precipitation and industrial processes involving equilibria. Lab work consists of simple qualitative and quantitative analysis, and good lab technique is taught.

CHEM 201 Applied Chemical Principles 2 – A continuation of CHEM 101 giving detailed coverage of gravimetric and volumetric analysis and qualitative analysis of cations and anions. Electrochemistry includes cells, electroplating and corrosion. Simple physical chemistry provides theory of solids, liquids and gases leading to fractional distillation and colligative properties. The Periodic Table is used to correlate many properties of elements and compounds. Names and properties of some organic compounds are covered and lab work covers qualitative and quantitative analysis and physio-chemical separations.

CHSC 305 Assaying – Analytical chemistry applied to the ore minerals, with special attention to fire assaying for gold and silver. Gravimetric, volumetric and instrumental methods are developed for the more common metals.

CHSC 314 Mineral Processing – Deals specifically with mineral processing as applied to the B.C. mining industry. Covers the essential operations of applied mineral processing ie: grinding, screening, gravity separation, cyclone classification, flotation, sedimentation, thickening, filtration. Emphasis on numerical solution of operating and design type problems. Course includes laboratory work.

CHSC 405 Assaying – A continuation of CHSC 305.

CHSC 414 Mineral Processing – A continuation of CHSC 314. Prerequisite: CHSC 314.

CIVL 108 Graphical Communication 1 – Students learn to produce freehand sketches, without the use of conventional drafting equipment, to illustrate a concept or procedure, and are exposed to construction terminology and graphics standards. Topics include sitework and excavation, centreline profiles, cut and fill sections, open channel flow and culverts, contours, and pressure flow and ancillary works. Students are introduced to architectural drawing and details, and gain an appreciation of the difficulties in different types of construction drawings.

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 440 Statics and Strength of Materials – Simple stresses; stress, strain elasticity; compound bars and columns; temperature stress; elastic limit; limit of proportionality; yield; ultimate; factor of safety; load factor; ductility; resilience; fatigue; shock. Properties of sections; bending moments; shear forces; theory of flexure; deflection of beams; eccentric loading; lateral loading; compound stress and strain; Poisson's ratio; principal stress and strains; Mohr's circle; testing techniques; machines; extensometers; strain gauges; photo elasticity. Special sessions on rock mechanics. Prerequisite: CIVL 339.

CIVL 441 Hydraulics – Properties of fluids, hydrostatics, pressure and centre of pressures; fluid flow, continuity equation, velocity head, Venturi meters. Pipe friction and flow. Flow conditions. Open channel flow in flumes and streams. Flow measurement. Lab demonstrations. Pumps. Prerequisite: CIVL 339.

MATH 150 Basic Technical Mathematics for Mining – Graphical linear programming. Exponential/logarithmic theory and transformations, common and natural logarithms and logarithmic/semilogarithmic graphs. Radian measure. Trigonometric functions of any angle, vectors and solution of triangles, graphs of trigonometric functions, identities, compound and double angle formulas, trigonometric equations and inverse functions.

MATH 250 Calculus 1 and 2 for Mining – Limits, the derivative, differentiation rules for algebraic, trigonometric, inverse trigonometric, logarithmic and exponential functions; curve sketching, implicit differentiation, higher order derivatives, applied maxima/minima, related rates and differentials. Antidifferentiation, the indefinite integral and the definite integral including area, volume, centroid and other applications. Tables of integrals, integration by parts, partial fractions and substitution techniques.

MATH 350 Computing for Mining – An introduction to PC-DOS. Most of the statements in Microsoft Basic will be discussed including arrays, subroutines and files. Selected problems related to the Mining Technology will be used in discussions and assignments. 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 for Mining – Part of the course will be used to introduce the elements of Critical Path Scheduling and Leveling 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 – The objective: an introduction to the general sphere of mining and, more particularly, mining exploration. 10 hrs. on identifying the factors important to mine profitability; 20 hrs. giving a unified picture of modern prospecting techniques: geochemistry in some detail, geology, geophysics, sampling and diamond drilling. Maps, photos, reports and references; economics and planning.

MINE 142 Handheld Computer Techniques – An introductory course in the use of the microcomputer to solve various mathematical and surveying problems. Emphasis will be on the application of the small computer system to the solution of mining related problems. Topics include computer programming in BASIC and in small computer systems communications.

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; brief subjective descriptions of rock mechanics, fragmentation and mine services which receive detailed treatment elsewhere. Unit operations of drilling, blasting, loading and hauling are discussed in the context of organization, equipment, labor and supplies. Prerequisite: MINE 102.

MINE 301 Structural Geology – Brief review of mechanical principles of rock deformation and of the primary structures of sedimentary, igneous and metamorphic rocks. The origin, nature and classification of joints, folds and faults, with emphasis on their relation to mineral resources. Lab work includes examinations of specimens, methods of recording structural data, mapping and solution of structural problems, with emphasis on economic aspects. Prerequisite: MINE 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, manner of occurrence, distribution and economics of mineral resources, with emphasis on typical Canadian occurrences. Ways of recognizing, discovering and developing mineral deposits. Lab work illustrates and develops techniques in megascopic study and identification of hand specimens; valuation of mineral deposits, computer data storage and retrieval. Field trips are correlated with all classroom work in geology. Prerequisite: MINE 201.

MINE 402 Mining – Sampling, geo-statistics and modeling, 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 laboratory 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. The course consists of lectures, case study exercises and some field exercises covering the gravity, magnetic, resistivity, self-potential and seismic method of analyzing the physical properties of the earth.

PHYS 304 Mining Geophysics – Consists of field work and some lectures on geophysical methods of mineral exploration. Emphasis is on the operation of geophysical instruments, the method of conducting geophysical surveys and the presentation and interpretation of data.

SURV 140 Surveying – Substance of course 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 – See SURV 140.

SURV 265 Survey Drafting and Computer Graphics – Enables students to apply drafting fundamentals to the solution of survey problems. Students will acquire skills in plotting cadastral survey data, drafting plans, profiles and cross-sections, and in developing simple earth-work diagrams.

SURV 340 Surveying – Application of survey methods to underground and surface mines. Underground surveying in shaft sinking, development control (level and inclined) and production areas. Elementary astronomy, establishing azimuth by solar and pole star observations. Mine quantities in development areas, pickup of tunnels, cross sectioning, stopes (including tonnage calculations). Construction of mine plans and sections. Field projects include tunnel surveys and open-pit triangulation, trilateration and bench pickup. Mining Acts applied to surveying.

SURV 440 Surveying – 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 letters, memos and short reports. It includes instruction and practice in handling criticism and grievance procedures, participating in meetings, retrieving technical mining-related data, and briefing small groups. As far as possible, assignments are integrated with students' other courses. Prerequisite: TCOM 101, TCOM 211.

TCOM 404 Advanced Technical Communication for Mining – Students complete and update the job search component begun in first year. They then work on more specialized technical reports – site descriptions, geological reports and analytical reports on specific mining methods and equipment. They give a final technical briefing on their mining methods report. As far as possible, assignments are integrated with students' other courses. Prerequisite: TCOM 101, TCOM 211, TCOM 306.

Faculty and Staff

R.B. Hyde, B.S.A., M.Sc., P.Ag., Associate Dean
J.F. Fairley, B.A.Sc., P.Eng.
F.R.K. Edmunds, B.A., M.Sc., Ph.D.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Petroleum

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.

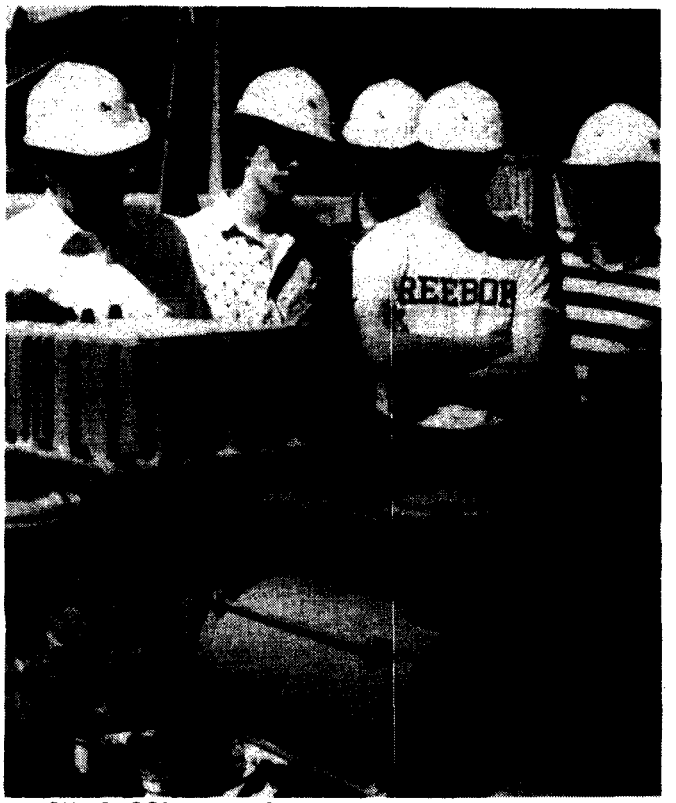
This program is accredited by the Applied Science Technologists and Technicians of B.C.

Post Graduation

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

Algebra 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.



TECHNOLOGY: Petroleum

		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		
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		Clrm hrs/wk
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.

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.

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 petrochemicals of commercial importance are emphasized. Instrumental analyses of petroleum fractions and products is covered in lectures and in practical work.

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 341/441 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.

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.

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 Gas and Oil and Gas Processing – Covers the handling of crude oil and natural gas from the well head to the transmission pipeline. Field handling to include: fluid stabilization, gas separation, hydrate control, emulsion treating, well effluent recombination calculations. Gas processing covers: sweetening, sulfur recovery, dehydration, natural gas liquids recovery. A technical report with oral presentation is required. 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 considered include: atmospheric and vacuum distillation; thermal, catalytic and hydro cracking; catalytic reforming; alkylation; polymerization; hydrotreating; chemical treating; lubricating oil refining; process and effluent water treating. 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 covered include: gas measurement, pressure regulation, design and construction of distribution systems, corrosion control, leak surveys, maintenance, gas contract control, peak shaving, burner design, customer relations, system design and operational codes.

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. The lecture part of the course examines the desired properties and specifications of these products and the equipment in which the products are used. Laboratory periods cover the testing of various products obtained from a typical crude oil. Supplementing these studies are field trips to local refineries. A major term paper is required. Prerequisite: 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.

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 are sciences upon which much of modern technology and exploration geophysics are based.

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.

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 and letters and memos of request, adjustment and collection.

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 will make oral presentations, design a questionnaire and conduct interviews.

Faculty and Staff

R. Hyde, B.S.A., M.Sc., P.Ag., Associate Dean
D.A. Campbell, B.A., (Hons.), M.Ed., Program Head
R.G. Kinney, Dipl.T., A.Sc.T.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

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.

Prerequisite

BCIT Diploma of Technology in an Engineering Program or Operations Management, or a two year college Diploma in Science, or a Bachelor's Degree in Science or Engineering.

PROGRAM: Quality Assurance and Nondestructive Testing

Level 5		Clrm hrs/wk
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

Level 6		A	B
CHSC 639	Nondestructive Testing 2	9.0	9.0
MATH 614	Statistical Quality Control 2	3.0	3.0
MATH 624	Computer Applications: Statistical Quality Control	3.0	0.0
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: Quality Management	0.0	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, basic stress analysis, 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 currents 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; CHSC 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 testing. 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, standards of current and voltage, 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 Mechanical 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 from 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: Quality Management – 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. Is 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

R. Hyde, B.S.A., M.Sc., P.Ag., Associate Dean
W. Irvine, B.A., M.Sc., P.Eng
J. Lloyd, P.Eng.
D. McLeod, A.R.M.T.C., M.I.M.
R. Pike

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Wood Products Manufacturing

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 positions in supervisory, technical, marketing and sales. 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

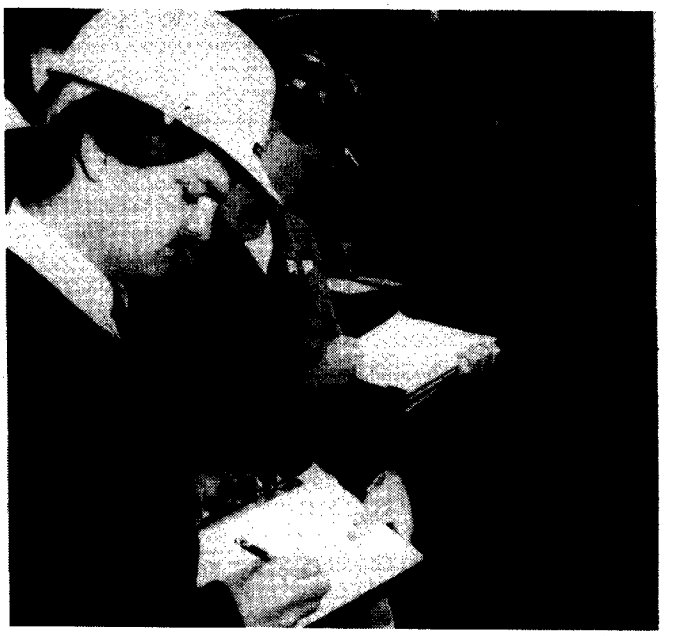
First-year students in the Wood Products Program study basic sciences and introductory courses including wood science, log utilization, and lumber tallying and grading. In the second year there is increased emphasis on manufacturing techniques, process control and economics. Second-year courses also 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.

Prerequisites

Algebra 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.

TECHNOLOGY: Wood Products Manufacturing
PROGRAM: Wood Products Manufacturing

Level 1		Clrm hrs/wk
MATH 146	Basic Technical Mathematics for Wood Products	5.0
PHYS 118	Introductory Applied Physics	5.0
TCOM 101	Introduction to Technical Communication	3.0
WOOD 101	Wood Science 1	7.0
WOOD 102	Lumber Grading 1	2.0
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	5.0
MECH 146	Interpretation of Engineering Drawings	2.0
PHYS 218	Introductory Applied Physics	5.0
TCOM 207	Technical Communication for Wood Products	3.0
WOOD 108	Lumber Grading 2*	8.0
WOOD 201	Wood Science 2	4.0



Level 3		Clrm hrs/wk
COMP 121	Computer Applications	3.0
ELEC 257	Electrical Equipment	4.0
MECH 416	Mechanical Equipment: Wood Products	3.0
OPMT 164	Management Engineering 1: Wood Products	3.0
TCOM 305	Advanced Technical Communication for Wood Products	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	4.0
TCOM 403	Advanced Technical Communication for Wood Products	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 – 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 – 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 – 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 – 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 – The techniques required to solve plant layout and materials handling problems are covered and the student applies these techniques to a comprehensive in-house project. As a term project, the student selects for study a job in an industrial plant in the forest products industry. The student applies the techniques learned in OPMT 164 and the first part of this course to the solution of a plant project and submits a written report on the findings, including conclusions and recommendations.

PHYS 118 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 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 207 Technical Communication for Wood Products – Further prepares students for writing for the lumber and plywood industry. Students write letters, job application letters, resumes, proposals, progress reports and a technical report done jointly with an engineering course. Students also learn interview techniques. Prerequisite: TCOM 101.

TCOM 305 Advanced Technical Communication for Wood Products – Students review and practice technical reporting. They write several memos and a Summer Technical Report which is marked jointly by the instructor and people employed in the lumber and plywood industry. They practice illustrating, revising and editing skills, and present an oral technical report. Prerequisite: TCOM 101, TCOM 207.

TCOM 403 Advanced Technical Communication for Wood Products – 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, TCOM 207, TCOM 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 term 1 in preparation for Lumber Grading 2, the course covers information fundamental to the grading of western softwood lumber including tree growth and wood structure, species identification, classification of products and the recognition of characteristics found naturally, and caused in manufacture.

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 saw-mill and plywood industries. Considerable time is spent practicing 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, driving, lay-up and finishing. Some time is spent discussing other types of panel boards and related coatings and overlays. Field trips augment material given in lectures.

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 covered include wood and chip units and conversion factors, mechanical and rheological properties, micro- and ultra-structure, wood protection and preservation. The lab section of the course is largely made up of a research project, with emphasis on reporting of methods and results. Prerequisite: 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

R.B. Hyde, B.S.A., M.Sc., P.Ag., Associate Dean
J.T. Neilson, B.A.Sc., P.Eng., Program Head
H. Kettner

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

RENEWABLE RESOURCES TECHNOLOGIES

Forestry
Fish, Wildlife and Recreation
Natural Resources Management

British Columbia's greatest natural renewable resource is its forest land. The benefits which derive from intelligently planned use of this forest land are many, varied and extremely valuable. Wise use of the land and related resources is essential for the continued survival of many industries, as well as for the perpetuation of the resources themselves. The Renewable Resources Technologies programs have been established to meet these needs and offer training 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 and, because of the limited number of jobs, the number of students is restricted.

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.

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.

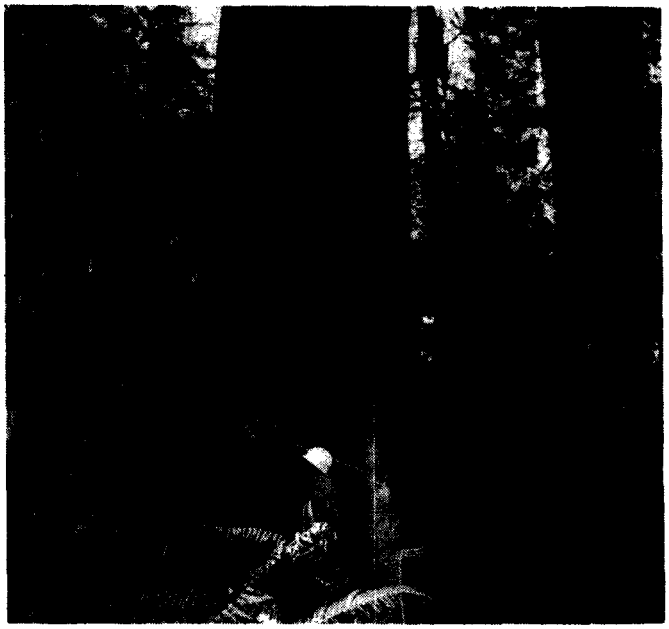
When course credits are given, electives will be chosen in consultation with the Program Head.

Prerequisites

*The following are **minimum** requirements: Algebra 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 Algebra 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.

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.



TECHNOLOGY: Renewable Resources
PROGRAM: Forestry

		Clrm hrs/wk
Level 1		
FSTR 101	Natural Resource Measurements	5.0
FSTR 103	Plant Identification	5.0
FSTR 104	Photo Interpretation and Mapping 1	4.0
FSTR 106	Microcomputer Applications	3.0
FSTR 108	Applied Ecology in BC Natural Resources 1	5.0
MATH 145	Basic Technical Mathematics for Renewable Resources	5.0
TCOM 101	Introduction to Technical Communication	3.0
Level 2		
FSTR 201	Forest Measurement 1	8.0
FSTR 202	Introduction to Soils	4.0
FSTR 203	Applied Ecology in BC Natural Resources 2	5.0
FSTR 204	Photo Interpretation and Mapping 2	4.0
FSTR 205	Fire Management 1	3.0
*FSTR 208	Integrated Resource Project	40.0
MATH 245	Mathematics 2 for Renewable Resources	5.0
TCOM 206	Technical Communication	3.0

* a one-week course

Level 3		
FSTR 301	Forest Measurement 2	6.0
FSTR 302	Timber Harvesting 1	5.0
FSTR 303	Roads and Transportation 1	6.0
FSTR 304	Forest Pestology	4.0
FSTR 305	Silviculture 1	4.0
*FSTR 311	Summer Technical Report	
FSTR 326	Forest Management	4.0
TCOM 304	Advanced Technical Communication	2.0

* prepared during summer

Level 4		Clrm hrs/wk
FSTR 402	Timber Harvesting 2	4.0
FSTR 403	Roads and Transportation 2	5.0
FSTR 404	Forest Pestology	4.0
FSTR 405	Silviculture 2	5.0
*FSTR 413	Independent Studies	60.0
FSTR 414	Log Scaling	4.0
FSTR 415	Fire Management 2	2.0
FSTR 426	Forest Administration	4.0
TCOM 402	Advanced Technical Communication	2.0

* a two-week course

PROGRAM: Fish, Wildlife and Recreation

Level 1

FSTR 101	Natural Resource Measurements	5.0
FSTR 103	Plant Identification	5.0
FSTR 104	Photo Interpretation and Mapping 1	4.0
FSTR 106	Microcomputer Applications	3.0
FSTR 108	Applied Ecology in B.C. Natural Resources 1	5.0
MATH 154	Basic Technical Mathematics for FWR	4.0
TCOM 115	Technical Communication	4.0

Level 2

BISC 224	Zoology	5.0
FSTR 202	Introduction to Soils	4.0
FSTR 203	Applied Ecology in B.C. Natural Resources 2	5.0
FSTR 204	Photo Interpretation and Mapping 2	4.0
FSTR 207	Introduction to Fish, Wildlife and Recreation	4.0
*FSTR 208	Integrated Resource Project	40.0
MATH 254	Statistics for FWR	6.0
TCOM 215	Advanced Technical Communication	4.0

* a one-week course

Level 3

FSTR 307	Recreational Land Management	7.0
FSTR 308	Wildlife Management	7.0
FSTR 309	Fish Management 1	6.0
FSTR 310	Projects	6.0
*FSTR 311	Summer Technical Report	
FSTR 312	Environmental Law Enforcement	3.0
TCOM 307	Advanced Technical Communication	2.0

* prepared during summer

Level 4

FSTR 407	Recreational Land Management	7.0
FSTR 408	Wildlife Management	7.0
FSTR 409	Fish Management 2	7.0
FSTR 410	Projects	5.0
*FSTR 413	Independent Studies	60.0
FSTR 416	Natural Resource Administration	3.0
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.

FSTR 101 Natural Resource Measurements- 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, lake volume and area measurements, and sampling for population estimates. Emphasis is on field labs with supporting lectures.

FSTR 103 Plant Identification – The structure, physiology, taxonomy and uses of plants, with emphasis on those having important biological and economic significance in the biotic zones of B.C. Introduction to reproduction of plants with particular emphasis on conifers. Recognition and evaluation of common plants in forest, range land and alpine habitats of British Columbia and their uses in land management practices. A plant collection containing at least 75 native plant species is required from students.

FSTR 104 Photo Interpretation and Mapping 1 – Practical use and application of aerial photography in natural resources. Classification, reconnaissance, planning and inventory using aerial photos. Practice in the use of 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 FSTR 204.

FSTR 106 Microcomputer Applications – Introduction to computers and their applications to various forestry, fish, wildlife and recreation requirements.

FSTR 108 Applied Ecology in B.C. Natural Resources 1 – Provides basic background material on B.C.'s land and climate 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 is discussed. The fields of 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.

FSTR 201 Forest Measurement 1 – Continuation of FSTR 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: FSTR 101, FSTR 104, and MATH 145; or instructor's approval.

FSTR 202 Introduction to Soils – Introduces students to soil formation, soil as foundation and soil as a medium for plant growth. Covers the properties of soils; texture, structure and organic matter content, and water retention. Introduces students to the soils and landscapes of British Columbia. Prerequisite: Level 1 of the program or instructor's approval.

FSTR 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 wild life habitats, and recreational planning are discussed. Examples are drawn from current environmental issues. Prerequisite: FSTR 101, FSTR 103, and FSTR 108; or instructor's approval.

FSTR 204 Photo Interpretation and Mapping 2 – see FSTR 104. Prerequisite: FSTR 104, and MATH 145 or 154; or instructor's approval.

FSTR 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.

FSTR 207 Introduction to Fish, Wildlife and Recreation – Basic identification of various fish and wildlife and their importance and interaction with other natural resources.

FSTR 208 Integrated Resource Project – This course is an intensive one-week project, in which students from the Forestry and Fish, Wildlife, Recreation Options 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.

FSTR 301 Forest Measurement 2 – Continuation of FSTR 201. Field reconnaissance; forest timber volume measurement and calculation; sampling design; field mapping; data compilation; report writing. Subjects include current cruising procedures, acceptable sampling design, elementary statistical analysis, computer application for data summaries. Prerequisite: FSTR 201 or 251, FSTR 204, MATH 245; or instructor's approval.

FSTR 302 Timber Harvesting 1 – This course deals with common harvesting systems used on the B.C. coast and includes associated phase costs, setting and landing layouts, deflection lines, environmental and safety aspects, and some discussion of integrated resource planning. The field project takes several labs to complete and concludes with a mini-contract to harvest and reforest the given area. Other topics in the course relate to harvesting on the coast as well as the interior. Prerequisite: 1st year Forestry or instructor's approval.

FSTR 303 Roads and Transportation 1 – Truck road location. Preparation of plans and profiles. Measurement of earth and rock work. Optimum road standards, culvert design, construction and maintenance. Prerequisite: 1st Year Forestry or instructor's approval.

FSTR 304 Forest Pestology – An integrated study of forest insect and disease problems. Basic life histories. The interactions of damage agencies in the forest. Improved sampling techniques related to insect and disease damage. Use of subject literature. Cooperation with appropriate agencies. Prevention and control of damage. Measuring and reporting of insect and disease damage. Recognition of the currently important insects and diseases. Prerequisite: 1st year Forestry or instructor's approval.

FSTR 305 Silviculture 1 – Foundations of forest management: site, stocking, spacing, forest yield, forest growth and regulation. Introduction to silviculture: forest regeneration, seed and stock procurement, principles of seed production and cone collection. Prerequisite: FSTR 103, 202 and 203; or instructor's approval.

FSTR 307 Recreational Land Management – An introductory course in recreational land management. Development and recreational use of areas designed 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 developments. 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. Attendance at a weekend seminar on Tourism and Outdoor Recreation is mandatory. Prerequisite: 1st year of the program or instructor's approval.

FSTR 308 Wildlife Management – The principles and practice of wildlife management, with particular reference to problems and procedures in British Columbia wildlife environments. Dynamics of wildlife populations. Methods of study. Harvesting. Regulations. Natural and artificial regulation of animal numbers. Diseases and parasites. The economics of wildlife, particularly in forest habitats. Extensive field study to support and extend lecture and lab material. Prerequisite: 1st year of the program or instructor's approval.

FSTR 309 Fish Management 1 – The biology of British Columbia fish, including anatomy, taxonomy, physiology, behavior and ecology. Management aspects of fisheries including population dynamics, habitat evaluation and improvement, harvesting, pollution and fishery regulations. Labs deal with methodology as it applies to the above and much of the training will be done in the field. Emphasis throughout is on the British Columbia situation. Prerequisite: 1st year of the program or instructor's approval.

FSTR 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 FSTR 410. Prerequisite: 1st year of the program or instructor's approval.

FSTR 311 Summer Technical Report – A detailed report on a phase of resource management from first-hand experience, or from approved library research.

FSTR 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".

FSTR 326 Forest Management – Forest tenures and policy in British Columbia, 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 of discounted cash flows in forest management.

FSTR 402 Timber Harvesting 2 – Deals with harvesting systems in use in the interior of B.C. and includes various logging phases and associated costs, log production planning and scheduling, cost equalization points and interest. In addition, contracts and contract logging, forest landscape planning, and industry and government relationships in managing our resources, will be discussed. There will be field work associated with the course and an important logging research report and oral presentation. Prerequisite: FSTR 302.

FSTR 403 Roads and Transportation 2 – Simple log span bridge design, construction and maintenance. Explosives. Truck road construction, maintenance and costing. Hauling costs. Log dumps, sorting logs on water or land. Booming grounds. Water transportation of logs. Prerequisite: FSTR 303.

FSTR 404 Forest Pestology – see FSTR 304. Prerequisite: FSTR 304 or instructor's approval.

FSTR 405 Silviculture 2 – Site examination, analysis and prescriptions; site preparation, planning methods, evaluating artificial regeneration, methods application, contract, planting, costing and inspection; brush control methods and application; spacing methods and evaluation; conifer release, application; fertilization, methods and application. Prerequisite: FSTR 305 or instructor's approval.

FSTR 407 Recreational Land Management – see FSTR 307. Prerequisite: FSTR 307 or instructor's approval.

FSTR 408 Wildlife Management – see FSTR 308. Prerequisite: FSTR 308 or instructor's approval.

FSTR 409 Fish Management 2 – see FSTR 309. Prerequisite: FSTR 309 or instructor's approval.

FSTR 410 Projects – This is a continuation of the work begun in FSTR 310. The student conducts a professional field research study and prepares a final report of a quality suitable for publication. Prerequisite: FSTR 310 or instructor's approval.

FSTR 413 Independent Studies – Offers an opportunity to student groups or individuals to become involved in a subject area or work 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 term 4, after final exams have been written.

FSTR 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 grading of logs. Visits to conversion facilities to observe lumber recovery, shake and shingle production and veneer manufacturing from logs will be included.

FSTR 415 Fire Management 2 see FSTR 205. Prerequisite: FSTR 205 or instructor's approval.

FSTR 416 Natural Resource Administration – Many of the functions once performed by government agencies and industry in the natural resource field are now being contracted out. This course is designed for people interested in embarking on a career in service contracting to the natural resource industry. Upon successful completion of this course, the student will have a basic knowledge of small business planning, be able to read and understand financial statements, understand simple double-entry accounting principles, be able to project a business plan for entrepreneurial activities and develop estimates for contract work.

FSTR 426 Forest Administration – See FSTR 416.

MATH 145 Basic Technical Mathematics for Renewable Resources – Systems of measurement, mensuration, Trapezium and Simpson's rules. Angular systems and angular motion. Trigonometric ratios 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 it applies 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 Fish, Wildlife and Recreation – Organization and presentation of data, frequency distributions and measures of central tendency; variation, skewness and kurtosis. Probability theory and laws. Random variables, discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Analysis of variance. Method of least squares, regression and correlation, and curve fitting. Some non-parametric statistics.

TCOM 101 Introduction to Technical Communication – In this course students practice writing skills applicable to the forest resource industry. Instruction, claim, request and adjustment letters and process and mechanism descriptions are covered. They also practice technical library search techniques and oral briefings.

TCOM 115 Technical Communication – Introduces students to technical and scientific communication skills required for a career in FWR. They study the principles of effective technical communication, business and technical formats, correspondence, short reports and research techniques for fish, wildlife and parks management topics.

TCOM 206 Technical Communication – Students write incident, progress, comparison and formal technical reports. They also write a proposal, resume and job application letter. They practice formal meeting, interview and research techniques and are exposed to word processing. Prerequisite: TCOM 101 or instructor's approval.

