BCIT

BRITISH COLUMBIA
INSTITUTE OF TECHNOLOGY

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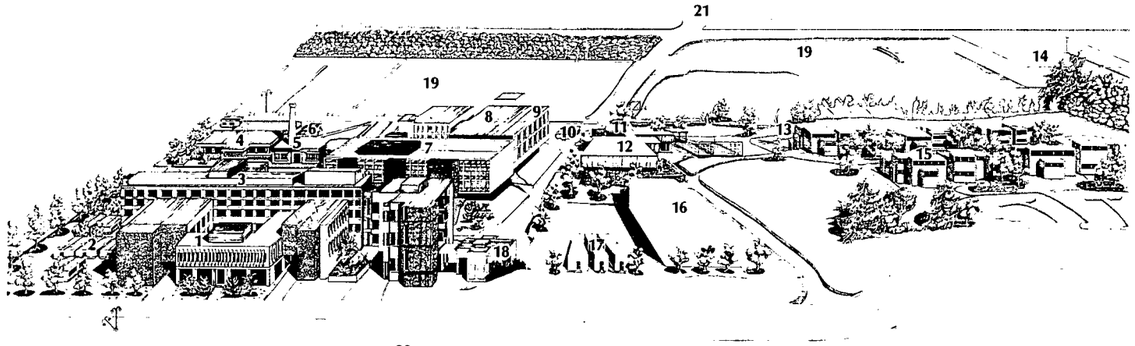
Campus Map



Legend

1 Registration/Admissions
2 "A" Portables
3 Main Building
4 Food Training Centre
5 Mechanical Building
6 "C" Portables
7 1976 Building
8 Library
9 Bookstore
10 Campus Life Portable
11 Student Activity Centre
12 Gymnasium
13 Playing Fields
14 Logger Sports Field
15 Maquinna Residence
16 Teacher Training Centre (UBC)
17 "B" Portables (Nursing)
18 Theatre Building
19 Parking
20 Willingdon Avenue
21 Wayburne Avenue

Hello!

We welcome your interest in the British Columbia Institute of Technology.

Our campus is in Burnaby near Canada Way. The surroundings and setting are sensible, rather than spectacular, but we do have a great view of the mountains — on a clear day!

Our student body is medium-sized — about 3,800 — and this gives BCIT a friendly, casual atmosphere.

BCIT has a lot to offer you: excellent job-oriented training by faculty who are interested in their students as individuals. In just two years, you can earn a nationally-recognized Diploma of Technology and begin your career in business management, engineering or health.

The courses are intensive — 35 hours a week of classes plus assignments and study time — but much of your time is spent in labs gaining practical experience in using equipment and applying techniques.

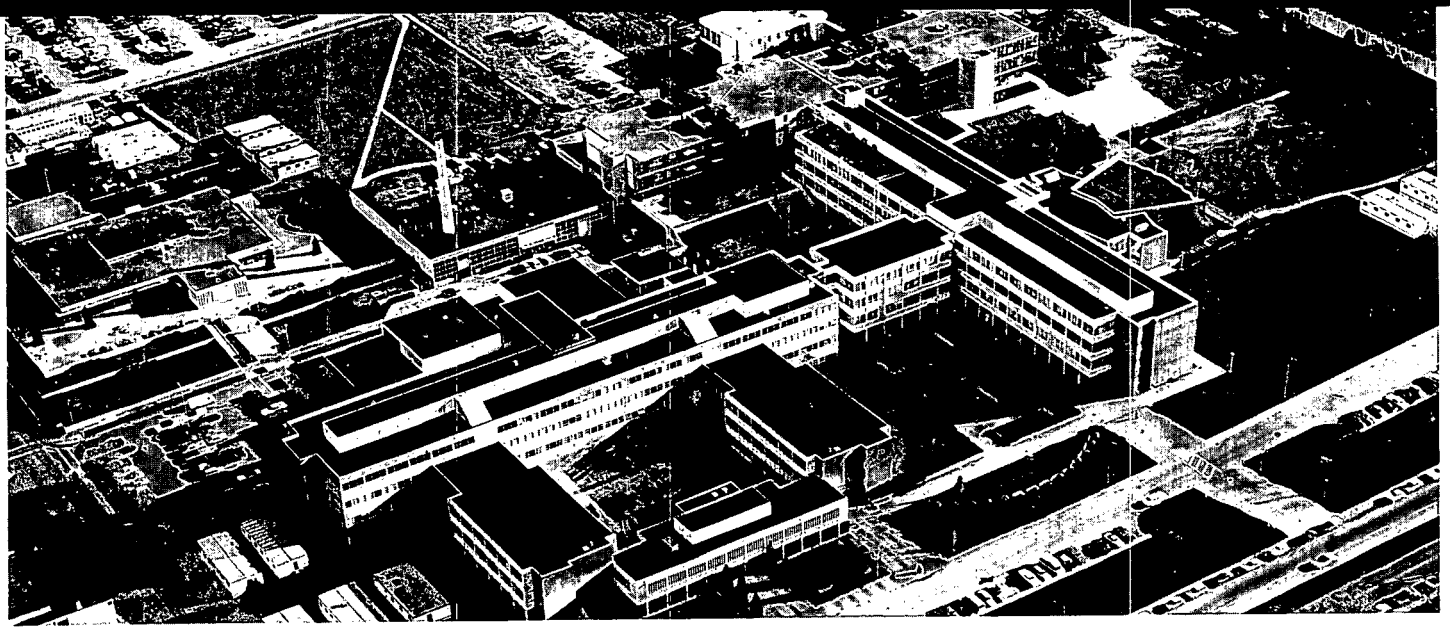
But it's not all hard work. There are dances, sports and special events and coffee in the caf.

When you think about your future, think about BCIT — the career campus.

Gordon A. Thom

Gordon A. Thom,
B.Comm., M.B.A., M.Ed.,
Principal

BCIT: A Thumbnail Sketch



1958 A royal commission discovers that Canada must bring technologists from abroad to fulfill job vacancies because there is no technological training available in the country

1959 The Bridge Report recommends that a technological institute be established in B.C.

1960 The federal government passes the Technical and Vocational Training Assistance Act providing for joint federal-provincial funding of technical and vocational schools

1961 The Government of British Columbia announces plans to build BCIT

1962 L.C. (Cec) Roper is named as BCIT's first principal

1964 BCIT opens its doors to students

1966 First graduates begin their careers

1967 Dean Goard succeeds Cec Roper as principal

1970 Student Activity Centre opens

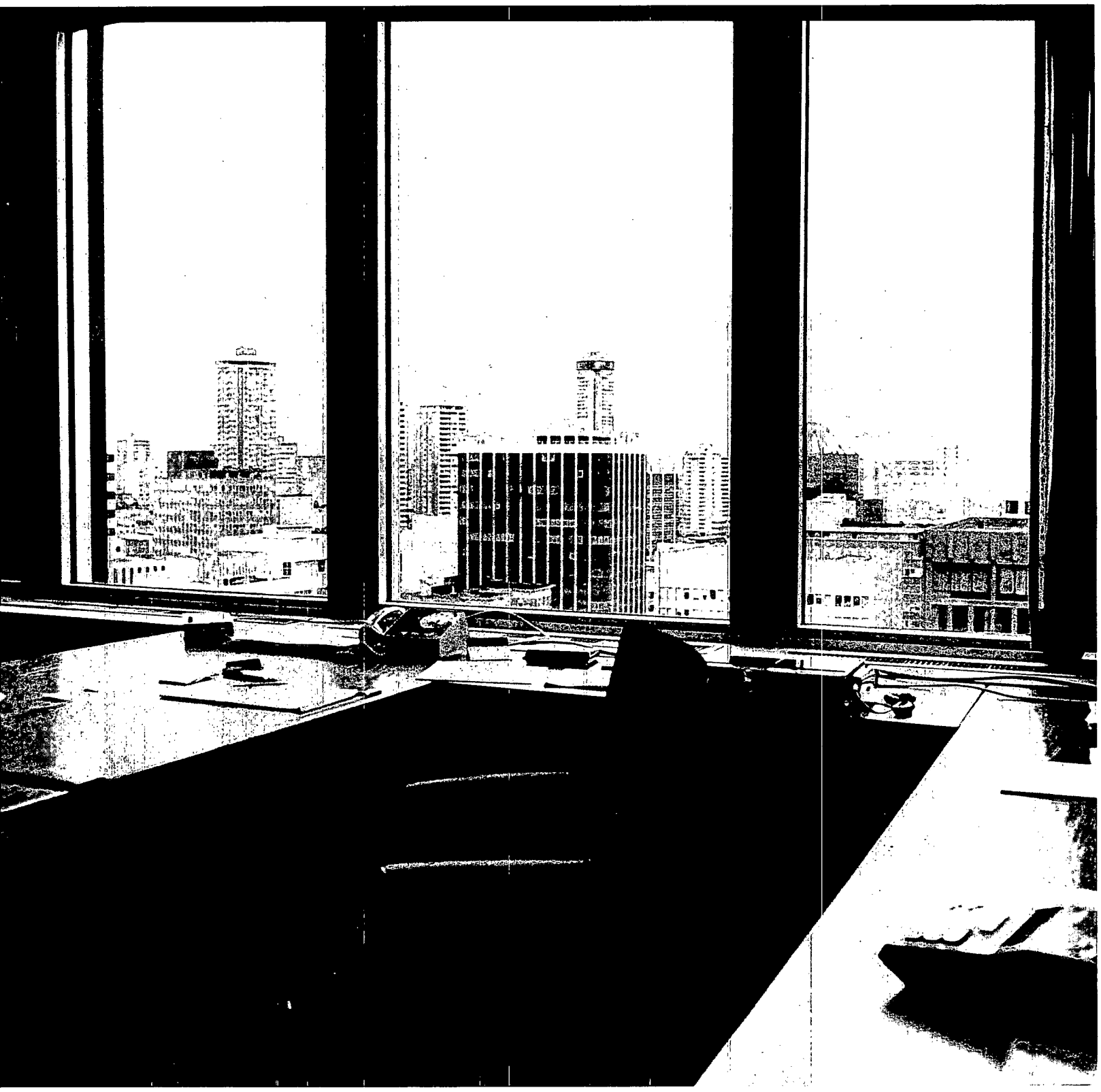
1974 BCIT Act is passed by B.C. legislature removing the Institute from the direct control of the Ministry of Education. Gordon Thom succeeds Dean Goard as principal

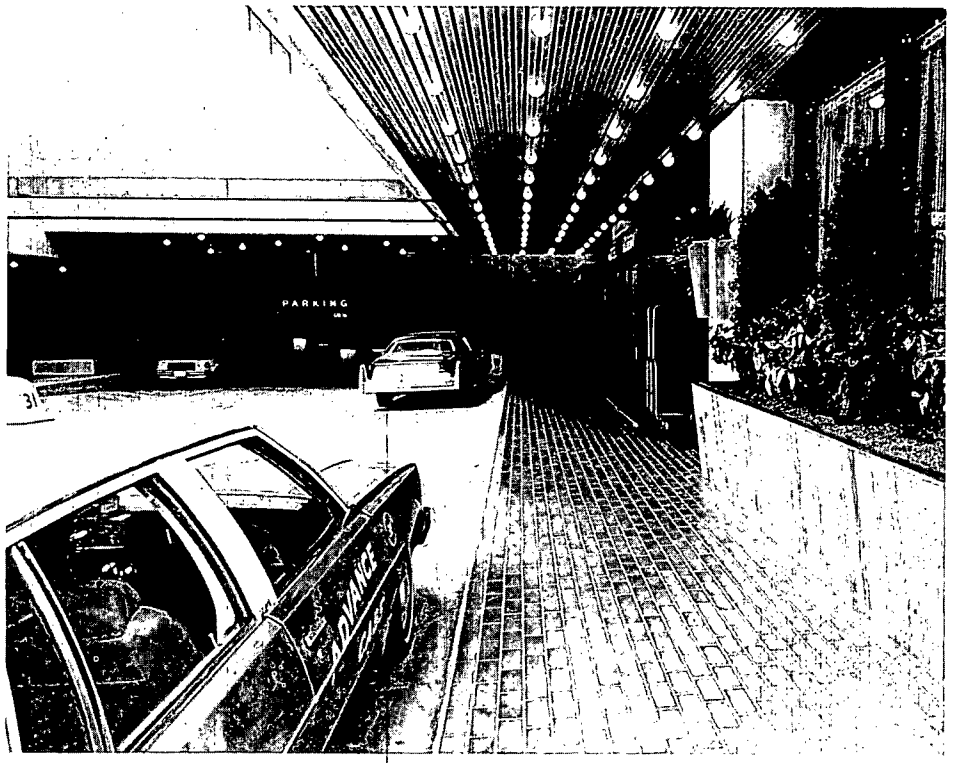
1977 The B.C. legislature passes the Colleges and Provincial Institutes Act altering BCIT's status

1978 First on-campus student residence opens

Contents

Business Management




PARKING

Administrative Management

Many people who are contemplating a career in business management would like to acquire a solid core of knowledge and skills which can then be fitted to any area of the business community. The Administrative Management Technology provides such an opportunity, and is particularly valuable to those who have a special interest in small or self-owned businesses.

Job Opportunities
Graduates of the Administration Option work in planning, banking, finance, production, marketing or real estate. Many now operate their own businesses.

Graduates of the Personnel and Industrial Relations Administration Option become involved in manpower selection and placement, manpower training and development, labor-management relations, job evaluation, and organization renewal and development.

Graduates in Public Administration may join the public service at the municipal, regional, provincial or federal level, or enter the private sector as general administrators.

The Program
Following a year of general studies, students select one of three options: Administration, Personnel and Industrial Relations Administration or Public Administration.

Prerequisites
Graduation from the Selected or Combined Studies Program with Algebra 11, Math 11 or Business and Consumer Math 11. Prospective students should be people-oriented. Business experience is an advantage.

Post-graduation
Graduates may earn advance credit towards designation as a Chartered General Accountant or a Registered Industrial Accountant. Advance credit is also given by the Chartered Institute of Chartered Secretaries and Administrators.

Course of Studies

		Clrm hr/wk
Year 1	**Term 1**	
10.130	Management I	3
10.135	Economics	3
14.050	Introduction to Data Processing	4
14.184	Office Systems and Procedures	3
16.140	Accounting	5
20.191	Marketing	3
22.110	Business Mathematics	4
31.110	Business Communication	4
	Library and Research	6
		35
	Term 2	
10.221	Organizational Behavior I	3
10.230	Management II	4
10.235	Economics	3
10.240	Government and Business	3
	Term 2 cont	
16.240	Accounting	5
20.291	Marketing	3
22.210	Business Statistics	4
31.210	Business Communication	4
	Library and Research	6
		35

Year 2	Term 3	Adm	Pers	Public Adm
10.321	Organizational Behavior II	—	3	—
10.325	Industrial Relations	4	4	4
10.327	Organization Renewal and Development	—	3	—
20.350	Real Estate Management	3	—	—
10.331	Management III	4	—	4
10.340	Government and Politics in Canada	—	—	4
10.360	Business Law	3	3	3
10.370	Management of Human Resources I	—	3	—
14.052	Computers in Business	4	4	4
16.344	Management Accounting	4	—	—
16.350	Public Financial Administration	—	—	4
16.362	Finance	4	4	4
22.310	Management Engineering I	3	3	3
	Library and Research	6	8	5
		35	35	35
	Term 4			
10.425	Industrial Relations	—	3	—
10.427	Training and Development	—	3	—
10.428	Directed Studies	6	6	6
20.450	Real Estate Management	3	—	—
10.431	Management IV	3	3	3
10.440	Government and Politics in Canada	—	—	4
10.460	Business Law	3	3	3
10.470	Management of Human Resources II	3	4	3
16.445	Credit and Collections	4	—	—
16.450	Taxation	—	—	3
16.462	Finance	4	4	4
22.410	Management Engineering II	2	2	2
	Library and Research	7	7	7
		35	35	35

Subject Outlines

10.130 Management I — An orientation to the nature of business in the private enterprise system, embracing forms of business ownership, organization, man-

agement principles and techniques, as well as the functions of planning and organizing. Students are given an opportunity to develop their analytical skills by analysing, deliberating upon, and proposing solutions to typical business problems.