TCOM 215 Advanced Technical Communication – Students refine job finding skills and update their resumes and application letters. They practice specialized formats and write lengthy technical and scientific reports typical of fisheries, wildlife and parks management. Prerequisite: TCOM 115 or instructor's approval.

TCOM 304 Advanced Technical Communication – 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: Successful completion of TCOM 215, 115 or instructor's approval.

TCOM 307 Advanced Technical Communication – Students will review and practise the writing, thinking and revision skills that apply to the Summer Technical Report and other industry-related documents. In addition, students will prepare and present an extended slide/tape presentation appropriate to their technology. Prerequisite: TCOM 115, TCOM 215 or instructor's approval.

TCOM 402 Advanced Technical Communication – Students will update their resumes and write application letters. In addition, they will learn specialized techniques for communicating with the public through interpretative and educational programs and the media. They will practice public speaking and interview techniques. Prerequisite: Successful completion of TCOM 304 or instructor's approval.

TCOM 415 Public Information Techniques for Fish, Wildlife and Recreation – In this course, students study specialized principles and techniques for communication with the public through interpretive and educational programs and the media. They write promotional data, news releases and journal articles. They practice public speaking, preparing graphic displays, interview techniques and interpretive program design. Prerequisite: TCOM 304, TCOM 405 or instructor's approval.

Faculty and Staff

R.M. Strang, B.Sc., Ph.D., R.P.F, Associate Dean
W.R. Cannon, B.A.
N.E. Alexander, M.P.M.
M.R. Angelo, B.S.F., M.F.
D. Campbell, Dipl.T., Dipl. Adult Ed.
F. Cassetta, B.Sc.F., R.P.F.
C.W. Chestnut, B.A., Ph.D. (on leave)
T.D. Chisholm, B.Ed.
C.J. Diebold, C.A.M., C.Tech
D. Guthrie, B.Sc., M.Sc., Ph.D.
D.C. Holmes, B.A.Sc., M.F., R.P.F., P.Eng., Program Head
E.W. Howard, B.S.F., M.F., Cert. Inst.
A.G. Jakoy, B.S.F., M.Sc., R.P.F., Chief Instructor
R. Kley, Dipl.T., A.Sc.T. (on leave)
H. Lynum, B.A.Sc., R.P.F.
D.H. MacLaurin, B.Sc.F., R.P.F.
R.W. Reisen, Dipl.T., E.T.I., A.Sc.T.
G. Rosberg, B.Sc., 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. (on leave)
J. Smyth, Dipl.T., F.i.T.
P. Willms, Dipl.T. (on leave)
P. Yanciw, B.A.Sc.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Natural Resources Management

Post-diploma Program

This post-diploma program is designed to meet the needs of resource technologists who wish to broaden their knowledge of the major natural resources of British Columbia.

The Program

This nine-month program (two terms) examines the natural resources of British Columbia and the needs, constraints and methods to manage these resources in the best interests of the province. Included will be fish, wildlife, recreation, rangeland, hydrology (water), agriculture, mining, tourism and their interdependencies (natures).

When course credits are given, electives will be chosen in consultation with the Program Head.

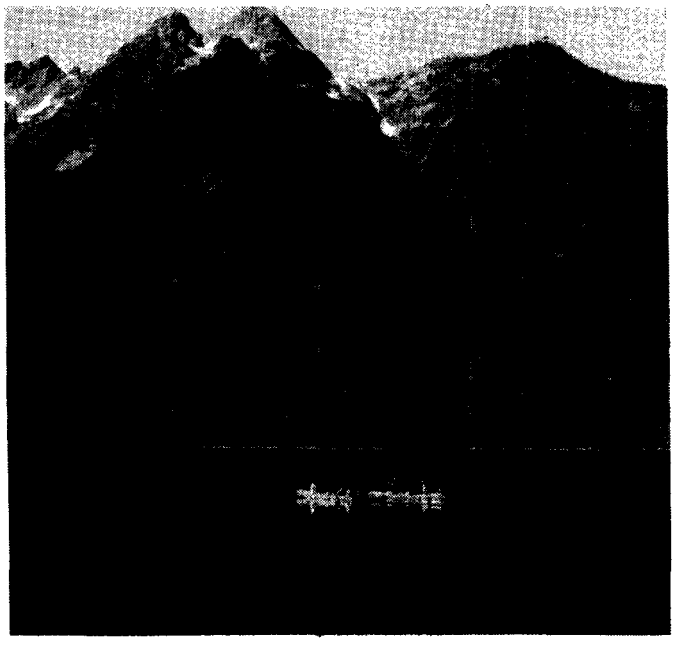
Prerequisites

Graduation from a BCIT diploma program or a two-year college program in an engineering or business technology. Baccalaureate degree in bioscience, engineering, geography or geology will also be considered.

PROGRAM: Natural Resources

		Clrm hrs/wk
Level 1		
FSTR 501	Fish Resource	2.0
FSTR 502	Rangeland Management	4.0
FSTR 503	Hydrology and Geomorphology	4.0
FSTR 504	Forest Land Management	6.0
FSTR 505	Interdependent Resources	4.0
FSTR 506	Projects, Special Topics and Current Issues	6.0
FSTR 507	Wildlife Resource	2.0
FSTR 508	Recreation Resource	2.0
TCOM 501	Management Communication	2.0
Level 2		
FSTR 601	Natural Resource Planning	6.0
FSTR 602	Environmental Impact Assessment	6.0
FSTR 603	Environmental Law	3.0
FSTR 604	Natural Resource Economics	5.0
FSTR 606	Projects	5.0
*FSTR 613	Independent Studies	60.0
FSTR 655	Conservation and Outdoor Recreation Education	3.5
MATH 624	Computer Applications: Statistical Quality Control	
TCOM 615	Public Information Techniques	2.0
	Electives	4.0

* a two-week course



Course Descriptions

FSTR 501 Fish Resource – The identification, habitat and life cycles of British Columbia's fish . The principles and practice of management, and the importance of interaction with all other resources.

FSTR 502 Rangeland Management – Includes identification of common range plants, knowledge of range distribution, types of range, productivity intensity and variety of uses, assessment of productivity and stocking, range reclamation, season of use, impact on the forest resource and non-grazing use of range land.

FSTR 503 Hydrology and Geomorphology – Assumes a basic knowledge of the factors that have shaped the earth and of the hydrologic cycle. The course includes a review of the broad landforms of B.C. and their evolution, and a consideration of the sensitivity of representative landforms to various types of development. Some aspects of the hydrology of forested ecosystems are discussed and specific effects of natural resource use on hydrological systems are presented.

FSTR 504 Forest Land Management – Designed for non-forestry students, it includes background in most second year forestry courses including forest tenure and policy in the Province of British Columbia, concepts in integrated resource use policy and management, timber supply area management and planning, operational planning with integrated resource considerations, and basic background information relating to pestology and silviculture.

FSTR 505 Interdependent Resources – A conceptual overview of other non-forested resources such as agriculture, mining, water, tourism, etc. Includes an introduction to the use of microcomputers in the processing of natural resource management data and an exposure to pesticide safety, use and abuse.

FSTR 506 Projects, Special Topics and Current Issues – Will include discussions and use of guest lectures or visits relating to current resource topics/issues. A project will be selected by each student from any of these topics or one of his own choosing in the resource field. The assessment of the student will be based on the written descriptions and reports submitted for the project. Ideally, the project will involve an analysis of a problem, issue or situation, followed by research toward a solution to be reported on in FSTR 606.

FSTR 507 Wildlife Resource – The identification, habitat and life cycles of British Columbia's wildlife and their management, within the framework of integrated resource management.

FSTR 508 Recreation Resource – The principles and practice of recreational land management. Tourism as related to outdoor recreation.

FSTR 601 Natural Resource Planning – The emphasis is on integrated resource use. Guest lecturers with expertise in resource planning may be included as part of the instructional team. The course will emphasize integrated resource planning analysis by examining the planning systems used by various resource agencies. Examples of procedures from various levels of planning will be considered and practised in the field. The student will be required to carry out data collection and analysis for some planning functions.

FSTR 602 Environmental Impact Assessment – Assessment of environmental impact and inventory techniques.

FSTR 603 Environmental Law – The court system in B.C.; review of various provincial and federal resource Acts; two case studies; court attendance; written decision on assigned cases.

FSTR 604 Natural Resource Economics – Includes economic concepts as applied to various natural resources and relationships to consider in cost/benefit analysis.

FSTR 606 Projects see FSTR 506. Prerequisite: FSTR 506.

FSTR 613 Independent Studies – This course offers an opportunity to student groups or individuals to become involved in a subject area or work 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 Term 4, after final exams have been written.

FSTR 655 Conservation and Outdoor Recreation Education – Provides Natural Resources Management students with the opportunity to recognize and understand the fundamental concepts of the value of wildlife and the natural environment in our modern way of life.

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.

TCOM 501 Management Communication – This course introduces techniques for effective written and oral technical communication on the job. Emphasis is on reporting technical information in the natural resource management field.

TCOM 615 Public Information Techniques – In this course, students learn specialized techniques for communicating with the public through interpretive and educational programs and the media. They write promotional data, news releases and journal articles. They practice public speaking, preparing graphic displays, interview techniques and media programs.

Faculty and Staff

R.M. Strang, B.Sc., Ph.D., R.P.F., Associate Dean
N.E. Alexander, M.P.M.
M.R. Angelo, B.S.F., M.F.
F. Cassetta, B.Sc.F., R.P.F.
C.W. Chestnut, B.A., Ph.D., (on leave)
E.C. Crossin, B.S.F., R.P.F.
D. Guthrie, B.Sc., M.Sc., Ph.D.
A.G. Jakoy, B.S.F., M.Sc., R.P.F.
G. Rosberg, B.Sc., Dipl.T.
J. Simpson, B.Sc.F., M.Sc.
B. Sivak, B.S.F., M.F., Ph.D., R.P.F. (on leave)

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

School of Health Sciences

Office of the Dean

George Eisler, M.A.Sc., P.Eng., M.B.A., Dean

Andrea Labé, Administrative Assistant/Executive Secretary to the Dean

Programs

Health Technologies

Dave Martin, B.Sc.(Hons), M.S.R., Acting Associate Dean

Medical Imaging

Jannie Scriabin, B.Sc.,(Hons.),M.Sc., A.R.T. (Clin.Chem.), Associate Dean

Medical Laboratory Science

Jannie Scriabin, B.Sc.,(Hons.),M.Sc., A.R.T. (Clin.Chem.), Associate Dean

Nursing

Margaret S. Neylan, M.A., B.S.N., R.N., R.P.N. (Hons.), Associate Dean

Basic Health Sciences

This department provides courses in human anatomy and physiology, immunology, microbiology, pathophysiology, sociology, organizational psychology, and human development for students enrolled in the School of Health Sciences. These courses are designated by the prefix BHSC and are listed and described in the following health technology entries. Each course is oriented towards a particular technology so that, although the material studied may be introductory in nature, the student quickly becomes aware of applications. In many cases these courses are the foundation upon which specific technology subjects are built. The department's responsibility, therefore, is to teach those concepts of biological and behavioral sciences which provide the student and graduate with the knowledge and comprehension to meet the present and the future challenges of the modern health worker.

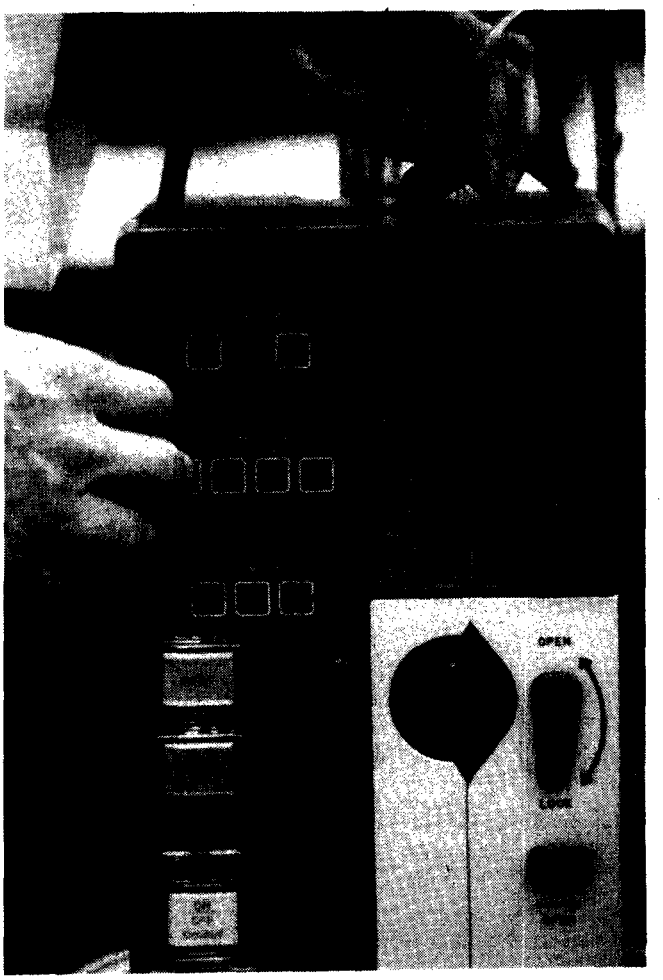
Faculty and Staff

Jannie Scriabin, B.Sc.,(Hons.),M.Sc., A.R.T. (Clin.Chem., MLT), Associate Dean
D. W. Martin, B.Sc (Hons), M.S.R., 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

HEALTH TECHNOLOGIES

Biomedical Engineering
Electrophysiology
Environmental Health (Public Health Inspector Training)
Health Information Technology
Occupational Health and Safety
Prosthetics and Orthotics

Biomedical Engineering Technology



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, utltrasound 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, bio chemistry 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.

The Biomedical Engineering program is accredited by ASTTBC. Graduates are eligible for registration as Applied Science Technologists (A.Sc.T.) after two years of relevant work experience following graduation.

Prerequisites

a) High School graduation with a minimum of C+ in Algebra 12, Physics 11 and Chemistry 11.

b) Selection interview with program instructors.

c) Applicants with relevant practical experience or special background may be considered.

PROGRAM: Biomedical Engineering Technology

Level 1		Credit
BMET 100	Electronics Principles and Practice 1	9.0
CHEM 107	Chemistry for Biomedical Engineering Technology	6.0
ELEC 152	Measurement for Biomedical Engineering Technology	4.0
HCOM 104	Technical Writing for Biomedical Engineering Technology	3.0
MATH 178	Basic Technical Mathematics for Biomedical Engineering Technology	8.0

Level 2		Credit
BHSC 202	Human Anatomy and Physiology	8.0
BMET 200	Electronics Principles and Practice 2	10.5
CHEM 207	Introduction to Organic and Biochemistry for Biomedical Engineering Technology	6.5
GNNU 182	Patient Care	1.0
HCOM 203	Technical Writing for Biomedical Engineering Technology	4.0
MATH 278	Calculus for Biomedical Engineering Technology	10.5
Level 3		
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	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 202 Human Anatomy and Physiology – The basic structure and function of the human body is discussed using the systems approach. The cell's role as the unit of structure and function is emphasized. Emphasis is also placed on the regulation of body functions and the role of control systems in homeostasis. Examples of the uses of biomedical instrumentation in diagnosis and treatment are given.

BMET 100 Electronics Principles and Practice 1 – Provides students with basic knowledge of electrical quantities, their units and relationships. The course includes DC circuit analysis techniques for R, RC, RL and RLC circuits; AC circuit analysis for R, RC, RL circuits. 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 coordin- ated 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.

BMET 401 Biomedical Device Technology 2 – Various electronic equipment used in the biomedical environment is presented through block diagrams. Selected equipment is covered in more detail with schematic diagrams (e.g. electrosurgical, telemetry and cardiac resuscitation equipment.) Electrical safety considerations of all equipment studied will be presented. Lab exercises, coordinated with course content, emphasize calibration and repair techniques. Prerequisite: BMET 300, 301, 310.

BMET 402 Biomedical Engineering Technology Project – Students will build a device such as an ECG simulator using the latest technology and design techniques. Students will gain experience with the actual implementation of a project such as planning, designing, material acquisition, prototyping, printed circuit designing, construction, testing, calibration, commissioning and evaluation. A technical report for the project is also required. Prerequisite: BMET 300, 301, 310.

BMET 403 Medical Imaging – Introduces the concepts involved in imaging systems used in medicine. Equipment examined includes that in X-ray, nuclear medicine, and ultrasound. Prerequisite: BMET 300, 301, BHSC 202.

BMET 410 Digital Systems and Microprocessors – An introduction to microprocessor hardware and software. Topics to be covered: digital arithmetic, memories and mass storage devices, microprocessor architectures, memory and I/O decoding, I/O techniques, interrupts, DMA, LSI/VSLI peripheral chips, data communications, memory management and virtual memory, instruction sets, software development methods, subroutines, data types, operating systems, editors, assemblers, linking loaders, and introduction to a high level language as a microprocessor development tool. Prerequisite: BMET 300, 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 portion of this course is four weeks in duration. Prerequisite: BMET 300, 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 quantitative analysis, both gravimetric and volumetric.

CHEM 207 Introduction to Organic and Biochemistry for Biomedical Engineering Technology – The naming, properties and main reactions of the major classes of organic compounds are discussed. The biochemistry includes both the chemistry and metabolism of fats, proteins and carbohydrates. Lab work includes techniques and synthesis in organic chemistry and biochemical techniques frequently encountered in the clinical lab, e.g.: spectrophotometry, chromatography, electrophoresis. *Prerequisite: CHEM 107.*

CHEM 411 Instrumental Analysis for Biomedical 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 152 Measurement for Biomedical Engineering Technology – Safety in electrical measurement techniques is emphasized throughout this course. Topics: error percentage and prediction, standards and calibration, device testing, analog and pulse signals, electrical noise, earthing, understanding service manuals. Equipment used: analog and digital meters, function and signal generators, bridges, frequency counters, curve tracers, oscilloscopes and attachments.

ELEC 252 Measurement for Biomedical Engineering Technology – An orientation course covering basic devices for measuring pressure, temperature, density and flow. A study of the principles of analysis instruments, using potentiometric, amperometric and polarographic techniques; ultraviolet, visible and infrared spectroscopy; flame photometry; paper and column chromatography; electrophoresis and refractometric methods. Concept of regulation and feedback control.

ELEC 259 Video Fundamentals – An introductory course covering the basic principles of video display. Topics include raster scan, industrial composite video signals, character generation, video projects.

GNNU 182 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 – Emphasizes clear, correct, health-oriented technical writing for biomedical engineering technologists. Students will learn how to organize and sequence technical information, illustrate documents, describe and define technical material, write direct letters and memos, write a professional resumâ? and application letter, and summarize reports and articles.

HCOM 203 Technical Writing for Biomedical Engineering Technology – A continuation of HCOM 104. This term students will write and present orally hospital-oriented and industry-oriented memo reports, and write and present a longer, formal technical report. This term focuses on professional communication. Students will learn how to use the Wang word processing system to write reports and use medical terminology correctly.

HCOM 301 Advanced Communication for Biomedical Engineering Technology – Designed to help biomedical engineering students complete the writing portion of technology assignments and projects successfully. Because the course content is, in part, determined by technology assignments, it will vary. The instructor and students work as editor and writers in the writing and revising of technology assignments. In addition, students will update resumes to graduate level requirements, as a separate part of the course.

MATH 178 Basic Technical Mathematics Biomedical 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, logarithmic/semilogarithmic graphs, decibels, and exponential growth and decay. Trigonometric functions, solution of triangles and graphing and addition of sinusoidal functions. Complex numbers, rectangular/polar transformations, phasor representation of sinusoidal waveforms and AC circuits. 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 included are: limits, the derivative, differentiation rules, applied maximum and minumum 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 methods 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 – This is a general 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

Dave Martin, B.Sc.(Hons), M.S.R., Acting Associate Dean
M.J. Barrett, Dipl.T.,A.Sc.T.
P.K. Chiu, B.Eng., M.Sc., Ph.D., P.Eng., Program Head
D. Moreau, B.Sc., Dipl.T., A.Sc.T.
A. Nichols, B.A.Sc., P.Eng.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Electrophysiology Technology

Modern hospitals and health care clinics require the services of trained technologists to operate sophisticated electroneurophysiological testing equipment and other related biomedical equipment. In order to understand the operation of this equipment, the graduate will have studied mathematics, physical science and engineering subjects. Course work in the basic health sciences will inform the student about human physiology and the biological signals to be measured. In addition, course work in the social sciences will prepare the student for interpersonal relationships with the clinical environment. Extensive clinical experience is built into the program to ensure that the student develops necessary practical skills in the work environment.

Job Opportunities

Graduates of the Electrophysiology Program will find employment in hospitals or private clinics in the following fields: electroencephalography (electrical activity of the brain), electromyography (electrical activity of the neuro-muscular system), and evoked potentials (electrical activity generated by stimulation of the sensory systems). Graduates will principally find employment in Diagnostic Neurophysiology Departments of hospitals. In addition to performing a wide variety of tests on patients, the graduate will be expected to evaluate the results in order to assess the performance of the test equipment 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.

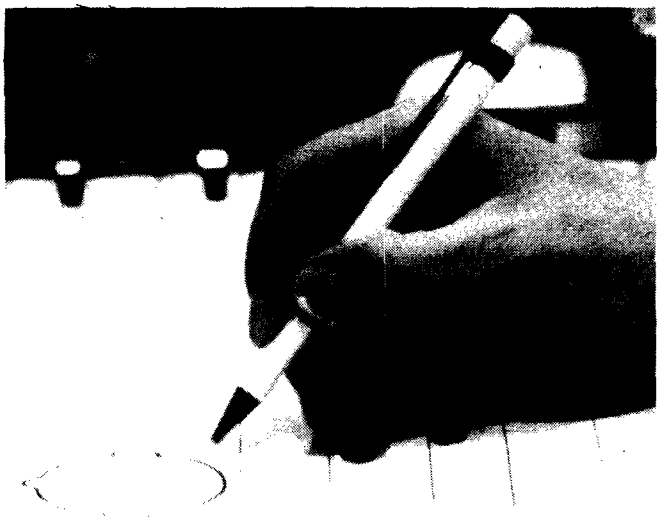
Upon successful completion of the two year program, the student will receive a Diploma of Technology in Electrophysiology. After a period of work experience in a clinical sitation, students will become eligible to write the Technologist Registration Examinations of the appropriate certifying body of their chosen fields of interest.

Prerequisites

Algebra 12, Physics 11 and Chemistry 11 all with C+ 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. For further information contact the Registrar's office.

PROGRAM: Electrophysiology

Level 1		Credit
BHSC 111	Anatomy and Physiology	4.0
CHEM 107	Chemistry for Biomedical Engineering	6.0
ENPY 150	Electrophysiology	9.0
HCOM 104	Technical Writing for Biomedical Engineering	3.0
MATH 178	Basic Technical Mathematics for Biomedical Engineering	8.0



Level 2		Credit
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 182	Patient Care	4.0
HCOM 203	Technical Writing for Biomedical Engineering	4.0
MATH 278	Calculus for Biomedical Engineering	10.5

Level 3		
BHSC 312	Neuroanatomy and Physiology	6.0
BHSC 339	Human Behavior	4.0
ENPY 350	Electrophysiology	9.0
ENPY 351	Electrophysiology Clinical	6.0
MATH 378	Statistics for Biomedical Engineering	2.0
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. For further information contact the Registrar's Office.

Course Descriptions

BHSC 111 Anatomy and Physiology – A basic introductory course in human anatomy and physiology, which uses the systems approach. It provides the electrophysiology technology student 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 technology 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 practices of electrophysiology. Emphasis is placed on the structure and function of the nervous system and selected pathophysiological states.

BHSC 339 Human Behavior – Basic considerations of behavioral science relevant to Electrophysiology Technologists' concerns will be explored. Theory and research findings dealing with stress and illness behavior will be presented. Professional and ethical considerations and ways of dealing with common hospital events will be explored. Emphasis will be on human relations skills in dealing with patients and staff.

CHEM 107 Chemistry for Biomedical 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 quantitative analysis, both gravimetric and volumetric.

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 both the chemistry and metabolism of fats, proteins and carbohydrates. Lab work includes techniques and synthesis in organic chemistry and biochemical techniques frequently encountered in the clinical lab, e.g.: spectrophotometry, chromatography, electrophoresis. Prerequisite: CHEM 107.

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.

ENPY 351 Electrophysiology Clinical – Scheduled on Tuesday and Thursday mornings at local hospital EEG laboratories, this course will provide hands-on patient contact experience 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, audiology, opthalmology. Program will be tailored to the specific student. Clinical work may be out-of-town. Prerequisite: ENPY 350, 351.

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 – Emphasizes clear, correct, health-oriented technical writing for biomedical electronics technologists. Students will learn how to organize and sequence technical information, illustrate documents, describe and define technical material, write direct letters and memos, write a professional resumé and application letter, and summarize reports and articles.

HCOM 203 Technical Writing for Biomedical Engineering – A continuation of HCOM 104. This term, students will write and present orally hospital-oriented and industry-oriented memo reports, and write and present a longer, formal technical report. This term focuses on professional communication. Students will learn how to use the Wang word processing system to write reports and use medical terminology correctly.

MATH 178 Basic Technical Mathematics for Biomedical Engineering – Systems of linear equations, determinants, matrices, types of systems and application to electrical networks. Polynomial curve fitting, loop analysis, and T to Y transformations. Common and natural logarithms, logarithmic/semilogarithmic graphs, decibels, and exponential growth and decay. Trigonometric functions, solution of triangles and graphing and addition of sinusoidal functions. Complex numbers, rectangular/polar transformations, phasor representation of sinusoidal waveforms and AC circuits.

MATH 278 Calculus for Biomedical Engineering – An introduction to differential and integral calculus. Topics included are: limits, the derivative, differentiation rules, applied maximum and minumum 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 application of it to numerical methods 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 – Provides students with basic knowledge of statistics. Topics include random sampling, measurement and rounding, frequency distributions, measures of central tendency, measures of dispersion, normal distribution, ranks and percentiles. Estimation, central limit theorem, standard errors, confidence intervals, hypothesis testing, null and alternate hypothesis, large sample hypothesis testing, t-distribution, small sample hypothesis testing and nonparametric testing will also be covered. Computer packages will be discussed.

PHYS 324 Biophysics – This is a general level course in basic physics with emphasis on applications to biological systems. 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

Dave Martin, B.Sc.(Hons), M.S.R., Acting Associate Dean
Karin Liddle, R.E.T.
M. Wilson-Young, R.EEG.T., R.E.T.
M. Young, B.A., Dipl.T., R.E.T., Program Head

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Environmental Health

PUBLIC HEALTH INSPECTOR TRAINING

The public health inspector is a vital member of the community health delivery system whose role includes improving the environment through the use of education, consultation, inspection and monitoring techniques and, if necessary, by the enforcement of health legislation. This role is applied in the areas of food hygiene, insect and rodent control, communicable disease investigation, public accommodation, community care facilities, public recreational facilities, water supply and waste disposal systems, occupational health and safety and environmental pollution – air, water, soil and noise. The graduate provides leadership and technical expertise in the development of long-range planning to protect and improve community health. To meet these demands the candidate must be a mature, practical person and possess excellent communicative skills, as well as considerable tact and discretion in working with people at all levels within the community.

Job Opportunities

Employment possibilities for public health inspectors include municipal, provincial and national health agencies, environmental and pollution control agencies and private businesses and industries such as food processing, catering and fisheries. Occasional openings occur in the teaching field. Employment opportunities exist in the industrial health and hygiene area for students who also possess an undergraduate degree.

The Program

The cross-disciplinary curriculum includes general studies in health and the health engineering sciences, math and the physical and social sciences, in order to give students a thorough understanding of the many health hazards in the environment and to equip them to measure, evaluate and recommend controls for these hazards. Instructional modes include lectures, labs and field experience.

Prerequisites

Algebra 12, Physics 11 and Chemistry 12 are course requirements for this program. Applicants must be in good health. The nature of the work precludes individuals who are severely handicapped. Applicants should be able to show evidence of maturity, have a positive outlook and be interested in serving the community. Acceptance is dependent on a preselection interview.

Post-graduation

After completing the requirements of the two-year program leading to a Diploma of Technology, graduates must complete six months of field training in a recognized health unit under the direction of a Medical Health Officer and a Public Health Inspector. Successful candidates may then sit a national examination to qualify for a Certificate in Public Health Inspection (Canada) granted by the Board of Certification of the Canadian Institute of Public Health Inspectors.

PROGRAM: Environmental Health

		Clrm hrs/wk
Level 1		
BHSC 123	Public Health and Pollution Control Microbiology	3.0
CHEM 108	Chemistry for Environmental Health 1	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	2.0
BHSC 223	Public Health and Pollution Control Microbiology	3.0
CHEM 208	Chemistry for Environmental Health 2	6.0
ENVH 231	Food Hygiene 2	2.0
ENVH 232	Public Health Inspection 2	2.0
ENVH 266	Epidemiology and Biostatistics	4.0
ENVH 275	Drinking Water and Waste Disposal	5.5
HCOM 205	Communication for Environmental Health	3.0
PHYS 212	Environmental Physics	3.5
Level 3		
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	Environmental Noise	5.0
ENVH 358	Environmental Health Relations	5.0
ENVH 379	Technical Research Methods 1	7.0

Level 4		Clrm hrs/wk
BHSC 424	Communicable Disease Control	4.0
CHEM 419	Industrial Chemical Processes	2.0
CHSC 413	Environmental Analytical Methods	3.0
ENVH 437	Public Health Administration 2	2.0
ENVH 453	Environmental Health and Engineering 2	3.0
ENVH 456	Public Health Law	3.0
ENVH 459	Technical Research Methods 2	3.0
ENVH 470	Industrial Hygiene and Toxicology	5.0
ENVH 471	Food Hygiene 4	5.0

Course Descriptions

BHSC 123 Public Health and Pollution Control Microbiology – An introduction to those areas of microbiology which the public health inspector will use in daily work. The areas include the structure and physiological characteristics of bacteria, viruses and fungi, and their significance to food, water, sewage and waste disposal.

BHSC 204 Basic Anatomy and Physiology – Designed to provide a basic knowledge of human anatomy and physiology. Emphasis is placed on the physiology of human body systems and how environmental factors affect these systems.

BHSC 223 Public Health and Pollution Control Microbiology – See BHSC 123. Prerequisite: BHSC 123.

BHSC 424 Communicable Disease Control – Provides the student with a sound knowledge of the natural history, spread and control of communicable diseases. Emphasis is placed on modes of transmission and control of diseases of provincial and national importance.

CHEM 108 Chemistry for Environmental Health 1 – A general chemistry course for environmental health. Topics include chemical symbols, formula, acid base reactions, calculation based on formulae and chemical equations. Theory of volumetric analysis molarity, normality calculations based on concentration of solutions. Acid base equilibria solution, pH and POH, buffers and hydrolysis.