10.135, 10.235 Economics — The aim of the course is to develop an understanding of the organization and operations of the Canadian economy. Students analyse demand and supply, how production costs vary and how prices are determined in different markets (micro-economics). The theoretical tools of the economist are used to explore the concepts of national income, employment, money and banking, inflation, international trade and growth (macro-economics). An appreciation of the relation between economic theory and economic policy is provided.

10.221 Organizational Behavior I — This course introduces the student to a psychological approach to administration through a study of the determinants of human behavior, personality, motivation, attitudes, perceptions, learning and leadership, and their application to the administrative process.

10.230 Management II — This course follows on from Management I to give the student a further insight into the functions and practice of management. Areas covered include the main functions of direction and control, as well as topics such as communication, supervision, leadership and a brief introduction to industrial relations.

10.235 See 10.135

10.240 Government and Business — An examination of the involvement of federal, provincial and municipal government in the regulation and support of business enterprise in Canada. A look at government policy toward monopoly and combines control, the promotion of competition and the stimulation and stabilization of Canadian business. While theories of government intervention will be examined, the course will concentrate on the practical aspects of government involvement with business. Examples of specific government programs will be explored to determine their effects on the business enterprise.

10.321 Organizational Behavior II — This course examines the determinants of employee job performance and productivity within the organization; the effect of different patterns of formal organization on motivation; the effect of the different forms of informal organizations and leadership styles on organizational performance; and the satisfaction of individual needs within the organization.

10.325 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.

10.327 Organization Renewal and Development — This course is designed to train students in the processes and techniques of organization development, including the diagnosis of problems and the processes in solving organizational problems.

10.331 Management III — This course 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.

10.340, 10.440 Government and Politics in Canada — The course emphasizes the process of government and politics. It deals with the policy-making process, the Canadian constitution, federalism, political parties and interest groups. A portion of the course is devoted to provincial-municipal relations.

10.360, 10.460 Business Law — A study of legal rules and principles which guide decisions involving the law of contracts, including the sale of goods and negotiable instruments, as well as the business associations of agency, partnership and the company.

10.370, 10.470 Management of Human Resources I and II — An introduction to the fundamentals of personnel management, including organization of the personnel function: recruiting, testing, interviewing; selection; job descriptions and evaulation; salary administration, fringe benefits; training, management development and performance appraisal; constructive discipline, grievances and morale.

10.425 Industrial Relations — A detailed analysis of selected labor-management problem areas with emphasis on the solution of practical existing problems in industrial relations.

10.427 Training and Development —This subject provides the student with the capability of designing and implementing a training program. Emphasis is placed on practical problems of training in industry.

10.428 Directed Studies — This course is designed to give the student some practical application of concepts learned in major program areas by engaging in problem-solving projects in business or government.

10.431 Management IV — 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 several fields such as finance, control, personnel, production, marketing and general management for study and disussion. The course is designed to acquaint the student with the role of top management and the interrelationships between these fields. Determination of an acceptable course of action will be followed by the development of a proposed scheme of implementation. The course includes an opportunity, as part of a team, to run a "company" on a computerized management game.

10.440 See 10.330

10.460 See 10.360

10.470 See 10.370

14.050 Introduction to Data Processing — Training in basic data processing principles to develop recognition of the possible application of these principles in industry. The principal functions of data processing will be illustrated and practised with an H.P. minicomputer operating interactively. Elementary computer programs will be written and tested on the computer. Use of flowcharting and elementary data processing systems design will illustrate the achievement of data processing objectives.

14.052 Computers in Business — For those people who are not specializing in data processing, a look is given at the types of computer systems currently in use in business. Topics include computer hardware and software development, program preparation (students will code and execute a COBOL program in this section), input-output media and devices, data centres, operating systems, controls in computer systems, installing a computer and current trends in the computer industry.

14.184 Office Systems and Procedures — This course includes lab exercises in one-write systems, paper process charting, structuring a coding system, forms analysis and control and designing a business form.

16.140, 16.240 Accounting — 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.

16.240 See 16.140

16.344 Management Accounting — The management accountant's role; income determination; decision-making; profit planning; budget; forecasting; profit-margin variance analysis; corporate financial analysis; income tax; internal control; annual report; accounting aids for sales and production management; measuring managerial performance; direct costing and the contribution approach.

16.350 Public Financial Administration — A course to familiarize students with the roles, problems and technology of governments in Canada, with emphasis on government finance. The course is divided functionally into three areas: economics of government actions, budgeting procedures and applications and finance—principally the management of cash and investments.

16.362, 16.462 Finance — An investigation of different methods of raising funds for new and existing businesses, corporate and noncorporate. Business risk and uncertainty. Analysis of important financial decisions. Working capital policy, capital budgeting, dividend policy, capital structure. Failure and bankruptcy.

16.445 Credit and Collections — Study of various types of credit and their use by retail businesses, financial institutions, commercial enterprises and consumers.

Includes sources of information, credit policy and control and collection techniques.

16.450 Taxation — An introductory course dealing with all aspects of taxation in Canada. Municipal, provincial and federal taxation will be covered. Specific topics will include tax, sales taxes, and customs and excise taxes.

16.462 See 16.362

20.191, 20.291 Marketing — This course is designed to give students a good understanding of the role of marketing in a firm. Marketing plays a critical role in any firm dealing in a product or service and the decisions made by the marketing manager are reflected in the administrative and financial functions of a firm. The lab sessions will deal with typical marketing problems and students are exposed to the decision-making process in marketing management.

20.291 See 20.191

20.350, 20.450 Real Estate Management — 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 agent, salesman and appraiser are covered.

20.450 See 20.350

22.110 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 as applied to business administration.

22.210 Business Statistics — Major emphasis 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, hypothesis testing and simple linear regression.

22.310 Management Engineering I — Scientific approach to problem-solving, with particular application to administrative management problems. Includes method study, systems and procedures, charting and analysis, forms design and contol, work distribution, layout, planning and scheduling, measurement and costing.

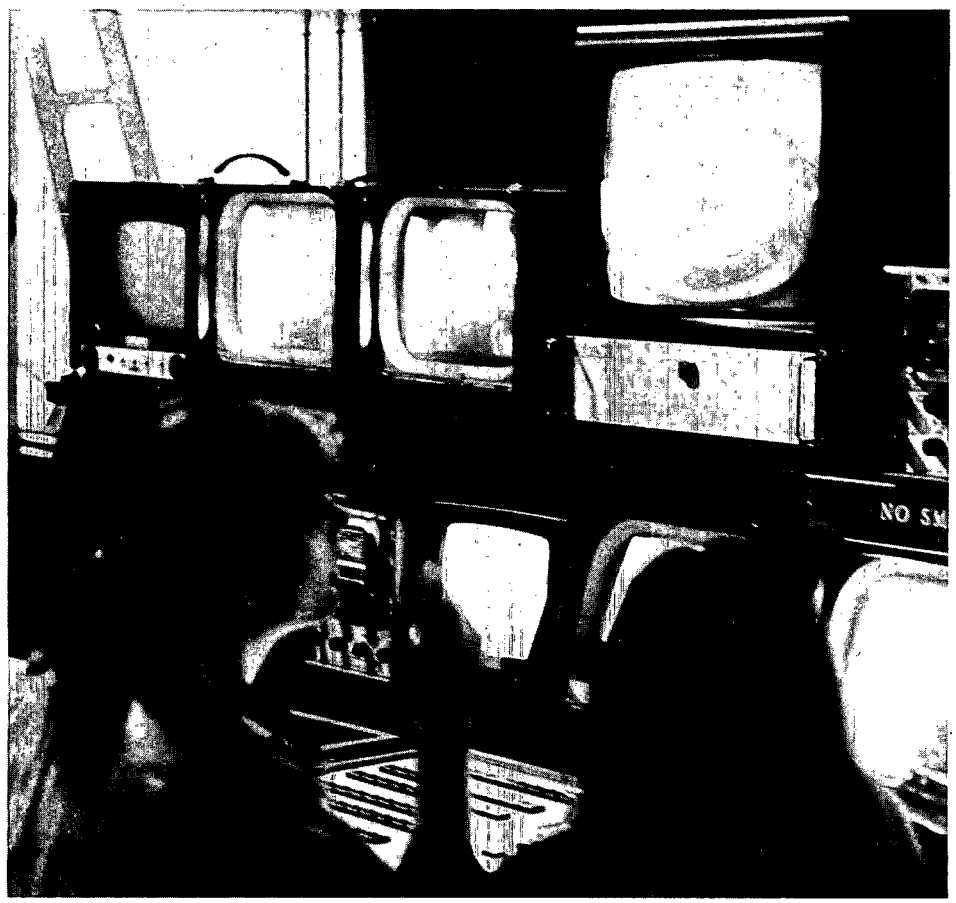
22.410 Management Engineering II — A continuation of 22.310, involving the practical application of problem-solving techniques in business organizations. The student works on live projects requiring research and detailed analysis, plus the preparation of technical reports and a presentation to management and instructors.

31.110, 31.210 Business Communication — Students will be instructed in the skills and techniques required to write memos, letters and reports of the kind used in business; to speak in small and large group situations; and to develop effective telephone techniques. The course begins with a brief review of the communication process and includes an organizational approach to writing and speaking tasks. The course includes modules on the job search and study skills. One lecture per week provides core information. Practical application of the material occurs in the three labs held weekly and through periodic assignments.

31.210 See 31.110

Faculty and Staff

R.A. Cradock, B.Comm., M.B.A., R.I.A., *Department Head*
G. Bell, B.Comm., M.A., Chief Instructor
G.E. Bissell, B.Comm., M.A.
Mrs. J.P. Dean, B.A., M.A.
C.J. Dickhoff, B.A., M.A. (Econ.), M.A. (Public Admin.), Chief Instructor (on leave)
L.A. Fingarson, B.Comm. (part-time)
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.A., M.B.A.
T.P. Juzkow, B.A.Sc., M.B.A., P.Eng., Senior Instructor
J. Kyle, C.D., B.A., M.B.A., Ph.D.
D. Lewis, LL.B. (part-time)
A.G. Liddle, M.B.A. (on leave)
D. Schram, B.Comm., M.Sc. (Intn. Bus.)
D. Scoretz, B.A., M.Sc. (part-time)
R.M. Sharp, B.A.Sc., M.B.A., P.Eng.
G. Storey, B.A., M.Sc.
N.E. Stromgren, B.A.
B. van der Woerd, B.A. (on leave)
J.H. Viger, B.Comm. (on leave)
F.C. Williams, B.A. (Hons.), M.A.
R.A. Yates, LL.B., M.B.A.



Broadcast Communications

The Broadcast Communications program was initiated through the combined efforts of the private sector of the industry and the Canadian Broadcasting Corporation in this Province. The need for trained personnel continues to grow in broadcast journalism, radio and television production. Those interested in entering fields other than mass communications through broadcasting; i.e., audio-visual production, public relations or cablecasting, will find much of the basic technical background included.

The educational emphasis is upon versatility so that a graduate may find employment in a variety of occupations within the broadcast industry. Students will enrol in one of the three options: Radio Production, Television Production or Broadcast Journalism. The first of the four terms in the course is designed to provide a general background, with the remainder of the time dedicated to concentrated effort in all aspects of the chosen option.

Job Opportunities
Graduates are employed in all parts of the world, wherever radio or television facilities exist.

The Program
Television Production — Concentration is on the production tools of a modern television broadcast station. Full use of color and experience in producing all types of modern television productions is provided so that the student may work his or her way through most of the occupational positions in the television hierarchy.

Radio Production — As in the Television Option, as detailed a background as is possible is provided in AM and FM radio with the addition of as much practical experience as can be given in the time available.

Broadcast Journalism — Technically, this option bridges both radio and television. The students work in three main areas: radio news, television news and investigative and research reporting. Considerable time is spent as well working in the area of documentary, information and research presentations in both television and radio.

In each of the options students are graded against industry and professional standards and must achieve such standards within their period of study.

Prerequisites
Graduation from the Selected or Combined Studies Program is a general prerequisite. Only a limited number of students can be accepted each year and applicants should apply early. Information meetings are held Mondays at 5 p.m. in room 129. If on-campus interviews are not possible, please write to the Department Head and an interview in the field may be arranged. In making application, full details on related experience and extracurricular courses or aptitudes should be included. All applicants are given formal interviews and are dealt with individually. No waiting list is established.

The prospective student is expected to have a thorough knowledge of English. Previous studies in the areas of political science and current events will also prove of value. Typing is essential.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
12.101	Introduction to Radio (Radio Option) or	
12.102	Introduction to Television (Television Option) or	17
12.101 .102	Introduction to Radio and Television (Journalism Option)	
12.103	Introduction to Broadcast Journalism	2
12.105	Industry Organization	2
12.107	Production Techniques (Technical Introduction)	2
12.190	Writing and Sales	4
31.112	Communication for Broadcasters	4
	Library and Research	4
		35

Year 2	Term 2	Rad	TV	Jrn
12.201	Introduction to Radio	15	—	—
12.202	Introduction to Television	—	15	—
12.203	Broadcast Journalism	—	—	15
12.205	Industry Organization	2	2	2
12.206	History and Current Events	2	2	2
12.207	Production Techniques (Announcing)	3	—	3
12.208	Production Techniques (Staging)	—	3	—
12.209	Production Techniques (Photography)	—	—	3
12.290	Writing and Sales	3	3	3
31.212	Communication for Broadcasters	4	4	4
	Library and Research	6	6	6
		35	35	35

Year 2	Term 3			
10.381	Organizational Behavior	3	3	3
12.301	Radio	22	—	—
12.302	Television Production	—	22	—
12.303	Broadcast Journalism	—	—	22
12.307	Production Techniques (Radio News)	3	—	—
12.308	Production Techniques (Photography)	—	3	—
12.309	Production Techniques (Announcing)	—	—	3
31.312	Advanced Communication for Broadcasters	4	4	4
	Library and Research	3	3	3
		35	35	35

	Term 4	Rad	TV	Jrn
12.401	Radio Production	22	—	—
12.402	Television Production	—	22	—
12.403	Broadcast Journalism	—	—	22
12.406	History and Current Events	2	2	2
12.407	Production Techniques (Announcing)	3	—	—
12.408	Production Techniques (Public Affairs)	—	3	—
12.409	Production Techniques (Editorial)	—	—	3
31.412	Advanced Communication for Broadcasters	3	3	3
	Library and Research	5	5	5
		35	35	35

Subject Outlines

10.381 Organizational Behavior — This course is the study of man's behavior and attitudes in an organizational setting; the organization's effect on his perceptions, feelings, and actions and his effect on the organization, particularly how his behavior affects the achievement of the organization's purposes. Within this context, such concepts as leadership, communications, power, authority, change and conflict will be examined.

12.101, 12.201 Introduction to Radio — 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 all broadcast accessories, and develops the manual dexterities needed in the operation of this equipment.

12.102, 12.202 Introduction to Television — An introduction to the processes of television picture transmission and the equipment used in broadcast television. Cameras, lighting equipment, telecine equipment, video switchers, video-tape recording and color television. Manual dexterity is developed in the operation of this equipment in a studio and control-room situation.

12.103, 12.203 Introduction to Broadcast Journalism — The student is given a first look at the world of broadcast journalism. The subject covers the history of news, newsroom organization and operations in radio and television; news writing and editing, news sources and coverage; the production of newscasts and special interest features for both radio and television.

12.105, 12.205 Industry Organization — A first-term study is made of the history of broadcasting from first steps through to present-day usages and of the rules and regulations under which broadcasting in Canada is governed. The student is introduced to the development of programming, copyright, broadcast systems and management.

12.107 Production Techniques — The students are given their first look at "what makes it work". This is an elementary technical introduction.

12.190, 12.290 Writing and Sales — The course familiarizes the students with advertising techniques, particularly in the broadcast media. Lectures and workshop sessions relate to the writing and evaluation of radio and television commercials. Basic marketing concepts, the function of advertising in society and the economics of broadcast are related. Commercials are studied in detail. Special emphasis is placed on developing the student's ability to work within a group situation. While students may not become writers, the course may lead to a position in broadcast sales, sales promotion or advertising generally.

12.201 See 12.101

12.202 See 12.102

12.203 See 12.103

12.205 See 12.105

12.206, 12.406 History and Current Events It is essential that people in broadcasting have as broad a base of external knowledge as possible. This subject combines lectures and practical exercises and deals with present-day happenings on the local, regional, national and international level.