CHEM 208 Chemistry for Environmental Health 2 – An introduction to organic biochemistry, and a selection of topics of interest to Environmental Health. Organic covers functional group analysis, naming by IUPAC, common name and trade names of many commercial chemicals, oil refining, photochemical smog; pesticides. Biochemistry covers lipids, carbohydrates and proteins. Other topics include alkalinity, hardness, water softening, surfactants, heavy metal poisoning, chemical toxicity, biological oxygen demand, chemical oxygen demand and swimming pool chemistry. Prerequisite: CHEM 108.

CHEM 313 Instrumental Analytical Methods for Environmental Health – Principles and laboratory procedures of the more common instrumental methods of chemical analysis: spectroscopic methods including visible, ultraviolet and infra-red spectroscopy, atomic absorption spectroscopy, flame photometry, potentiometry, polarography and chromatography. Prerequisite: CHEM 208.

CHEM 419 Industrial Chemical Processes – Designed to give the student an overview of the chemical processes used in industry, chemicals, chemical reactions, products manufactured, waste products, pollutants produced 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 introductory course in the study of 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 Public Health Inspector. Current chemical, physical and biological control methods are examined in detail.

ENVH 141 Food Hygiene 1 – The food hygiene courses will examine the public health concerns associated with the food industry. Specific attention will be directed to legislative control and enforcement, inspection techniques, causes and investigation of food-borne illnesses, microbiological concerns and educational programs, as all of these are applied to the food industry in production, processing, handling, storage, service display, construction and materials.

ENVH 142 Public Health Inspection 1 – Provides the student with knowledge of duties and responsibilities in government organizations. A detailed review of related environmental and health legislation will be covered, as well as the division of control and authority at the federal, provincial and local levels. Control techniques and methodology used by government organizations is stressed.

ENVH 143 Environmental Health and Engineering 1 – Covers a number of topics relevant to the field of environmental health including solid waste collection and disposal, emergency measures, camp and recreational sanitation, housing, community planning and swimming pools.

ENVH 231 Food Hygiene 2 – See ENVH 141.

ENVH 232 Public Health Inspection 2 – See 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.

ENVH 275 Drinking Water and Waste Disposal – An introductory course which examines the means, methods, design and construction of facilities required to provide adequate potable water and sewage disposal. Associated health hazards, protective measures, and how to solve problems encountered in individual systems, will be considered. Further topics will include the characteristics of, and disposal methods for, agricultural wastes.

ENVH 331 Food Hygiene 3 – See ENVH 141.

ENVH 332 Public Health Inspection 3 – See ENVH 142.

ENVH 337 Public Health Administration 1 – This is a survey course which examines the principles of organizational behavior, organization and design. The theoretical aspects of public health administration will be examined, showing the administrative philosophies from the classical school of administration to present-day philosophy. These administrative concepts will be dealt with as they apply to the functioning of government agencies and health departments. Particular reference will be made to Canadian government organization.

ENVH 350 Environmental Noise – Covers noise topics relevant to the field of environmental health with emphasis on occupational and community noise assessment and control. The lab course will emphasize audiometry, noise measurement and analysis, and calibration techniques utilizing state-of-the-art instrumentation. Prerequisite: MATH 182 or PHYS 212.

ENVH 358 Environmental Health Relations – Examines the interrelationships and interactions between various government departments, agencies and corporations. Additionally, the forces which underly the social behavior of groups, large organizations and communities will be examined. Interpersonal relations will be exemplified through the practical application of public health education and the interaction of personnel in the environmental health field. Principles of public relations will also be examined with emphasis on problems peculiar to public health.

ENVH 379 Technical Research Methods 1 – Provides for the development of research methods and communication skills necessary to design technical research reports. Special emphasis will be placed on predicting trends in the field of public health. This course is designed to encourage the student to be self-assertive and creative. Prerequisite: ENVH 266.

ENVH 437 Public Health Administration 2 – See ENVH 337.

ENVH 453 Environmental Health and Engineering 2 – See ENVH 143.

ENVH 456 Public Health Law – An examination of the legal system which serves our society, followed by a detailed look at certain areas of substantive law which public health officials are likely to come in contact with while carrying out their duties. Special attention will be given to that body of legislation designed for the protection and promotion of individual and community health. Court procedure and evidence giving are examined in depth.

ENVH 459 Technical Research Methods 2 – See ENVH 379. Prerequisite: ENVH 379.

ENVH 470 Industrial Hygiene and Toxicology – A survey course in occupational health. Given lectures, laboratory exercises and field situations, the student will be able to recognize common occupational health hazards, demonstrate how to use appropriate environmental sampling equipment and recommend control measures which may alleviate potential health hazards.

ENVH 471 Food Hygiene 4 – See ENVH 141.

HCOM 106 Communication for Environmental 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 – Builds on skills taught in HCOM 106 and adds incident, inspection and investigation reports, proposals and a professional job application package. Meetings and interviewing skills are also covered. Students will propose, design and sell a training module for an environmental health topic.

MATH 182 Basic Technical Mathematics for Environmental Health – Systems of measurement and mensuration. Linear and quadratic equations and systems of linear equations. Functions and their graphs including power functions. Exponential/logarithmic theory, common and natural logarithms, logarithmic/semilogarithmic graphs and exponential growth and decay.

PHYS 212 Environmental Physics – An introduction to the physical principles, properties and relationships of physical quantities and how they affect each other. Motion, force, energy, power, properties of matter, thermal energy, electricity, wave motion, sound, light and radiation, as they apply to environmental topics. The lab program emphasizes measurements, data analysis and experimental techniques while confirming and expanding the lecture concepts.

Faculty and Staff

Dave Martin, B.Sc.(Hons), M.S.R., Acting Associate Dean
E.J. Borsky, Dipl.T.
W.J. Fox, B.Sc., C.P.H.I.(C)
B. Price, C.P.H.I.(C), Program Head
C.L. Young, C.E.T, C.P.H.I.(C)

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Health Information Technology

Health Information Technology offers interested students the advantage of two program options – a one-year health record technician option and a two-year health record administrator option. The two options have essentially an equivalent first year curriculum and are designed to meet the requirements of prospective employers. Both options are open to female and male candidates. Applicants are required to discuss the nature of the work with health record administrators or technicians currently working in the field.

Health record professionals make a valuable contribution to the health care system. They provide a very special service to the administrative and treatment teams in a health facility, a service that provides the information necessary to manage the facility to its best advantage while giving patients the best possible care. The major source of health information is the health or medical record which summarizes the information about the patient's care.

Health records are maintained in all health care facilities and provide a permanent, confidential report of each patient's encounter with the health care delivery system. The health record is a complete, timely, accurate document of medical and allied health professional observations concerning health, illness or injury, and is an important tool in maintaining and evaluating the quality of care. As the necessity for accurate documentation in health care grows, computerization is becoming an important consideration in the recording and utilizing of health information, including record linkage.

The Health Information Technology program is fully recognized by the Canadian College of Health Record Administrators (CCHRA). Successful completion of the national examination qualifies the graduate to work anywhere in Canada.

Program Transfer

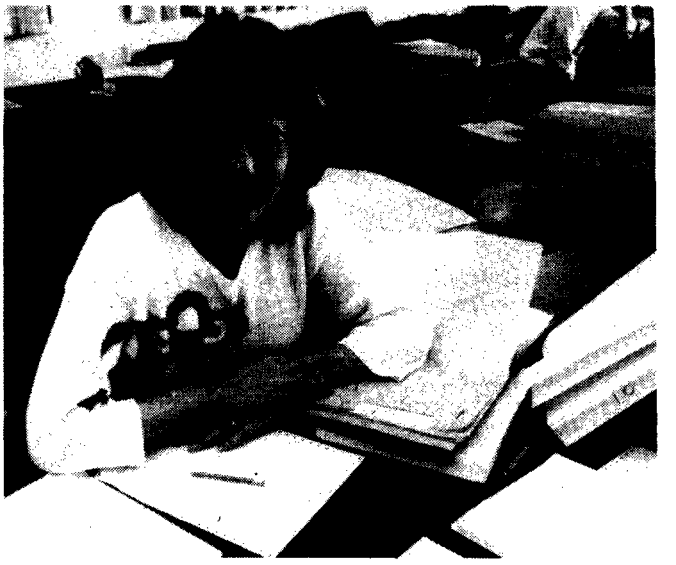
In June 1988, the Ministry of Advanced Education and Job Training announced that both options of the Health Information Technology program would be transferred to Douglas College effective September 1989. Planning for the transfer is well underway with both institutions cooperating to ensure the continuance of program quality and recognition. Information about the program can be obtained from either BCIT (434-8418) or Douglas College (520-5478).

Curriculum Developments

Subject to the necessary approvals, several positive changes are planned for the September 1989 curriculum which reflect advances and developments in professional practice. Generally, the overall curriculum content remains similar to the outline for the Health Record Administrator and the Health Record Technician options described in the next sections.

The following summarizes the proposed curriculum enhancements:

Courses which are being combined include Clinical Lab Procedures with Disease Processes; Transcription with Medical Terminology; Health Record Science with Health Record Procedures; and Health Labor Relations with Health Record Administration. Courses being consolidated include Communications, Organizational Psychology and Management. Courses being expanded include Introduction to Quality Assurance and Coding and Data Retrieval. New courses being added to year two of the program include Research and Epidemiology and Financial Aspects of Health Information Services.



HEALTH RECORD ADMINISTRATOR OPTION

This is a two-year program designed to train students for management and administration in the health record department of hospitals and health agencies. Each graduate receives a Diploma and is eligible for recognition by the Canadian College of Health Record Administrators at the Certificant Level (CCHRA[C]).

Health record departments of hospitals and health agencies require the specialized services of health record administrators to develop, manage and utilize health information systems.

Job Opportunities

The health record administrator may be employed in the hospital health record department, as the director of the department or in a staff position. In addition to traditional employment in hospitals, other facilities such as community health centres, government agencies and industry may also employ health record administrators to develop, implement and maintain health information systems.

Health record administration is an expanding field. With initiative, today's health record administrator may enter any area in which knowledge of health record standards and systems is necessary. As the use of computers in health care expands, health record administrators are increasingly involved in the design, analysis and use of computerized information systems.

The Program

In collaboration with the Health Record Association of British Columbia and health care agencies, BCIT has designed the Health Record Administrator option to provide two years of instruction in the form of lectures, lab exercises and practical experience. In the first year, students concentrate on the basic health sciences and acquire a fundamental knowledge of health record science. Two weeks of introductory practical experience in hospital health record departments will be provided during term two. In the second year, health record administration, management, labor relations, organizational theory, quality assurance and computer applications will be stressed. During the last term of the program, a ten week practicum in health record departments of B.C. hospitals and various health agencies will take place. Students incur the costs of travel and living expenses during practicum sessions and may be placed throughout the province for the practicum.

Students are expected to become members of the HRABC while attending the program. To be recognized by the CCRHA, graduates will successfully write the national examination thus becoming Certificant members of the CCHRA.

Graduates possess the skills required to meet current and future demands for health record professionals trained in information and resource management applicable to the health care industry.

Prerequisites

Algebra 12, Biology 12, and proficiency in typing (approximately 50 wpm), are course requirements for this program. Maturity, responsibility and an interest in health care and information management are essential. Experience in business or in a related health field is an asset. The work demands attention to detail and accuracy; of utmost importance are leadership ability, initiative and effective interpersonal skills.

Applicants are required to have a successful personal interview with HIT faculty following a visit to a health record department in an acute care general hospital.

PROGRAM: Health Record Administrator

Level 1		Credit
BHSC 103	Human Anatomy and Physiology	4.0
HCOM 105	Communication for Health Information Technologists	3.0
HITA 100	Health Record Science	3.0
HITA 101	Medical Terminology	3.0
HITA 102	Disease Processes	5.0
HITA 105	Health Record Procedures	4.0
MATH 180	Basic Mathematics and Statistics for Health Information	4.0
MLAB 112	Introduction to Clinical Lab Procedures	4.0
Level 2		
BHSC 203	Human Anatomy and Physiology	4.0
COMP 111	Introduction to Data Processing	4.0
HCOM 204	Communication for Health Information Technologists	4.0
HITA 113	Transcription	3.0
HITA 200	Health Record Science	5.0
HITA 205	Health Record Practicum (February/March)	3.0
HITA 206	Coding and Data Retrieval	7.5
HITA 212	Disease Processes	5.0
HITA 222	Intro to Quality Assurance	4.0
MATH 280	Statistics 2 for Health Information	4.0
Level 3		
BHSC 337	Organizational Psychology	4.0
COMP 211	Computer Applications	3.0
HITA 300	Health Record Administration	5.0
HITA 303	Health Record Technological Developments	3.0
HITA 306	Coding and Data Retrieval	7.0
HITA 322	Quality Assurance and Risk Management	4.0
OPMT 169	Health Records Management	4.0
Level 4*		**Credit**
BHSC 437	Organizational Psychology	3.0
COMP 311	Computer Applications	3.0
HITA 400	Health Record Administration	4.5
HITA 406	Coding and Data Retrieval	5.0
HITA 422	Quality Assurance for HRDs	3.5
HITA 430	Health Labor Relations	3.0
HITA 405	Health Information Practicum (March/April/May)	20.0
OPMT 269	Health Records Management	2.5

*Courses run from January to spring break in March to be followed by 35 hours/week, 10-week practicum from mid-March to end of May.

HEALTH RECORD TECHNICIAN OPTION

The health record technician is a highly-skilled member of the health care team. Through the Health Information Technology, BCIT has designed a one-year program of study for individuals interested in pursuing this career option.

This program is designed to train students in the technical aspects of health record science. Each graduate receives a Certificate and is eligible for recognition by the Canadian College of Health Record Administrators at the Associate level (CCHRA[A]).

Job Opportunities

The program is designed to prepare graduates for small hospitals where they may assume major responsibilities in the health record department, and for larger hospitals where they work under the supervision of a health record administrator. Other hospital departments and health facilities (such as the Cancer Control Agency of B.C. or Greater Vancouver Mental Health Services) provide additional employment opportunities.

In a small health care facility, the health record technician may be fully responsible for the operation of the health record department; i.e. the initiation, development, operation and maintenance of health information systems. In a larger institution, the health record technician may specialize in one particular area of work. This includes technically evaluating health records according to established standards; compiling various health and administrative statistics; coding and abstracting data from health records; maintaining and using a variety of indices, storage and data retrieval systems.

The Program

Lectures, lab exercises and practical experience are combined in the training of health record technicians. Basic health sciences and the fundamentals of health record science are taught in depth. Two weeks of introductory practical experience in hospital health record departments will be provided during term two. Also during term two, the student will be introduced to quality assurance, data processing, and department management and supervision. The program concludes with a more advanced five week practicum during which technical experience is provided by health record departments in hospitals. Students incur costs of travel and living expenses for practicum sessions and may be placed throughout the province for the practicum.

Students are expected to become members of the HRABC while attending BCIT. To be recognized by the CCHRA, graduates will successfully write the national examination, thus becoming Associate members of the CCHRA.

Graduates who wish to become health record administrators may apply to BCIT for the second year of the Health Record Administrator Option on a full-time or part-time basis.

Prerequisites

Graduation from the Selected or Combined Studies Program plus Algebra 12, Biology 12 and proficiency in typing (approximately 50 wpm). Maturity, responsibility, and an interest in health care and information handling, are essential for a successful career as a health record technician. The work involved demands attention to detail, accuracy and reliability.

Applicants are required to have a successful personal interview with HIT faculty following a visit to a health record department in an acute care general hospital.

PROGRAM: Health Record Technician

Level 1		Credit
BHSC 103	Human Anatomy and Physiology	4.0
HCOM 105	Communication for Health Information Technologists	3.0
HITA 100	Health Record Science	3.0
HITA 101	Medical Terminology	3.0
HITA 102	Disease Processes	5.0
HITA 105	Health Record Procedures	4.0
MATH 180	Basic Mathematics and Statistics for Health Information	4.0
MLAB 112	Clinical Lab Procedures	4.0
Level 2		
BHSC 203	Human Anatomy and Physiology	4.5
COMP 111	Intro to Data Processing	4.0
HCOM 204	Communication for Health Information Technologists	4.5
HITA 200	Health Record Science	5.0
HITA 202	Disease Processes	5.0
HITA 222	Intro to Quality Assurance	4.0
HITT 205	Health Record Practicum (February/March)	3.0
HITT 206	Coding and Data Retrieval	9.5
HITT 213	Transcription	5.0
HITT 305	Health Record Practicum (June/July)	10.0

Course Descriptions

BHSC 103 Human Anatomy and Physiology – Provides students with an understanding of normal body structure and function. The course relates this knowledge to various aspects of the work performed by health record technicians and administrators such as coding and abstracting data collection for evaluation of patient care, and specification of documentation requirements in the health record.

BHSC 203 Human Anatomy and Physiology – See BHSC 103. Prerequisite: BHSC 103.

BHSC 337 Organizational Psychology – Prepares students to work in health records departments in health care institutions at a supervisory level. Organizational behavior theory and research findings will be presented and applied to situations encountered in health care organizations. Role playing and other involvement exercises will be used to apply the theory. Students will be encouraged to present their work-related experiences to enhance the course content.

BHSC 437 Organizational Psychology – See BHSC 337. Prerequisite: BHSC 337.

COMP 111 Introduction to Data Processing – Lectures and practical exercises are used to present topics such as: computer operations; input, output and storage devices; input and reporting methods; report design; data accuracy and error correcting; file processing; systems design concepts; flowcharting; programming using the BASIC language.

COMP 211 Computer Applications – Covers computer applications in engineering and medical technologies; how a computer works, recognizing problems suitable for computer solution, flowcharting and communicating with computer personnel. Emphasis is on the use of computers to solve problems related to the technology concerned. Where available, 'package' programs will be demonstrated and used by students. FORTRAN or BASIC programming language is taught, depending on the technology. Prerequisite: COMP 111

COMP 311 Computer Applications – The objectives and components of health information systems are examined from various perspectives: types of systems, reasons for computerizing health information and the role of the health record administrator in the needs assessment, analysis, design and management of health information systems. The evaluation and selection of hardware and software are also discussed. Prerequisite: COMP 211.

HCOM 105 Communication for Health Information Technologists – Introduces health information students to professional communication. The course emphasizes clear, concise and correct health-oriented writing. Students will learn how to select, organize and sequence information, how to write instructions and procedures, how to write direct memos and letters, and how to present information orally. They will also learn how to use the Wang word processing system to plan, write and revise documents.

HCOM 204 Communication for Health Information Technologists – A continuation of HCOM 105. This term, students will learn how to write persuasively, prepare an effective resumé and application letter, write effective information and analytical reports, conduct effective meetings, plan and implement an effective inservice education program and how to access and report on information in the professional literature.

HITA 100 Health Record Science – This course provides students with knowledge and practice in the fundamental principles and procedures of health record science. After an orientation to the program and the profession, areas studied in the first term include a detailed examination of all aspects of the health record from formation to completion; microfilming, record retention; hospital accreditation; interdisciplinary relations and intrahospital organization; confidentiality and release of health information. The second term incorporates a more detailed analysis of the profession, legal aspects of health records, the Canadian health care delivery system, managing a small medical library, and an introduction to management and supervision of a health record department.

HITA 101 Medical Terminology – An introduction to the language of medicine. Basic rules of medical terminology, medical abbreviations, medical specialties and operative terms are included. There will be a detailed study of medical prefixes, roots and suffixes, with emphasis on analysis and word-building.

HITA 102 Disease Processes – An introduction to the concepts of pathophysiology. Common diseases for each body system are studied in detail relating each to medical and surgical treatments. Diseases studied will be correlated with patient records in laboratory assignments. Corequisite: HITA 101.

HITA 105 Health Record Procedures – Provides practical experience in the basic clerical and technical tasks performed in a health record department. The course also gives students an introduction to coding principles which enables them to assign complete, accurate ICD-9-CM codes to diagnostic and operative statements. The course coordinates with HITA 100 Health Record Science, and is conducted in a simulated health record department on campus.

HITA 113 Transcription – Transcription practice with medical, obstetrical, pathological and surgical reports. The course includes an introduction to the electronic typewriter with limited memory capacity, as well as an introduction to word processing. The emphasis is on accuracy of transcription and increasing competence with electronic equipment. Prerequisite: HITA 101, 102, and 105.

HITA 200 Health Record Science – See HITA 100. Prerequisite: HITA 100.

HITA 202 Disease Processes – See HITA 102. Prerequisite: HITA 102.

HITA 205 Health Record Practicum – A two week practicum focusing on basic clerical and technical tasks in the health record departments of B.C. hospitals. Prerequisite: HITA 100 and 105. Corequisite: HITA 206 or HITT 206.

HITA 206 Coding and Data Retrieval – Emphasizes the coding of diagnoses and procedures from medical records, case studies, etc., using ICD-9-CM and ICD-9; abstract data manually using HMRI. Both activities are to be performed with speed and a high degree of accuracy. The student will also be able to locate and present specified information from the HMRI printouts. Prerequisite: BHSC 103, HITA 101, 102, 105, MLAB 112 .

HITA 212 Disease Processes – See HITA 102. Prerequisite: HITA 102.

HITA 222 Introduction to Quality Assurance- Deals with data collection, analysis and presentation. Topics include classification systems, data quality control, statistical formulae for health information, and an introduction to quality assurance concepts, principles and procedures. Prerequisite: HITA 100, 105.

HITA 300 Health Record Administration – Emphasizes the problem-solving approach to certain aspects of health record administration. Areas of advanced study include specialized hospitals (patient records, statistics and accreditation), the problem oriented record, medicolegal and ethical aspects, the health care delivery system and the health record profession. Health record policies, procedures and forms design; administrative committees; office space and environmental planning; administration of the Admitting and Outpatient Departments are also studied. Prerequisite: HITA 200.

HITA 303 Health Record Technological Developments – Examines the technological advances found in health record departments today. Some of the "office of the future" areas discussed are computerized coding and abstracting, computerized CR/ADT, electronic mail and advances in word processing. Emphasis is on implementation and evaluation of these systems. Prerequisite: HITA 113 or HITT 213.

HITA 306 Coding and Data Retrieval – A continuation of HITA 206, it provides the student with weekly labs in coding and abstracting (manually and electronically) with emphasis on speed and accuracy. The student will also be able to summarize and present data in such a way as to create and stimulate interest in its use. Prerequisite: HITA 206.

HITA 322 Quality Assurance and Risk Management – Emphasizes the management and use of health information. After a review of HITA 210 (particularly quality assurance and coding principles), the student will learn about the role of the Health Record Department (HRD) in risk management and utilization management programs. Data collection and presentation will be studied and the student will be able to produce timely, effective, useful reports. Quality assurance programs will be studied in terms of development, implementation and services provided by the health record department. Students will practice data retrieval and reporting using criteria audit methodology. Prerequisite: HITA 210.

HITA 400 Health Record Administration – See HITA 300. Prerequisite: HITA 300.

HITA 405 Health Information Practicum – Practical experience in the health record departments of general and specialized hospitals and other health facilities is provided, under the supervision of the director of health record services and a faculty member. After orientation to the clerical and technical duties, emphasis is placed on providing practice and instruction in the duties commonly performed by a health record administrator. Prerequisite: Successful completion of all courses in the program.

HITA 406 Coding and Data Retrieval – See HITA 306. Prerequisite: HITA 306.

HITA 422 Quality Assurance for HRD's – The development, implementation and maintenance of a quality assurance program for the health record department will be studied in depth. The course also examines the principles and practices of research and epidemiology. Prerequisite: HITA 310.

HITA 430 Health Labor Relations – A discussion of the development of labor relations in the health care environment, with detailed study of the basic principles of union practices, the application of collective agreements, the grievance procedure, and the collective bargaining process. Prerequisite: HITA 300.

HITT 205 Health Record Practicum – See HITA 205. Prerequisite: HITA 100, 105.

HITT 206 Coding and Data Retrievel – See HITA 206.

HITT 213 Transcription – Includes details as outlined in HITA 103 with increased emphasis on productivity and experience on word processing equipment. A major project concerned with the concepts, applications and evaluation of word processing services in the health record department is included. Prerequisite: HITA 101, 102, and 105.

HITT 305 Health Record Practicum – An advanced, five-week practicum for health record technician students. The course provides concentrated, practical experience in coding and abstracting in the health record departments of provincial hospitals. Students are provided with practical experience at two different sites. Prerequisite: Successful completion of all courses in the program.

MATH 180 Basic Mathematics and Statistics for Health Information – The course includes a comprehensive review of basic algebraic skills including Health Administration applications of rates (eg. age-adjusted rates), ratio and proportion, least squares, correlation, routine graphing and exponential growth. The main focus will be on descriptive statistics with emphasis on data presentation, measures of central trendency including measures of relative standing (percentiles) and dispersion for both raw and grouped data. Basic rules of probability are introduced. The course will provide the foundation for the inferential statistical topics developed in Math 280.

MATH 280 Statistics 2 for Health Information – Probability theory and laws. Random variables, mathematical expectation, discrete and continuous theoretical distributions. Sampling, estimation and hypothesis testing with both large and small samples. Method of least squares, regression and correlation. Non-parametric statistics. Prerequisite: MATH 180.

MLAB 112 Introduction to Clinical Laboratory Procedures – An introduction to clinical lab procedures in the fields of clinical chemistry, urinalysis, hematology, histotechnology and immunohematology for the purpose of interpreting lab reports in reference to documentation on the health record, abstracting, and quality assurance studies. Course also includes microbiology.

OPMT 169 Health Records Management – Management principles are related to the health care industry in such areas as health care financing, a systems approach to health care, organizational structure, planning, organizing, directing and controlling. Quantitative approaches to the management function are stressed.

OPMT 269 Health Records Management – A continuation of the scientific principles of management as applied to work improvement and innovation in health care including problem solving, data collection and analysis, methods of work measurement and work sampling techniques, and implementation strategies. Prerequisite: OPMT 169.

Faculty and Staff

Dave Martin, B.Sc.(Hons), M.S.R., Acting Associate Dean
Elaine Gibson, CCRHA(C), M.Ed., Program Head
Laurie Montgomery, BHRS, CCHRA(C)
Betty Nelson, CCHRA(C)

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Occupational Health and Safety

One of the primary purposes of this program is to graduate individuals who are able to provide the knowledge and leadership necessary to develop programs in industry that will assist in conserving life, health and property. They will consult with company and labor officials on ways to improve productivity by implementing loss control programs. Graduates will also identify health and safety hazards in the work environment and advise corrective action. The occupational health and safety officer will assume a major role in the development and conduct of safety training programs for workers. Accidents will be investigated to identify their root causes, and methods found to eliminate recurrences.

To achieve these career objectives, the applicant is expected to be a mature, objective person who possesses the ability to communicate decisions and goals in a tactful and professional manner.

Job Opportunities

Career openings are found in industries and regulatory agencies where the health and safety of the workers is of concern.

The Program

The science-oriented program includes combined studies in the health, engineering and business fields. This ideal combination prepares the student to understand the potential safety and health hazards of the work environment, as well as the human relations involved in seeking beneficial solutions and methods of improving the workplace environment.

Prerequisites

Algebra 12, Chemistry 11 and Physics 11. Candidates will be interviewed.

PROGRAM: Occupational Health and Safety

		Clrm hrs/wk
Level 1		
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	Policies in Industrial Health and Safety	3.0
OH&S 161	Principles of Accident Prevention 1	5.0
PHYS 118	Introductory Applied Physics	5.0
	Library and Research	6.0
Level 2		
ADMN 261	Software Systems	3.0
CHEM 215	General Chemistry for OH&S	5.0
CHSC 288	Engineering Concepts 1	4.0
HCOM 212	Communication for OH&S Professionals	3.0
MATH 288	Statistics for OH&S	4.0
OH&S 247	Security Systems	1.0
OH&S 271	Principles of Accident Prevention 2	5.0
PHYS 218	Physics for OH&S	5.0
	Library and Research	5.0

		Clrm hrs/wk
Level 3		
ADMN 333	Industrial Relations	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 and Vibration	5.0
OH&S 359	Loss Management	3.0
OPMT 181	Ergonomics	5.0
	Library and Research	4.0
Level 4		
ADMN 435	Personnel Management for OH&S	2.0
ADMN 484	Introductory Law for OH&S	1.5
BHSC 407	Anatomy and Physiology	3.0
CHEM 418	Industrial Chemical Processes	3.0
FMGT 416	Accounting for Health Managers	2.0
HCOM 412	Writing Professional Audits	1.0
OH&S 436	Occupational Diseases	3.0
OH&S 458	Safety Program Evaluation	5.0
OH&S 464	Fire Protection	3.0
OH&S 465	Electrical Safety	3.0
OH&S 470	Industrial Hygiene 2: Toxicology	5.0
	Library and Research	6.0

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 spread sheets, 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 – An introductory analysis of the fundamental issues and facts of labor-management relations. Special emphasis is given to collective agreement content and interpretation, bargaining and basic labor economics.

ADMN 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.

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 – Designed to give the student an overview of the chemical processes used in industry, the chemicals used, chemical reactions, products manufactured, waste products, pollutants produced and the hazards to personnel. Students will make field trips to selected industries.

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 and safety fields. It includes organizing information, writing public relations letters, procedures and literature reviews. Students also deliver a short oral training session on an environmental or occupational health and safety topic.

HCOM 212 Communication for OH&S Professionals – Builds on skills taught in HCOM 112 and adds incident, inspection and investigation reports, proposals and a professional job application package. Meetings and interviewing skills are also covered. Students will propose, design and sell a training module for an environmental health or occupational health and safety topic.

HCOM 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 will also present their findings to industry contacts and the OH&S program head, communication instructor and OH&S 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 will work with industry representatives, handle correspondence, conduct interviews and analyse 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.

OH&S 142 Policies in Industrial Health and Safety – 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 Principles of Accident Prevention 1 – Covers the history of the safety movement, a management approach to accident prevention, the root causes and real costs of accidents, accident investigation, inspections, job safety analysis, maintaining interest in safety, special problem solutions, motivation, the problem employee, and off-the-job safety.

OH&S 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 Principles of Accident Prevention 2 – Covers accident prevention for industrial operations. The engineering and technology involved in the various operations is examined. Topics include industrial buildings and plant layouts; construction and maintenance; manual handling and material storage; hoisting apparatus and conveyors, ropes, chains and slings; powered industrial trucks; elevators; principles of guarding; woodworking and metal working machinery; cold forming of metals; hot working of metals; welding and cutting; heating and ventilation.