12.207, 12.307, 12.407 Production Techniques — These courses are taken by students of the Radio Option only. In the second and fourth terms, announcing training is given in a weekly seminar. In the third term, the students are given a weekly seminar on the operation of a radio newsroom.

12.208, 12.308, 12.408 Production Techniques — These courses are taken by students in the Television Option only. In the second term, attention is given to staging and lighting; in the third term, filming; and in the fourth term, public affairs.

12.209, 12.309, 12.409 Production Techniques — These courses are given to students in the Broadcast Journalism Option. In the second term a weekly seminar on film and cinematography; in the third term, announcing; and in the fourth term, editorial and feature writing.

12.290 See 12.190

12.301, 12.401 Radio Production — Putting the fundamentals of radio production to work. The elective deals with all aspects of modern radio broadcasting in which the student is given ample opportunity to expand techniques learned in the first year into modern and creative broadcasting.

12.302, 12.402 Television Production Students engage in the production of television broadcasts, making use of full studio facilities in the production of television programs, commercials, special events coverage, the taking and editing of film material and the carrying out of on-the-job training projects. A complete color studio facility with full video recording is available to the students.

12.303, 12.403 Broadcast Journalism — This program is divided equally into journalistic uses of radio, television and investigative reporting. The students will expand their skills in the creative use of news, features and documentaries and will be given ample opportunity for any extensive research projects which they will be required to tackle.

12.307 See 12.207

12.308 See 12.408

12.309 See 12.209

12.401 See 12.301

12.402 See 12.302

12.403 See 12.303

12.406 See 12.206

12.407 See 12.207

12.408 See 12.208

12.409 See 12.209

31.112, 31.212 Communication for Broadcasters — Through lectures, discussions and workshops, this course covers all forms of communication, especially writing. Students completing this course should be able to deal effectively with business writing (letters, memos, reports), practical writing (resumés, proposals) and broadcast writing (editorials, reviews, short features).

31.212 See 31.112

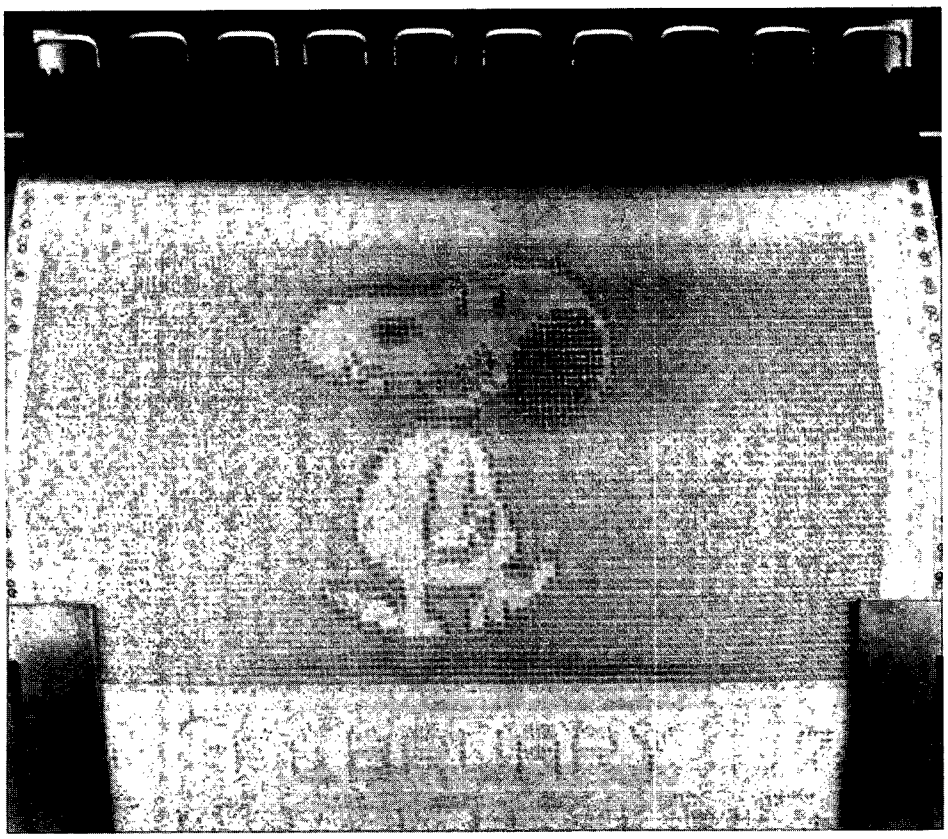
31.312, 31.412 Advanced Communication for Broadcasters — Emphasis in this course will be placed upon writing for the media. Sales messages, dramatic scripts, documentaries, news copy and original program proposals will be written by the student, who will also participate in voice exercises and play readings. To stimulate critical awareness, students will be expected to watch and write reviews on several live performances and motion pictures. Guest lecturers from the arts and the media will be utilized if and when available.

Note: As far as possible, materials and assignments used in this course will be geared to the individual elective; i.e., Radio, Television or Broadcast Journalism.

31.412 See 31.312

Faculty and Staff

F.L. Sanderson, Dipl.Ed., B.Th., *Department Head*
J.W. Ansell, Dipl.T.
B. Antonsen, Dipl.T.
A.D. Baxter
T.J. Garner, B.A.
K.W. Hughes, Dipl.Ed., Senior Instructor
J.J. Kemp
B.G. McMaster, B.A., M.A.
K.J. Mitchell
R.H.B. Nason, B.A.
B. O'Neill
L.D. Rose, B.A., M.A. (on leave)
D.W. Short
W.A. Smith
T. Stacey, B.A.



Computer Programming and Systems

The computer has made it possible to store, retrieve and analyse vast quantities of complex information at high speed and has become invaluable as a managerial tool. Computers are now commonplace in business accounting, banking and airline reservations systems and are also used in scientific research applications, in compiling insurance actuarial tables and in automated control of industries. But in order for the computer to do its job, the programmer must make an analysis of the problem and give the computer a detailed set of instructions in a logical progression to handle every conceivable situation in solving the problem. Thus it is the human element which determines the degree of success of any computer application.

Job Opportunities
Most graduates begin their careers as junior programmers, and after some experience, may choose to move into jobs as systems analysts, programmer analysts or operating systems programmers. Others may move into sales or supervisory positions.

The Program
The first year of the program is comprised of basic business courses such as accounting, economics, business equipment and an introduction to programming and systems. In the second year, students specialize in either business data processing systems or management science (the application of mathematical techniques to managerial, engineering or medical problems).

Prerequisites
Graduation from the Selected or Combined Studies Program with Algebra 11 or Math 11. Since competition for places in the program is very high, those applicants with a solid academic background as evidenced by high school transcripts, appropriate business experience and/or other successful post-secondary education will greatly strengthen their applications. Successful completion of BCIT Continuing Education courses in computer programming may also be an advantage. All applicants should enjoy solving problems, be capable of rigorous attention to detail, be logical and methodical. Students planning on entering the Management Science Option in the second year must have Algebra 12 or Math 12.

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
10.132	Management in Industry	3
14.160	Computer Programming I	4
14.170	Computer Systems I	2
14.182	Office Equipment	3
16.140	Accounting	5
20.090	Marketing	4
22.114	Applied Mathematics	5
31.114	Business Communication	4
	Common Tutorial	1
	Library and Research	4
		35
	Term 2	
10.236	Economics	3
14.260	Computer Programming II	6
14.270	Computer Systems II	5
14.296	Office Systems and Procedures	3
16.240	Accounting	5
22.214	Statistics in Business Industry	3
31.214	Business Communication	4
	Common Tutorial	1
	Library and Research	5
		35

		Bus Syst	Mgt Sci
Year 2	**Term 3**		
10.382	Organizational Behavior	3	—
14.306	Management Science I	—	8
14.360	Computer Programming III	8	8
14.370	Computer Systems III	8	8
14.380	Operating Systems	2	2
16.341	Cost and Managerial Accounting	4	—
16.343	Cost Accounting	—	4
22.314	Introduction to Operations Research	3	—
22.334	Management Engineering I	3	—
	Library and Research	4	5
		35	35
	Term 4		
10.432	Business and Administrative Practices	3	3
14.409	Management Science II	—	8
14.460	Computer Programming IV	8	8
14.470	Computer Systems IV	8	8
14.480	Operating Systems	2	2
16.441	Cost and Managerial Accounting	4	—
22.434	Management Engineering II	4	—
	Library and Research	6	6
		35	35

Subject Outlines

10.132 Management In Industry — An orientation to the nature of business management and the administrative process. Elements of planning, organization and leadership techniques will be examined. Study and discussion will be undertaken of actual business cases illustrating problems frequently met in industry and requiring managerial analysis, decision and action.

10.236 Economics — This is a one-term introductory course which presents basic economic theory and concepts. The course examines macro-economic issues in the Canadian economy using theoretical tools of economics. Micro-economic theory will be used to show its relevance in an analysis of the business firm, the price system and the market system.

10.382 Organizational Behavior — This course is the study of man's behavior and attitudes in an organizational setting. Topics include the organization's effect on personal perceptions, feelings and actions and their effect on the organization, as well as the individual's effect on the achievement of the organization's purposes. Concepts such as leadership, communications, power, authority, change and conflict will be examined.

10.432 Business and Administrative Practices — An insight into the basic nature of business problems and the administrative process involved in handling them, with emphasis on the personnel management function. Study and discussion will be undertaken of actual business situations illustrating problems frequently met in industry requiring managerial analysis, decision and action. A sequel course to Management in Industry.

14.160 Computer Programming I — An introduction to the principles of programming using IBM Assembler language. Emphasis is on the understanding of the mode of operation of a program, practice in the flow-charting, coding, debugging and documenting of simple business applications.

14.170 Computer Systems I — A brief introduction to data processing systems using appropriate computer equipment so the student may gain experience in the cycle, from system idea to system implementation.

14.182 Office Equipment and Systems — A course to develop practice in solving business problems on electronic calculators. The course also includes lab exercises in structuring a coding system, forms analysis and control and design of business forms.

14.260 Computer Programming II— Continuation of IBM/370 Assembler language introduced in 14.160. Programming techniques include such standard business requirements as file updating, multiple control breaks and processing of disk storage files. Included are binary operations, base/displacement addressing and subroutines.

14.270 Computer Systems II — Introduction to computer systems design and basic systems analysis techniques. Emphasis is on computer applications: payroll, billing and other accounting and statistical functions.

14.296 Office Systems and Procedures — An introduction to common business applications such as accounts receivable and accounts payable. Lab exercises include one-write systems, paper process charting and creating files on a minicomputer using both magnetic stripes and tape cassettes.

14.306 Management Science I — The application of management science or operations research to the solution of probabilistic problems in government and industry. Topics include probability and decision theory, inventory models, queuing theory, simulation of discrete and continuous systems and Monte Carlo simulation. Students use FORTRAN and APL to solve problems.

14.360 Computer Programming III — Continuation of 14.260. Completion of Assembler language programming including the linkage of separately written program sections and macro writing. Introduction to COBOL language. Students will write several programs incorporating a variety of programming techniques.

14.370 Computer Systems III — Continuation of the principles of systems analysis and design as introduced in 14.270. Gathering data, systems analysis, systems flow charting, documentation and accounting controls. Introduction to disk storage systems and on-line computer systems, characteristics and uses.

14.380, 14.480 Operating Systems — The course thoroughly studies the IBM S/370 disk operating system. Students perform the operating systems tasks of implementing the computer manufacturer's operating systems, utilities and programming languages and developing standard programming routines and procedures.

14.409 Management Science II — PERT and CPM scheduling methods in planning and control. Linear programming theory, problem formulation, analysis of results, sensitivity analysis, practical application and limitations and implementation. Non-linear, integer and dynamic programming. Comparison of optimization, simulation and heuristic methods. Choosing the appropriate technique. The course uses "package" programs where applicable.

14.460 Computer Programming IV — Continuation of 14.360. Introduction of PL/I language including structured programming and the chief programmer team approach. Considerable time is spent on a large multi-program system which will include the use of Mark IV. This system is programmed from the design work performed in 14.470 Computer Systems IV.

14.470 Computer Systems IV — Methods used in the development of business data processing systems. Specifications of system design from prototype to detail. Equipment evaluation, acquisition and utilization, implementation and control. These techniques are applied to the solution of a typical data processing problem.

14.480 See 14.380

16.140, 16.240 Accounting — Basic accounting procedures; closing the books; adjustments; working papers; merchandise operations; statement and ledger organization; accounting principles; introduction to cost accounting; analysis of financial data; working capital; departmental and branch operations; consolidations.

16.240 See 16.140

16.341, 16.441 Cost and Managerial Accounting — The accountant's role in the organization; major purposes of cost accounting; cost-volume-profit analysis; job-order accounting; budgeting; responsibility accounting; standard costs; direct costing; relevant costs; capital budgeting; cost allocation; joint and by-products; process costing; payroll; factory ledgers; transfer pricing.

16.343 Cost Accounting — Direct costing and the contribution approach; cost-volume-profit analysis; cost analysis for managerial planning and decisions; inventory planning, control and valuation; budgeting and profit planning; standard costs; cost and price variance analysis; capital budgeting.

16.441 See 16.341

20.090 Marketing — A marketing course designed to describe the role of marketing in the business environment with special emphasis on applications to the computer industry. Areas covered include market research, target markets, product planning, promotion, distribution and pricing methods. The application of the above marketing considerations are related to consumer and industrial goods and services.

22.114 Applied Mathematics — Review of basic algebra and business applications. Mathematics of finance, simple and compound interest, loan-payment plans, annuities, methods of evaluating investments and an introduction to probability theory.

22.214 Statistics in Business and Industry — Fundamentals of descriptive statistics and a comprehensive study of the use of statistical inference. Topics include probability theory and distributions, sampling, hypothesis testing, chi-square, rank correlation, linear regression and index numbers.

22.314 Introduction to Operations Research — An introduction to the use of mathematics in decision-making in business, with special emphasis on applications that are commonly solved through the use of a computer. Topics include expected value, marginal analysis, linear programming, scientific inventory management and simulation.

22.334 Management Engineering I — The scientific approach to problem-solving, with particular application to business enterprises. Topics include method study, activity sampling, layout, forms design and control, the critical path method of scheduling, planning, work measurement and costing.

22.434 Management Engineering II — A continuation of 22.334, involving the application of scientific problem-solving techniques used in business organizations. The projects require research and detailed analysis, plus the preparation and presentation of technical reports.

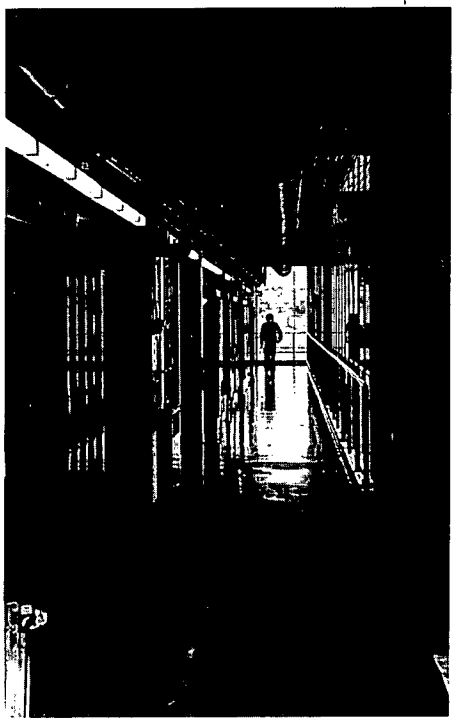
31.114, 31.214 Business Communication — The objective of this course is to develop students' written and oral communications skills. Students are taught

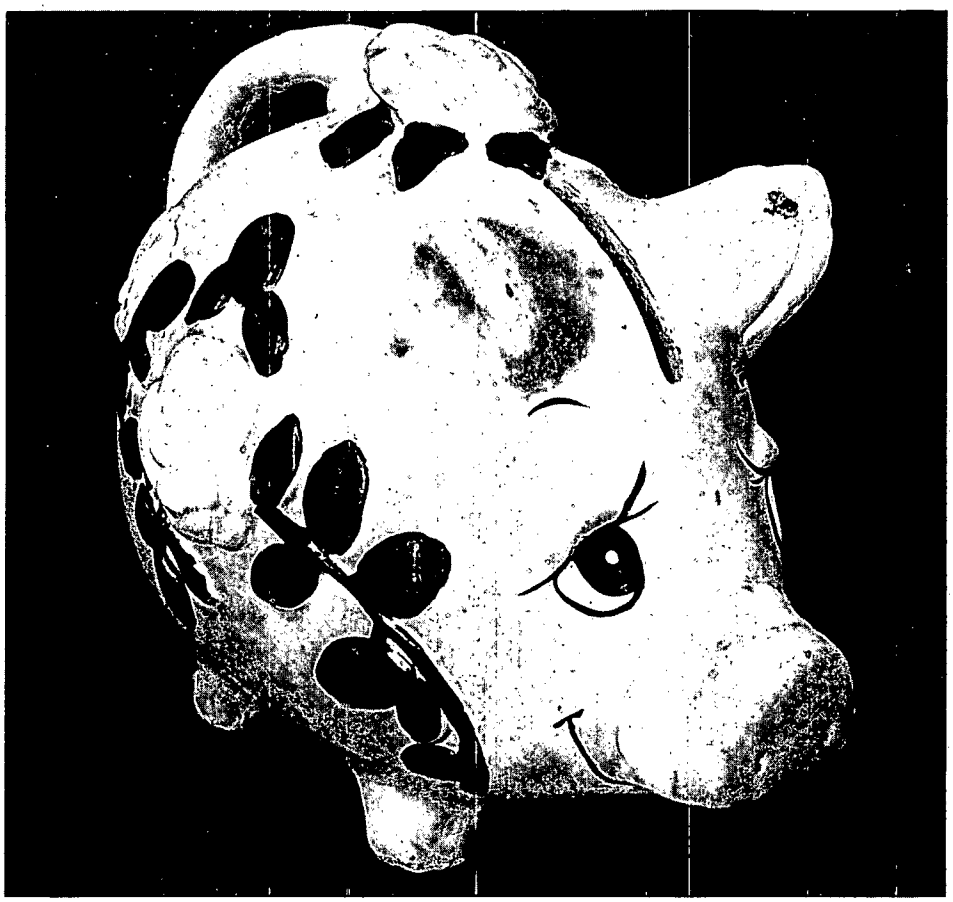
to write the kinds of letters, memos and reports which they can expect to encounter in the computer industry. They will also be taught the skills of speaking to small and large groups.

31.214 See 31.114

Faculty and Staff

D. Breckner, B.A., M.A., *Department Head* (on leave)
F. Senior, B.A. (Hons.), Acting Department Head
P. Abel, B.A. (Hons.), C.G.A., Acting Chief Instructor
J.W. Cooke, C.G.A., Senior Instructor
K.E. Holden, R.I.A. (on leave)
G.T. Kidd, B.Sc.
R.B. Long, C.G.A.
F.J. Martin, F.L.M.I., C.D.P.
R. McGowan, Dipl.T.
B.A. MacLaren, B.A.
E.N. Newton, B.Voc.Ed.
M. Scriabin, M.B.A.
C.P. Simmons, C.G.A.
M.E. Turner, M.B.A., P.Eng.
G.N. Weir, C.D.P.
A.Y.W. Wong, B.A.Sc., P.Eng.
H.E.W. Wuhrer, C.D.P., C.M.C., Senior Instructor





Financial Management

No enterprise can survive without means of funding and financial control, and in modern-day business, the techniques of financial management — financial planning, budget preparation and financial control — have gained increasing importance as management tools. BCIT students may specialize in accounting, finance or insurance.

Job Opportunities
Specialists in accounting commonly enter middle management positions in financial accounting, cost accounting, internal audit and budget preparation.

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

Opportunities in insurance include positions in adjusting and loss evaluation, actuarial science and sales, in both property and life insurance. Pension and financial planning are other possibilities.

The Program
Following a year of general studies in business, students will enter one of three options: Accounting, Finance or Insurance.

The Accounting Option is concerned with accounting systems, financial reporting and auditing. The second-year courses in this option build upon the accounting, data processing and systems fundamentals introduced in the first year with increased concentration on financial and cost accounting.

The Finance Option deals with the intricacies of funding business operations. In addition to a thorough grounding in financial accounting, students in this option make an in-depth study of financial decision-making in their second year of the Financial Management program.

The Insurance Option trains students in the methods in which groups and individuals in our society seek to protect themselves against risks such as fire, accidents, early death or protracted old age. The general studies courses in first year are followed by specialized courses in the principles of insurance, calculation of risk and estate and insurance planning.

Prerequisites
Graduation on the Selected or Combined Studies Program with Algebra 11 or Math 11 or Business and Consumer Math 11. An inquiring and logical mind, a capacity for hard work are important personal, qualities, as is the ability to work well with others.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
10.133	Management I	3
10.137	Economics	3
14.182	Office Equipment and Systems	3
16.140	Accounting	5
16.145	Credit and Collections	4
20.191	Marketing	3
22.116	Business Mathematics	5
31.116	Business Communication	4
	Library and Research	5
		35

	Term 2	
10.233	Management II	3
10.237	Economics	3
14.050	Introduction to Data Processing	3
14.296	Office Systems and Procedures	3
16.240	Accounting	5
20.291	Marketing	3
22.216	Business Statistics	5
31.216	Business Communication	4
	Library and Research	6
		35

Year 2	Term 3	Acctg	Fin	Ins
10.360	Business Law	3	3	3
10.383	Organizational Behavior	3	3	3
14.052	Computers in Business	4	4	4
16.341	Cost and Managerial Accounting	4	—	—
16.346	Auditing	4	—	—
16.347	Financial Accounting	5	5	5
16.361	Finance	4	4	4
16.365	Money and Banking	—	4	—
16.366	Security Analysis	—	4	—
16.370	Projects in Industry	4	4	4
16.380	Principles of Insurance	—	—	5
16.382	Loss, Casualty and Adjustments	—	—	3
	Library and Research	4	4	4
		35	35	35

	Term 4			
10.460	Business Law	3	3	3
14.053	Business Computer Programming	4	—	—
16.441	Cost and Managerial Accounting	4	—	—
16.446	Auditing	4	—	—
16.447	Financial Accounting	5	5	5
16.450	Taxation	3	3	3
16.461	Finance	4	4	4
16.465	Money and Banking	—	4	—
16.466	Security Analysis	—	4	—
16.470	Projects in Industry	4	6	6
16.480	Principles of Insurance	—	—	5

	Term 4 cont	Acctg	Fin	Ins
16.484	Estate and Insurance Planning	—	—	4
	Library and Research	4	6	5
		35	35	35

Subject Outlines

10.133 Management I — An orientation to the nature of business in the free enterprise system with an emphasis on organization for management. The functions of management, planning and organizing are thoroughly examined, as well as giving attention to topics such as management information systems, the role of the committee and the development of the theory of management philosophy. This leads to the course on administrative practices.

10.137, 10.237 Economics — The aim of the course is to develop an understanding of the organization and operations of the Canadian economy. Students analyse demand and supply, how production costs vary and how prices are detemined in different markets (micro-economics). The theoretical tools of the economist are used to explore the concepts of national income, money and banking, international trade, employment, inflation and growth (macro-economics). An appreciation of the relation between economic theory and economic policy is provided.

10.233 Management II — This course gives further insight into the functions and practice of management and includes a study of the function of directing in all its aspects of leadership, communication and motivation, followed by an analysis of the control function. Additional topics such as supervisory and administrative operations are covered. A brief introduction is also given to the topic of industrial relations.

10.237 See 10.137

10.360, 10.460 Business Law — A study of legal rules and principles which guide decisions involving the law of contracts, including the sale of goods and negotiable instruments, as well as the business associations of agency, partnership and companies.

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

10.460 See 10.360

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

14.052 Computers in Business — For those people who are not specializing in data processing, a look is given at the types of computer systems currently in use in business. Topics include computer hardware and software development, program preparation (students will code and execute a COBOL program in this section), input/output media and devices, data centres, operating systems, controls in computer systems, installing a computer and current trends in the computer industry.

14.053 Business Computer Programming — An introduction to problem-oriented computer programming using COBOL and Mark IV programming language. Standard accounting applications will be flow-charted, programmed and tested by the student on an IBM System/370 computer.

14.182 Office Equipment and Systems — A course to develop practice in solving business problems on electronic calculators. The course also includes lab exercises in structuring a coding system, forms analysis and control and design of business forms.

14.296 Office Systems and Procedures — An introduction to common business applications such as accounts receivable and accounts payable. Lab exercises include one-write systems, paper process charting and creating files on minicomputer employing both magnetic stripes and tape cassettes.

16.140, 16.240 Accounting — 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.

16.145 Credit and Collections — Study of various types of credit and their use by retail businesses, financial institutions, commercial enterprises and consumers. Includes sources of information, credit policy and control and collection techniques.

16.240 See 16.140

16.341, 16.441 Cost and Managerial Accounting — The accountant's role in the organization; major purposes of cost accounting; cost-volume-profit analysis; job-order accounting; budgeting; responsibility accounting; standard costs; direct costing; relevant costs; capital budgeting; cost allocation; joint and by-products; process costing; payroll, factory ledgers; transfer pricing.

16.346, 16.446 Auditing — Basic auditing procedures. Features of the internal control system. The audit program. Statutory audits, government audits, internal audits. The audit routine as applied to cash, inventory, accounts receivable and sales, fixed and other assets, accounts payable and purchases, income and other taxes and expenses. Specialized audit routines.

16.347, 16.447 Financial Accounting — Review of accounting principles and procedures and the preparation of financial statements. In-depth study of asset, liability and shareholders' equity accounts and their relationship, where applicable, to income measurement. Other specific studies include income tax allocation; accounting for changes in procedures, estimates and errors; statements from incomplete data; statement of changes in financial position; and fair value and price level adjusted statements.

16.361, 16.461 Finance — An in-depth study of the finance function within a corporation. The techniques which are necessary to make decisions under varying conditions and the theoretical framework upon which these techniques are built; methods for raising and utilizing intermediate and long-term funds; capital budgeting; working capital management; dividend policy; financial institutions; business failure; and international finance.

16.365, 16.465 Money and Banking — The study of money and money substitutes, supply of currency, creation of credit; functions and uses of money; practices, policies, functions and services of commercial banks; central banking and monetary control; objectives and techniques of monetary policy and debt management; financial assets and financial markets; money and the international economy.

16.366, 16.466 Security Analysis — Techniques and principles of security analysis; valuation of securities; analysis of risks inherent in all types of security investments. Emphasis will be placed on the investment setting, the securities market, financial statement analysis, investment timing and portfolio analysis of both individual and institutional investors.

16.370, 16.470 Projects in Industry — An introduction to the use of quantitative analysis techniques for making business decisions. In the spring term, these principles are used in solving financial management problems in selected businesses and industrial firms under the supervision of faculty members.

16.380, 16.480 Principles of Insurance — An introduction to basic insurance principles covering elements of risk, valuation, loss and insurance coverage calculation; co-insurance; the elements of actuarial science; the structure of the insurance industry; automobile insurance; the insurance industry in Canada and British Columbia, with special emphasis on statutory requirements; and elements of financial planning.

16.382 Loss, Casualty and Adjustments — The estimation of loss, calculation of risk and its relation to loss; casualty insurance; the law of negligence and insurance; insurance adjustment. The course will include practical examples of adjustment situations; insurance counselling and interview techniques; and presentation of loss and adjustment and situational problems arising.

16.441 See 16.341

16.446 See 16.346

16.447 See 16.347

16.450 Taxation — An introductory course dealing with all aspects of taxation in Canada. Municipal, provincial and federal taxation will be covered. Specific topics will include income tax, sales taxes and customs and excise taxes.

16.461 See 16.361

16.465 See 16.365

16.466 See 16.366

16.470 See 16.370

16.480 See 16.380

16.484 Estate and Insurance Planning — The principles of life insurance and term and whole-life insurance; computation of coverage and appropriate rate schedules; life expectancy tables and their calculation; pension planning; and annuities—their nature, advantages and disadvantages.

20.191, 20.291 Marketing — This course is designed to give the administrative and financial management students a good understanding of the role of marketing in a firm. Marketing plays a critical role in any firm dealing in a product or service, and the decisions made by the marketing manager are reflected in the administrative and financial functions of a firm. The lab sessions will deal with typical marketing problems and students are exposed to the decision-making process in marketing management.

20.291 See 20.191

22.116 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 as applied to the field of financial management.

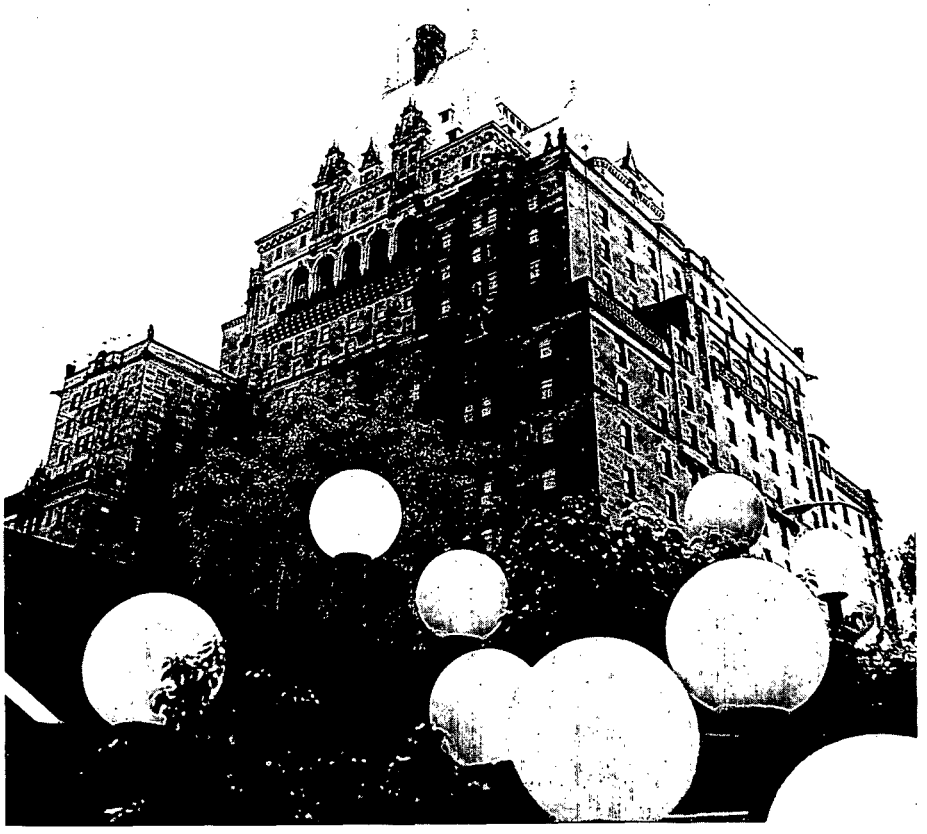
22.216 Business Statistics — Major emphasis on descriptive statistics, including numerical and graphical presentation of data, measures of central tendency and dispersion, elementary probability, index numbers and time series. Introduction to inferential statistics through selected topics as sampling, confidence limits of the mean, hypothesis testing and simple linear regression.

31.116, 31.216 Business Communication — The objective of this course is to develop the kinds of communications skills needed by graduates of the Financial Management Technology. To this end, students will be taught to write effective letters, memos and reports. Students will also be instructed in the techniques necessary to conduct a meeting, an interview and present a report.

31.216 See 31.116

Faculty and Staff

P.J. Wooley, B.A., M.A., C.A., *Department Head*
C.M. Briscall, B.Comm., M.B.A., R.I.A., Chief Instructor
D.K. Chan, B.A.Comm., M.B.A., C.A.
A.D. Cobbett, Dipl.T., M.B.A., R.I.A.
J.R.H. Curtis, B.Comm., M.B.A.
H. Dick, B.Comm.
R.J. Dolan, B.B.A., M.B.A., Senior Instructor
T.L. Estrin, B.Comm., M.S., Ph.D.
G.H. Farrell, Dipl.T., M.B.A., R.I.A., Senior Instructor
R.W. Jackson, M.C.I.
J.C. McAdam, B.A.Sc., M.B.A., P.Eng.
E.C. McIntosh, B.Comm., C.G.A.
P. Meyer, Dipl.Adult Ed., B.A.
R.C. Nichols, B.Comm., R.I.A.
M.F. Thurgood, B.Comm., M.B.A., R.I.A.
C.J. Trunkfield, B.A., M.B.A., C.G.A.
H.B. Yackness, B.Comm., M.B.A., C.A.