OH&S 350 Industrial Hygiene 1: Noise and Vibration – Reviews relevant topics in acoustics, audiometry, noise dosimetry and noise control within buildings. The student will be introduced to basic methods of sound measurement and the assessment of hearing loss. At the end of this course, the student will be able to estimate noise in the work environment and recommend simple sound control measures associated with the use of enclosures, damping and absorbent materials. Prerequisite: Year 1 of the Occupational Health and Safety program, or permission of the instructor, MATH 188 or PHYS 218.

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 WHIMIS legislation.

OH&S 436 Occupational Diseases – Provides the student with an overview of occupational diseases in terms of their causes and prevalence, methods of spread and their prevention. There is discussion of the responsibility of the worker, and various professionals as well as the worker, in the management of occupational diseases of the lungs which are commonly experienced by workers in B.C. There is discussion on a wide range of problems from contaminated water, food supplies, to scabies and causes of silicosis and "white fingers" disease.

OH&S 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.

OH&S 464 Fire Protection – Deals with the concept of Fire Prevention. Topics include: the handling and storage of flammable and combustible liquids, chemical hazards, dust explosions, bleve, electrical hazards, construction features, chemistry of fire, fire detection, portable extinguishers, automatic sprinkler systems and inspection procedures.

OH&S 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.

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, vapours, dusts and fumes is reviewed. The second part of the course discusses the hazards associated with excessive exposure to ionizing and non-ionizing radiation, temperature and pressure extremes.

OPMT 181 Ergonomics – 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 118 Introductory Applied Physics – Covers 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 Physics for OH&S – See PHYS 118.

Faculty and Staff

Dave Martin, B.Sc.(Hons), M.S.R., Acting Associate Dean
Lars G. Larsson, C.R.S.P., Program Head
Val Wuorinen, C.D., Ph.D., C.R.S.P.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Prosthetics and Orthotics Technology

Prosthetists and orthotists help people who have become disabled, or who were born with physical defects, by fitting them with artificial limbs or supports. The prosthetist designs, constructs and fits artificial limbs, while the orthotist designs, constructs and fits orthopaedic braces and supports. Both work closely with doctors, physiotherapists and others in rehabilitation medicine. After assessing the needs of a patient, the prosthetist or orthotist may 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 $20,000 per year, rising to about $35,000 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, 1990.

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

Algebra 12 and Physics 11 are course requirements for this program. Metalwork and woodwork courses are recommended. Applicants should have a good academic background, manual dexterity, mechanical aptitude and good interpersonal skills. Patience and inventiveness are of considerable importance.

Expenses

In addition to tuition fees, students need approximately **$600** for textbooks and supplies for the two-year program. Students are also responsible for costs of travel to and from agencies where practicums are held, and should be prepared to purchase certain small hand tools.

PROGRAM: Prosthetics and Orthotics

		Clrm hrs/wk
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	Regional Anatomy 1	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	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	2.0
BMET 482	Applied Electrical Fundamentals	2.0
P/OT 400	Prosthetics and Orthotics 4	25.0
P/OT 401	Business Practices	3.0
P/OT 402	Practicum	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 Regional Anatomy 1 – This is a laboratory course which, together with BHSC 311, follows a regional approach to the study of human anatomy. The major emphasis in this course is on the study of the muscles and skeletal structure of the lower limb. Prerequisite: BHSC 110.

BHSC 242 Behavioral Science – In a series of lectures, discussions and planned experiences, students are given a greater understanding of how various people react to physical loss or illness, and of the role to be played in assisting the handicapped to reintegrate with society. Topics include the psychology of being ill, understanding stress behavior, pain management, interpersonal communication, adjustment in self-image, the disabled person in society, and relationships among health care professionals.

BHSC 310 Pathology and Pathophysiology – Students explore basic concepts of the disease process, and the nature of the various disorders they are most likely to see in their prosthetic/orthotic practices. Topics such as cellular injury and death, trauma, inflammation and healing are covered. Specific disorders include bone, joint and muscle pathologies, neurological and hemodynamic disorders, metabolic and congenital abnormalities and neoplasia.

BHSC 311 Anatomy and Physiology Regional – This course is a continuation of BHSC 211 and follows a regional approach to the study of human anatomy. Emphasis is placed on the muscles and skeletal structures of the upper limb and trunk.

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.

BMET 482 Applied Electrical Fundamentals – This course is a continuation of BMET 382. Materials covered include review of magnetism, inductance, motors, transformers, capacitance, electrical safety and principles of the myoelectric prothesis.

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 – Through a series of lectures and projects, students improve their ability to express themselves clearly and appropriately to patients and their families, health care professional groups such as government and fee-paying agencies. Topics include basic skills in writing instructions, memorandums, letters and reports, and effective public speaking. Library orientation and research techniques are also emphasized.

HCOM 206 Technical Writing for Prosthetics and Orthotics – A continuation of HCOM 111. Students write routine and persuasive reports and proposals. An oral presentation is also included. The emphasis is on communication applications in the prosthetics/orthotics field.

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 and quartic sheets, 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 Lower Limb 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 practicing 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 some detail. Force tolerance and mobility of the skeletal system are examined in detail to determine the functional loss associated with various physical disorders or amputations, and the residual function upon which a lower limb prosthesis or orthosis can be based. Prerequisite: PHYS 121.

P/OT 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 the functional loss associated with various physical disorders or amputations and the residual function upon which a prosthesis or orthosis can be based. The effect of pressure on soft tissue is also explored. Various 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 technqiues. The area of Upper Limb Prosthetics and Orthotics is then treated with each student constructing and fitting a variety of devices, including Myoelectric Prostheses. Prerequisite: P/OT 302.

P/OT 401 Business Practices – Students receive a basic understanding of the planning, organization, directing and controlling functions of business management. Topics such as human relations, management of time, budgeting and accounting, record keeping and labor relations will be covered, with examples drawn from actual prosthetic/orthotic facilities. The ethical and legal concerns of a health care professional will also be presented.

P/OT 402 Practicum – See P/OT 202. Prerequisite: P/OT 400, P/OT 401, P/OT 410.

P/OT 410 Patient Assessment and Care – A series of presentations and projects help students learn how to evaluate patients from the viewpoint of functional loss, select appropriate devices to restore function, and design solutions to specific needs not met by available componentry. Basic principles and procedures for handling the disabled are also covered.

PHYS 121 Physics for Prosthetics and Orthotics Technology – This general level physics course emphasises physics applications in prosthetics and orthotics. The course covers mechanics, and includes topics in kinematics, dynamics, statics, simple machines, energy and fluid mechanics. Measurement and problem solving techniques are stressed. The mathematical treatments require algebra and trigonometry.

Faculty and Staff

Dave Martin, B.Sc.(Hons), M.S.R., Acting Associate Dean
Wm. J. McGuiness, M.A., C.P.O., Program Head
Silvia Raschke, C.O., Assistant Instructor

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

MEDICAL IMAGING

Diagnostic Medical Sonography
Medical Radiography Technology
Nuclear Medicine Technology

Diagnostic Medical Sonography

Post-diploma Program

Diagnostic ultrasound is a rapidly emerging, relatively new medical diagnostic technique. Using high frequency sound waves transmitted and reflected through various body parts, it is possible to image organs, masses and fluid collections within the body. The technique provides valuable diagnostic information. Unlike x-rays, ultrasound waves are non-ionizing. Diagnostic ultrasound energy is non-invasive and non-traumatic. To date, no significant biological effects have been demonstrated.

The field of Diagnostic Medical Sonography is dedicated to the preservation of life and health by diagnosis and prevention of disease. The diagnostic medical sonographer (ultrasound technologist) is a skilled person, qualified by academic and clinical training to provide patient services using diagnostic ultrasound. Sonographers work under the supervision of a doctor of medicine, qualified in the use and interpretation of ultrasound procedures. Studies performed by the sonographer include: echocardiography, abdominal sonography, obstetrical/gynecological sonography, ophthalmic sonography, and neonatal brain sonography.

Job Opportunities

Graduates in this dynamic new allied health field will assume an important role in maintaining high quality patient care, provide leadership in the development of health programs, and participate in medical research. Employment opportunities exist in hospital ultrasound facilities, or integral sections of other hospital departments, such as Radiology, Cardiology or Obstetrics. A large percentage of hospitals in B.C. have diagnostic ultrasound equipment, and its use is expanding rapidly.

The Program

Due to the entrance requirement of knowledge in allied health, the program is only one year in length. The first term is primarily devoted to the study of the theory of diagnostic ultrasound. The clinical aspects comprise the larger portion of the second term. Clinical training is provided in selected hospitals in B.C. The course of studies includes anatomy and physiology, pathophysiology, physics of ultrasound, instrumentation and applied sonography.

Upon successful completion of the program, the graduate is eligible to write the American Registry of Diagnostic Medical Sonographers examinations.

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 Diagnostic Ultrasound as a career, and a letter of reference from a physician and/or a post secondary academic faculty member with whom you have worked. Based upon the documentation submitted, the most suitable applicants will be invited to an interview.

PROGRAM: Diagnostic Medical Sonography

Level 5	(15 weeks including exam week)	Clrm/Lab hrs/wk	Credit
BHSC 508	Anatomy and Physiology	3.0	3.0
BHSC 509	Pathophysiology	3.0	3.0
DSON 502	Applied Echocardiography	4.5	4.5
DSON 503	Applied Abdominal Sonography	7.5	7.5
DSON 504	Applied Obstetrical and Gynecological Sonography	7.5	7.5
PHYS 523	Physics of Ultrasound	4.5	4.5
Level 6	(34 weeks including exam week)		
DSON 602	Clinical Experience in Echocardiography	7.0	16.0
DSON 603	Clinical Experience in Abdominal Sonography	11.5	26.0
DSON 604	Clinical Experience in Obstetrical and Gynecological Sonography	11.5	26.0

* All courses have a 60% pass level.

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 is divided into three equal sections: obstetric gynecologic pathology, abdominopelvic organ pathology and cardiography. General principles of the disease process and complex syndromes will also be discussed.

DSON 502 Applied Echocardiography – 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 heart.

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 Clinical Experience in Echocardiography – In this course, essentially a continuation of DSON 502, the emphasis shifts to more clinical experience.

DSON 603 Clinical Experience in Abdominal Sonography – In this course, essentially a continuation of DSON 503, the emphasis shifts to more clinical experience.

DSON 604 Clinical Experience in Obstetrical and Gynecological Sonography – In this course, essentially a continuation of DSON 504, the emphasis shifts to more clinical experience.

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

Jannie Scriabin, B.Sc. (Hons), M.Sc., A.R.T. (Clin.Chem., MLT), Associate Dean
Anne Rhodes, R.T.(R), R.D.M.S., Program Head

Clinical Coordinators and Instructors

Grace Hospital
Vicki Lessoway, R.D.M.S.

Lions Gate Hospital
Eileen Guiliani, R.D.M.S.

St. Paul's Hospital
Linda Hemminger, 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

Vancouver General Hospital
Jan Reid, R.T.(R), R.D.M.S.
Breige McConville

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Medical Radiography Technology

The medical radiographer is a technologist who works as part of a 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), and may work in the hospital radiology department, at the patient's bedside or in the operating room. Radiographers are also employed in private x-ray clinics. Medical radiography **is not a hazardous occupation**. The dangers of radiation are well recognized and rigidly controlled. The conscientious radiographer can derive much personal satisfaction as a contributor to the success of the health team and the well being of the patient. Medical Radiography is a field suited to both men and women.

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; two 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 nine 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.

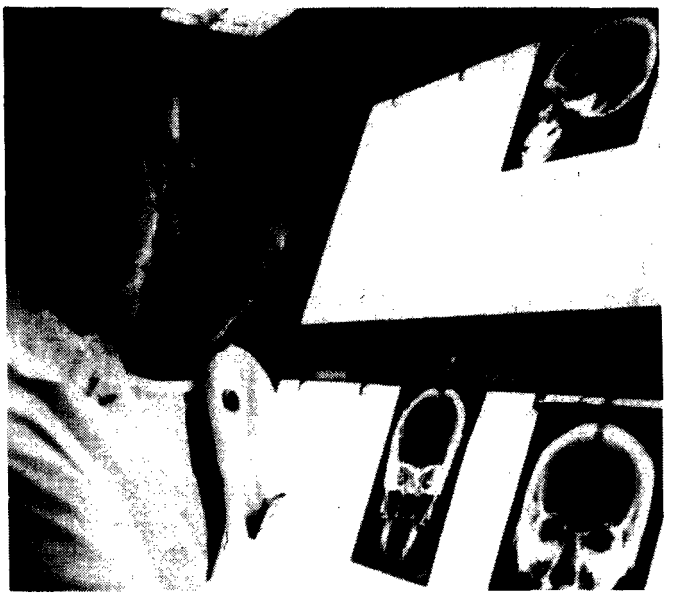
Prerequisites

Algebra 12, Physics 11, Biology 11, Physics or Biology 12 all with C+ are the minimum required subject prerequisites.

Also required are basic typing skills, an introductory computer course, volunteer work 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 complete an immunization program. A preadmission interview with the program head of Medical Radiography is conducted to assess the applicant's suitability for this field. Students are expected to be competent in written and oral English. The applicant's suitability for the program is also assessed by hospital staff, following a visit to a radiology department by the applicant.



Course of Studies

YEAR ONE

Level 1	January to May (20 weeks), June (4 weeks)	**Clrm hrs/wk**	**Credit**
BHSC 113	Basic Anatomy and Physiology	2.0	2.5
BHSC 141	Human Behavior	1.0	1.5
GNNU 180	Patient Care	2.0	2.5
MRAD 101	Radiographic Procedures	6.0	8.0
MRAD 102	Medical Imaging	4.0	5.5
MRAD 103	Radiographic Technique and Evaluation	1.0	1.5
MRAD 104	Radiographic Anatomy and Physiology	3.0	4.0
MRAD 106	Clinical Experience	7.0	9.5
PHYS 110	Physics for Medical Radiography	5.0	6.5
MRAD 116	Hospital Practicum (4 weeks, June)	35.0	8.0

Level 1 is 20 weeks in length, including exam week. Students are in the hospitals for clinical experience for one day per week (MRAD 106) and full-time for the month of June (MRAD 116).

Level 2	September to December (15 weeks)		
BHSC 213	Basic Anatomy and Physiology	1.5	1.5
BHSC 241	Human Behavior	1.5	1.5
GNNU 280	Patient Care	2.5	2.5
MRAD 201	Radiographic Procedures	4.5	4.5
MRAD 202	Quality Assurance (4 weeks only)	2.5	0.5
MRAD 203	Radiographic Technique and Evaluation	2.0	2.0
MRAD 204	Radiographic Anatomy and Physiology	2.0	2.0
MRAD 205	Case Studies (11 weeks only)	1.0	0.5
MRAD 206	Hospital Practicum (11 weeks only, Oct-Dec)	17.5	11.0
MRAD 207	Pathology	2.0	2.0
PHYS 210	Physics for Medical Radiography	1.5	1.5

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 in the latter). 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)	Clrm hrs/wk	Credit
HCOM 102	Communication for Medical Radiographers	2.0	2.0
MRAD 301	Radiographic Procedures	3.0	3.0
MRAD 302	Medical Imaging	2.5	2.5
MRAD 303	Radiographic Technique and Evaluation	1.5	1.5
MRAD 304	Radiographic Anatomy and Physiology	1.5	1.5
MRAD 305	Case Studies	1.0	1.0
MRAD 306	Clinical Experience	17.5	17.0
MRAD 307	Pathology	2.0	2.0
MRAD 308	Radiation Biology and Protection	1.5	1.5
MRAD 309	Special Procedures	1.5	1.5

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 406	Clinical Experience	35.0	66.0
Level 5	January to April (17 weeks)		
MRAD 506	Clinical Experience	35.0	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).

Note: All courses have a 60% pass level.

Course Descriptions

BHSC 113/213 Basic 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 141/241 Human Behavior -The first half of the course deals with organizational behavior 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 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 extremities, chest and abdomen will also 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 Radiographic Technique and Evaluation – A systematic review of the radiographic examinations taught in MRAD 101 is carried out. The student evaluates radiographs for image quality, structures demonstrated and technical factors.

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 106 Clinical Experience – Students are orientated to the clinical area and gain experience in basic radiographic positioning and techniques relating to the chest and abdomen, as well as preparation of contrast media.

MRAD 116 Hospital Practicum – The student will gain practical experience in the clinical area in basic radiographic positioning of the upper and lower extremities, chest and abdomen.

MRAD 201 Radiographic Procedures – The radiographic procedures related to the vertebrae and thoracic cage are studied, including the radiography of the digestive, urinary and biliary systems. Five hours each week in the x-ray laboratory allow the student to practice positioning and x-ray the phantoms in the areas covered in class. Prerequisite: MRAD 101.

MRAD 202 Quality Assurance – Covers all aspects of a hospital quality assurance program including: processor monitoring, darkroom problems, x-ray unit monitoring and various tests used to detect equipment problems.

MRAD 203 Radiographic Technique and Evaluation – A systematic review of the radiographic examinations taught during MRAD 301. The student evaluates radiographs for positioning, image quality, structures demonstrated and technical factors.

MRAD 205/305 Case Studies – Designed to provide the bridge between classroom theory and clinical work. Working in groups, a case study is presented and students will discuss all aspects of the case including the anatomy and physiology, positioning, radiation protection, imaging and equipment issues, technique and patient care. Students will have the opportunity to develop analytical and planning skills in a laboratory setting.

MRAD 206 Clinical Experience – Students will gain practical experience in the following areas: upper or lower extremity (trauma patient), non-ambulatory chest with I.V. or drainage, non-traumatic vertebra, routine fluoroscopy and routine I.V.P.'s.

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 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 302 Medical Imaging – Rectification, control circuits, mobile units, serial radiography, x-ray tubes, image amplifiers, C.C. television, videorecording and body section radiography comprise the apparatus studied in this course. The image recording portion covers special processes, artifacts and image presentation. The basics of digital image processing technology are introduced including digital angiography, subtraction technique, C.T. scanning and magnetic resonance imaging.

MRAD 303 Radiographic Technique and Evaluation – A systematic review of the radiographic examinations taught during MRAD 401 is carried out during Level 4. The student evaluates radiographs for positioning, image quality, structures demonstrated and technical factors.

MRAD 306/406/506 Clinical Experience – The student will gain practical experience in the following areas: skeletal radiography; trauma vertebra; fluoroscopy examinations; horizontal beam procedures; injectable contrast exams and mobile exams.

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 student is reintroduced to the basic interactions of radiation with matter. An in-depth study of intracellular responses to radiation is made. The latter part of this course deals with radiation pathology and human experience with radiation injury. The aims and objectives of radiation protection are discussed, as well as the various organizations responsible for establishing protection standards. The course then deals with regulations governing the use of diagnostic radiation and methods of reducing exposure to the patient, the technologist and fellow workers.

MRAD 309 Specialized Procedures – Includes discussion of the specialized radiographic procedures utilized to demonstrate the vascular tree, the central nervous system and the digestive, biliary and genito-urinary tracts. Also included is a brief discussion of pediatric radiography and C.T. scanning.

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.

Faculty and Staff

Jannie Scriabin, B.Sc. (Hons), M.Sc., A.R.T. (Clin.Chem., MLT), Associate Dean
Miss A. McMillen, R.T.R., Dipl. Hlth. Care Mgt., M.Ed., Program Head
Mrs. S.G. Hundvik, R.T., M.Ed.
Mrs. D. Kaplun, A.C.R.
Mr. E. Seeram, B.Sc., R.T.
Mr. R.J. Smith, R.T.
Miss O.H. Triska, A.C.R., Dipl. Adult Ed.
Mrs. I. Williamson, R.T.
Mrs. M. Grose, Technical Staff

* For specific program information, please contact the **Program Head** at 432-8743.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Nuclear Medicine Technology

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 plasma and other body materials.

Nuclear medicine is responsible for a host of revolutionary, safe, non-invasive diagnostic procedures that are now available to physicians in 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 patients' samples, prepare radiopharmaceuticals for injection into patients, record test results, receive, handle, record, store and measure radioactive materials and perform quality control procedures on a wide variety of instrumentation and imaging devices.

The Program

Designed to prepare graduates to function as technologists in nuclear medicine departments, the program is a combination of lecture and lab instruction at BCIT and clinical experience in the nuclear medicine departments of clinical facilities presently affiliated with the program.

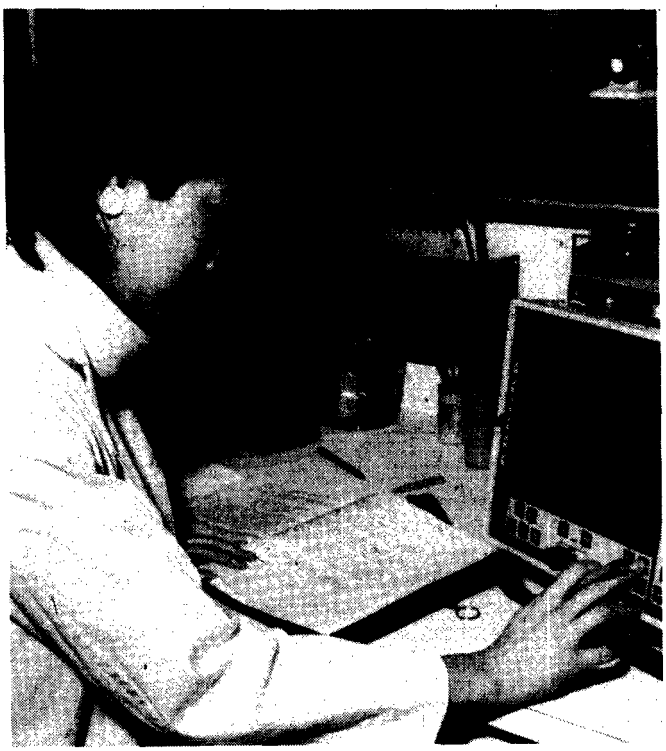
The student will spend terms 1 and 2 of first year at BCIT for lectures and labs in basic subjects applicable to nuclear medicine technology and patient care. The Institute is equipped with a lab containing facilities and equipment commonly used in nuclear medicine departments. The student spends the summer term of first year in the nuclear medicine department of a hospital.

In the second year at BCIT, the student spends alternate two-week periods at BCIT and the nuclear medicine department of one of the Lower Mainland hospitals. The summer term of second year is spent in a nuclear medicine department gaining further clinical experience.

On successful completion of the two-year (six term) program, the student receives the BCIT Diploma of Nuclear Medicine Technology and is eligible to write national certification examinations.

Post-graduation

Graduates of the BCIT program are eligible to take the National Certification Examinations set by the Canadian Association of Medical Radiation Technologists. Successful candidates may use the designation R.T. (N.M). after their names and work as registered nuclear medicine technologists anywhere in Canada and in many other parts of the world. An Advanced Certification is available.



Prerequisites

Algebra 12, Chemistry 11 and 12 and one other science 11 are course requirements for this program. Applicants must be competent in oral and written English. Preference is given to those applicants who have Physics 11. Since the work is highly technical and exacting, the student must feel comfortable with complex instruments, possess 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. Nuclear Medicine Technology is open to men and woman.

A preadmission 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 to the student. 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		Clrm hrs/wk	Credit
BHSC 106	Anatomy and Physiology	4.0	4.0
BHSC 126	Basic Medical Microbiology and Immunology	2.0	2.0
CHEM 106	Chemistry for Nuclear Medicine Technology 1	6.0	6.0
MATH 174	Technical Mathematics for Nuclear Medicine Technology	5.0	5.0
MLAB 111	Clinical Laboratory Orientation	3.0	3.0
NMED 101	Radiopharmaceuticals	4.0	4.0
PHYS 105	Basic Physics for Nuclear Medicine Technology	6.0	6.0

Level 2		Clrm hrs/wk	Credit
BHSC 206	Anatomy and Physiology	4.0	5.5
CHEM 206	Chemistry for Nuclear Medicine Technology 2	6.0	8.0
GNNU 181	Patient Care	2.0	2.5
MATH 274	Statistics for Nuclear Medicine Technology	4.0	5.5
NMED 204	Applied Physiology	2.0	2.5
NMED 205	Radiobiology and Protection	2.0	2.5
NMED 201	Radioassay Procedures	4.0	5.5
PHYS 205	Radioactivity and Instrumentation	7.0	9.5
Summer			
NMED 209	Clinical Experience in Diagnostic Procedures	35.0	24.0
Level 3			
BHSC 306	Pathophysiology	2.0	2.0
HCOM 103	Communication for Health Technologists	1.0	1.0
NMED 304	Applied Physiology	9.0	9.0
NMED 305	Clinical Experience in Diagnostic Procedures	15.0	16.0
NMED 308	Imaging	1.0	1.0
PHYS 305	Radioactivity and Instrumentation	3.0	3.0
Level 4			
BHSC 406	Pathophysiology	1.5	2.0
BHSC 439	Human Behavior	2.0	2.5
HCOM 202	Communication for Health Technologists	2.0	2.5
NMED 404	Applied Physiology	7.0	9.5
NMED 405	Clinical Experience in Diagnostic Procedures	15.0	20.0
PHYS 405	Radioactivity and Instrumentation	2.5	3.5
Summer			
NMED 409	Clinical Experience in Diagnostic Procedures	35.0	24.0

Note: All courses have a 60% pass level.

Course Descriptions

BHSC 106 Anatomy and Physiology – An examination of human structure and function based on a systems approach. Included are basic cytology and histology, and the endocrine, nervous and skeletal systems. Remaining systems are covered in BHSC 206.

BHSC 126 Basic Medical Microbiology and Immunology – Deals with basic properties of medically important micro-organisms, the communicability of infection, host-parasite relationships, methods of destruction and control of micro-organisms, with particular attention to the safe preparation of radio pharmaceuticals used for injection. The course also deals with basic immunologic concepts including their related in-vitro applications.

BHSC 206 Anatomy and Physiology – This is a continuation of BHSC 106 and covers the cardiovascular, lymphatic, respiratory, digestive, urinary and reproductive systems. Emphasis is placed on homeostatic control systems. Prerequisite: BHSC 106.

BHSC 306/406 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 106 Chemistry for Nuclear Medicine Technology 1 – This course covers basic general chemistry. It includes stoichiometry, nomenclature, concentrations of solutions (molarity, molality, equivalent weight, PPM, percent), acid-base chemistry (strong and weak electrolytes, buffers, hydrolysis of salts) and electrochemistry (oxidation, reduction, voltaic cells, Nernst equation). The laboratory part of the course which runs parallel with the lectures consists of quantitative analysis, both gravimetric and volumetric.

CHEM 206 Chemistry for Nuclear Medicine Technology 2 – An introduction to organic and biochemistry. The naming, properties and main reactions of the major classes of organic compounds are discussed. Coordination compounds are studied with emphasis on the chelating agents used in nuclear medicine. The biochemistry includes both the chemistry and metabolism of fats, proteins and carbohydrates. Lab work includes techniques and synthesis in organic chemistry and biochemical techniques frequently encountered in the clinical lab, e.g.: spectrophotometry, chromatography, electrophoresis. Prerequisite: CHEM 106.

GNNU 181 Patient Care – Assists the student to understand the hospital environment and the health problems of the patient. Emphasis will be placed upon observation and communication appropriate to the nuclear medicine technologist. The nursing lab will be used to practice basic technical skills and procedures required in emergency situations.

HCOM 103 Communication for Health Technologists – Introduces students to the communication needs of the nuclear medicine profession – communicating with supervisors and patients. The course includes organizing and explaining information, objective and subjective descriptions, specialized journal research, information memos and oral briefings. It also covers medical terminology.

HCOM 203 Communication for Health Technologists – A continuation of HCOM 103. The course covers the specific communication tasks required of nuclear medicine technologists: short reports and action memos, persuasive presentations, and meetings. It also covers the job package and medical terminology. All assignments are based on nuclear medicine case studies.

MATH 174 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 (differentiation rules, applied maxima/minima, definite and indefinite integrals, differential equations as applied to decay).

MATH 274 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 101 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 201 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 adequately in a nuclear medicine lab. Hands-on experience will be gained in all aspects of "in vitro" and "in vivo" procedures.

NMED 304 Applied Physiology – The student is instructed in all aspects of current applied physiology including criteria, methodology, instrumentation, patient problems and approach, data collection and manipulation.

NMED 305 Clinical Experience in Diagnostic Procedures – See NMED 209.

NMED 308 Imaging – Designed to familiarize Nuclear Medicine Technology students with the many methods and materials used to visually display the spatial distribution of radioactivity in nuclear imaging procedures. The utilization of optical, photographic, video tape and computer visual displays will be covered in theory and practice.

NMED 404 Applied Physiology – 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 110 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, quantum concepts, production of x-rays, interaction of x-rays with matter, radioactivity, x-ray tubes, radiation detection and the basics of digital radiography.

PHYS 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 indepth study of scintillation detectors and an introduction to the Anger type gamma camera.

PHYS 210 Physics for Medical Radiography – See PHYS 110.

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

Jannie Scriabin, B.Sc. (Hons), M.Sc., A.R.T. (Clin.Chem., MLT), Associate Dean

Ms. B. Clark, R.T., (T. & N.M.), Program Head (on leave)
Mr. R. Singer, R.T.(N.M.), Acting Program Head
Ms. L. Logan, R.T.(N.M.)
Mr. L. Parisotto, B.Sc., R.T.(N.M.)
Mrs. L. Deverall, R.T.(N.M.), Technical Staff

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

MEDICAL LABORATORY SCIENCE

Cytogenetics Laboratory Technology
Medical Laboratory Technology

Cytogenetics Laboratory Technology

Post-diploma Program

Cytogenetics deals with the study of human chromosomes in health and disease. Cytogenetics Laboratory Technology (CGLT) is the area of specialization in Laboratory Medicine which investigates chromosome banding patterns and chromosome number. It involves the culture of selected cells and their examination 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.

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 lab.

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 Examinations 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 three clinical training laboratories affiliated with the CGLT program: B.C.'s Children's Hospital, Vancouver General Hospital, and the Cancer Control Agency of B.C.

Prerequisites

A B.Sc. in Cell Biology with emphasis on Genetics and Medical Genetics **or** current registration with the CSLT as a Medical Laboratory Technologist (R.T.) with relevant recent working experience and appropriate academic background.

Starting Date

The Cytogenetic Laboratory Technology program will start on **August 1st, 1989**. Note that this is an earlier start than most other programs at BCIT.