Hospitality and Tourism Administration

Rapid expansion in the hospitality and tourism industry continues, resulting in a high demand for professionally-educated staff who are able to plan for future requirements, and who are able to adapt to rapidly-changing conditions.

Job Opportunities
Hotel, Motel and Food Service graduates are employed in hotels, motels, restaurants, department stores, industrial and airline catering firms, and in a wide variety of other organizations involved in food services and housing, such as hospitals and universities. Travel and Tourism graduates may find employment in travel agencies, with tour operators, with surface or air transportation companies, or with government agencies involved in travel promotion.

The Program
Students enter one of two options: Hotel, Motel and Food Service or Travel and Tourism. In Hotel, Motel and Food Service, students obtain intensive theoretical and practical training in general business procedures and in all aspects of hotel and restaurant operations. A fully-outfitted hotel and restaurant lab which includes a front desk, equipped with the latest electronic billing and audit machines, is utilized. Students also train in the Institute's dining room and food production lab, where they learn the fundamentals of food operations from the purchase of food through its preparation to the serving of a top-quality meal.

Travel and Tourism curriculum also has both a practical and theoretical base and includes courses in domestic and foreign travel, as well as marketing, economics, accounting and data processing. A mandatory three-month summer work practicum is part of both programs.

Prerequisites
Graduation from the Selected or Combined Studies Program with Business and Consumer Math 11. For Hotel, Motel and Food Service, foods and commercial subjects are recommended. For Travel and Tourism, history, geography and French are recommended. Students are advised they should be prepared to work irregular hours once they enter the industry. The ability to associate harmoniously with fellow employees and the public is very important. Some practical experience is advisable before applying to either of the two programs.

Course of Studies

Hotel, Motel and Food Service

		Clrm hrs/wk
Year 1	**Term 1**	
10.138	Economics	3
16.140	Accounting	5
16.145	Credit and Collections	4
18.102	Food and Beverage	5
18.103	Front Office Procedure	3
18.111	English Speech	2
22.118	Business Mathematics	4
31.118	Business Communication	4
	Library and Research	5
		35
	Term 2	
10.238	Economics	3
14.050	Introduction to Data Processing	3
16.240	Accounting	5
18.201	Rooms and Lounge Operations	3
18.202	Food and Beverage	5
18.203	Front Office Machine Posting Practicum	1
22.218	Basic Management Engineering	3
31.218	Business Communication	4
	Library and Research	8
		35
Year 2	**Term 3**	
18.300	Summer Work Practicum	—
18.302	Food and Beverage	3
18.305	Food Production and Service	6
18.313	Food and Beverage Cost Control	4
18.316	Human Relations	2
18.325	Marketing and Sales Promotion	5
18.330	Tourism Plant Design	4
18.331	Introduction to Tourism	3
22.318	Business Statistics	4
	Library and Research	4
		35
	Term 4	
10.417	Hospitality Industry Law	3
18.402	Food and Beverage	3
18.405	Food Production and Service	6
18.413	Hospitality Industry Accounting	4
18.416	Human Relations	2
18.418	Front Office Accounting	2
18.425	Marketing and Sales Promotion	5
18.450	Term Project	4
	Library and Research	6
		35

Travel and Tourism

		Clrm hrs/wk
Year 1	**Term 1**	
10.138	Economics	3
16.140	Accounting	5
16.145	Credit and Collections	4
18.111	English Speech	2
18.132	Tours and Hotels	3
18.331	Introduction to Tourism	3
22.118	Business Mathematics	4
31.118	Business Communication	4
		28
	Term 2	
10.238	Economics	3
14.050	Introduction to Data Processing	3
16.240	Accounting	5
18.233	Transportation Facilities and Schedules	2
18.234	Air Travel	6
18.235	Geography of Canada	2

	Term 2 cont	Clrm hrs/wk
22.218	Basic Management Engineering	3
31.218	Business Communication	4
		28

Year 2	Term 3	
18.300	Summer Work Practicum	—
18.316	Human Relations	2
18.326	Travel Marketing	3
18.333	Foreign Language	3
18.334	Air Travel	6
18.340	Tourism Product Development	3
18.341	Recreational Geography	2
18.344	Financial Control	3
20.392	Transportation Economics and Regulation	3
22.318	Business Statistics	4
		29

	Term 4	
18.416	Human Relations	2
18.426	Travel Marketing	3
18.433	Foreign Language	3
18.434	Air Travel	6
18.435	Creative Promotion and Printing	2
18.443	Regional Economic Development	4
18.445	World Travel Destinations	3
18.450	Term Project	4
20.492	Transportation Economics and Regulation	3
		30

Subject Outlines

10.138, 10.238 Economics — The aim of the course is to develop an understanding of the organization and operation of the Canadian economy. Students analyse demand and supply, how production costs vary and how prices are determined in different markets (micro-economics). The theoretical tools of the economist are used to explore the concepts of national income, employment, inflation and growth (macro-economics). An appreciation of the relationship between economic theory and economic policy is provided.

10.238 See 10.138

10.417 Hospitality Industry Law — A summary of Canadian law applicable to the hospitality industry: sources of law; constitutional law; the legislative, executive and judicial functions. The common law of contract, tort, bailment, employment and agency; property (real and personal); partnerships and corporations. Statutory enactments dealing with sale of goods, human rights methods of securing debts, working conditions, crime, labor relations, liquor, health and licensing.

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

16.140, 16.240 Accounting — 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.

16.145 Credit and Collections — Study of various types of credit and their use by retail businesses, financial institutions, commercial enterprises and consumers. Includes sources of information, credit policy and control and collection techniques.

16.240 See 16.140

18.102, 18.202 Food and Beverage — Background of industry; sanitation; meal planning and menu preparation; selection of foods; purchasing methods; principles of food preparation; equipment layout and specifications; service of foods; menu writing; administrative requirements; organization of the catering department.

18.103 Front Office Procedures — Front office organization and psychology. Materials, equipment and supplies used; rooms salesmanship; reservations, registration and front office "accounting" for various-size hotels; handling of cash and credit transactions; and the processing of accounts.

18.111 English Speech — Speech construction; types of speeches; speaking before groups; introducing and thanking speakers, chairing meetings and interviewing; practice in preparation and delivery of talks to groups.

18.132 Tours and Hotels — Through lectures and audio-visual presentations, the student will become familiar with the package tour concept. From a study of tour idea evaluation through detailed tour arrangement, costing, brochure preparation, marketing, reservation systems and final analysis, the student should be able to create simple tour packages and evaluate existing packages. The role of hotels and travel agents in tour packaging will also be extensively covered.

18.201 Rooms and Lounge Operations — Housekeeping organization and duties; control forms used; supplies and equipment used; specifications for purchasing equipment and linen; laundry operations; beer-parlour organization and control; cocktail-lounge operations, glassware, types of beverages, dispensing devices, inventory procedures and practical mixology sessions.

18.202 See 18.102

18.203 Front Office Machine-posting Practicum — To enable the student to gain practical and theoretical knowledge of equipment used in front offices of larger hotels. Upon completion of this course, the graduate will be able to handle transactions and error corrections on posting equipment.

18.233 Transportation Facilities and Schedules — The objective is to familiarize students with planes, ships, trains, buses and their configurations. Actual scheduling used by carriers will be studied to familiarize the student with all codes and formats. Layout of airport, dock and station facilities will also be covered.

18.234 Air Travel — The objective of this course is to train the student in the practical use of the most used tariffs, schedules and manuals to obtain a thorough knowledge of the intricacies of air travel requirements for proper fare construction, documentation and ticketing. This course deals with air travel in North America, including coding, reservations, regular and special tariffs and ticket writing. This course is a prerequisite for 18.334.

18.235 Geography of Canada — The objective of this course is to familiarize students with the geography of Canada with particular emphasis on present use and future potential of tourist attractions, accommodations and other facilities.

18.300 Summer Work Practicum — Each student must work for a minimum of three months full-time in the hospitality/tourist industry during the four-month summer break between first and second year. A report covering this practical experience must also be completed.

18.302, 18.402 Food and Beverage — Volume feeding management; menu pricing; pre-cost and control; budgeting; standards measurement; function catering; food service layout; food processing; organization of the department and staff scheduling; calculation of work loads; staff training and human relations; institution and hospital food services; environment and atmosphere. Study of the complexities of menu planning; menu writing and terminology; merchandising in menu presentation; wine manufacturing and terminology; association of wine and food.

18.305, 18.405 Food Production and Service — Research in food preparation to balance quality preparation with cost of production; testing of new products to evaluate the possibility of their uses in a practical production situation; menu planning; development of certain manipulative skills to permit students to be in a position to eventually train and supervise others; dining room service.

18.313 Food and Beverage Cost Control — Fundamentals of internal controls and information systems for food and beverage operations. The course covers techniques of effective purchasing, receiving and production; sales controls; food and beverage cost calculations; and the sales mix and its effect on costing. Course emphasis is on interpretation of data for effective and profitable decision-making.

18.316, 18.416 Human Relations — Systematic approach to the personnel pro-

blems in today's business organizations, including human needs and wants, motivation process, social systems, leadership, unions, management techniques, communication problems, staff hiring and appraisal, training and incentives. Lab discussions based on real-life cases help develop ability to make decisions upon critical analysis of facts available.

18.325, 18.425 Marketing and Sales Promotion — This course serves to explore the relative positions of all components of the tourism industry — travel agent, tour operator, air or surface carrier, recreation facilities and accommodation. How and where they depend on each other, how they buy and sell between themselves, and finally, how they get their individual products or combined products to the market place.

18.326 Travel Marketing — This course will emphasize proper travel consulting with individual travellers through personal encounter, phone or letter. It will also cover the presentation of the product to small groups using audio-visual aids; the presentation of services offered to retailers; the proper use of mailing lists and mailing pieces; and the distribution of sales literature. This course is a prerequisite for 18.426.

18.330 Tourism Plant Design — A study of those facilities that go to make up the resort from urban continuity through to restaurant and room layout and how the hotelman can maximize this exposure to the developers and related groups. The course will also cover layout and design for ski areas, golf courses, tennis courts, marinas and other related recreational facilities.

18.331 Introduction to Tourism — Study of the growth of tourism and why particular destinations are popular. The economic importance of tourism and government involvement. Tourism and the environment and the direction of current trends in tourism and travel.

18.333, 18.433 Foreign Language — This is a basic conversational French course making use of a classroom "oral-aural" approach with the most up-to-date two-way language lab facilities. Vocabulary building, pronunciation, grammar, intonation, idiom, listening and comprehension will be included. Films will also be part of the course.

18.334 Air Travel — Successful completion of 18.234 is required for continued study and work with international tariffs and regulations in order to interpret and use them for construction of regular and special air fares, and accompanying ticketing and documentation requirements. This course, along with 18.234, is a prerequisite for 18.434.

18.340 Tourism Product Development — The evaluation of existing tour products in this course will lead to study of further development of established destinations, and the research of new destinations through feasibility reports, definition of appropriate markets and short and long-term action planning.

18.341 Recreational Geography — In this course the student will be familiarized with the various world tourism regions which attract people for vacation, recreation and other reasons.

18.344 Financial Control — This course deals with the specialized financial requirements of the tourism and travel industry; long and short-term budgeting and controls; sales reporting; carriers and government requirements; proper financing and banking assistance; routing of travel documents; function of accounting departments; and the planning of profit through sales and revenue projections.

18.402 See 18.302

18.405 See 18.305

18.413 Hospitality Industry Accounting — Preparation, interpretation and analysis of hotel balance sheets and profit and loss statements; budgeting and forecasting; feasibility studies; financing and cash flow; cost-volume-profit analysis; investment decision-making.

18.416 See 18.316

18.418 Front Office Accounting — Review of front office guest accounts using both manual, mechanical and electronic machine systems; preparation of the night transcript for smaller hotels and motels; completion of night audit for large hotels, using equipment such as the NCR 42 and the 250-8000 models. This course will involve as much practical use of the equipment as is possible.

18.425 See 18.325

18.426 Travel Marketing — This course is a continuation of 18.326 and covers long and short-term marketing, planning and research; promotion planning, budgeting and evaluation; presentations to potential customers; familiarization trips and seminar planning; advertising campaigns and the successful sales organization.

18.433 See 18.333

18.434 Air Travel — Successful completion of 18.234 and 18.334 is required for continued study and work in this course with all recognized air travel tariffs, manuals and regulations in order to make proper interpretation and use of them for construction of regular and special air fares and accompanying ticketing and documentation requirements for any airport in the world.

18.433 See 18.333

18.435 Creative Promotion and Printing — The objective of this course is to familiarize the student with the various printing processes, letter types, paper, typesetting, color separations, layouts, costing and printing procedures in order to achieve creative promotion and communication of printed words and pictures.

18.443 Regional Economic Development — This course will cover tourism in British Columbia—past, present and future. It will be related to present and anticipated facilities, accommodation, transportation and recreational opportunities, both general and specialized.

18.445 World Travel Destinations — This course offers a study of a variety of world travel destinations attracting business travellers, conventions and meetings and/or exhibition groups, as well as the major tourism destinations related to past, present and future anticipated developments.

18.450 Term Project — Each student will select, or will be assigned, a topic related to the hospitality-tourist industry. With the guidance of an instructor, the student will then develop and submit an appropriate report.

20.392, 20.492 Transportation Economics and Regulation — This course will deal with transport costing economic regulation and other types of regulation. The modes involved will include air, highway, rail and water. The course will emphasize the economics, liabilities and the regulations of passenger travel and passenger possessions (baggage). An overview of cargo, including dangerous commodities, will also be given. Topics include cartels and conferences; governmental intervention; intergovernmental cooperation; United Nations Committees concerning travel; and aspects of immigration and customs.

20.492 See 20.392

22.118 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 as applied to the hospitality-tourism industry.

22.218 Basic Management Engineering — Approaches to problem-solving and work simplification, with particular application to hotel and restaurant operations. Includes method study, some measurement techniques, layout and systems concepts.

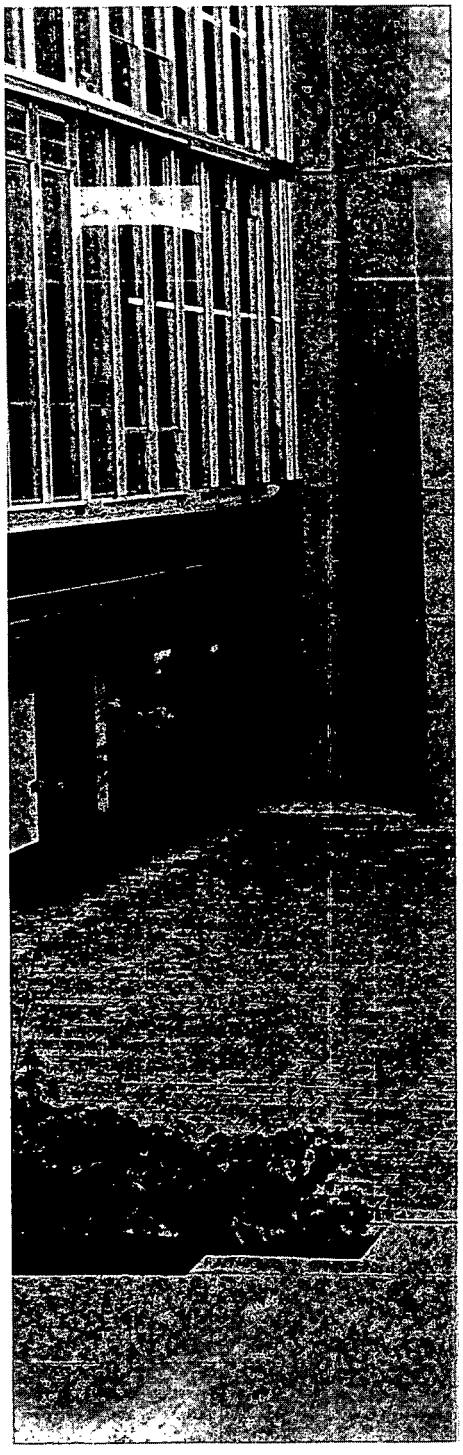
22.318 Business Statistics — Major emphasis on descriptive statistics, including numerical and graphical presentation of data, measures of central tendency and dispersion, elementary probability, index numbers and time series. Introduction to inferential statistics through selected topics such as sampling, confidence limits of the mean, hypothesis testing and simple linear regression.

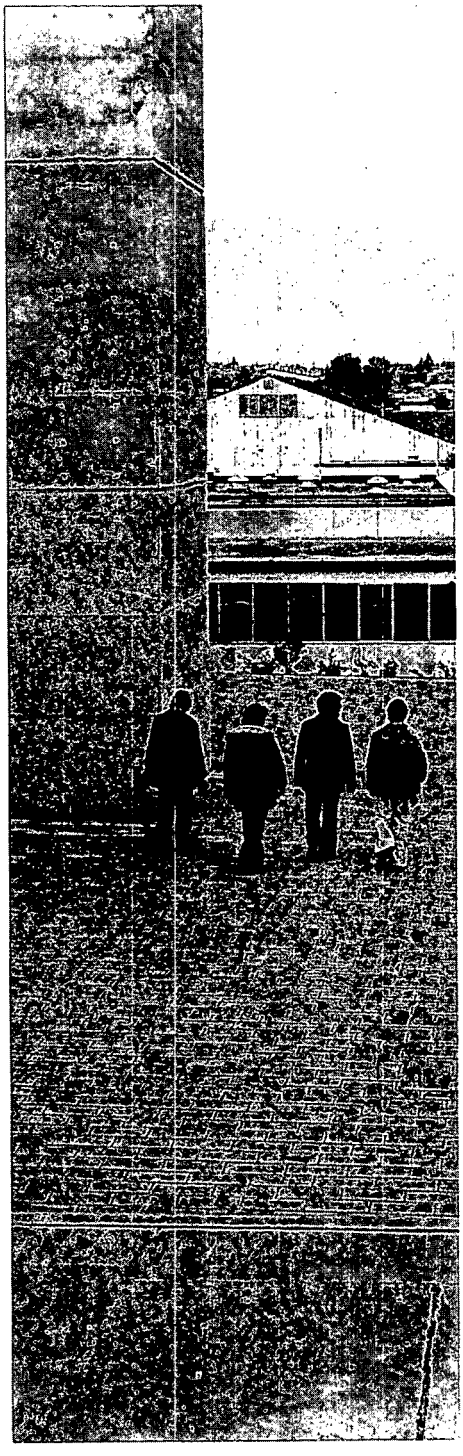
31.118, 31.218 Business Communication — This is an applied business communications course which concentrates on techniques and applications of written and spoken business communications. The discussion topics, explanations, illustrations and assignments are related as closely as possible to the hospitality and travel industries. The emphasis of the course is on the composition and analysis of writing a wide variety of business letters and reports.

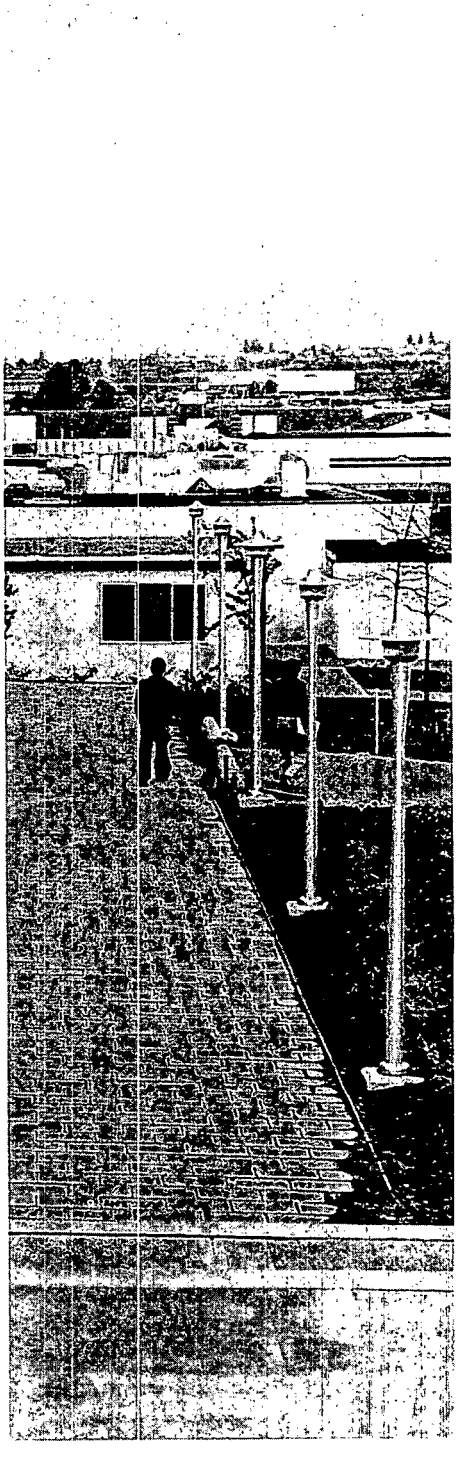
31.218 See 31.118

Faculty and Staff

M.M. Coltman, M.B.A., C.G.A.,*Department Head*
R. Agon
R.A. Brett, Dipl.T. (on leave)
E.J. Cooke
F.N. Daniels
B.J. Fernandes
K.F. Krueger
J.G. Lindenlaub, Chief Instructor
L. Lous
R. Schlyecher
G.J. Wilson







Marketing Management

Marketing has been a vital force and played a major role in reaching our high standard of living. The present and future unsettled and disrupted economic conditions of the world are now forcing new responsibilities and new responses on marketing. Intelligent, resourceful and trained marketing personnel are required to meet these new challenges.

Job Opportunities
Past marketing graduates have enjoyed good employment prospects. Numerous firms recruit on campus. The graduate is equipped for a wide range of jobs in customer services, sales and market analysis and these skills fit the needs of a wide variety of business and government organizations.

Graduates of the Marketing Management Option enter careers as management trainees in industrial and retailing firms; in sales and sales management; in advertising and sales promotion; in product and market development; and in marketing research.

Real Estate Management Option graduates find employment as appraisers, assessors, brokers, market and investment analysts, mortgage bankers, planners and property managers.

Transportation and Distribution Management Option graduates work in businesses involved in both the buying of a service for the movement of goods or people and the selling or supplying of transportation facilities.

The Program
Marketing personnel must be equipped with an understanding of the objectives, principles and methods of marketing. They must be able to adapt to accelerating rates of technological innovation and to initiate dynamic marketing practices and intense cultivation of markets. In order to meet this need, the Marketing Management program makes extensive use of the most modern methods of instruction and provides for guests from industry to lecture in their respective fields of specialization. Active participation of the student in business settings through field trips, group projects, seminars and case studies is required.

Following a common first year, students may choose one of three options: Marketing, Transportation and Distribution Management or Real Estate Management. Courses in the Marketing Option give students a thorough background in both retail and industrial businesses. Students selecting Transportation and Distribution Management will specialize in transportation modes, their services and equipment, national and international shipments, materials handling and storage and the economics of traffic and transportation. Courses in Real Estate Management are geared to meet the needs of the real estate industry and may lead ultimately to professional status.

Prerequisites
Graduation from the Selected or Combined Studies Program with Algebra 11 or Math 11. Admission may also be granted to mature students who can provide evidence of probable success in the program.

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
10.134	Management in Industry	3
10.139	Economics	3
14.050	Introduction to Data Processing	3
14.182	Office Equipment	3
16.140	Accounting	5
20.180	Marketing	3
22.120	Business Mathematics	4
31.120	Business Communication	4
	Library and Research	7
		35

		Mktg Mgt
	Term 2	
10.239	Economics	3
14.296	Office Systems and Procedures	3
16.240	Accounting	5
16.245	Credit and Collections	3
20.275	Salesmanship	3
20.280	Marketing	3
22.220	Business Statistics	4
31.220	Business Communications	4
	Library and Research	7
		35

		Mktg	Real Est	Traf & Trnsp
	Term 3			
10.325	Industrial Relations	—	—	4
10.360	Business Law	3	3	3
10.384	Organizational Behavior	—	—	3
14.052	Computers in Business	—	—	4
16.342	Marketing Management Accounting I	5	5	—
20.310	Retailing	4	—	—
20.322	Marketing Management	4	4	—
20.323	Sales Management*	4	—	—
20.331	Modes of Transportation	—	—	6
20.332	Transportation Economics	—	—	5
20.333	International Trade	—	—	3
20.371	Advertising and Sales Promotion	4	4	—
20.372	Consumer Behavior	3	3	—
20.382	Marketing Research	4	4	—
20.350	Real Estate Management	—	4	—
20.352	Property Management	—	4	—
22.320	Management Engineering I	—	—	3
	Library and Research	5	5	4
		36	36	35

	Term 4	Mktg	Real Est	Traf & Trnsp
10.460	Business Law	3	3	3
10.483	Management of Human Resources	4	4	—
16.442	Marketing Management Accounting II	5	5	—
16.443	Management Accounting	—	—	4
20.411	Merchandising	3	—	—
20.422	Marketing Management	3	3	—
20.432	Transportation Economics	—	—	5
20.434	Transportation Regulations	—	—	3
20.435	Distribution Management	—	—	3
20.436	Transportation Trends	—	—	6
20.437	Marketing Research for Transportation	—	—	4
20.450	Real Estate Management	—	3	—
20.451	Appraisal	—	3	—
20.482	Marketing Research	3	3	—
20.484	Transportation and Distribution Management*	3	—	—
20.490	Directed Studies	7	7	—
22.420	Management Engineering II	—	—	3
	Library and Research	5	5	4
		36	36	35

**Alternative elective — Real Estate Management*

Subject Outlines

10.134 Management in Industry — 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.

10.139, 10.239 Economics — The course aim is to develop an understanding of the organization and operation of the Canadian economy. Students analyse demand and supply, how production costs vary, and how prices are determined in different markets (micro-economics). The theoretical tools of the economist are used to explore the concepts of national income, employment, inflation, and growth (macro-economics). An appreciation of the relation between economic theory and economic policy is provided.

10.239 See 10.139

10.325 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.

10.360, 10.460 Business Law — A study of legal rules and principles which guide decisions involving the law of contracts, including the sale of goods and negotiable instruments, as well as the business associations of agency, partnership and companies.

10.384, 10.483 Organizational Behavior and Management of Human Resources — This course is designed to provide the student with an opportunity to experience and learn about cause-and-effect human relationships within a business environment. The course will involve study of individuals, groups and organizations from a managerial and personnel administrative point of view. Heavy emphasis will be placed on involvement and simulation techniques as the key to effective understanding of management of the human resource.

10.460 See 10.360

10.483 See 10.384

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

14.052 Computers in Business — For those people who are not specializing in data processing, a look is given at the types of computer systems currently in use in business. Topics include computer hardware and software development, program preparation (students will code and execute a COBOL program in this section), input/output media and devices, data centres, operating systems, controls in computer systems, installing a computer and current trends in the computer industry.

14.182 Office Equipment — A course to develop the touch method of operation for adding machines, to provide practice in solving business problems on electronic calculators and to provide hands-on experience in using a punched tape word processing machine. The course includes an exercise to introduce business forms.

14.296 Office Systems and Procedures — An introduction to common business applications such as accounts receivable, accounts payable and payroll. One-write practice sets, paper flow chart problems and an electronic accounting machine are the devices used to teach the procedures and methods aspect.

16.140, 16.240 Accounting — 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.

16.240 See 16.140

16.245 Credit and Collections — Study of various types of credit and their use by retail businesses, financial institutions, commercial enterprises and consumers. Includes sources of information, credit policy and control and collection techniques.

16.342, 16.442 Marketing Management Accounting — Here, emphasis is placed upon profit planning, pricing strategies, and control in the retail merchandising environment. Also studied are cost-accounting control concepts and applications, inventory management techniques, cash and capital planning techniques and revenue reporting systems. The course ends with a study of the implications for managerial decision-making of accounting reporting methods and policy.

16.442 See 16.342

16.443 Management Accounting — The management accountant's role, income determination, decision-making, profit planning, budget, forecasting, profit margin variance analysis, corporate financial analysis, income tax, internal control, annual report, accounting aids for sales and production management, measuring managerial performance, direct costing and the contribution approach.

20.180, 20.280 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.

20.275 Salesmanship — Introduction to professional selling. Emphasis on practical problems of locating and qualifying prospects, use of the depth approach and improving sales preparation and organization. Some examination also given to improving interpersonal communications in non-selling situations.

20.280 See 20.180

20.310 Retailing — This course deals with fundamental principles of large and small scale retailing. The areas dealt with are principles of retail gravitation, principles of location, trading area analysis methods, assessment techniques of market and sales potentials, productivity problems in retailing, life cycle of retail institutions, retail strategies and sales promotion.

20.322, 20.422 Marketing Management — Knowledge of how the marketing system operates, as gained through the introductory marketing course, is supplemented by uderstanding the varied responsiblities of the marketing manager— the influence of business policies, use of market research, demand, competition, cost analysis, marketing planning and controlling the marketing program.

20.323 Sales Management — General principles of sales management. Emphasis is given to the human resource, with stress placed on selection, assimilation, training and supervision. Also, examination of sales research, planning, organization and analysis is made. The course finishes with a discussion of sales

management ethics.

20.331 Modes of Transportation — This course is designed to introduce students to the various ways and means that commodities are moved. Methods employed by air, highway, pipeline, rail and water carriers, and the equipment utilized to achieve the aims of transportation are discussed. Students spend much of their time in the field, analysing the operations of carriers, shippers and consignees.

20.332, 20.432 Transportation Economics — The principles underlying the economics of transportation, including policies, prices and rate structures, will be studied. The relationship of economic theory and the actual practices within the transportation industry will be compared. The concept of effective utilization of transportation resources is considered along with the resultant economic consequences of the substitution of one mode for another.

20.333 International Trade — Emphasis in this course will be placed on the export and import of commodities and their importance to Canada. Studies will cover procedures, rules and regulations necessary for international shipments. Developing techniques for the movement of goods throughout the world will be examined. The practical approach is emphasized. The intent of this course is to assist the student to understand the complexities of international trade as well as the terminology of international trade and the activities involved within international trade as it is happening on the local and foreign scenes.

20.350, 20.450 Real Estate Management — 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 agent, salesman and appraiser are covered. This is a credit course recognized by the Real Estate Council of British Columbia and the Department of Real Estate Studies at UBC. It exempts the student entering the real estate brokerage business from the salesman's prelicensing course.

20.352 Property Management — This course lays the foundation for a sound education in property management. It thoroughly familiarizes the student with the basic theories and techniques of managing investment real estate. On completion of the course, the student will have an insight into the long-range welfare of the investment property and be familiar with the day-to-day skills necessary to manage residential and commercial properties. Students obtain credit points for this course toward the designation of Certified Property Manager with the Institute of Real Estate Management. The course will cover all responsibilities of the property manager, such as management agreements, merchandising rental space and leasing, controlling the physical investment and maintenance real estate economics, finance and valuation, neighborhood analysis, property analysis and apartment management. Students will gain an overall view of the many types of property in which management opportunities abound.

20.371 Advertising and Sales Promotion — Advertising philosophy and purpose. Organization of the advertising function. Relationship of advertising to other business divisions. Advertising planning. The business management of advertising. The creative process. Research. Media — newspaper, radio, TV, magazines, direct mail, outdoor, public relations. Copy, layout, art. Strategies and campaigns. Production and communications. Controls. Evaluating results. The course is designed to make the student a competent advertising critic.

20.372 Consumer Behavior — An examination of consumer purchase decisions. Special emphasis will be placed on areas such as motivation and arousal, perception, attitude and attitude change and consumer decision processes.

20.382, 20.482 Marketing Research — The purpose of the course is to examine the basic approaches to marketing research, discuss the technique tools and relate these tools to the decision-making process. Emphasis is placed on the use of market research in the total marketing decision concept. Special applications of marketing research and simulated real-life situations will be examined.

20.411 Merchandising — While most marketing courses emphasize the selling aspects, this course deals with the other side of selling—buying. The importance of selecting the right type of merchandise assortment, techniques of buying, vendor services available, inventory planning and control methods are considered. Merchandising in four different areas are dealt with—retailing, wholesaling, international business, and industrial buying.

20.422 See 20.322

20.432 See 20.332

20.434 Transportation Regulation — An analysis of current transportation legislation both at the Canadian and international levels is made, with reference to duties and liabilities of carriers and those whom they serve. A study of common and statutory law relating to passengers and freight is vital to those engaged in transportation services.