Course of Studies

		Clrm hrs/wk	Credit
DIDACTIC PHASE			
Level 5	(20 weeks including exam week)		
BHSC 104	Anatomy and Physiology (9 weeks only)	4.0	2.5
BHSC 121	Introductory Principles of Immunology (9 weeks only)	5.0	3.5
CGLT 501	CGLT Fundamentals 1	6.0	6.0
CGLT 502	Chromosome Analysis 1	10.0	10.0
CGLT 503	Seminar Assignments 1	1.0	1.0
CGLT 504	Darkroom Photography 1	3.0	3.0
CGLT 505	Technical Assignment 1	2.5	2.5
MLAB 100	MLT Fundamentals (6 weeks only)	15.0	7.0
MLAB 113	Introductory Hematology (4 weeks only)	7.0	2.0
Level 6	(11 weeks including exam week)		
CGLT 601	CGLT Fundamentals 2	14.5	10.5
CGLT 602	Chromosome Analysis 2	13.0	9.5
CGLT 603	Seminar Assignments 2	1.5	1.0
CGLT 604	Darkroom Photography 2	4.5	3.5
CGLT 605	Technical Assignment 2	4.0	3.0
Spring Break	March 19-23, 1990		
CLINICAL ORIENTATION PHASE	(6 weeks in length)		
CGLT 605	Cont. of Technical Assignment 2	4.0	1.5
CGLT 606	Clinical Orientation	26.0	10.5
CLINICAL PHASE	(22 weeks)		
CGLT 607	Clinical Training	35.0	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/ hypersensitivities, their characteristics and management; immune deficiency diseases and auto-immunity.

CGLT 501 CGLT Fundamentals 1 – An introduction to Cytogenetic Laboratory Technology with extensive hands-on training, demonstrations, lectures on the principles and methodologies of clinical cytogenetic technology. The student is introduced to the theoretical and practical aspects involved in cell growth and culture as they relate to the major cytogenetic laboratory procedures. The principles and practical application of various banding techniques are studied as they relate to the major human tissue types. 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 photography 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 orientated 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 is submitted.

CLGT 601 CGLT Fundamentals 2 – A continuation of CGLT 501 which emphasizes quality and timely chromosome results. 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 Student Assignments 2 – Students are assigned topics from the current cytogenetic literature as well as aspects of the work not covered in class.

CGLT 604 Dark Room Photography 2 – Students learn to organize all aspects of producing a complete cytogenetics report including the photography. Enhancement of the microscopic image reproduced on film for maximum reflection is stressed. The student learns the role of the cytogenetics technologist in the photographic dark room.

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 cytogenetic laboratories. CGLT 605 must be completed during this time.

CGLT 607 Clinical Training – Students are assigned to a subsection of one of the affiliated cytogenetics laboratories. The clinical experience will vary amongst the major tissue types, and productivity expectations will be approximately one-half 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 – This course introduces the student to the origin, development and function of white blood cells. Both theoretical and practical knowledge are introduced.

Faculty & Staff

Jannie Scriabin, B.Sc.(Hons), M.Sc., A.R.T. (Clin.Chem., MLT), Associate Dean

Fred Bauder, B.Sc., A.R.T. (Cg), CLSp(Cg), Program Head
Sharon Saranchuk, B.Sc., R.T., (Cg), A.I.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Medical Laboratory Technology

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 and treatment of a wide range of medical disorders and conditions. Rapid and continuous advancement in the techniques, procedures and instrumentation involved in the practice of medical laboratory technology make it an ever expanding and challenging field for the technologist.

Employment Opportunities

Medical laboratory technology offers a variety of scientific pursuits within the modern hospital, the private clinic and the research laboratory. These include Clinical Chemistry, Clinical Microbiology, Hematology, Histotechnology and Immunohematology. The trained Medical Laboratory Technologist may pursue a career in any one or a combination of these fields after training.

The Program

The training program at BCIT is a two-year Diploma program consisting of one year of academic studies at the Institute followed by a twelve-month clinical training period spent in one of the clinical facilities (hospital or private lab) associated with the program. All participating laboratories are accredited for training purposes conjointly by the Canadian Medical Association and the Canadian Society of Laboratory Technologists. After successful completion of the two-year training program, the student is eligible to write the Certification Examinations of the Canadian Society of Laboratory Technologists, which lead to the qualification of Registered Technologist, the nationally-recognized qualification for employment in a Medical Laboratory.

Affiliate Clinical Training Facilities

There are nine clinical training laboratories affiliated with the MLT program. Six of the laboratories are located in the Lower Mainland (Vancouver and surrounding area), two are on Vancouver Island and one is in Prince George.

Prerequisites

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 100
Mathematics	UBC 3 credits at the Math 100 level*

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

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

Color blindness precludes admission to the MLT program.

Final acceptance to the program will be based on the results of a personal interview with senior staff members of one of the affiliated clinical laboratories.

Starting Date and Length of the MLT Program

The Medical Laboratory Technology program will start on **August 1st, 1989**. Note that this is an earlier start than most of the other programs at BCIT. The academic year will finish at the end of May, 1990. The clinical training year will begin in June 1990 and continue for fifty-two weeks.

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 the following MLT courses: MLAB 203: Clinical Chemistry; MLAB 204: Clinical Microbiology; MLAB 205: Hematology; MLAB 109: Histotechnology; MLAB 208: Immunohematology and MLAB 200: Clinical Orientation.

Course of Studies

Level 1	(20 weeks including exam week)	Clrm hrs/wk	Credit
BHSC 104	Anatomy and Physiology	4.0*	2.5
BHSC 121	Introductory Principles of Immunology	5.0*	3.5
MLAB 100	MLT Fundamentals	15.0*	7.0
MLAB 103	Clinical Chemistry	10.0	9.5
MLAB 104	Clinical Microbiology	9.0	9.0
MLAB 105	Hematology	7.0	5.0
MLAB 109	Histotechnology	9.0	9.0

Level 2	(20 weeks including exam week, excluding Spring Break)	Clrm hrs/wk	Credit
MLAB 200	MLT Clinical Orientation	2.0*	2.5
MLAB 203	Clinical Chemistry	7.0	9.5
MLAB 204	Clinical Microbiology	8.5	11.5
MLAB 205	Hematology	7.9	10.5
MLAB 208	Immunohematology	7.5	10.0

* Course is 10 weeks or less in length.

Year 2

Clinical training in an affiliated clinical facility in the Vancouver area (Lower Mainland), Vancouver Island or the Interior of B.C.

Course Descriptions

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 dilutors, 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 correctly perform and interpret clinical microbiology tests and procedures

MLAB 105 Hematology – This course is designed to enable the student to become proficient in the manipulative skills required to perform hematological laboratory tests and to acquire the theoretical and practical knowledge to interpret the data resulting from these tests. It provides a detailed study of the origin, development and function of blood and its cellular components; a study of blood diseases and blood coagulation. The theory and practical application of hematological instrumentation is also studied in detail.

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 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 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.

Faculty and Instructors

Jannie Scriabin, B.Sc. (Hons), M.Sc., A.R.T. (Clin.Chem.,MLT), Associate Dean
Karen E. Nicolson, B.Sc., A.R.T. (Clin.Micro.), Program Head
Wendy W. Basford, R.T.
Paul Bradbury, F.I.M.L.S., A.R.T. (Hist).
Frank L. Curtis, F.I.M.L.S., A.R.T. (Immunohem.)
Kathleen McCord, R.T.
Lloyd Simandl, A.R.T. (Hematol.)
Sylvia Sinclair, A.I.M.L.T., R.T.
Evelyn A. Whiteside, B.A., R.T.
Dorothy Yarema, B.Sc., R.T.

Technical Staff

Elinor Hudon, R.T.
K. Patricia MacCulloch, R.T.
Heather A. Pedlar, R.T.
Milena Petrovic
Linda Preston
Peter Sawrenko, R.T.
Vivian Tang, R.T.

Clinical Coordinators and Instructors

Greater Victoria Hospital Society
Trevor Corble, A.R.T. (Clin.Micro.), Coordinator
Ester Bertelsen, A.R.T. (Clin.Chem.)
Miriam Li, M.Sc., M.T. (ASCP)
Ellen Tate, A.R.T. (Hematol.)
Gerald Todd, A.R.T. (Hist.)
Mitzi Ujimoto, R.T.
Assisted by other instructors from Victoria General and Royal Jubilee Hospital Laboratories.

Lions Gate Hospital
Pamela Friedrich, B.A., R.T., Coordinator
Mary Beth Brown, B.A., A.R.T. (Clin.Chem.)
John Garrett, A.I.M.L.S., R.T.
Roberta Holmen, B.Sc., A.R.T. (Clin.Micro.)
Louvaine Kadonaga, B.Sc., A.R.T. (Hematol.)
Sandra Laidlaw, A.R.T. (Hematol.)
Grace Wood, B.Sc., A.R.T. (Immunohem.)

Metro-McNair Clinical Laboratories
Terry Murray, R.T., Coordinator
Phil Edora, R.T.
Shelley Tiffin, R.T.
Sue Thomas, A.R.T. (Clin.Chem.)

Nanaimo Regional General Hospital
Dawn Dunphy, A.R.T. (Hematol.), Coordinator
Lynn Dean, R.T.
Heather Doskotch, R.T.
Joe Johal, R.T.
Bill Logan, A.R.T. (Hist.)
Deanna Thompson, R.T.

Prince George Regional Hospital
Bryan Llewellyn, A.R.T. (Hist.), Coordinator

Royal Columbian Hospital
Judi Green, A.R.T. (Hematol.), Coordinator
Guida Fee, B.Sc., R.T.
Diane Krancenblum, A.R.T. (Gen.)
Donna Liddle, A.R.T. (Clin.Chem.)
MariePaule Lovett, A.R.T. (Clin.Micro.)
Joanne Philley, A.R.T. (Gen.)

St. Paul's Hospital
Elaine Grenon, A.R.T., Coordinator
Leslie Edwards, A.R.T. (Hist.)
Hermi Edora, B.Sc., A.R.T. (Hematol.)
Malcolm Francis, A.R.T. (Clin.Chem.)
Susan Pengilly, R.T.
Lorna Wilson, R.T.

University Hospital Shaughnessy Site
Marge Robertson, R.T., Coordinator
Brenda Beebe, R.T.
Shirley Harrington, R.T.
Vicki Klett, R.T.
Sandra MacAdam, A.R.T. (Hematol.)
Teresa Marchetti, R.T.

Vancouver General Hospital
Ruth Miller, R.T., Coordinator
Eva Chew, B.Sc., ASCP M.T., R.T., A.R.T. (Clin.Micro.)
Sabine Hutchinson, R.T.
Nancy Neel, B.Sc., R.T.
Eva Patseas, B.Sc., R.T.
Donna Sills, R.T.
Linda Streeter, B.Sc., R.T.
Tom Wells, B.Sc., R.T.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

NURSING

General Nursing
Certificate of Credit in Nursing

General Nursing

Today's registered nurse assists people in meeting health needs in collaboration with other members of the health care team including dietitians, occupational therapists, pharmacists, physicians, physiotherapists and social workers. Demands made upon nursing professionals range from providing information on health concerns to promoting proper health care, preventing disease, providing restorative care and emotional support. Proficiency is required in problem-solving and decision-making and in interpersonal, communicative and psychomotor skills. Although it is a high-stress profession, both men and women find general nursing a rewarding career.

Job Opportunities

Registered nurses are employed in general hospitals and community agencies. Positions for the new graduate are available mainly in medical and surgical units.

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, and experience with medical, surgical, obstetrical, pediatric and psychiatric patients and families.

The first year of the program is also offered at 5 access colleges: North Island College; Northwest Community College; Fraser Valley 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. These students may be able to complete Level 5 in their home regions, dependent on such factors as available placements and preceptors.

Independent study is based on printed modules that contain objectives, pre-tests, learning activities, post-tests and reference lists. Students are expected to have completed the module 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 self-directed, disciplined and have well-developed reading, study and organization skills. Remedial courses on these skills are available at many post-secondary institutions, particularly the colleges and BCIT. Some high schools offer such courses in their evening programs.

Students will complete a program consisting of five terms. Each term is 17 weeks in length. The fall term extends from mid-August to mid-December and the winter term from January to mid-May. Students are free of studies from mid-May to mid-August.

Admission Requirements

Applicants must have all the admission requirements completed at least one month prior to registration to be eligible for a seat.

A. Applicants under 23 years of age at the time of entry into the program.

1. Senior secondary school graduation, with:
   a) Chemistry 11 and either Chemistry 12 or Biology 12 (preferred) both with C+
   b) Algebra 11 with a minimum of C
   c) English 12 with a minimum of C+.
2. Experience working with patients in a hospital or Extended Care Unit;

   or

   Full-time/part-time work experience in any field and 30 hours volunteer experience with patients in a hospital or Extended Care Unit;

   or

   Six months (2-4 hrs per week) volunteer experience with patients in a hospital or Extended Care Unit.

   All with satisfactory references.
3. Completion of the immunization program is required before final acceptance into the program.
4. A physical examination by a physician of the applicant's choice, indicating satisfactory health.
5. 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.
6. A St. John Ambulance standard First Aid certificate or equivalent is required and must be valid for the student's first year in the program.
7. English 100 (UBC) or equivalent preferred.

B. Applicants over 23 years of age at the time of entry into the program.

1. Senior secondary school graduation or equivalent, e.g: G.E.D. or BTSD, with Chemistry 11 and either Chemistry 12 or Biology 12 (preferred) to be completed within two years prior to enrolment with a minimum of C+ in both courses.
2. Experience as an employee working with patients in a hospital or Extended Care Unit;

   or

   Full-time/part-time work experience in any field and 30 hours volunteer experience with patients in a hospital or Extended Care Unit;

   or

   Six months (2-4 hr per week) volunteer work experience with patients in a hospital or Extended Care Unit.

   All with satisfactory references.
3. Completion of the immunization program is required before final acceptance into the program.
4. A physical examination by a physician of the applicant's choice, indicating satisfactory health.
5. 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.
6. A St. John Ambulance standard First-Aid certificate or equivalent is required and must be valid for the student's first year in the program.
7. English 100 (UBC) or equivalent preferred.

Notes:

1. Applications are accepted in October for the following August and January classes.
2. Applicants with baccalaureate degrees within 5 years will be assessed on an individual basis to determine equivalency with academic criteria.
3. C.P.R. (Level C) certificate is prerequisite to Term 4. It must be current during both Terms 4 and 5.

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 Student Financial Services in the Counselling department.

Post-graduation

Following completion of the nursing diploma program, students write the Canadian registration examinations in order to obtain the R.N. (Registered Nurse) designation. The fee for these examinations is $135. 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.

PROGRAM: General Nursing

		Credit
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
Level 2		
BHSC 205	Physiology	3.5
BHSC 225	Microbiology	1.0
BHSC 226	Immunology	1.0
BHSC 239	Sociology	1.5
BHSC 240	Human Development 2	1.5
GNNU 200	Nursing 2: Theory and Clinical	24.0
Level 3		
GNNU 300	Nursing 3: Theory and Clinical	29.5
HCOM 107	Writing for General Nurses	3.5
Level 4		
GNNU 400	Nursing 4: Theory and Clinical	28.5
GNNU 410	Gerontology for Nurses	3.5
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 225 Microbiology – Provides an introduction to basic microbiological concepts, including the distinguishing characteristics of micro-organisms, methods of controlling infectious diseases and host-parasite relationships. Prerequisite: BHSC 105.

BHSC 226 Immunology – Provides an understanding of the immune response as applied to immunity, surveillance, homeostasis, hypersensitivity, autoimmunity and immunohematology. The course progresses from discussions on the components and biological activities of the immune response to the immune response role in protective as well as disease conditions. Prerequisite: BHSC 105, 225.

BHSC 239 Sociology – An introduction to the study of human behavior. Basic terminology and concepts of sociology are presented. Emphasis is placed on the study of the family as a social institution, as well as on other forms of group processes and collective behavior. The relationship between behavioral sciences and problems of health care is examined.

BHSC 240 Human Development 2 – Focuses on growth and development from young adulthood to aging adult. Physical, cognitive, affective and social development are surveyed. Emphasis is placed on relating developmental concepts to health care. Prerequisite: BHSC 140.

GNNU 100 Nursing 1: Theory and Clinical – This course is offered in the first term of the General Nursing Diploma Program – 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. The student is further introduced to the basic concepts of the nursing process; psychomotor skills, interactive skills and the helping relationship; organization and responsibilities of the professional nurse. 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.

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. Community visits will be integrated throughout the course. Prerequisite: GNNU 100, BHSC 105, 140.

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-centered maternity units and pediatric units. Community visits are integrated throughout the course. Prerequisite: GNNU 200, BHSC 205, 225, 226, 240.

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 focuses 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).

GNNU 410 Gerontology for Nurses – This course builds on the knowledge of stages and tasks of growth and development, lifestyle patterns and unanticipated event stressors from Terms One to Four, to study in greater depth adults of 75-85 (mid-old) and 85-105 (old-old) years. The key concepts of the General Nursing Diploma Program curriculum will be the framework for the application of this knowledge. These concepts are compatible with the Ontario Standards of Practice for Gerontological Nursing. This course is offered 3 hours per week for 17 weeks (51 hours) for 3.5 credits. Prerequisite: GNNU 300, CPR (Level C).

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, 239, 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.

For information, write to Health Part-time Studies, British Columbia Institute of Technology, 3700 Willingdon Avenue, Burnaby, B.C. V5G 3H2. These courses are offered in fall, winter and spring terms.

Faculty and Staff

Mrs. M. Neylan, M.A., B.Sc.N., R.N., R.P.N.(Honours), Associate Dean
Mrs. L. Barratt, B.A., R.N., Diploma Psychiatric Nursing
Ms. M.J. Belfry, M.Sc., B.N., R.N.
Mrs. D.M. Belyk, B.Sc.N., R.N.
Ms. L. Brazier, R.N., B.Sc.N.
Mrs. E. Carr, B.Sc.N., R.N.
Ms. V. Cartmel, B.Sc.N., R.N.
Ms. K. Doyle, B.N., R.N., Diploma Counselling Psychology
Mrs. K. Edwards, B.Sc.N.(Honours), R.N.
Mrs. L. Field, B.Sc.N., R.N.
Ms. E.M. Fraser, B.Sc.N., R.N.
Mrs. S. Gallo, B.Sc., Ph.N., R.N.
Mrs. S. Grasset, B.Sc., Ph.N., R.N.
Mrs. A. Houseman, R.N., B.Sc.N
Ms. E. Jackson, R.N., B.Sc.N.
Mrs. A. Kenney-Lee, B.N., M.Ed., R.N.
Mrs. M. LaBelle, B.N., R.N., Diploma P.H.
Ms. B.A. Lawes, B.Sc.N., R.N.
Mrs. M.E. Martin, B.Sc.N., R.N.
Ms. A.J. Mazzocato, M.S.N., B.N., R.N.
Ms. L.P. Meredith, M. Adult Ed., B.Sc.N., R.N.
Mrs. L. Milligan, R.N., B.Sc.N.
Mrs. K. Negoro, Diploma Nrsg. Ed., R.N.
Mrs. A.L. Novada, B.Sc.N., Diploma T.S., R.N.
Mrs. M. Olson, B.Sc.N., R.N.
Mrs. K. Quee, B.Sc.N., R.N.
Mrs. A. Taylor, M.A., B.Sc.N., R.N.
Mrs. D. Taylor, B.Sc.N., R.N.
Mrs. J. Uren, R.N., B.Sc.N., M.A. (Education)
Mrs. J. Verner, B.Sc.N., R.N.
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, M.A., B.Sc.N., R.N.
Mrs. D. Zimka, B.Sc.N., R.N.

Support Staff

Mrs. N. Sayre, Sec/Supervisor
Mrs. F. Nordstrand, R.N., Psychomotor Lab Coordinator
Mrs. L. Colquhoun, Records Assistant
Ms. M. Louie, Native Support Worker
Ms. J. Pfaff, Clerk Typist

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

School of Trades Training

Office of the Dean

Len McNeely, R.I.A., M.B.A., Dean

Office of the Registrar

TRADES PROGRAMS

Aviation Trades

Bill Foyle, A.M.E., Associate Dean

Construction and Metal Industries Training

Mike Cannell, Associate Dean

Electrical/Electronic Trades

Dennis Duffey, Associate Dean

Food Trades

John Bateman, Associate Dean

Mechanical Industries Training

Ron Evans, Associate Dean

Process Trades

Ron Hyde, B.S.A., M.Sc., P.Ag., Associate Dean

Renewable Resources Trades

Roy Strang, B.Sc., Ph.D., R.P.F., Associate Dean

School of Trades Training

BCIT is the largest trades training centre in British Columbia. Our programs are designed to prepare students to enter employment, and to provide them with employment upgrading and retraining opportunities. The Institute provides extensive training options in Aviation Trades, Construction Trades, Electrical/Electronic Trades, Food Trades, Mechanical Industries Training, Metal Industries Training, Process Trades and Renewable Resources Trades.

Office of the Registrar

Mario Mazziotti, Dipl.T., Registrar
Sam DiGiando, B.A., Associate Registrar
Michelle Philippe, B.Sc., Dipl.T., Systems Assistant

Registration

Kelly Durkin, Supervisor
General enquiries: 434-1610

Admissions

Brenda Walton, Supervisor
Application enquiries: 432-8419

Student Records

Jeri Fostvelt, Supervisor
General enquiries: 432-8478

Timetabling

George Brown, Supervisor
General enquiries: 434-5734 (5386)

Admissions

Admission is primarily on a first-come, first-served basis, and applicants are encouraged to apply early to avoid delays. Applicants may be considered for only one program at a time. Upon acceptance to a program, students will be asked to pay a non-refundable, non-transferable deposit of $75 with the remaining fees due 2 weeks prior to the first day of class. Students unable to pay their tuition fees must make financial arrangements prior to the start of class.

Applicant priority is given first to British Columbia residents who are Canadian Citizens and Landed Immigrants who have lived in British Columbia for the immediate twelve months prior to enrolment; second priority is given to out-of-province Canadian Citizens and Landed Immigrants; third priority is given to out-of-country applicants. BCIT does not accept applications from persons on Visitors Visas.

All applicants must provide official documentary proof that they meet the necessary program prerequisites. Official transcripts are required; photocopies are not acceptable. Please note, students applying to BCIT are required to submit all documentation with English translations.

Application Fee

A $15 non-refundable, non-transferable fee must accompany your application form. Applications without fees will be returned unprocessed.

Certificates

A Certificate of Trades Training will be granted to students who successfully complete their programs of study.

Honor Awards

The **Lieutenant Governor's Silver Medal** is awarded annually to a graduate from a Trades program, for academic excellence and personal contribution to both the Institute and the community at large.

The **Dean's Award** is presented annually to the outstanding student in the School of Trades Training.

Academic Requirements

Guidelines are established for admission to ensure that students will be able to master the learning tasks covered in the program. Most of our programs require Grade 10 as a minimum with a few programs requiring Grade 12 graduation. Some programs require specific Grade 11 and 12 subjects. All programs require students to have a good comprehension of the English language. Do not hesitate to apply if you feel your background and experience qualify you to enter any Institute program. Appropriate combinations of education and experience are considered. Our only interest is your success. Although Grade 10 is accepted as a minimum entrance requirement for some of our programs, some employers may require Secondary School graduation for employment.

English Language Proficiency

All programs require students to have a good comprehension of the English language. Applicants whose first language is not English may be asked to provide test results from the Vancouver Community College, King Edward Campus, English Language Assessment Test.

Transfer from Regional Colleges

Students may transfer from regional colleges to some of our Entry Level Trades Training programs. An application form must be completed and forwarded to the Admission Office with official transcripts showing successful course completion. Admission dates are subject to space available in the program. Fees are applied accordingly.

Credit for Completion of Career Preparation Programs in Secondary Schools

Memorandums of Understanding have been signed between the Institute and Boards of School Trustees for many school districts. Credit may be given to students who have completed the secondary school portion of the training, thus avoiding duplication of learning.

Trades Training Prerequisites

Appliance Repair: Grade 10. Must have a good working knowledge of the English language.

Aviation Trades

A.R: Grade 12 with Algebra 11 and Physics 11. Good color vision.

E: Grade 12 with Algebra 12; Physics 11 or Electronics 12. Good color vision.

Aircraft Structures: Grade 12 with Algebra 11. Good color vision.

Automotive Electrical/Electronics Technician:

Journeyman or T.Q. status (must provide license number);
or
Apprentice with a letter of recommendation from employer;
or
Pre-tested. (Pre-testing is available in the Mechanical Resources Centre.)

Automotive Mechanic: See ELTT page 209.

Barber/Styling: Grade 10. Minimum age 18.

Benchwork and Joinery: See ELTT page 209.

Boilermaking: See ELTT page 209.

Carpentry: See ELTT page 209.

Commercial Transport Mechanic: See ELTT page 209.

Computer Numerical Control (CNC):

Students should have completed a machinist pre-employment program, hold a trade certificate or have equivalent demonstrated capability in the following areas: use of conventional shop equipment; safe work practices; mathematical problems – machine shop geometry, angles; reading and interpreting drawings and using precision measuring instruments.

Diamond Driller/Helper: Grade 10.

Diesel Engine Mechanic: See ELTT page 209.

Drafting

Combined Program: Grade 12 with Math 11.

Architectural Design Technical and Graphical Communication:

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. **Please note:** preference will be given to applicants who have Grade 12 graduation with C+ or better in English 12 and Algebra 12.

Electrician: See ELTT page 209.

Electricity and Industrial Electronics:

a. Grade 12 with C in Algebra 11
or
b. Pass an entrance test measuring math and reading skills

Electronics
Level A: Grade 12 with Algebra 12 and Physics 11.
Level B: Level A or pass assessment for Level A.
Level C: Level B or pass assessment for Level B.

Food Trades: Grade 10 or mature student.

Forestry Crewperson: Grade 10.

Greenhouse, Nursery, Landscape Worker: Grade 10 and pass an entrance test measuring math and reading skills.

Heavy Duty Mechanic: See ELTT page 209.

Inboard/Outboard Mechanic: ELTT see page 209.

Industrial Maintenance Mechanic:

a. Grade 12 with Mechanical Electives and pass an entrance test measuring math and reading skills
or
b. Individual assessment by department.

Ironworking: See ELTT page 209.

Machinist: See ELTT page 209.

Millwright: See ELTT page 209.

Motorcycle Mechanic: See ELTT page 209.

Plumbing: See ELTT page 209.

Power and Process Engineering:

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 mentioned qualifications may request individual assessment by the Power Engineering Department.

Power Engineering

General Program:

a. Grade 12
or
b. Pass an entrance test measuring math and reading skills

Technical Program:

a. Grade 12 with Algebra 12 and Physics 11
or
b. Pass an entrance test measuring math and reading skills

Security Alarm Installer:

a. Grade 12 or equivalent. Preference will be given to applicants with Grade 12 graduation with a C or better in Algebra 11;
or
b. Pass an entrance test measuring math and reading skills;
c. Age requirement of 19 years or older;
d. Security clearance from the office of the B.C. Attorney General.

Sheet Metal Working: See ELTT page 209.

Steamfitting: See ELTT page 209.

Steel Fabricating: See ELTT page 209.

Tool and Die Technician:

a. Grade 12 with Mechanical Electives and pass an entrance test measuring math and reading skills
or
b. Individual assessment by department.

Tree Trimmer: 3 months tree trimming experience and a letter from an employer.

Upholstery: Grade 10

Welding

Level C: Grade 10 recommended. However, an appropriate combination of work experience and education considered.
Level B: Level C
Level A: Level B

Continuous Entry Programs

Programs are offered throughout the year with varying start dates for each program. Students should contact Student Services at 434-3304 for program information.

Fees and Expenses

Tuition fees for fixed-duration training programs vary according to the length of the program. The 1988/89 tuition fee rate is $21 per week or $84 per month. Students accepted to any program must pay a $75 non-transferable, non-refundable commitment fee to confirm their seat. Full fees are due 2 weeks prior to the intake.

Student Activity Fee

The Student Activity fee for fixed-duration training programs varies according to the length of the program. The 1988/89 student activity fee rate is $1.75 per week or $7 per month (subject to change).

Miscellaneous Fees: Trades Programs

Certificate duplicate	$ 50	
Late fee/reinstatement fee	50	
NSF cheques	15	
Reassessment of course	25	per course
Appeals reassessment	50	per course
Student ID card duplicate	10	
Transcripts, first copy	5	
- Additional copy	1	
Tax receipts, duplicate	10	
T2202A forms, duplicate	10	
Welding log books, duplicate	10	
Challenge exam	Cost of course	
Application fee	15	

Refunds

Students who withdraw up to 14 calendar days after the start of classes are eligible for a full refund less the $75 commitment fee. No refunds are given after this date. This also applies to students who are involuntarily withdrawn by the department due to poor performance or conduct.

Cancellations

The Institute will make every effort to offer all courses as listed in the calendar. Nevertheless, the Institute reserves the right to limit enrolment, to select students, to cancel courses, to combine classes or to alter time of instruction without prior notice.

CEIC (Manpower) Sponsorship

For information regarding sponsorship, visit any local CEIC (Canada Manpower) office. Students are required to pay the Student Activity Fee charged at the time of registration.

Apprenticeship Programs

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. Telephone: (604) 660-7200.

BCIT offers apprenticeship training in the following programs:

- Autoglass Installation
- Automotive Mechanic
- Baking
- Benchwork and Joinery (Cabinetmaker)
- Boilermaking
- Carpentry
- Commercial Transport Mechanic
- Cooking
- Drywall Finisher
- Electrical Motor Winder
- Electrical Work
- Electronics
- Floor Covering
- Glazier
- Heavy Duty Mechanics
- 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
- Painting and Decorating
- Piledriver and Bridgeman
- Plumbing
- Practical Horticulture
- Refrigeration
- Sheet Metal
- Steamfitting and Pipefitting
- Steel Fabrication
- Tilesetting
- Wall and Ceiling Installer
- Welding

Attendance

Regular and punctual attendance is essential for students to complete training and be granted a certificate. Students with poor attendance may not be permitted to write the final examination for the course, except in unusual circumstances such as excused absence. If students are absent for five (5) days without notifying the instructor, then it will be assumed they have withdrawn from training. For apprenticeship students, three or more days of unexcused absence will result in termination. Students **must** contact their departments when they are absent.

Entry Level Trades Training

Entry Level Trades Training (ELTT), BCIT's delivery of Provincial Training Access, is designed to give students the skills and practical knowledge required to get a job in one of the trade specialities. On successful completion of the program, you will receive certification and a detailed transcript documenting the skills and knowledge you have attained. In addition, you may receive credit for the first year of institutional training if you obtain apprenticeship employment.

Trade Specialties

The following trades training specialties are offered in the ELTT format:

- Automotive Mechanic
- Benchwork and Joinery (Cabinetmaker)
- Boilermaking
- Carpentry
- Commercial Transport Mechanic
- Diesel Engine Mechanic
- Electrician
- Heavy Duty Mechanic
- Inboard/Outboard Mechanic
- Ironworking

- Machinist
- Millwright
- Motorcycle Mechanic
- Plumbing
- Sheet Metal Working
- Steel Fabricating
- Steamfitting

For further information about the ELTT program, contact Student Services at 434-3304.