20.435 Distribution Management — The wide range of storage and warehousing includes diverse matters such as inventory control, palletization, utilization, containerization, packaging, locational analysis and general materials handling, and these areas form the content of this course.

20.436 Transportation Trends — The evolution taking place in transportation is of such magnitude that investigations in these areas are mandatory if the student is to be aware of what is going on now and what is likely to occur. Advancements in rapid transit, automated passenger and freight terminals, new equipment and improvements to existing equipment merit study and analysis, if the student is to embark on a transportation career.

40.437 Marketing Research for Transportation — The purpose of this course is to provide the student with a knowledge of the procedures and applications of marketing research within the context of the business firm involved in the transportation field. Case studies and problems will be used to incorporate the practical aspects.

20.450 See 20.350

20.451 Appraising Real Property — The course is designed for use by appraisers, real estate brokers, lenders, builders and assessors. On completing this introductory course, the student will have learned how to apply the 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, the appraisal framework, area analysis, neighborhood analysis, site analysis, site valuation, improvements analysis, direct sales comparison approach, gross rent multiplier analysis. Cost approach: reproduction cost of new improvements and estimation of accrued depreciation (diminished utility). Summary of the cost approach: correlation analysis and final value estimate, writing the appraisal report, professional ethics and standards practice. This is a credit course for the student seeking professional status and is recognized by the Society of Real Estate Appraisers.

20.482 See 20.382

20.484 Transportation and Distribution Management — The total distribution concept has undergone many rapid changes over the past few years. The Canadian transportation scene will be investigated in detail because of its importance to our economy. Included in these studies will be an analysis of the various modes of transportation, our trade patterns with foreign lands, techniques of moving goods between shippers and receivers, materials handling and storage and related activities.

20.490 Directed Studies — Seven hours of the student's timetable are allocated to two major projects. The projects are to be in marketing areas of the student's choice and carried out under the guidance of assigned faculty members.

22.120 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 as applied to the marketing area of business.

22.220 Business Statistics — Major emphasis 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 as sampling, confidence limits of the mean, hypothesis testing and simple linear regression.

22.320 Management Engineering I — The scientific approach to problem-solving, with particular application to business enterprises. Topics include method study, systems and procedures, charting and analysis, forms design and control, work distribution, layout, planning and scheduling, work measurement and costing. The course material is slanted toward the needs of the traffic and transportation side of marketing.

22.420 Management Engineering II — A continuation of 22.320, involving the practical application of problem-solving techniques in business organizations. The student works on live projects requiring research and detailed analysis plus the preparation and presentation of technical reports to managers and instructors. The course is tailored for the needs of the traffic and transportation marketing student.

31.120, 31.220 Business Communication — The course will develop the student's skill in the fundamentals of written business communication. The first semester introduces the student to basic research tools and to short and long reports. The second semester deals mainly with the various types of business letters. Students are also exposed to audio-visual presentation techniques and reading and study skills.

31.220 See 31.120

Faculty and Staff

G.H. Abbott, B.Comm., M.B.A., *Department Head*
R. Basford, B.A.Sc., M.B.A.
D.F. Clark, B.Comm., M.B.A.
G.T. Jacob, B.A. (Hist. & Econ.), B.A. (Bus. Admin.) M.B.A.
E.Y. Maitland, B.A. (Hons.)
M.I. Shacker, B.A.
W.D. Sproule, B.Comm., C.A., R.I. (B.C.), F.R.I.
R.W. Vandermark, B.A.
R.A. Venne, B.Comm., (Hons.Econ.), M.B.A.
W.A.E. Walley, B.A.
T. Winder, B.A., M.B.A.

Operations Management

Leaders in business, industry and government recognize the need for well-trained professionals who are skilled in the sophisticated techniques required for solving today's complex business problems—professionals who are fluent in the languages of the business world and the engineering world and who understand the systems used in both areas.

Job Opportunities
A variety of career possibilities exist, including procedures analyst, methods analyst, project administrator, production control planner, systems analyst, industrial engineering technologist, materials manager, quality control supervisor, data processing coordinator, work study analyst, planner-buyer, inventory control analyst, cost estimator, distribution manager, personnel officer, production manager, critical path analyst, time and motion analyst, maintenance planner, technical sales manager and technical writer.

The Program
The Operations Management course consists of a comprehensive program of lectures, seminars, field trips and group projects under the guidance of an experienced team of professionals. Course subjects are in the areas of business, industrial engineering and human relations. The Operations Management graduate will possess a knowledge of the methods which are necessary for the effective development of solutions to problems in any work environment, have acquired a base from which to develop a disciplined professional approach to management, have an understanding of the fundamentals of industrial engineering, understand the varying techniques for working well with others through the utilization of sound human relations skills, be fluent in the complex language of the business world, have developed written, graphic and verbal communications skills and be prepared to make an immediate contribution to the efficiency of any company.

Prerequisites
Graduation from the Selected or Combined Studies Program with Algebra 11 or Math 11 or Business and Consumer Math 11. This requirement may be waived for mature students on approval of the Department Head.

For success in the Operations Management program, and in a career, the student should possess the ability to relate to other people and have an inquiring mind. In addition, the student should have sufficient ability in numerical and logical reasoning.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
14.050	Introduction to Data Processing	4
16.142	Introduction to Financial Accounting	3
22.100	Applied Mathematics	5
22.101	Introduction to Operations Management	7
31.122	Technical Communication	3
33.117	Basic Science	3
49.102	Interpretation of Engineering Drawings	2
49.109	Engineering Concepts I	3
	Library and Research	5
		35
	Term 2	
10.234	Economics	2
10.285	Organizational Behavior	2
16.242	Introduction to Managerial Accounting	3
22.200	Applied Statistics	4
22.201	Method Study and Procedure Analysis	7
22.202	Computer Programming — Applied FORTRAN IV	3
31.22	Technical Communication	3
33.217	Basic Science	3
49.209	Engineering Concepts II	3
	Library and Research	5
		35
Year 2	**Term 3**	
10.334	Economics	3
10.371	Management of Human Resources	2
16.348	Cost Accounting	3
22.300	Quantitative Methods	5
22.304	Production Control Management I	5
22.305	Management Information Systems	3
22.306	Industrial Engineering	9
	Library and Research	5
		35

	Term 4	4A	4B
10.426	Industrial Relations	—	4
22.400	Quantitative Methods	7	2
22.401	Industrial Engineering Concepts	2	16
22.404	Production Control Management II	6	3
22.405	Management Information Systems	3	—
22.406	Industrial Engineering	10	—
22.407	Market Research	2	2
22.408	Supervision	—	3
	Library and Research	5	5
		35	35

Subject Outlines

10.234, 10.334 Economics — The aim of the course is to develop an understanding of the organization and operation of the Canadian economy. Students analyse demand and supply, how production costs vary, and how prices are determined in different markets (micro-economics). The theoretical tools of the economist are used to explore the concepts of national

income, employment, inflation, and growth (macro-economics). An appreciation of the relation between economic theory and economic policy is provided.

10.285 Organizational Behavior — This course is the study of man's behavior and attitudes in an organizational setting; the organization's effect on his perceptions, feelings and actions; and his effect on the organization, particularly how his behavior affects the achievement of the organization's purposes. Such concepts as leadership, communications, power, authority, change and conflict will be examined.

10.334 See 10.234

10.371 Management of Human Resources — This course is designed to provide the student with an opportunity to experience and learn about cause-and-effect human relationships within a business environment. The course will involve study of individuals, groups and organizations from a managerial and personnel administration point-of-view. Heavy emphasis will be placed on involvement and simulation techniques as the key to effective understanding of management of the human resource.

10.426 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.

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

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

16.242 Introduction to Managerial Accounting — This course 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.

16.348 Cost Accounting — This course will concentrate 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 will be also dealt with.

22.100, 22.200 Applied Mathematics — The fundamentals of descriptive statistics and a comprehensive study of the use of statistical inference are integrated with applied mathematics and are covered concurrently over a one-year period. Basic algebra, trigonometry and graphs with business applications are reviewed. Topics include basic mathematics of finance, simple and compound interest, loan-payment plans, methods of evaluating investments, probability theory and distributions, sampling, hypothesis testing, chi-square, rank correlation, linear regression and index numbers.

22.101 Introduction to Operation Management — A study of the business firm with respect to its organization and functions. Emphasis will be placed on how the operations management graduate will fit into the organization. This will be accomplished through discussions, field trips to local industries and related case problems. Additional areas of interest will include business law and government regulations involving the working environment.

22.200 See 22.100

22.201 Method Study and Procedure Analysis — The student studies the basic systematic approach to problem-solving in work environments. The course includes problem definition, systems of data collection, information analysis and determination of the best possible solution by applying quantitative techniques. Other areas include office procedure analysis and facility layout.

22.202 Computer Programming — Applied FORTRAN IV — Instruction in the FORTRAN IV computer-programming language with emphasis on the solution of problems common to the operations management discipline. Topics include program flow-charts (the design phase), arithmetic operations, input-output operations, array manipulation, subprograms, program testing and program debugging.

22.404 See 22.304

22.405 See 22.305

22.407 Market Research — The familiarization with the basic approaches to market research. Lectures and workshop sessions will emphasize data gathering techniques, the analysis and interpretation of data related to the decision-making process.

22.408 Supervision — This course introduces the student to some of the skills required to implement short-range managerial decisions with the resources available at the first level of supervision.

31.122, 31.222 Technical Communication — The course is divided into a one-hour lecture and a two-hour lab per week. In the lecture, students will receive information on basic writing and communicating skills, reading and study skills, business correspondence and related writing tasks, audio-visual techniques, oral presentations and reports. The lab hours will be used to practice these skills. There will be approximately 10 assignments each term; each assignment will be designed to develop a specific communication skill that the student will need in his or her field.

31.222 See 31.122

33.117, 33.217 Basic Science — This is a survey course covering the usual topics of physics as they relate to the Operations Management Technology. The use of precise mathematical relationships is minimal. Emphasis is on how the basic laws of physical science affect and limit activities in the technology.

33.217 See 31.117

49.102 Interpretation of Engineering Drawings — This course introduces the student to engineering drawings as a method of communication. He will learn how to read various types of blueprints and how to communicate through the use of drawings. Emphasis will be placed on visualization, dimensioning and freehand sketching.

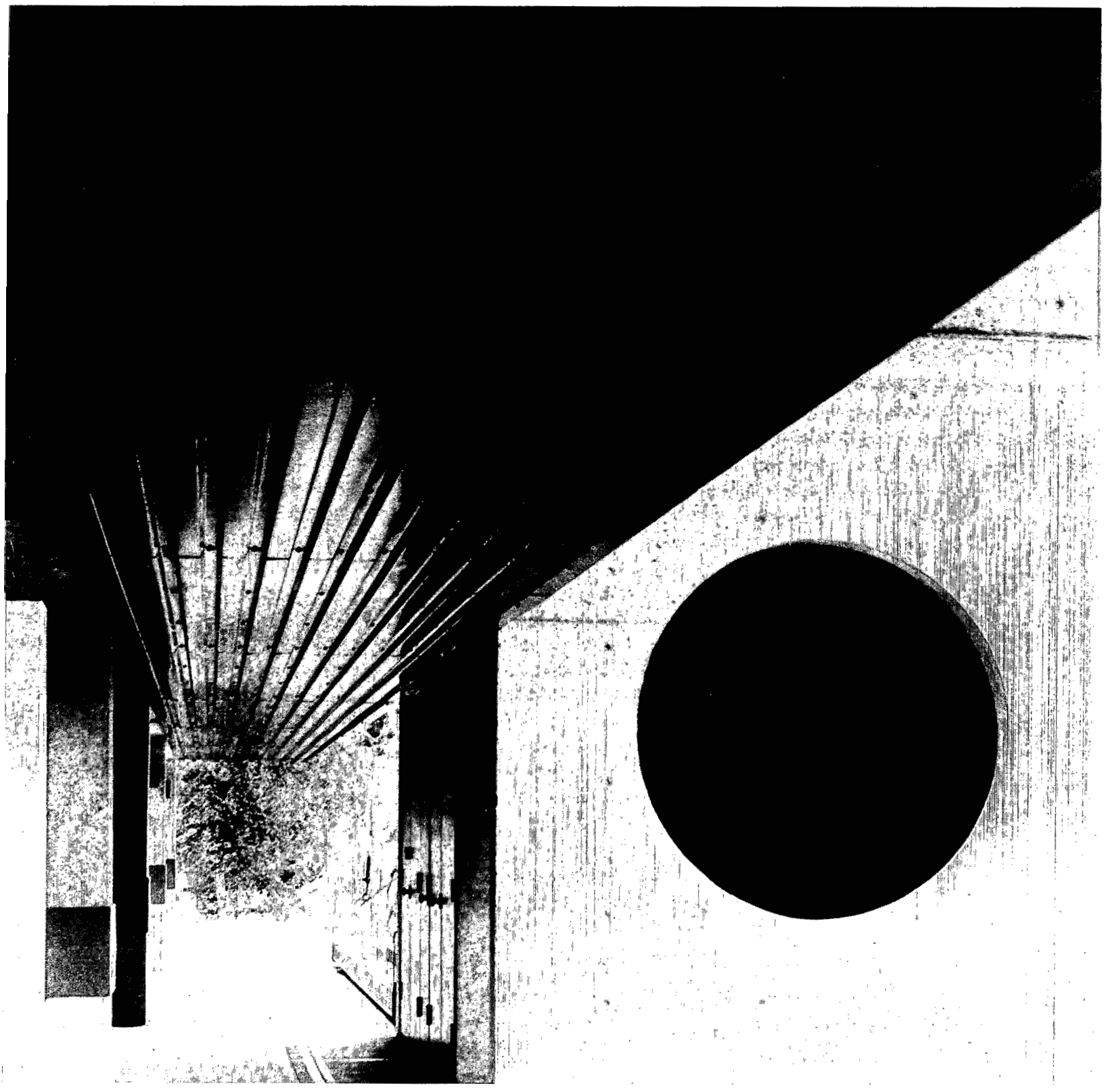
49.109 Engineering Concepts I — A study of applied mechanics and design concepts. Topics include some metallurgy, forces, moments, couples, frames, beams, centroids, friction and some elementary dynamics.

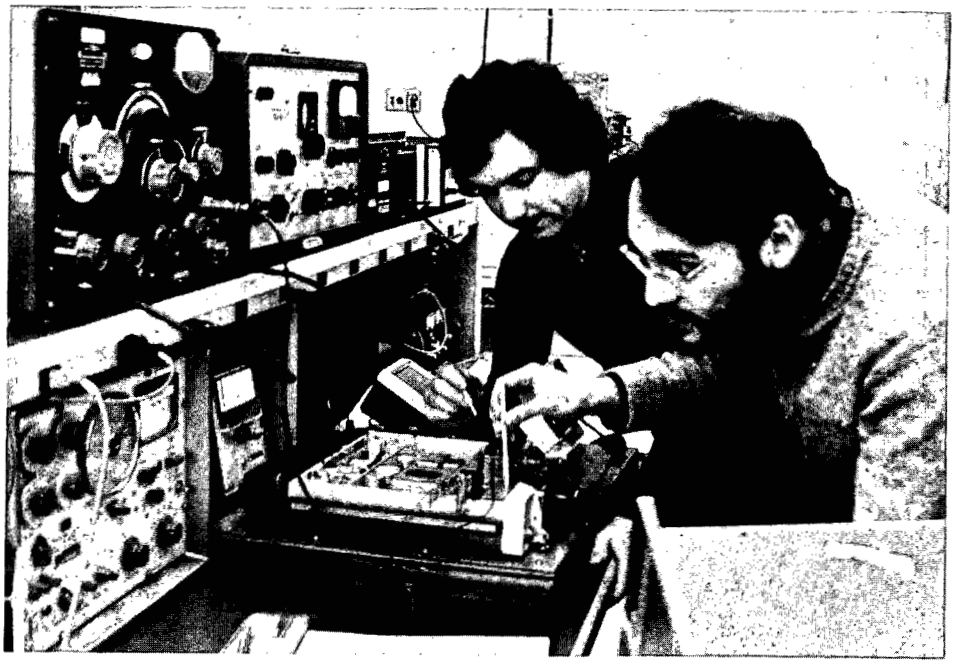
49.209 Engineering Concepts II — A study of manufacturing processes and equipment including casting, forging, presswork, welding. Student participation includes visits to local industry, practical lab work and preparing and presenting to the class topics on processes of recent development

Faculty and Staff

R.G. Smylie, B.A.Sc., P.Eng., *Department Head*
B. Curtis, M.B.A.
F.L. Gruen, B.Mgt.Eng., M.A.Sc., Senior Instructor
K.C. Hartley, B.A.Sc., P.Eng.
A.S. Lee, B.Eng., P.Eng.
D.W. Malcolm, B.Sc.
E. Mason, B.A.Sc., P.Eng.
N. MacKeown, B.A.Sc., P.Eng.
J.A.I. Millette, B.A.
B.R.M. Morrow, B.Comm., Senior Instructor
G.W. Murray, Dipl. T.
T.J. Schmaltz, Dipl.T.
W.J. Sheriff, B.A., B.Sc.
L.A. Smith, Dipl.T., C.A.M.