Entrance Requirements

Anyone over 16 years of age who meets the following requirements may apply.

1. Benchwork and Joinery
   Boilermaking
   Carpentry
   Ironworking
   Plumbing
   Sheet Metal Working
   Steamfitting
   Steel Fabricating
   a. **Submit documentation that you have one of the following:**
      - Successful completion of Career Preparation from a BC secondary school within the past 2 years;
      - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past 3 years;
      - Journeyman standing in a related trade;

      or
   b. Grade 10 completion;
      or
   c. Successful completion of an entrance test in math and reading skills **and be interviewed by department*.**

   * Boilermaking and Ironworking.
2. Automotive Mechanic
   Commercial Transport Mechanic
   Diesel Engine Mechanic
   Heavy Duty Mechanic
   Inboard/Outboard Mechanic
   Machinist
   Millwright
   Motorcycle Mechanic
   a. **Submit documentation that you have one of the following:**
      - Successful completion of Career Preparation from a BC secondary school within the past 2 years;
      - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past 3 years;
      - Journeyman standing in a related trade;

      or
   b. Grade 12 completion with Math 10 or Trades Math 11 and English 12;
      or
   c. Successful completion of an entrance test in math and reading skills.
3. Electrician
   a. **Submit documentation that you have one of the following:**
      - Successful completion of Career Preparation from a BC secondary school within the past 2 years;
      - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past 3 years;
      - Journeyman standing in a related trade;

      or
   b. Grade 12 completion with C or better in Algebra 11;
      or
   c. Successful completion of an entrance test in math and reading skills.

Program Description

ELTT is a competency based vocational training program. You will learn your trade in a series of small, clearly defined steps, or competencies. You will become fully proficient at each step before going on to the next one. ELTT is a practical, hands-on training system. You will be working in your shop area within the first week of entrance and the majority of your learning will be actual work in the shop. The theory you learn will be clearly related to your own trade, and you will learn it at the time that you need to apply it to practical activities.

In addition to your technical skills and knowledge, you will learn and be evaluated on good work practices. Consequently, you will be expected to attend regularly and to work to industry standards.

Calendar of Events Trades Training 1989-1990

1989

Mon	Jul 3	CANADA DAY
Mon	Aug 7	B.C. DAY
Mon	Sep 4	LABOR DAY
Wed	Sep 20	SHINERAMA
Mon	Oct 9	THANKSGIVING
Mon	Nov 13	REMEMBRANCE DAY
Fri	Dec 22	Last day of training for Trades non-apprentice and apprentice students
Mon	Dec 25	CHRISTMAS DAY
Tue	Dec 26	BOXING DAY

1990

Mon	Jan 1	NEW YEARS DAY
Tue	Jan 2	Trades Classes and Apprentices begin
Fri	Apr 13	GOOD FRIDAY
Mon	Apr 16	EASTER MONDAY
Mon	May 21	VICTORIA DAY
Mon	Jul 2	CANADA DAY

AVIATION TRADES

Aircraft Maintenance Engineer
Avionics
Aircraft Structures

Aircraft Maintenance Engineer

CATEGORIES A.R.E.

This is a 16-month program recognized by Transport Canada. Graduates are accredited with 18 months credit toward the three years practical experience required for the AME License.

Program Length: 4 terms of 15 weeks (450 hours per term)

Prerequisite: A.R.

Grade 12 with Algebra 11 and Physics 11. Good color vision is essential. A mechanical background is recommended.

Prerequisite: E.

Grade 12 with Algebra 12; Physics 11 or Electronics 12. Good color vision is essential.

CATEGORIES: A.R. (Former Aircraft Maintenance Program)

Theoretical and practical training enables students to work 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, later as a mechanic or Aircraft Maintenance Engineer (category A or R license). Completion of the program assures 18 months credit toward the category A or R license.

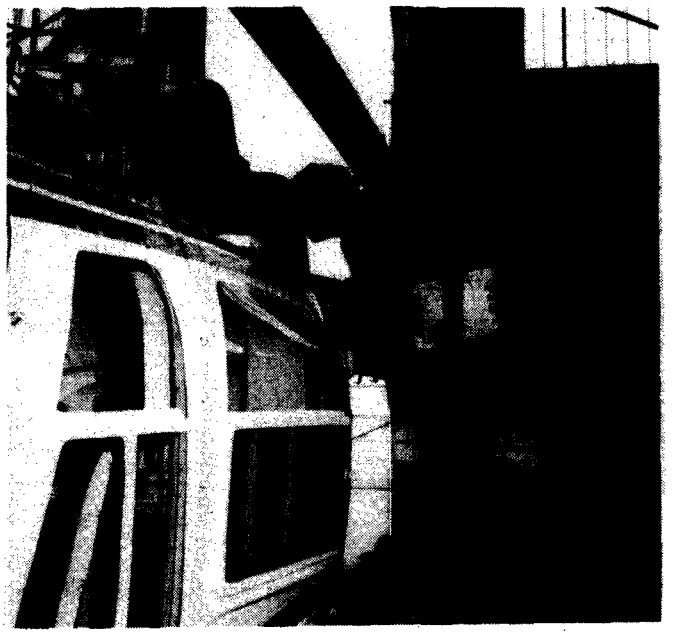
Program content includes aircraft powerplant and air frame; air frame and powerplant controls systems and components; electrical and avionics; ground equipment operating principles; methods of servicing, maintenance and repair; testing, parts identification and use for maintaining aircraft and their components; how to use manuals, technical bulletins, documentation systems, air regulations, etc., in the planning and maintenance of aircraft and their components.

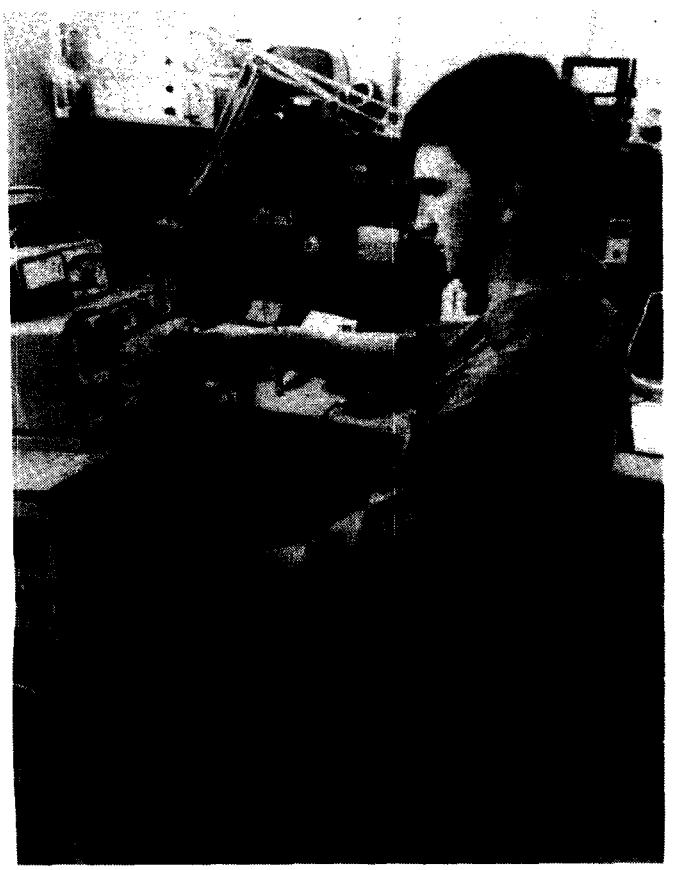
Instructors

Jack Baryluk, A.M.E.
John Edwards, A.M.E.
Brian Lockwood, A.M.E.
Peter Mills, A.M.E.
Charles Roberts, A.M.E.
Jack Sargent, A.M.E.
Charles Torrey, A.M.E.
David Upton, A.M.E.

CATEGORY: E (Former Avionics Program)

This program provides an indepth knowledge of electricity, electrical generation, power distribution, analog electronics, digital electronics and radio theory. It explains how to interpret and comply with Canadian Aircraft Regulations and Airworthiness Standards. The program enables students to understand the operating principles of aircraft, powerplants, avionics and associated ground equipment; and theoretical and practical knowledge of basic systems, components and methods to maintain, overhaul and repair aircraft electrical and avionics systems; to recognize and know the major components and functions of electrical communication, navigation and instrumentation systems; how to use tools safely, test equipment and materials for the maintenance and repair 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.

Training enables students to work on light, medium or heavy fixed wing or rotary wing aircraft, and provides the preparation necessary for employment in the aviation industry as a technician or Aircraft Maintenance Engineer (Category E License). Successful completion of this program will provide 18 months credit toward the Category E license.

Program Content

Common Core Material

CATEGORIES: A. R. E.

Term 1
Block A Basics – introduction
Block B Structures
Block C Theory of flight
Block D Electricity 1
Block E Electricity 2

CATEGORIES: A. R.

Term 2 Powerplants
Block A Elementary engines: reciprocating
Block B Ignition systems and fuel
Block C Gas turbines
Block D Powerplant systems
Block E Propellers and testing

Term 3 Airframe
Block A Sheet metal
Block B Hydraulics landing gear and plumbing
Block C Controls and rigging
Block D Rotary wing basics
Block E Rotary wing maintenance operation

Term 4 Servicing and Maintenance
Block A Maintenance procedures
Block B Structures 2
Block C Aircraft systems 1
Block D Aircraft systems 2
Block E Testing and evaluation

CATEGORY: E AVIONICS

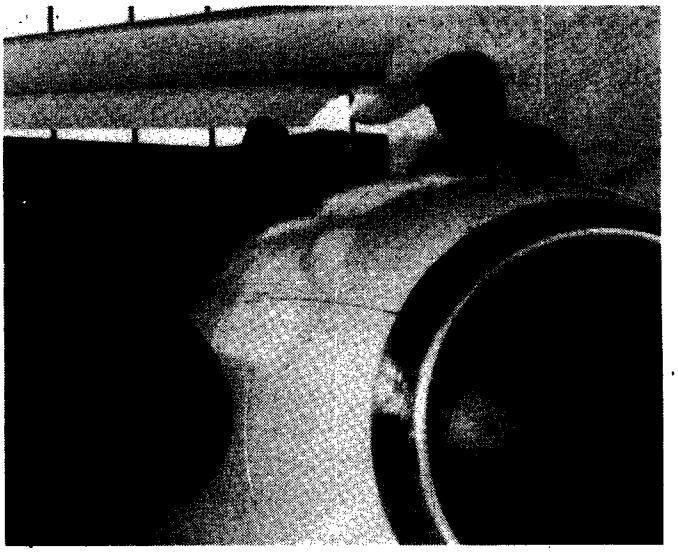
Term 2 Electronic Theory
Block A Analog 1
Block B Analog 2
Block C Analog 3
Block D Analog 4
Block E Digital 1

Term 3 Electronics
Block A Digital 2
Block B Digital 3
Block C Sheet metal and controls
Block D Powerplant and powerplant systems
Block E Airframe Systems

Term 4 Avionics
Block A Introduction to radio
Block B Aircraft communication
Block C Aircraft navigation
Block D Pulse techniques
Block E Instrumentation

Instructors

Patrick Muldoon, A.M.E.
Vincent Murray, A.M.E.



Aircraft Structures

This program trains students in the basics of repairs to aircraft structures. Aircraft Structures graduates have found lifetime careers in the aviation industry; several companies give preference to BCIT students when hiring new learner mechanics.

Program length: 30 weeks

Prerequisite: Grade 12 with Algebra 11. Good color vision is essential. Some drafting is recommended.

Program Content

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 to repair aircraft structures; the role of Transport Canada in the aviation industry; the importance of time management in profitability.

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.

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.

Instructors

Peter Davies, B.Tech.
Winston Drydon

Staff

Bill Foyle, A.M.E., Associate Dean
Greg Hodgins, Storesperson
Helen Hurley, Secretary
Val Kilik, Storesperson
Lynda Turner, Instructor Support

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Barber/Styling

The Program

BCIT's Barber/Styling program equips trainees with the skills and knowledge required to begin employment as Apprentice Barbers.

Current styles have created a demand for barbers who are not only proficient in the skills of haircutting, perming, coloring, shaving and massage, but have the creativity to do custom work to meet the personal grooming needs of a variety of clients.

Skills are developed by training and practice followed by on-the-job experience.

Program Content

Administration and introduction
Hygiene and sanitation
Honing and stropping
Shaping and styling
Scalp and hair treatments
Hairpieces and toupés
Cutting and coloring
Perming
Taper cuts
Personal and professional ethics
Instruments and implements
Shaving and facial massage
Shampooing and rinsing
Electricity and light therapy
Management and business administration
Science of barbering

Length of Program: 46 weeks

Starting dates: Continuous, as space becomes available. Contact BCIT Student Services for current dates: (604) 434-3304.

Prerequisites

- Grade 10
- 18 years of age
- Good health
- Good eye/hand coordination
- Outgoing personality
- Medical certificate indicating freedom from communicable diseases

Career Potential

Employment may be found in unisex or barber shops, with the possibility of owning one's own business.

Instructor

Ken Coleman

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

CONSTRUCTION AND METAL INDUSTRIES TRAINING

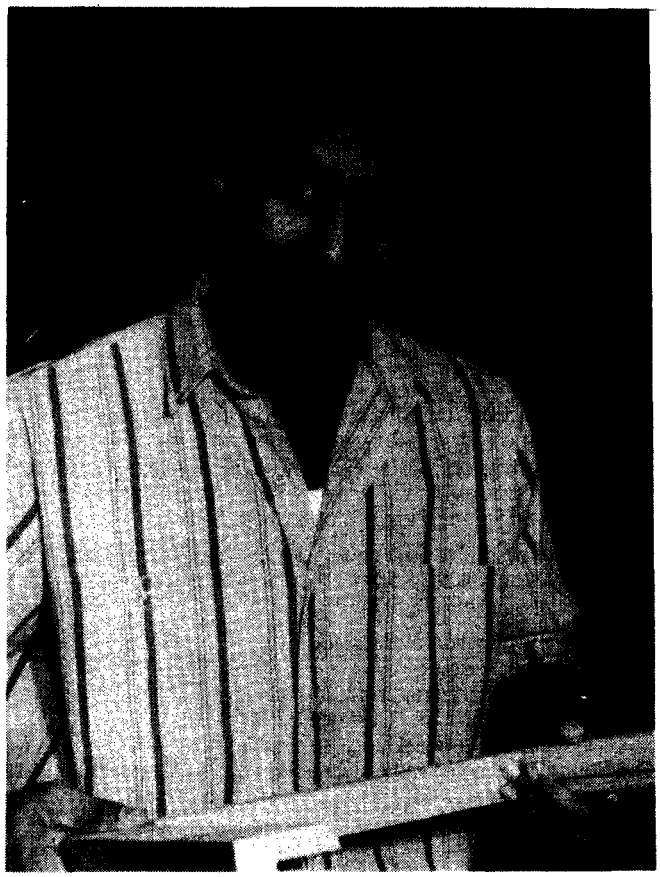
Benchwork and Joinery (Cabinetmaker)
Boilermaking
Carpentry
Drafting
Ironworking
Plumbing
Sheet Metal Working
Steamfitting
Steel Fabricating
Upholstery
- **Autotrimmer**
- **Custom Furniture**

Welding

CONSTRUCTION TRADES

ENTRY LEVEL TRADES TRAINING

Benchwork and Joinery (Cabinetmaker)



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 done 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.

The Program

Training prepares students for entry-level employment in the joinery trade. Basic theory and related information along with hands-on shop practice enables students to become competent in basic interior woodworking tasks. Upon successful completion of the program, students should work toward journeyman status in the trade by seeking employment as an apprentice.

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, 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
Lift and support loads
Use specialty tools
Floor and wall framing
Interior and exterior finishing
Cabinets and finishes
Prepare for employment

Length of Program:
28 weeks. However, students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0730-1415

Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or
b. Grade 10 completion;
   or
c. Successful completion of an entrance test in math and reading skills.

Employment Opportunities

Opportunities are currently found in small shops producing such items as custom cabinets. Most of these shops are in town. Graduates should be prepared to work in production shops at this time, although formal apprenticeships are still common in this trade.

Instructors

Carl Catt, T.Q.

ENTRY LEVEL TRADES TRAINING

Carpentry

Carpentry is divided into two fields: rough carpentry and finish carpentry. The rough carpenter erects the basic structure of a building (foundation, floors, walls and roof); the finishing carpenter installs doors, cabinets, wall panelling, stair railings and wood trim. Some carpenters are skilled in both fields.

Today, with so many new 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.

The rough carpenter may also specialize in wood framing or erecting concrete structures such as hi-rise buildings.

The Program

Training prepares students for entry-level employment in the carpentry trade. Basic theory and related information along with hands-on shop practice enables students to become competent in basic carpentry tasks. Upon successful completion of the program, students may wish to work toward journeyman status in the trade by seeking 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
Use specialty tools
Oxyacetylene cutting and welding
Floor and wall framing
Ceiling and roof framing
Exterior finishing
Interior finishing
Cabinets and finishes
Prepare for employment

Length of Program: 28 weeks. However, students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0730-1415

Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

b. Grade 10 completion;

   or

c. Successful completion of an entrance test in math and reading skills.

Employment Opportunities

The steady upturn in the construction industry has resulted in increased employment opportunities for carpenters. Most opportunities are still in the residential building section although employment is sometimes available on commercial projects. Employers are beginning to offer more apprenticeships, but graduates should be prepared to work in non-indentured positions. Those who do not serve formal apprenticeships, but gain enough work experience with employees, may be eligible to write the trades qualification (T.Q.) examination.

Instructors

Rick Dohl, B.Ed., T.Q., I.P., Carpentry
John-Allan Eliasen, T.Q., I.P., Carpentry/Joinery I.D.
Paul Jakobsen, T.Q., I.P., Carpentry I.D.
Paul Nielsen, T.Q., I.P., Carpentry I.D.
Al Reimer, T.Q., I.P., Carpentry I.D.
Keith Simpson, T.Q., I.P., Carpentry I.D.
Wayne Stevens, T.Q., I.P., Carpentry/Joinery I.D.
Kurt Traugott, B.Ed., T.Q., Carpentry
Peter Wilson, T.Q., I.P., Carpentry/Joinery I.D.

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

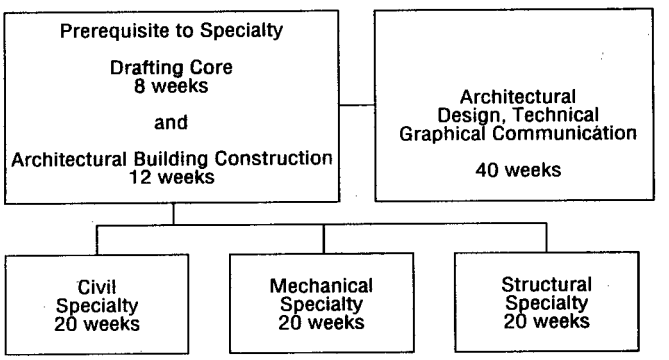
Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Drafting



Prerequisite for Combined Program

Grade 12 with Grade 11 math. Good hand/eye coordination and technical aptitude. Students will normally enter at the core level although credit for prior experience and/or acquired knowledge may be given. Test required.

Drafting Core

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.

Length: 8 weeks

Architectural Building Construction

Prepares the student to choose one of the four specialties available and concentrates on developing basic drafting skills. Includes introduction to architectural specialty, introduction to building systems and graphic techniques, and continuation of CAD training.

Length: 12 weeks if credit is granted for drafting core.
20 weeks if combined with drafting core.

Career Potential

Possible employment at the junior drafter level.

Civil Drafting

The Specialty

Prepares the student to combine the necessary understanding of building construction with the requirements of municipal regulations.

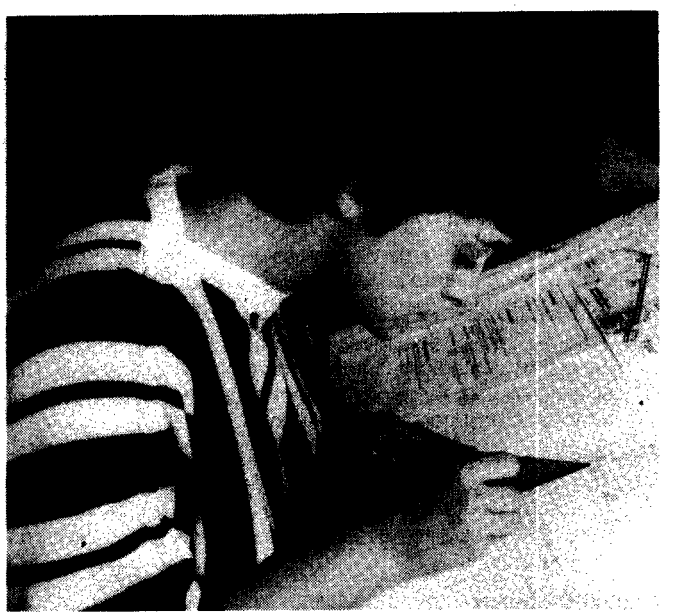
Specialty Content

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

Career Potential

Students may be potential drafters and surveying assistants working for engineering firms, surveyors, and municipalities.



Mechanical Drafting

The Specialty

Prepares the student to combine the understanding of building construction with the design and regulatory devices used in detailing building mechanical systems.

Specialty Content

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

Career Potential

Employment may be found in architectural offices specializing in systems design.

Structural Drafting

The Specialty

This drafting 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.

Specialty Content

Combines building construction with the design of reinforced concrete and structural steel.

Length of Specialty: 20 weeks

Career Potential

Students may find employment in engineering offices which deal with reinforced concrete and structural steel.

Architectural Design Technical and Graphical Communication

The Specialty

In assessing their suitability for this program, potential 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 human ethic 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 clean-cut solutions. Students find that in addition to intellectual and creative ability, they also need initiative, tenacity and a tolerance for uncertainty.

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

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. **Please note:** preference will be given to applicants who have Grade 12 graduation with C+ or better in English 12 and Algebra 12.

Career Potential

Employment may be found in architectural firms or related engineering companies.

Instructors

C. Chandler, Instructors Diploma
C. Cullen, B.A., B.Theol., Instructors Diploma
B. Hilliard, Instructors Diploma
P. Kavanagh, Instructors Diploma

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

ENTRY LEVEL TRADES TRAINING

Plumbing

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.

The Program

Students are prepared for entry-level employment in the plumbing trade. Basic theory and related information along with hands-on shop practice enables students to become competent in basic plumbing maintenance tasks. Upon successful completion of the program, students may wish to work toward journeyman status in the trade by seeking 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

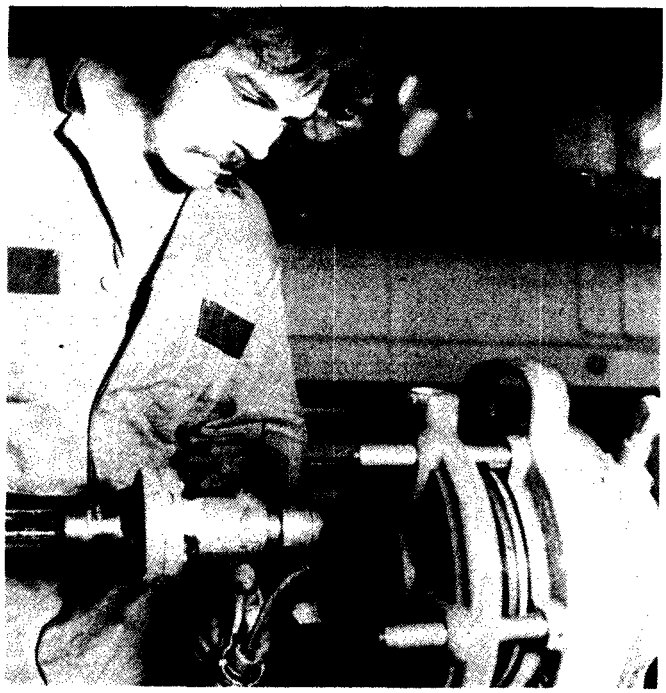
Length of Program: 28 weeks. However, students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0730-1415

Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;



   - Journeyman standing in a related trade;
   or
b. Grade 10 completion;
   or
c. Successful completion of an entrance test in math and reading skills.

Employment Opportunities

With the steady improvement in the economy, the employment outlook for graduates in the piping trades has greatly improved. Apprenticeships with union and non-union contractors are now becoming common. Graduates can expect to find work in the commercial/institutional, industrial and residential sectors of the piping trade.

Instructors

John Masse, Chief Instructor
David Bowles
James Endert
William Evans
Gary Norgard
Nick Potis

ENTRY LEVEL TRADES TRAINING

Steamfitting

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.

The Program

Training prepares students for entry-level employment as steamfitters/pipefitters. Basic theory and related information along with hands-on shop practice enables students to become competent

in basic steamfitting/pipefitting tasks. Upon successful completion of the program, students may wish to work toward journeyman status in the trade by seeking employment as an apprentice.

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: 28 weeks. However, students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0730-1415

Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

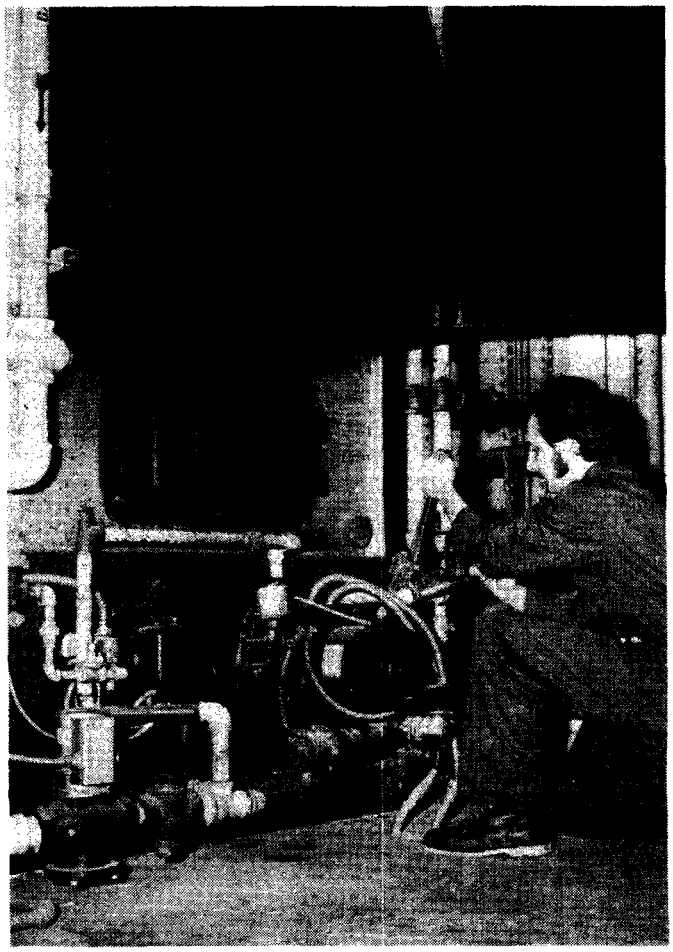
b. Grade 10 completion;

   or

c. Successful completion of an entrance test in math and reading skills.

Employment Opportunities

In this trade, opportunities are found in industrial plants, pulp and lumber mills, and commercial areas. Most of these industries are unionized and graduates are encouraged to seek apprenticeships. The employment outlook for graduates has shown considerable improvement over the last year (1988).



Instructors

John Masse, Chief Instructor
Ron Marier
Gary Miller

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services. (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Upholstery: Auto Trimmer

The Program

This program prepares students for entry-level employment as automotive upholsterers. Basic theory and related information along with hands-on shop practice enables students to become competent in basic and custom automotive upholstery work.

Program Content

General shop practice
Tools and equipment
Sewing machine operation
Button machine operation
Trim and hardware
Materials
Models and styles of automobiles
Design, layout, cutting, serving and installation of:
- Door panels
- Seats
- Carpets
- Headliners
- Vinyl tops
- Glass

Length of Program: 20 weeks.

Prerequisite

Grade 10. Must have a good working knowledge of the English language and a genuine interest in the restoration of automobiles.

Career Potential

Employment opportunities exist with automotive body shops, upholstery shops, auto seat cover centres and industrial upholstery trimming shops which specialize in a particular area of work, such as restoring cars or custom work.

Instructor

Menno Janzen

Upholstery: Custom Furniture

The Program

This program covers the theory and practical skills required by a custom furniture upholsterer. Students are taught how to use hand and power tools, layout, match materials, mark and cut to a particular design or style. Students learn the use of sewing machines, cements, glues, buttons and tufting: how to estimate jobs, and good business practice.

Program Content

Level 1
Safety and handling equipment
Estimating and layout – basic
Fabric cutting and lay up – basic
Paddings, terms and usage
Foam pricing and estimating – basic
Fabricating cement and solvents
Stripping upholstery – basic

Level 2
Stripping for templates
Frame repairs and styling
Showood refinishing
Coil and no-sag springs
Sewing cushions and skirts
Edgings and installations
Basic tufting

Level 3
Designing tufts and flutes
Installation of tufts and flutes
Application of layouts
D.N.R. – railroad cutting
Fabric variations and treatments

Level 4
Technical sewing methods
Detailed sewing – back seats
Types of sewing
Upholstery terms (five major areas)
Stitching methods
Application of pleating methods
Upholstery with vinyls

Level 5
Trimming and finishing – terms and methods
Application of finishings
Estimating
Decorating methods – fabric
Decorating methods – design
Pricing
Business practice
Sales calls

Length of Program: 20 weeks

Prerequisite

Grade 10, or a good working knowledge of the upholstery trade.

Career Potential

Employment opportunities may be found with furniture manufacturers, department stores, furniture refinishing and recovering firms. Many graduates have started their own businesses.

Instructor

Bob Andrews, Chief Instructor

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

METAL INDUSTRIES TRAINING

ENTRY LEVEL TRADES TRAINING

Boilermaking

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.

The Program

Training prepares students for entry-level employment as boilermakers (erectors). Basic theory and related information along with hands-on shop practice enables students to become competent in basic vessel construction tasks. Upon successful completion of the program, students may wish to work towards journeyman status in the trade by seeking employment as an apprentice.

Boilermakers 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

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

Length of Program: 21 weeks. However, students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0700-1345

Prerequisites

Anyone over 16 who meets the following requirements may apply.

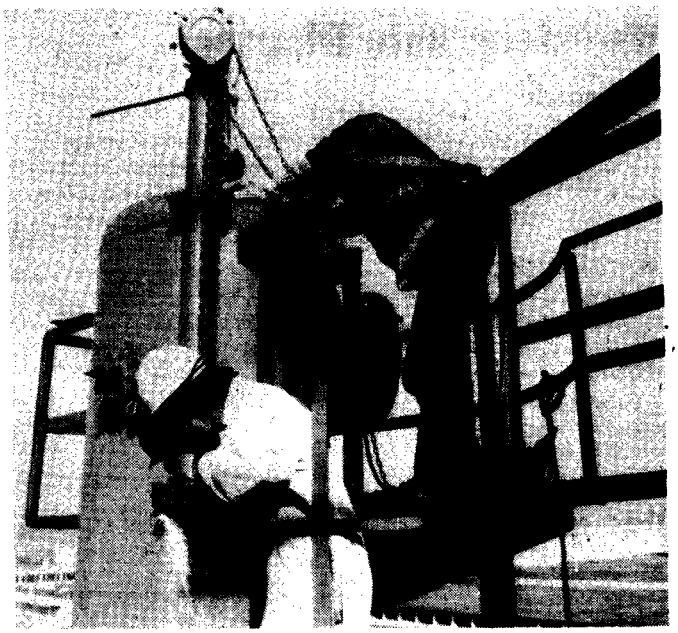
a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

b. *Grade 10 completion;

   or

c. Successful completion of an entrance test in math and reading skills and be interviewed by department.



Career Potential

Graduates of this program are eligible for acceptance into the boilermaking union. 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 dams.

Instructor

Joe Kiwior

ENTRY LEVEL TRADES TRAINING

Ironworking

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 gangs, 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 gang are usually designated according to the work they do: bolter-up, connector, hooker-on or rigger.

The Program

Training prepares students for entry-level employment in the ironworking trade. Basic theory and related information along with hands-on shop and field practice enables students to become competent in basic ironworking activities. Upon successful completion of the program, students may wish to work toward journeyman status in the trade by seeking employment as an apprentice.

Ironworkers must be able to work at heights and in adverse weather. 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 and acceptable work practices
Mathematics
Sketch and read drawings
Prepare for employment
Use basic measuring, layout and hand tools
Use metalfab 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

Length of Program: 26 weeks. However, students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0700-1345

Prerequisites

Anyone over 16 who meets the following requirements may apply.

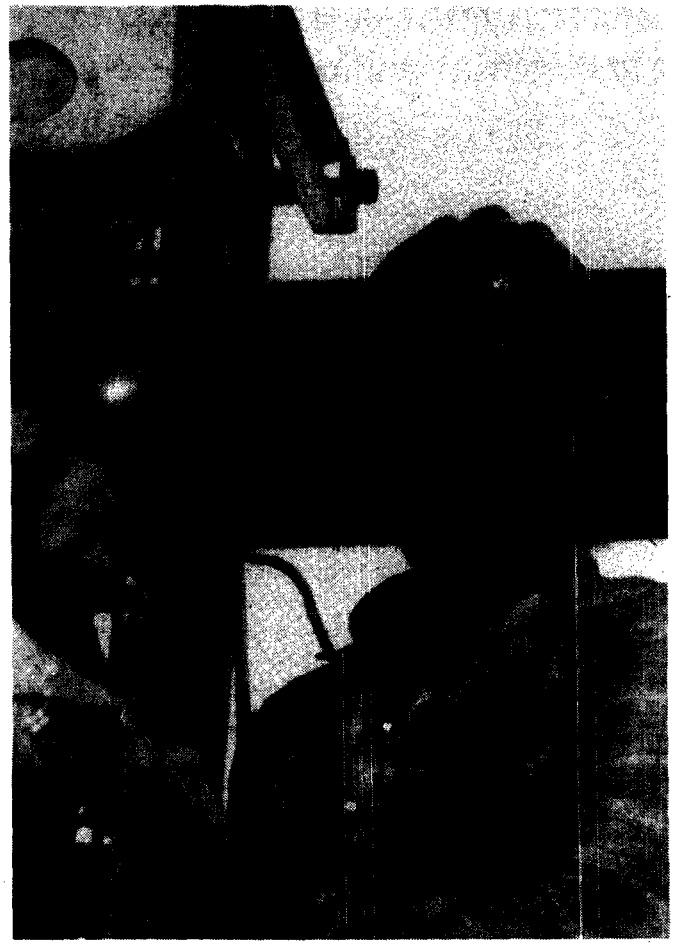
a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

b. Grade 10 completion;

   or

c. Successful completion of an entrance test in math and reading skills and be interviewed by department.



Career Potential

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.

Instructor

Nino Romanin

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

ENTRY LEVEL TRADES TRAINING

Sheet Metal Working

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 (copper)
- roofing and flashing (copper, aluminum, stainless steel).

The Program

Students are prepared for entry-level employment in the sheet metal industry. Basic theory and related information along with hands-on shop practice enables students to become competent in fabricating basic sheet metal products. Upon successful completion of the program, students may wish to work towards journeyman status in the trade by seeking employment as an apprentice.

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
Apply science concepts
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
Arc welding
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 blow-pipe project
Construct a stainless steel project
Construct a ventilation project
Prepare for employment

Length of Program: 26 weeks. However, students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0730-1430

Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

b. Grade 10 completion;

   or

c. Successful completion of an entrance test in math and reading skills.

Career Potential

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.

Instructors

Gord Bradbury, Chief Instructor
Ted Kondo
Dave Stewart

ENTRY LEVEL TRADES TRAINING

Steel Fabricating

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.

The Program

Training prepares students for entry-level employment as steel fabricators. Basic theory and related information along with hands-on shop practice enables students to become competent in basic steel fabrication methods for products such as steel building, tanks, and equipment. Upon successful completion of the program, students may wish to work towards journeyman status in the trade by seeking employment as an apprentice.

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
Describe business and industrial organizations and prepare for employment
Erect ladders and scaffolds
Describe the properties of metals
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
Cut and weld with oxyfuel equipment
Use arc welding equipment
Use steel fabrication shop equipment
Fabricate projects

Length of Program: 26 weeks. However, students may be allowed to proceed through as quickly as they are able to master the skills.

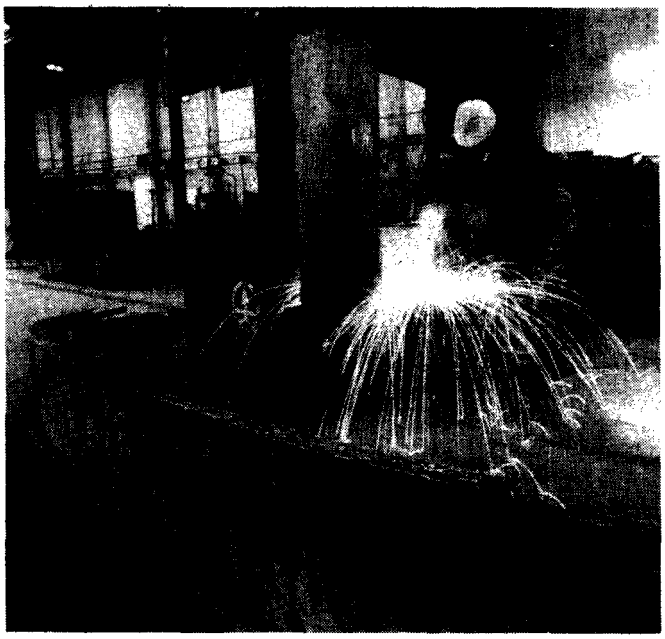
Normal Course Hours: 0700-1345

Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or



b. Grade 10 completion;
   or
c. Successful completion of an entrance test in math and reading skills.

Career Potential

Over the past few years the demand for graduates has improved. This is due to the steady improvement in the B.C. economy. Employment has increased in smaller shops as they fill the gap left by larger operations which closed during the recession. With the increased demand for entry level workers, apprenticeships are more readily available. Graduates should seek an apprenticeship upon graduation.

Instructors

Gary Blidook, Chief Instructor
Gil Cooper
Terry Subtelny

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Welding

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 Labour.**

Welding programs are available on three shifts.

1st shift: 0700-1330
2nd shift: 1300-1930
3rd shift: 1530-2200

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 weldings (GMAW 1)
Flux core arc welding (FCAW 1)
RK1 Material handling
RK2 Blueprint reading 1
RK3 Welding metallurgy 1

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)
P1 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

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, 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 are welding 2 (GTAW 2)
RK8 Metallurgy 3
RK9 Blueprint reading 3

Short-term 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.O.L. prequalified 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 of the B.C. registered welder training programs

* See modules/courses listed under the Level C, B and A programs

Length of Program

Level C	- Up to 30 weeks
Level B	- Up to 16 weeks depending on number of modules required
Level A	- Approximately 8 weeks, depending on number of modules required
Upgrade Options	- Varies as to individual requirements and goals

* 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.

Prerequisite

Level C

Completion of Grade 10 recommended but an appropriate combination of work experience and education will be considered.

Level B

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

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 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.

Career Potential

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.

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
Jim Black, Chief Instructor
Don Becker
Frank Bertalan
Fred Bettis
Ray Holroyd
Elif Iverson
George Jones
Don McRae
Al Pasichnyk
Mark Rigby
Eric Sukkel
Eric Waterfield

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

ELECTRICAL/ELECTRONIC TRADES

Appliance Repair
Electrician
Electricity and Industrial Electronics
Electronics
Power Engineering – General
– Technical
Power and Process Engineering (3rd Class)
Security Alarm Installer

Appliance Repair

The Program

Appliance repair training includes the service and repair of domestic electric and microwave ranges, dishwashers, washing machines, electric clothes dryers, food waste disposers, water heaters, freezers, refrigerators and air conditioners.

Program Content

Trade tools and procedures
Basic electrical and mechanical theory
Basic electronics
Cooking appliances
Laundry appliances
Freezers, refrigerators and room air conditioners
Dishwashers and food waste disposers
Water heaters
Solid state control of appliances
Test and measurement
Public relations
Portable appliance repair

Length of Program: 40 weeks

Prerequisites

Grade 10. Must have a good working knowledge of the English language.

Career Potential

Employment opportunities may be found with department stores, major appliance stores and appliance servicing shops which deal with electro-mechanical processes. Self-employment is an additional possibility.

Instructors

Gary Arneja
Lou Beaubien
Albert Dawson, (Chief Instructor)

ENTRY LEVEL TRADES TRAINING

Electrician

Traditionally, the electrical trade was split into two groups called the construction trade and the industrial trade. Consequently, there were construction electricians and industrial electricians. Recently, this distinction has been changed by combining the two groups under the one heading of "electrical worker". The electrical worker lays out, assembles, installs, repairs, maintains,

and corrects electrical equipment; tests fixtures, apparatus, control equipment, and wiring systems for alarm, communication, light, heat or power in buildings or other structures. Plans proposed installations from blueprints, sketches, or specifications. Installations consist of panelboards, switch-boxes, pull boxes and other electrical devices.

The Program

Students are prepared for entry-level employment in the electrical trade. Basic theory and related information along with hands-on shop practice will develop competence to perform basic electrical tasks. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

Applicants should have good manual and mechanical ability; good health and physical condition. 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 and acceptable work habits
Solve mathematical problems
Apply science concepts
Read and interpret drawings and specifications
Process technical information
Use hand tools
Use power tools
Lift loads and erect scaffolds and ladders
Apply the principles of magnetism
Prepare for employment
Apply electrical energy and power concepts
Apply principles of electrical circuits
Use electrical test equipment
Apply the Canadian Electrical Code
Select and install circuit devices
Connect AC motors and simple controls
Select conductors, boxes, raceways and fittings
Install cables, conductors and fittings

Length of Program: 22 weeks. Students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0800-1500

Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

b. Grade 12 completion with C or better in Algebra 11;

   or

c. Pass an entrance test in mathematics and reading skills.

Career Potential

Job opportunities exist in the electrical construction field relating to residential, commercial and industrial installations. Resource industries and manufacturing firms also offer electrical employment. Most firms prefer applicants with some pre-electrical training.

Instructors

Vince Foley, B.Ed., A.Sc.T.
Mike Horcoff, P.Eng.
Alan Miles, B.Ed.
Stephen Sallaway
Herbert Schweigert, A.Sc.T.
Jim Simpson
Roy Ternes
Otmar Wetzlmayr

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Electricity and Industrial Electronics

This program trains graduates to enter employment as construction, industrial, marine, and maintenance electricians as well as various engineering technician related positions. Graduates may also qualify for advanced standing as indentured candidates within the apprenticeship system.

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.

Each of the ten courses which comprise the program is designed to allow a weekly breakdown of approximately 15 hours in the workshop, where work covers the various practical aspects of the electrical trade; approximately 10 hours of classroom instruction, which covers the necessary theoretical principles; and approximately 5 hours on assigned theoretical problems.

Applicants should possess sufficient physical strength and stamina to meet the demand of the work; good hearing, eyesight, normal color vision, manual dexterity 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, (606) 434-3304.

Program Content

Wiring methods
Fundamentals of electricity and magnetism
D.C. machines
Single phase circuit analysis
Three phase circuit analysis
Transformers
Three phase machines
Magnetic motor control
Electronics

Length of Program: 49 weeks

Prerequisites

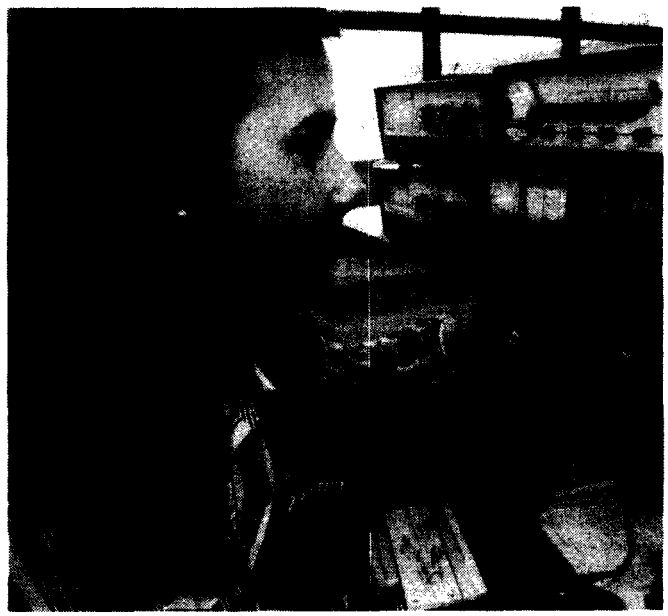
a. Grade 12 graduation with C or better in Algebra 11;
or
b. Pass an entrance test measuring math and reading skills.

Career Potential

Job opportunities exist in the electrical construction field relating to residential, commercial and industrial installations. Resource industries and manufacturing firms also offer electrical working positions. Most firms prefer applicants with previous electrical training.

Instructors

G. Denham
R. McLarnin
M. Wanstall, Chief Instructor



Electronics

The Program

Electronics training will provide graduates with the skills to construct, install, maintain, analyze and troubleshoot electronic equipment and circuits. Students will learn the use of tools and test equipment; repair, adjust and test electronic systems; troubleshoot and interface microcomputer systems, and participate in more advanced analog and digital systems training.

Program Content

Level A

Fundamentals of electronics AC/DC theory
Safety in electronics
Tools for electronics
AC/DC theory circuits and network analysis
Measurement and instruments
Electro-magnetism and application

Level B

Semiconductor devices and theory
Characteristics of semiconductors
Power supplies
Oscillations
Amplification
Integrated circuits
Operational amplifiers
Communication circuits

Level C

Digital techniques and systems
Digital circuitry maintenance
Microprocessor and computer maintenance
Process technical information

Length of Program: 40 weeks consisting of three 13-week levels, plus 5 days of testing and evaluation

Prerequisites

Level A - Grade 12 graduation with Algebra 12 and Physics 11;

Level B - Completion of Level A* or pass assessment for Level A;

Level C - Completion of Level B* or pass assessment for Level B. Poor color vision may restrict employment in some electronic fields.

* Students with training, or a combination of work experience/ training may write a gating exam for advanced placement.

Career Potential

This program trains graduates to undertake the installation, troubleshooting and repair of a variety of electronic equipment, including microprocessors, in the manufacturing and service departments of industrial and commercial establishments. Graduates are also suitable to work in the electronics sales field.

Instructors

Miro Angeles, P.Eng., B.A.Sc., M.Ed., Chief Instructor
Russ Brendzy
Neil Simmonds
Canede Wong, Ditl.Eng.

Apprentices

Fred Bailey

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Power Engineering

General 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. Graduates may then 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 refrigerator plants, and caretakers of large buildings with central heating and air conditioning systems.

The Program

The program is divided into four 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 hand skills, and achieve 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 operations and systems
General electricity
Power plant theory
Instrumentation
Power plant maintenance
General mathematics
Applied science
Computer fundamentals

Length of Program: 40 weeks

Prerequisites

a. Grade 12 graduation;
   or
b. Pass an entrance test measuring math and reading skills.

Career Potential

An analysis of five years of data shows that 70% of Power Engineering graduates were placed in a training related job. In addition, employment was usually obtained 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.

Power Engineering

Technical Program

This program provides sound practical and technical knowledge and skills to persons desiring to enter the power engineering field. In addition, this 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 Interprovincial 4th Class Power Engineer's Certificate of Competency. 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 refrigerator plants, and caretakers of large buildings with central heating and air conditioning systems.

The Program

The program is divided into four 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 hand 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

Length of Program: 40 weeks

Prerequisites

a. Grade 12 including Algebra 12 and Physics 11;
or
b. Pass an entrance test measuring math and reading skills.

Career Potential

An analysis of five years of data shows that 70% of Power Engineering graduates were placed in a training related job. In addition, employment was usually obtained 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.

Power and Process Engineering

(3rd Class)

This program provides sound practical and technical knowledge and skills to persons desiring advancement in the field of power engineering. After completing this 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. Graduates may then 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 four 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 trouble shooting exercises are provided to reinforce theoretical concepts, develop hand skills, and become familiar with additional power engineering techniques.

Program Content

Power plant theory
Technical communications
Thermal engineering
Technical electricity
Fluid mechanics
Metallurgy
Engineering mechanics
Plant management
Strength of materials
Energy management
Power plant maintenance
Computer technology

Length of Program: 40 weeks

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 mentioned qualifications may request individual assessment by the Power Engineering Department.

Career Potential

An analysis of five years of data shows that 80% of Power Engineering graduates were placed in a training related job. In addition, employment was usually obtained within a few weeks of graduation. Average salaries reported by students were amongst 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.

Instructors

A. Barnard
J. Brown, Chief Instructor
W. Brown
R. Carviel
H. Doad, Coordinator, Full-time Programs
W. Edwards
P. George, Coordinator, Upgrading and Correspondence
F. Hajer
A. Lees
H. Peters
H. Rink
R. Smith

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

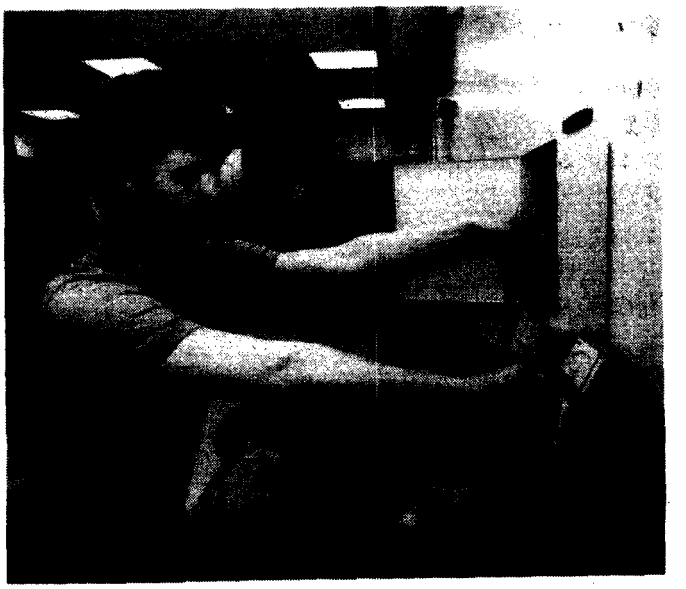
Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Security Alarm Installer



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.

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 trouble-shooting 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

Length of Program: 25 weeks

Prerequisites

a. Grade 12 or equivalent. Preference will be given to applicants with Grade 12 graduation with a C or better in Algebra 11;
or
b. Pass an entrance test measuring math and reading skills;
c. Age requirement of 19 years or older;
d. Security clearance from the office of the B.C. Attorney General.

Career Potential

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 monitor central security stations, install alarm systems, work in sales, troubleshoot existing systems and coordinate security installations.

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 sit the Security Alarm Installers' Tradesman Qualification Exam.

Instructors

L. Sunell, Chief Instructor
C. Spink

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

FOOD TRADES

Commercial Baking
Professional Cook Training
Retail Meat Processing
Retail Meat Wrapping
Sausage Making and Smoked Meats

Commercial Baking

The Program

Training covers all aspects of the baking trade, including bread, cookies and special occasion cakes. Theoretical instruction includes safety, sanitation and hygiene, weighing and measuring techniques and devices, baking terminology, food handling and elementary management. The program's emphasis is on the theory and practical knowledge of basic commercial baking preparation.

Program Content

Food handling and storage
Sweet yeast production
Bread baking technology
Pies, cakes and flans
Cookies and petits fours
Sugar art work
Flowers of royal icing and marzipan
Analysis of materials, terms
Special occasion cakes, wedding cakes
Puff pastries
Buns and rolls
French pastries
Seasonal products
Plant safety factors; sanitation and hygiene
Elementary management
Operation of bakery machinery and use of hand tools
Customer relations

Length of Program: 36 weeks – Intake every 4 weeks.

Prerequisites

Grade 10 or mature student. Applicants are required to present a recent medical certificate and proof of chest x-ray or TB test.

Career Potential

Employment opportunities may be found in large and small bakeries, hotels and restaurants, department stores and large food chain stores. Many graduates have successfully started their own businesses.

Instructors

Fred Andermatt
Hans Leber
Wilhelm Liesch, Chief Instructor

Professional Cook Training

The Program

Cook training covers all areas of short order, institutional cooking. Studentsare trained toplan menus, prepare and present foods attractively, cook in quantities, bake and manage kitchen activities.

Program Content

Level 1: Short Order Cook/Short Order

Lab – 5 weeks

Salad; sandwich; grill; sanitation (must pass Burnaby Health Dept. Food Handlers' Certificate); safety; broiling; basic soup; basic dessert; roasting; gravies; garnish; seafood; breakfast cooking; basic vegetable; microwave use; poultry and meat identification; principles of cooking; service preparation; salad bar.

Short Order Practical – 10 Weeks

Short order practical in short order kitchen and Culinaire Dining Room.

Training in Industry – 5 Weeks

With instructor supervision.

Level 2: Institutional Cook/Cafeteria and Institutional

Lab – 5 weeks

Vegetables; poultry; sauces; seafood; soups; stocks; meat, poultry and fish cutting; salads; fancy sandwich; meat cooking; basic desserts and pastry; meat identification; sanitation; receiving and storing; daily records; basic menu construction; salad bar; service preparation.

Institutional Practical – 10 weeks

Institutional practical in cafeteria kitchen.

Training in Industry – 5 weeks

With instructor supervision.

Level 3: A La Carte and Banquet Cook

Transferred to V.V.I. Must apply to V.V.I. for entry.

Length of Program: Each level is 20 weeks.

Prerequisites

Good health, a high standard of personal hygiene and the ability to stand and walk as required during busy periods. All applicants will be required to present a recent Health Certificate, as required by the Department of Health for the handling of food, and proof of a recent TB test, upon confirmation of a start date.

A challenge examination may be taken by anyone who has had industry experience or High School Career Preparation courses. Full credit for the next level of training will be given on the successful completion of the examination.

Level 1: Grade 10 or mature student.
Level 2: Successful completion of Level 1 or challenge examination for Level 1.

Note: The Professional Cook Training program has two levels of instruction. Students must make application to all levels desired. Students are not guaranteed entry into the next level of training; breaks in training could occur due to late applications, insufficient space in the next level or unsuccessful completion of previous level.

Instructors

Harold Bonkowski
Ronald Christian
Ulrich Falter, Chief Instructor
Bert Gibson
James Hutton
Rick Irwin
Graham Pepper
Thomas Rodgers
Ian Smith
Ernst Wallgram
Keiju Yanagawa
Horst Zimmermann

Retail Meat Processing

The Program

The meat processing course is designed to teach the many aspects of meat cutting and provide an environment in which students can be exposed to the efficiency, effectiveness and economics of current meat merchandising in preparation for employment. The training centre is well equipped with power machinery and the necessary meat cutting accessories. Maintenance, sanitation and proper care of equipment are stressed, and principles of safety are observed and practiced at all times. An introduction to merchandising and basic shop management is also provided through practical experience. Students are encouraged to take pride in their work for personal satisfaction and for good consumer relations. On-the-job training in industry for two weeks gives exposure to the retail meat industry which is very beneficial.

Program Content

Level 1: Primary meat cutting provides training for persons who wish to seek employment in packing house locker plants or related fields. It provides sufficient meat cutting basics for those who show the necessary ability and potential for further advanced training.

Level 2: Advanced meat cutting provides training oriented toward making students more readily employable in retail meat outlets.

Safety
Sanitation in the work area
Personal and equipment hygiene
Wholesale and block-ready primals
Retail block-ready cuts
Processing freezer orders
Service meat case merchandising
Self-service meat case merchandising
Processing poultry, pork, lamb, veal, fish and beef
Receiving
Basic management and all aspects of meat cutting
Use and care of equipment and hand tools
Customer relations

Length of Program: 24 weeks
Level 1: Primary Meat Cutting 12 weeks;
Level 2: Advanced Meat Cutting 12 weeks

Prerequisites

Grade 10 or mature student. Applicants are required to present a recent medical certificate and proof of recent chest x-ray or TB test.

Career Potential

Following graduation from the retail meat processing course, students may find employment in packing houses, block-ready shops, locker plants and small butcher shops; the more successful students may be employed in supermarkets.

Instructors

Robert Audette
Sid Heringer, Chief Instructor
Jack Stacey

Retail Meat Wrapping

The Program

This program provides training for persons who wish to seek employment in packing houses, locker plants, retail meat shops and related fields. It provides sufficient meat wrapping knowledge and experience to make students more readily employable in the meat industry.

Program Content

Safety and sanitation
Health regulations
Personal hygiene
WCB regulations
Use of equipment
Housekeeping
Refrigeration factors (basic)
Meat wrapping
Customer contact
Meat identification
Shelf life and conversions
Culling and re-wraps
Case layout
Signage
Inventory (basic)

Length of Program: 12 weeks

Prerequisites

Grade 10 or mature student. Applicants are required to present a recent medical certificate and proof of recent chest x-ray or TB test.

Career Potential

Upon successful completion of the meat wrapping program, students may seek employment in retail meat shops, delicatessens and other related shops.

Instructors

Robert Audette
Sid Heringer, Chief Instructor
Jack Stacey

Sausage Making and Smoked Meats

The Program

The manufacture of sausage and smoked meats for wholesale and retail stores and delicatessens is a highly specialized skill. Training prepares graduates for employment by teaching all aspects of sausage making. Students are taught to use machinery and hand tools in the sausage making process in a well-equipped training centre with smokehouse and sausage making equipment. Maintenance of sanitation and proper care of equipment are stressed, and principles of safety are observed and practiced at all times. A four week on-the-job training component is provided. Students will be placed in areas of the industry appropriate to their training. An introduction to merchandising and shop management is also provided. Students are encouraged to take pride in their work for personal satisfaction and for good customer relations.

Program Content

All aspects of sausage making and smoked meats
Use and care of equipment and hand tools
Sanitation in the working area
Personal and equipment hygiene
Safety practices
Introduction to merchandising and shop management
Customer relations

Length of Program: 35 weeks

Prerequisite

Grade 10. Mature students who do not meet the educational requirements may have related work experience assessed. Good health and physical ability are required, along with a determination to succeed. Applicants are required to present a recent medical certificate and proof of recent chest x-ray or TB test.

Career Potential

Graduates of the Sausage Making and Smoked Meats program may obtain employment in supermarkets, independent butcher shops, sausage making shops, delicatessens and packing houses.

Instructor

Gerhard Spieckermann

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

MECHANICAL INDUSTRIES TRAINING

Automotive Electrical/Electronics Technician
Automotive Mechanic
Commercial Transport Mechanic
Diesel Engine Mechanic
Heavy Duty Mechanic
Motorcycle Mechanic
Inboard/Outboard Mechanic
Industrial Maintenance Mechanic
Machinist
Millwright
Computer Numerical Control (CNC) Machine Operator
Tool and Die Technician

Automotive Electrical/ Electronics Technician

The Program

This program will take a technician through basic electrical diagnosis and repair to the latest "state of the art" automotive electronics.

Program Length: 17 weeks

Normal Course Hours: 0700-1345

Course 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

Prerequisites

Journeyman or T.Q. status (must provide license number);
or
Apprentice with a letter of recommendation from employer;
or
Pre-tested.**

** PRE-TESTING: 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 as they relate to automotive repair.

Procedure for Pre-Testing

All interested people must apply on 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 can be done Monday to Friday, between 0830 and 1400 hours.

Instructors

Jim Marchant, I.D., T.Q., I.P.
Gabor Retei, T.Q.

ENTRY LEVEL TRADES TRAINING

Automotive Mechanic

Automotive mechanics repair and test motor vehicles, performing such duties as disassembling, inspecting and assembling engines and accessories, cooling systems, transmission and clutches, drive lines, brakes and controls, and suspensions.

The modern automotive mechanic employs logic and deductive reasoning in diagnosing and troubleshooting, using a variety of mechanical and computer controlled systems.

The Program

Training prepares students for entry-level employment in the automotive trade. Basic theory and related information along with hands-on shop practice enable students to become proficient in automotive maintenance and repair. Upon successful completion of the program, students may wish to work toward journeyman status in the trade by seeking employment as an apprentice.

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

Length of Program: 33 weeks.
However, students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0700-1345 (first shift); 1130-1815 (second shift)

Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

b. Grade 12 completion with Math 10 or Trades Math 11, and English 12;

   or

c. Successful completion of an entrance test in math and reading skills.

Career Potential

Employment is found with local garages, 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.

Instructors

Len Arychuk, I.D., H.D.T.Q., Auto.T.Q.
Dan W. Bialobzyski, I.D., T.Q., I.P., A.S.T.Dip.
Norm Cloutier, T.Q., I.P.
Terry Fletcher, I.D.,T.Q.,I.P.
Dave Huesken, I.D.,T.Q.,I.P.
Vito Lalungo, T.Q.
Rob Macgregor, I.D., T.Q., I.P.
Jim Marchant, I.D., T.Q., I.P.
David Ney, T.Q., I.P.
Vince Piva, T.Q., I.P.
Fred Raadsheer, I.D., T.Q., I.P.
Gary Remenyk, T.Q., I.P.
Gabor Retei
Mel Rudeen, I.D., T.Q., I.P.
Sandy Sudom, I.D., T.Q.
Mike Thomas, T.Q., I.P.

ENTRY LEVEL TRADES TRAINING

Commercial Transport Mechanic

(Truck and Bus Mechanic)

Commercial transport mechanics overhaul, recondition, repair, and maintain highway trucks, air-conditioned tour buses, forklifts 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 and reassembly of various vehicle parts: motor, transmission, clutch, differential, suspension system and brakes.

The Program

Training prepares students for entry-level employment as commercial transport mechanics. 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. Upon successful completion of the program, students may wish to work toward journeyed status in the trade by seeking employment as an apprentice.

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

Length of Program: 30 weeks.
However, students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0700-1345

Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

b. Grade 12 completion with Math 10 or Trades Math 11, and English 12;

   or

c. Successful completion of an entrance test in math and reading skills.

Career Potential

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. Those who gain the required work experience with employers may be eligible to write a Trades Qualification (T.Q.) examination. Graduates of this program are encouraged to seek formal apprenticeships in the industry.

Instructors

Peter Condon, I.D., Com.Trans., T.Q.
Ewan Sheard, I.D., Com.Trans., T.Q., B.Ed.
Larry Strong, I.D., Auto.I.P., Com.Trans., T.Q.

ENTRY LEVEL TRADES TRAINING

Diesel Engine Mechanic

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, bearing, gears, valves and bushings; rebuild engine blocks, cylinder heads, sub assemblies and components; fuel, electrical and cooling support systems.

The Program

Students are prepared for entry-level employment as diesel engine mechanics. Basic theory and related information along with hands-on shop practice enable students to become proficient in basic diesel engine maintenance and overhaul procedures. Upon successful completion of the program, students may wish to work toward journeyman status in the trade by seeking employment as an apprentice.

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

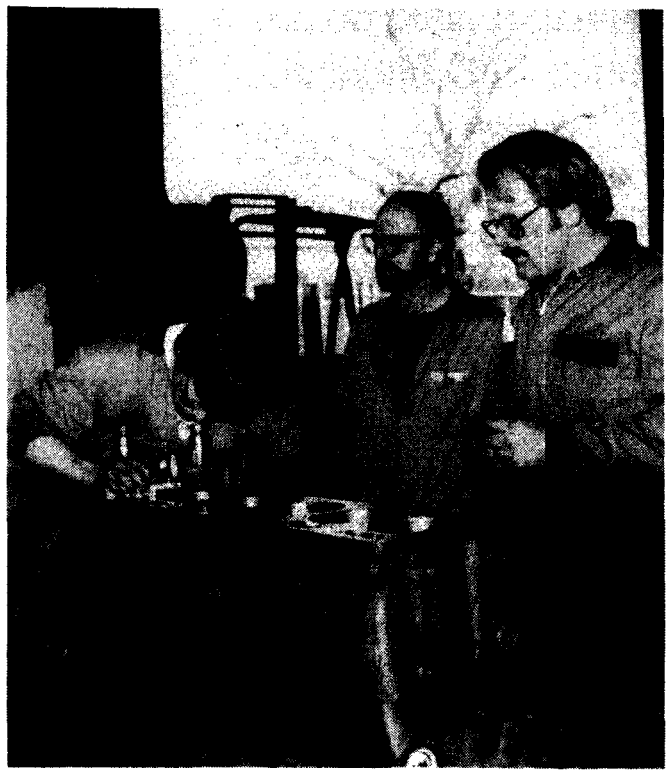
Describe mechanical trades
Solve mathematical problems
Describe and use safe work practices
Technical communications
Apply science concepts
Electrical principles and practice
Service electrical systems and components
Start, run, move, and shut down selected equipment
Describe and use mechanic's hand 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

Length of Program: 42 weeks.
However, students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0700-1345

Instructors

Don Eklof, I.D., Diesel Eng.I.P., H.D.I.P., Chief Instructor
Al Westfall, I.D., H.D.I.P.
Tom Kozar, I.D., H.D.I.P.
Paul Ehni, I.D., H.D.I.P.



Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

b. Grade 12 completion with Math 10 or Trades Math 11, and English 12;

   or

c. Successful completion of an entrance test in math and reading skills.

Career Potential

Diesel engine mechanics are required wherever diesel engines are found in industry. This includes railway, bus and truck lines, the marine industry, repair garages, logging and mining camps, and dealerships. In large businesses, apprenticeships may become available, but small shops usually don't offer them. Many opportunities exist in this trade, however, graduates should be prepared to work out of town in entry level jobs in industry until trainee or apprenticeship positions become available.

ENTRY LEVEL TRADES TRAINING

Heavy Duty Mechanic

The heavy duty mechanic repairs and tests heavy duty machines such as 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.

The Program

Training prepares students for entry-level employment as heavy duty mechanics. Basic theory and related information along with hands-on shop practice enable students to become competent in basic heavy duty mechanical maintenance and repair. Upon successful completion of the program, students may wish to work toward journeyman status in the trade by seeking employment as an apprentice.

Heavy duty mechanics must have 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

Length of Program: 30 weeks.
However, students may be allowed to proceed through as quickly as they are able to master the skills.

Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

b. Grade 12 completion with Math 10 or Trades Math 11, and English 12;

   or

c. Successful completion of an entrance test in math and reading skills.

Career Potential

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.

Instructors

Don Eklof, I.D., Diesel Eng.I.P., H.D.I.P., Chief Instructor
Al Westfall, I.D., H.D.I.P.
Edward Wilk, H.D.I.P.
Don Wickstrom, I.D., H.D.I.P.
Dave Mundell, H.D.I.P.

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

ENTRY LEVEL TRADES TRAINING

Motorcycle Mechanic

Motorcycle mechanics are involved with most aspects of motorcycle, ATV, and related motorcycle manufacture, equipment service and repair. They are required to perform operations ranging from new unit assembly and full service to top end and transmission/crankshaft rebuilds, electrical component repair, and chassis, wheel, suspension, final drive, and accessory service.

The Program

Training prepares students for entry-level employment as motorcycle mechanics. Basic theory and related information along with hands-on shop practice will enable students to work in the motorcycle service industry.

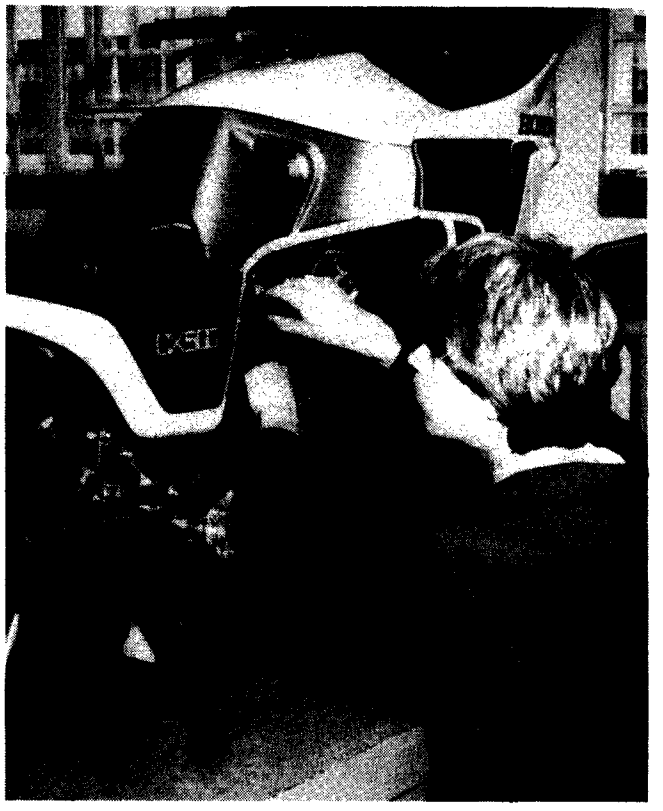
Applicants cannot be allergic to solvents. Good physical condition is desirable. Potential students with medical or physical difficulties should contact Student Services to arrange an interview (telephone interview if out of town) with the Institute's Special Needs Counsellor, (604) 434-3304.

Program Content

Use safe work practices
Solve mathematical problems
Process technical information
Use basic measuring and hand tools
Use power tools
Use fasteners, fittings and materials
Oxyacetylene weld and cut
Describe seal, gasket and bearing design and service
Describe two and four cycle top end theory and design
Perform two and four cycle top end service and rebuilding
Perform clutch service
Describe lubrication systems
Service power transmission
Perform crankshaft service
Service fuel delivery systems
Describe exhaust system design and maintenance
Service electrical systems
Describe final drive service
Service brake systems
Service wheels and tires
Service frame and suspension systems
Perform selected service procedures
Prepare for employment

Length of Program: 34 weeks. However, students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0700-1345



Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

b. Grade 12 completion with Math 10 or Trades Math 11, and English 12;

   or

c. Successful completion of an entrance test in math and reading skills.

Career Potential

Many positions are in service departments at franchised motorcycle dealers. There are some positions available in town, but most are out of town. There is no formal apprenticeship training in this trade at present, however, a program is being developed. Those who have the required years of experience, as verified by an employer, may be eligible to write a Trades Qualification (T.Q.) exam. Most graduates of this program are expected to find jobs in the trade.

Instructor

Tom Nelson, Dipl. Tech.

ENTRY LEVEL TRADES TRAINING

Inboard/Outboard Mechanic

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 and repair gauges and instruments, and 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 the maintenance and repair of boat rigging, boats and engines.

The Program

Students are prepared for entry-level employment as inboard/outboard marine mechanics. Basic theory and related information along with hands-on shop practice enable students to become competent in basic inboard/outboard maintenance. Upon successful completion of the program, students may wish to work toward journeyman status in the trade by seeking employment as an apprentice.

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 cut and weld
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
Rig a boat for an outboard motor
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
Prepare for employment

Length of Program: 34 weeks.

However, students may be allowed to proceed through as quickly as they are able to master the skills.

Instructors

Ken Nichol, I.D., T.Q.
Jeff Mica, T.Q.

Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

b. Grade 12 completion with Math 10 or Trades Math 11, and English 12;

   or

c. Successful completion of an entrance test in math and reading skills.

Career Potential

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. Although employment prospects vary with the economy and the weather, the potential is thought to be good at this point.

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Industrial Maintenance Mechanic

The Program

Industrial Maintenance Mechanics are responsible for the maintenance and repair of a wide variety of industrial equipment.

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 working practices
Describe industrial maintenance mechanic occupation
Describe industrial, business and labor organization
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 computers have in industry
Describe preventive maintenance procedures
Prepare for employment

Length of Program: 60 weeks (15 months)

Term 1: 22 weeks
Term 2: 22 weeks
Term 3: 16 weeks

Normal Course Hours: 0700-1400

Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Grade 12 graduation with mechanical electives **and** pass an entrance test measuring math and reading skills
or
b. Individual assessment by department.

Cooperative Programs

Cooperative programs integrate paid work experience with training at BCIT. The work experience relates to your training program. BCIT currently offers coop programs to trades students in the Industrial Maintenance Mechanic, Tool and Die Technician, and Horticulture programs. Other Trades programs are being considered. For more information contact Coop Education at 432-8753. 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.

Career Potential

Opportunities exist throughout the Province in a wide 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.

Instructor

Owen Collings, I.D., Machinist T.Q., Millwright T.Q.

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

ENTRY LEVEL TRADES TRAINING

Machinist

The machinist makes or repairs metal parts, tools or machines, including custom work such as line boring pump castings or 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.

The Program

Training will prepare students for entry-level employment in the machinist trade. Basic theory and related information along with hands-on shop practice will enable students to become competent in the basic operations needed to make industrial parts and components. Upon successful completion of the program, students may wish to work toward journeyman status in the trade by seeking employment as an apprentice.

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

Length of Program: 34 weeks.

However, students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0700-1400 (first shift)
or
1300-1945 (second shift)

Prerequisites

Anyone over 16 who meets the following requirements may apply.

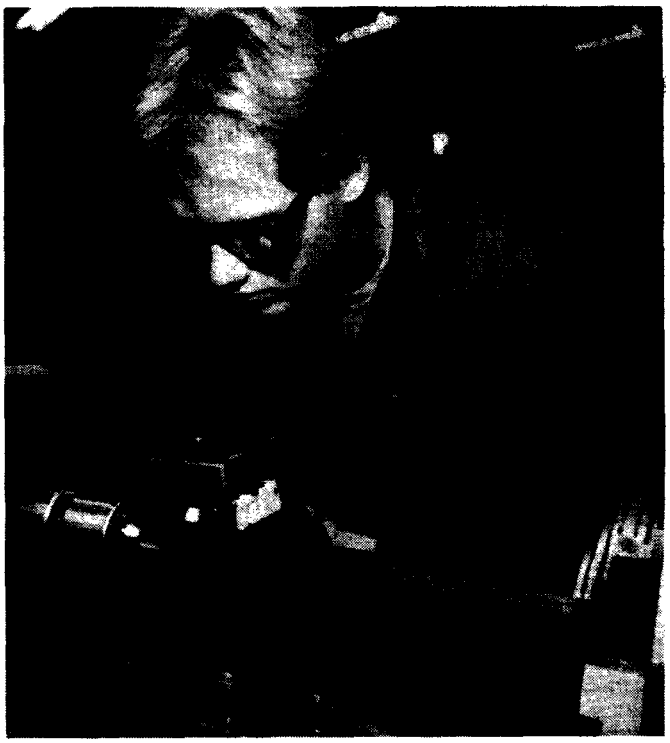
a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

b. Grade 12 completion with Math 10 or Trades Math 11, and English 12;

   or

c. Successful completion of an entrance test in math and reading skills.



Career Potential

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.

Instructors

George Ainslie, I.D., Machinist I.P., Tool & Die I.P.
Greg Burke, I.P., B.Ed.
Don Grant, I.D., T.Q.
Ted Marchant, I.D., T.Q., I.P.
Derek Rampling, B.Ed., N.Z.C.E.(Mech), Tool & Die Advanced Trade Cert., Machinist Advanced Trade Cert., Millwright B.C.T.Q.
Walt Sakich, T.Q.
John Spencer, I.D., City & Guilds Machinist T.Q.
Pat Thomas, I.D., Machinist I.P., Electronics Tech.T.Q.

ENTRY LEVEL TRADES TRAINING

Millwright

Millwrights are often described as masters of all trades as they are expected to install, maintain and/or repair all types of machinery in almost any industry.

Anywhere that machinery exists there is usually work for a millwright. Employment for millwrights is mainly centred on the major industries in B.C. such as 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 will prepare students for entry-level employment in the millwright trade. Basic theory and related information along with hands-on shop practice will enable students to 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

Length of Program: 39 weeks.

However, students may be allowed to proceed through as quickly as they are able to master the skills.

Normal Course Hours: 0800-1500

Prerequisites

Anyone over 16 who meets the following requirements may apply.

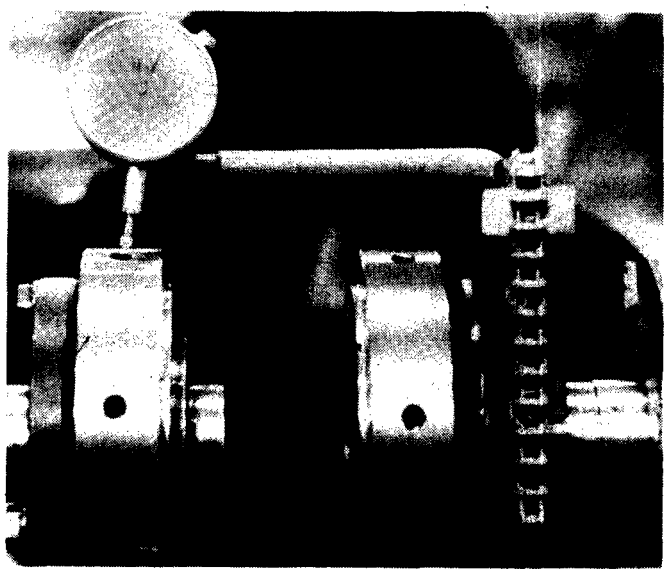
a. Submit documentation that you have one of the following:
   - Successful completion of Career Preparation from a B.C. secondary school within the past two years;
   - Successful completion of a portion of TRAC training from another B.C. post-secondary institution within the past three years;
   - Journeyman standing in a related trade;

   or

b. Grade 12 completion with Math 10 or Trades Math 11, and English 12;

   or

c. Successful completion of an entrance test in math and reading skills.



Career Potential

The potential for entry into a Millwright apprenticeship is good at this time. The expertise gained in this ELTT 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.

Instructors

Basil Acorn, T.Q.
Todd Davies, I.D., T.Q.
Peter Fill, I.D., T.Q., I.P.

Accommodation

For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Computer Numerical Control (CNC) Machine Operator

The Program

This program trains students to operate CNC machines. Training is designed for machinists and other trades wishing to upgrade their skills in the operation of CNC equipment. Students must demonstrate ability to use conventional shop equipment before being trained to operate and program CNC equipment. Training provides students with a basic background in the production of CNC programs. The learning tasks involving programming provide the operator with sufficient background to produce simple programs, and to edit existing CNC programs.

Program Content

Describe computers
Describe basic NC and CNC programming
Use CNC equipment
Process technical information

Length of Program: 14 weeks

Normal Course Hours: 0700-1400

Prerequisites

Students should have completed a machinist pre-employment program, hold a trade certificate or have equivalent demonstrated capability in the following areas: use of conventional shop equipment; safe work practices; mathematical problems—machine shop geometry, angles; reading and interpreting drawings and using precision measuring instruments.

Career Potential

This efficient and precise method of machine operation has a variety of applications in: machine shops, the tool and die and moldmaking 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.

Instructors

Ted Marchant, I.D., T.Q., I.P.
Derek Rampling, B.Ed., N.Z.C.E.(Mech), Tool & Die Advanced Trade Cert., Machinist Advanced Trade Cert., Millwright B.C.T.Q.

Tool and Die Technician

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.

A tool maker is required to operate all types of shop equipment such as lathes, grinders, milling machines and Computer Numerical Control Machines.

Program Content

Tool and die machining	Level 1, 2 and 3
Mathematics	Level 1 and 2
Metallurgy	Level 1 and 2
Mechanics	Level 1, 2 and 3
Tool design	Level 1, 2 and 3
Blueprint reading and drafting	Level 1 and 2
Manufacturing processes	Level 3
Materials and processes	Level 3
Computer Numerical Control (CNC)	Level 1, 2 and 3
Electrical discharge machining	Level 2 and 3
Technical communication	Level 1
Industry work terms	Level 1, 2 and 3

Length of Program: 3 academic levels with 3 coop education sessions (total 103 weeks)
Level 1: 34 weeks
Level 2: 33 weeks
Level 3: 36 weeks

Normal Course Hours: 0700-1400

Prerequisites

Anyone over 16 who meets the following requirements may apply.

a. Grade 12 graduation with mechanical electives **and** pass an entrance test measuring math and reading skills
   or
b. Individual assessment by department.

Career Potential

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, and technical sales.

On completion, graduates will receive a technician certificate. Two years technical training credit will be given towards a machinist or tool making apprenticeship.

Instructor

George Ainslie, I.D./Machinist, I.P., Tool & Die I.P.

Accommodation

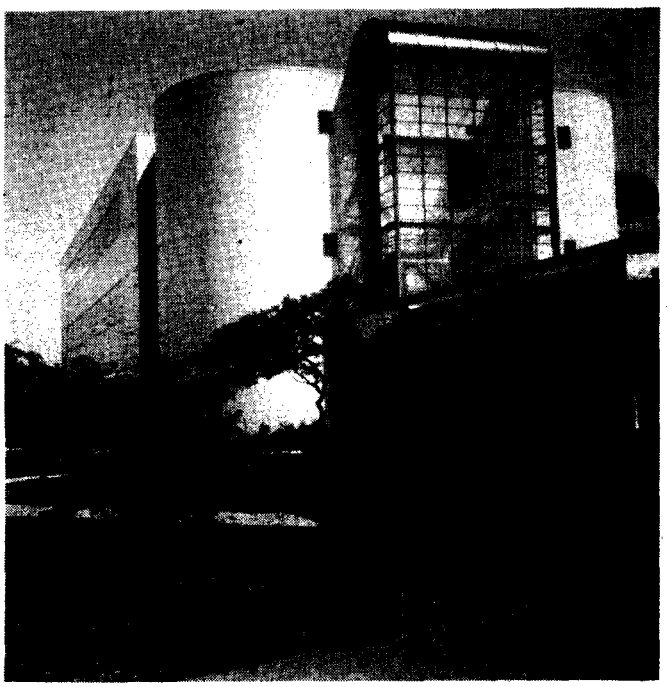
For assistance in finding suitable accommodation, contact the BCIT Housing Office at (604) 432-8677.

Financial Aid

There is an improved financial aid program for trades training. Attend a one hour information session at BCIT held every Friday at 1330 hours. Make an appointment for the financial aid information session by phoning Student Services (604) 434-3304.

Applicants may also wish to contact their local Canada Employment Centre regarding sponsorship.

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676



PROCESS TRADES

Diamond Driller Helper
Greenhouse, Nursery and Landscape Worker

Diamond Driller Helper

Diamond driller helpers assist qualified drillers to operate drilling equipment in rock and soil to facilitate blasting in mining or construction projects. They tap sub-surfaces to explore the earth for mineral deposits, sample rock for suitability and seismic prospecting, as well as take core samples.

Program Content

Familiarization with Lonyear 38 drill
Transport, set up, operate and dismantle rigs
Supply pumps
Helicopter safety
Mechanical and electrical safety procedures
Welding
Hydraulics
Operate support equipment
Ecology's role in nature

Length of Program: 14 days

Normal Course Hours: 0830 - 1530

Training Location: Kamloops

Prerequisites

Grade 10 and a recent medical certificate showig good hearing and physical condition. The Mines Regulation Act requires individuals working at the mine face to be 18 years of age. Must have a good working knowledge of the English language.

Career Potential

Opportunities exist in most heavy industrial trades, mining and forestry, exploration companies, oil and mineral industries, and related occupations.

Instructor

T.B.A.

Upgrade Levels 2 and 3

Level 2

This course is conducted with two instructors. One instructor works almost continuously on the drill with a small group while the other instructor works with the balance of the class in small groups. Students will work on projects while awaiting their turn on the drill.

Methods and conditions of drilling
Running parameters and bit selection
Drilling through faults
Drilling with lost circulation
Triple tube coring methods
Wedging use and components
Control drilling procedures
Hole survey methods
Grouting use and methods

Set-up and Use of Fluids, Lubes, Mud and Cement
Fluid and lube set-up and preparation
Mud use, testing and set-up
Cementing and capping a hole

Operation and Maintenance of Support Equipment
Fishing and Reaming Techniques
Minor Equipment Repairs
Hydraulic systems components and operation
Diesel engine operation
Diesel engine and hydraulic system minor repair and maintenance

Drilling Routines
Directing helpers
Derrick, mast and basket erection
Drill operation
Overburden drilling
Casing the overburden
Coring procedures
Casing recovery

Length of Program: 10 days; includes weekend.

Normal Course Hours: 0830-1530

Training Location: Kamloops

Level 3 (Under development)

This course is conducted with one instructor/coordinator and guest instructors from industry.

Drilling Strategies and Techniques
Tools and equipment
Problems and techniques in deep holes
Fishing and reaming problems and techniques in deep holes
Principles of mobilizing and demobilizing for a drill job

Care of Sick and Injured at a Drill Site
CPR techniques
Temporary care methods
How to communicate with a medical advisor

Drill Water Systems: Establishment and Maintenance
Basic water pressure calculations
Troubleshooting a water system

Special Drilling Techniques and Materials
Cementing procedures
Mud: advanced procedures and materials
Winter drilling techniques
Handling explosives used in drilling

Wedging Techniques
Reasons and techniques of wedging
How to use the Sperry-Sun compass

Equipment Repairs
Hydraulic system fault-finding and solutions
Electric system fault-finding and solutions
Engine and drill fault-finding and solutions
Limited cutting/welding techniques for non-structural repairs and fabrication

Length of Program: 10 days; includes weekend

Normal Course Hours: 0830-1530

Training Location: Kamloops

Prerequisites

Grade 10 and a recent medical certificate showing good hearing and physical condition. The Mines Regulation Act requires individuals working at the mine face to be 18 years of age. Must have a good working knowledge of the English language.

Career Potential

Opportunities exist in most heavy industrial trades, mining and forestry, exploration companies, oil and mineral industries, and related occupations.

Instructor

Jerry Silva

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Greenhouse, Nursery and Landscape Worker

The Program

The course prepares students for entry-level employment as greenhouse, nursery or landscape workers. It also qualifies students to enter the 4-year B.C. Apprenticeship program with 6-12 months credit. Theory, along with hands-on practice, will enable students to perform common greenhouse nursery and landscape tasks competently.

Program Content

Identify 200-300 greenhouse and landscape plants
Describe plant usage in various climates, microclimates and landscape designs
Identify plant parts and processes
Provide a favorable growing environment by using protective structures and control systems for heat, light, water and humidity
Identify and improve soils and pot plant media
Drain and irrigate landscaped areas and containerized plants
Select and use specialized tools and machinery
Identify common pests, diseases and weeds
Obtain a Pesticide Applicators Certificate
Install and maintain turf
Install and maintain trees, shrubs and herbaceous displays
Propagate plants by seed, cuttings, division and grafting
Plant and maintain containerized and field grown hardy nursery stock
Plant and maintain greenhouse crops for indoor display
Estimate business risks, landscape maintenance costs and horticultural opportunities

Length of Program: 41 weeks which includes a cooperative segment of practical training in the B.C. horticultural industry.

Prerequisites

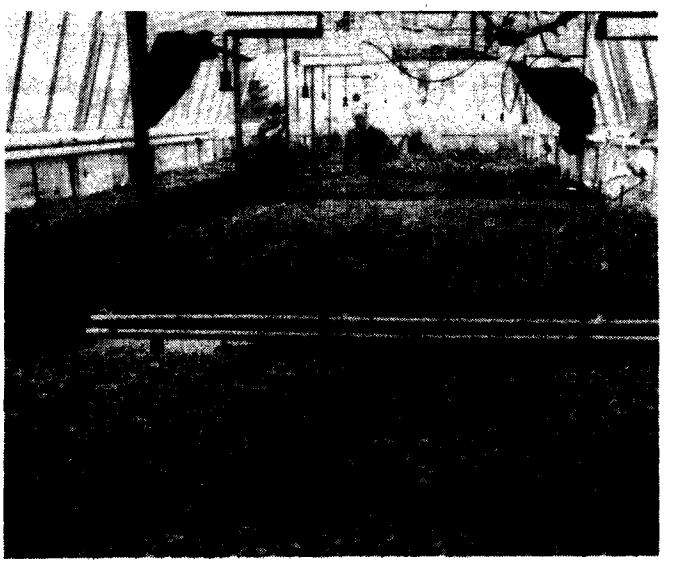
Grade 10

Strong and healthy backs and knees are important prerequisites.

Please note: Students/graduates will be required to work with pesticides and in inclement weather. If you have allergies you must be able to control them with medication because exposure is great.

Cooperative Education

This program incorporates paid on-the-job experience during the school year. The student will be required to successfully complete one (1) ten-week work term. The cooperative education work occurs during April, May and June. In the past, students have been employed by greenhouses, nurseries or landscaping companies throughout the lower mainland. The Cooperative Education department offers a service which will assist you in securing this work term experience.



Career Potential

Graduates may find employment with established landscape maintenance and installation firms, garden centres, greenhouses, nurseries and municipal and provincial Parks Boards. There is also good potential for self-employment.

Instructors

Steve McNamara, Dip. Hort., Kew, Chief Instructor
Jim O'Friel, Cert. Hort., Dublin
Joe Taaffe, B.Agr.Sc.(Hort.)

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

RENEWABLE RESOURCES TRADES

Forestry Crewperson
Tree Trimmer

Forestry Crewperson

The Program

Students are taught both the theory and practical skills required by the forest industry; emphasis is on practical field work. Students will learn forest regeneration, survival and juvenile spacing; site preparation and cone collection. They will acquire the skills necessary to use the power tools, hand tools and mechanical equipment required for clearing, spacing and planting. Recognition of common insects, diseases and undesirable species, are all part of the intensive training provided.

Program Content

Site preparation
Forest service organization
Intensive forestry
Regeneration, survival and pre-juvenile spacing surveys
Traversing
Power chain saw safety and maintenance
Maintenance of personal physical condition
Cone collection
Tree planting
Exposure to common insects and diseases
Recognition of problem areas
Mechanical juvenile spacing
Undesirable species control
Survival first aid course

Length of Program: 13 weeks

Normal Course Hours: 0830-1530

Prerequisite

Grade 10. Excellent physical condition is essential. Must have a good working knowledge of the English language.

Career Potential

Forestry crewperson training provides the opportunity to be employed outdoors or to become a contractor. Opportunities exist for employment with federal and provincial governments, large forest companies, industrial research companies, many private companies and silvicultural contractors.

Instructors

Roald Kley
Clarence Diebold

Tree Trimmer

The Program

This is a practical hands-on course dealing with operation, maintenance and safety of tree trimming and climbing operations.

Program Content

Chainsaw operation
Survival first aid
Chipper operation
Ground safety
Falling and bucking
Boom truck operation
Climbing
Live wire operations
Pruning
Roping, topping for limb removal
Rescue

Length of Program:
20 days (for those applicants who can document proof of a Survival First Aid course)
21 days (for applicants who have not previously completed a Survival First Aid course)

Prerequisite

Applicants should have a minimum of THREE months experience in tree trimming and furnish a letter from an employer to substantiate this prerequisite. Graduates from the Forestry Crewperson program are also acceptable applicants.

Priority placement into the program is given to those applicants who can provide a "letter of intent" from an employer. This letter must be on company letterhead and indicate that the employer is willing to provide the applicant with 1200 hours of supervised climbing and trimming near energized lines.

Career Potential

Successful completion of the program, plus 1200 hours of supervised climbing and trimming near energized lines, plus successful completion of the Tree Trimmer course and W.C.B. Survival First Aid Certification, are required before you write an examination for certification by the Ministry of Advanced Education and Job Training. This certificate is usually required for employment with B.C. Hydro or contractors who work for B.C. Hydro.

Special Equipment

Students should bring their personal rain gear, climbing boots and personal safety gear (hard hat, eye/ear protectors, slash pants). Students need standard lineman's boots. A chainsaw should be brought by each student.

Instructor

G. Kincaid

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE, BURNABY
BRITISH COLUMBIA, CANADA V5G 3H2
TEL: (604) 434-3304
TOLL FREE: 1-800-242-0676

Index