Engineering





Biological Sciences

The Biological Sciences Technology, with its choice of programs and options, offers a variety of secure and worthwhile career possibilities encompassing indoor and outdoor work, in large or small-scale settings. Food processing and production offers stable employment, even during unsettled economic conditions, since these industries are tied to population growth. Those with a concern for their environmental surroundings may gravitate towards landscape horticulture. Others may be interested in mastering the complexities of farm management.

Job Opportunities
Graduates in the Food Processing Option of the Biological Sciences Program 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.

Food Production Option graduates may occupy positions concerned with lab control of the production of agricultural chemicals, feeds and fertilizers, or in the field operations of food manufacturing. Inspection services and government and industry research labs also provide employment opportunities.

Landscape Horticulture Option graduates are employed with landscape contractors, horticultural nurseries, parks and recreation systems, landscape architects and planners.

Agri-Management Program graduates have broad employment opportunities. Some return to the family farm with a greatly broadened understanding of management principles and operating practices. Others are employed on large, multi-unit farms as management trainees. Still others find ready employment in farm-related business firms.

The Programs
The Biological Sciences Technology offers two programs: the Biological Sciences Program and the Management in Agriculture (Agri-Management) Program.

The first term of the Biological Sciences Program provides students with a general background. Students then proceed to one of three options: Food processing, Food Production or Landscape Horticulture. Food Processing students acquire a thorough knowledge of the techniques of food preservation such as canning, freezing, dehydrating and fermenting, as well as receiving a solid grounding in food chemistry and food microbiology. Food Production students concentrate on the scientific aspects of the production of food from agricultural sources. Their curriculum includes courses in the plant, animal and soil sciences and, in addition, subjects which stress the analytical and mechanical principles of food production. Students in Landscape Horticulture study the natural sciences related to floriculture, arboriculture, nursery production, turf management and landscaping. Landscape plan production techniques are also studied.

The Management in Agriculture Program (Agri-Management) curriculum is devoted to both the agricultural and business aspects of the farming industry. Courses include plant, animal and soil sciences and agricultural mechanics, as well as marketing, business organization and management, business law and taxes, finance and appraisal, as they relate to agriculture. The Agri-Management Program includes a summer practicum of supervised on-farm experience between first and second year.

Prerequisites
Graduation from the Selected or Combined Studies Program is necessary for entrance to either Program. Algebra 12 or Math 12 and Chemistry 11 are prerequisites for the Biological Sciences Program (Food Processing, Food Production, Landscape Horticulture), while Agri-Management Program students need Algebra 11 or Math 11 only.

Course of Studies
Biological Sciences Program

Year 1	Term 1	Clrm hrs/wk
30.103	Applied Chemical Principles	6
31.144	Technical Communication	3
32.144	Basic Technical Mathematics	5
33.102	Physics for Biological Sciences	5
44.121	Introductory Microbiology	6
44.122	Biology	5
	Library and Research	5
		35

	Term 2 Food Processing	2A	2B
30.203	Applied Chemical Principles	6	6
31.244	Technical Communication	3	3
32.244	Probability and Statistics	5	5
33.202	Physics for Biological Sciences	5	5
44.201	Food Processing	6	6
44.221	Microbiology for Food Processing	5	5
	Library and Research	5	5
		35	35

	Term 2 Food Production	2A	2B
30.203	Applied Chemical Principles	6	6
31.244	Technical Communication	3	3
32.244	Probability and Statistics	5	5
33.202	Physics for Biological Sciences	5	5
44.223	Microbiology for Food Production	5	5

	Term 2 cont **Food Production**	2A	2B
44.251	Food Production	6	6
	Library and Research	5	5
		35	35

	Term 2 **Landscape**	2A	2B
30.217	Applied Chemical Principles	6	6
31.244	Technical Communication	3	3
33.202	Physics for Biological Sciences	5	5
40.208	Landscape Drafting	3	3
44.253	Introductory Botany and Soils	6	6
44.263	Applied Horticulture	4	4
51.205	Introduction to Surveying	3	3
	Library and Research	5	5
		35	35

Year 2	**Term 3** **Food Processing**	
10.730	Industrial Management	3
30.303	Instrumental Analytical Methods	5
31.344	Advanced Technical Communication	2
44.301	Food Processing	5
44.303	Nutrition for Food Processing	2
44.311	Quality Control	4
44.312	Introductory Food Analysis	5
44.341	Mechanics of Machines	4
	Library and Research	5
		35

	Food Production	
30.303	Instrumental Analytical Methods	5
31.344	Advanced Technical Communication	2
44.312	Introductory Food Analysis	5
44.341	Mechanics of Machines	4
44.352	Applied Genetics	4
44.361	Plant Technology	6
44.371	Animal Technology	4
	Library and Research	5
		35

	Landscape Horticulture	
10.730	Industrial Management	3
31.344	Advanced Technical Communication	2
40.308	Landscape Drafting	3
44.343	Landscape Mechanics	5
44.363	Applied Horticulture	6
44.364	Nursery Crop Production	6
44.366	Landscape Structural Detail	5
	Library and Research	5
		35

	Term 4 **Food Processing**	4A	4B
22.444	Basic Operations Management	2	2
32.444	Computing	4	—

	Term 4 cont **Food Processing**	2A	2B
44.401	Food Processing	5	5
44.402	Process Analysis	5	5
44.411	Quality Control	4	4
44.412	Food Analysis	5	5
44.431	Sanitation	4	4
48.450	Instrumentation	—	6
	Library and Research	5	5
		34	36

	Term 4 **Food Production**	4A	4B
20.105	Agricultural Business	6	—
32.444	Computing	—	4
44.413	Agricultural Analysis	5	5
44.414	Experimental Techniques	4	4
44.442	Agricultural Mechanics	5	5
44.462	Plant Protection	6	6
44.481	Soil Technology	5	5
	Library and Research	5	5
		36	34

	Term 4 **Landscape**	4A	4B
42.444	Land Engineering	3	3
44.462	Plant Protection	6	6
44.465	Landscape Field Practice	6	6
44.466	Landscape Structural Detail	6	6
44.467	Advanced Plant Identification	—	4
44.468	Supervisory Practices	4	—
44.481	Soil Technology	5	5
	Library and Research	5	5
		35	35

Management in Agriculture (Agri-Management) Program

Year 1	**Term 1**	Clrm hrs/wk
10.131	Management in Industry	3
10.136	Economics	3
16.140	Accounting	5
22.110	Business Mathematics	4
31.144	Technical Communication	3
33.102	Physics for Biological Sciences	5
44.122	Biology	5
44.150	Agricultural Concepts	2
	Library and Research	5
		35

	Term 2 **Economics**	2A	2B
16.240	Accounting	5	5
22.210	Business Statistics	4	4
31.244	Technical Communication	3	3
33.202	Physics for Biological Sciences	5	5
44.251	Food Production	6	6
44.290	Agricultural Marketing	3	3

	Term 2 cont **Economics**	4A	4B
	Tutorial on Agricultural Concepts	1	1
	Library and Research	5	5
		35	35

A technical report on a summer practicum of on-farm experience will be required for students continuing into second year.

Year 2	**Term 3**	
44.341	Mechanics of Machines	4
44.352	Applied Genetics	4
44.361	Plant Technology	6
44.371	Animal Technology	4
44.391	Agricultural Business Organization and Management	5
44.392	Agricultural Business Law and Taxes	3
44.393	Agricultural Business Finance and Appraisal	3
44.394	Summer Technical Report	1
	Library and Research	5
		35

	Term 4	4A	4B
10.484	Management of Human Resources	3	3
22.444	Basic Operations Management	2	2
44.442	Agricultural Mechanics	5	5
44.462	Plant Protection	6	6
44.481	Soil Technology	5	5
44.491	Agricultural Business Organization and Management	5	5
44.495	Crop and Livestock Management	4	4
	Library and Research	5	5
		35	35

Subject Outlines

10.131 Management in Industry — An orientation to the nature of business management and the administrative process. Elements of planning, organization and leadership techniques will be examined. Study and discussion will be undertaken of actual business cases illustrating problems frequently met in industry and requiring managerial analysis, decision and action.

10.136, 10.236 Economics — The aim is to develop an understanding of the organization and operation of the Canadian economy. Students analyse demand and supply, how production costs vary, and how prices are determined in different markets (micro-economics). The theoretical tools of the economist are used to explore the concepts of national income, employment, inflation and growth (macro-economics). An appreciation of the relation between economic theory and economic policy is provided.

10.236 See 10.136

10.484 Management of Human Resources — The Management of Human Resources course is designed to provide the student with an opportunity to experience and learn about cause-and-effect human relationships within a business environment. The course will involve study of individuals, groups and organizations from a managerial and personnel administrative point of view. Heavy emphasis will be placed on involvement and simulation techniques as the key to effective understanding of management of the human resource.

10.730 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.

16.140, 16.240 Accounting — 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.

16.240 See 16.140

20.105 Agricultural Business — The course objective is to introduce the applicant of business skills to agri-business and to study in particular the marketing functions as related to the marketing of agricultural products and services. Case studies and readings are used to relate to the practical problems of agri-business.

22.110 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 as applied to business administration.

22.210 Business Statistics — Major emphasis 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 as sampling, confidence limits of the mean, hypothesis testing and simple linear regression.

22.444 Basic Operations Management — The techniques of management problem-solving and work simplification, with particular application to engineering and industrial organizations. Includes method study, some measurement techniques, layout, planning and scheduling. The course emphasizes practical applications in the field of biological sciences.

30.103 Applied Chemical Principles — An applied course of basic inorganic chemistry, including simple stoichiometry, solubility product, selective precipitation, solution preparation, pH, buffer solutions, oxidation-reduction, acid-base theory and titration calculations. Lab work consists of simple qualitative and analysis. Good lab techniques are emphasized.

30.203 Applied Chemical Principles — A continuation of 30.103 that includes theory of gravimetric and volumetric analysis, titration curves, chemical kinetics, simple physical chemistry, atomic structure, ionic and covalent bonding, periodicity and descriptive organic chemistry of selected groups. Lab work consists of qualitative and quantitative analysis and physical separations.

30.217 Applied Chemical Principles — A continuation of 30.103 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.

30.303 Instrumental Analytical Methods — This course introduces basic theoretical concepts, instrument construction and operation and general application of the following methods: potentiometry, polarography, refractometry, polarimetry, visible, ultra-violet and infra-red, and includes absorption and emission flame photometry and gas chromatography.

31.144, 31.244 Technical Communication — The objective of this course is to increase the students' skills in both written and oral communication. Students will have one lecture in which specific writing or speaking skills are discussed and one two-hour lab period during which they will apply the skill learned in the lecture. Students will write informal and formal reports, letters, resumés and memos and will give at least one oral presentation in each term.

31.244 See 31.144

31.344 Advanced Technical Communication — In two hours of lab sessions each week, students will practice under supervision typical kinds of engineering communications such as letters, memos, reports, proposals and meetings. Some assignments will be done jointly with various biological sciences courses. The equivalent of one short writing assignment per week will be required.

32.144 Basic Technical Mathematics — Theory and application of exponentials: common and natural logarithms, log-log and semi-log graphing, exponential and logarithmic equations. Calculus for algebraic functions: the derivative, derivatives of polynomials, products, quotients, and power of a function, curve sketching, applied maximum and minimum, differentials, the indefinite integral, the definite integral, areas under a curve and other applications.

32.244 Probability and Statistics — Descriptive statistics: organizing data into a frequency table; geometric and arithmetic descriptions. Probability: events, sample space, addition and multiplication laws, independent events and trials, counting formulas. Random variables; mathematical expectation. Binomial, Poisson and normal distributions. Sampling distributions. Estimation of the mean —large and small sample methods. Type I and type II errors. Correlation and linear repression with estimation and hypothesis testing of parameters.

32.444 Computing — An introduction to digital computing, using the IBM 370 system and the FORTRAN language; flow-charting, FORTRAN statements, input and output statements; elementary numerical methods; applications from the biological sciences, especially in the area of statistics.

33.102, 33.202 Physics — This is an introductory level course covering a wide range of physical principles, with emphasis on areas of popular interest and of special relevance to the Biological Sciences Technology. Topics covered in first term include kinematics, dynamics, friction, statics, energy, power, circular motion, momentum, elasticity and fluid mechanics. Topics covered in second term include temperature, heat, calorimetry, kinetic theory, heat transfer, basic electricity and magnetism, colorimetry, optics relativity and radiation. The program stresses the subjects of measurements,data analysis, experimental techniques and report writing.

33.202 See 33.102

40.208 Landscape Drafting — Elements of building construction relative to grading and drainage; concrete foundations; retaining walls; stud and joist framing; patios, terraces. Detailing of screens; trellises; glazing. Drafting related to the above; estimating; specifications. Some visiting lecturers.

40.308 Landscape Drafting — Continuation of 40.208, dealing with landscape construction relative to post and beam construction, masonry construction, retaining walls; drafting related to the above; specifications; estimating.

42.444 Land Engineering — An introduction to the behavior of earth and land surfaces and engineering materials under various natural conditions and under the action of both static and dynamic forces commonly occurring in engineered works. Included are foundation loads, settlements and bank stability of various soil types; also the occurrence and flow of water underground and on land surfaces. Through 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.

44.121 Introductory Microbiology — The course is designed to train students in the basic microbiological procedures employed in a laboratory; the use and care of the microscope; staining methods; aseptic techniques; methods of identifying micro-organisms.

44.122 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.

44.150 Agricultural Concepts — An overview of agricultural production in British Columbia, including terminology types, areas, size and trends. Business and

management principles as applied to agriculture. A brief exposure to government and marketing board involvement in agriculture. Information on farm-related businesses which supply and support the agricultural producer.

44.201 Food Processing — The composition of foods. Nutritional aspects. An introduction to the processes of canning, freezing, pasteurizing, dehydrating, fermenting and pickling. Experimental lots of food will be preserved by these methods during lab periods.

44.221 Microbiology for Food Processing — The application of microbiology to food manufacturing. The isolation of micro-organisms of significance 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.

44.223 Microbiology for Food Production — The application of microbiology to agricultural food production. An introduction to plant and animal pathology and to immunology. Seminar project. Assessing and reporting microbiological test results.

44.224 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. Labs consist of comparative vertebrate anatomy.

44.251 Food Production — An introduction to plant science with particular reference to basic plant morphology and physiological processes. Soil types and soil analysis. Animal husbandry and animal nutrition.

44.253 Introductory Botany and Soils — An introduction to 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 turfgrass.

44.263, 44.363 Applied Horticulture — The principles of environmental control and plant response. Plant growth regulators. Genetic principles pertinent to ornamental horticulture. Basic greenhouse and plant propagation techniques. The principles of plant taxonomy and and nomenclature. Recognition and utilization of woody species used in landscaping. Students must present a plant collection as part of the course requirement.

44.290 Agricultural Marketing — A study of the environment and institutions in the marketing of agricultural products and services. Consideration of the basic marketing functions—marketing research, product planning, selection of trade channels, merchandising, advertising and sales promotion, and the determination of price under various types of competition. The operation of marketing boards, commissions, the role of auctions in livestock marketing, the role of governments in agricultural marketing, and the marketing strategies of service and supply firms to agricultural production units.

44.301, 44.401 Food Processing — Detailed studies of specific food manufacturing processes, including dairy products manufacture, fruit and vegetable processing, jams and jellies, fish and meat products, edible fats and oils, food emulsions, processed potato products, dehydrated and freeze-dried foods, tea and coffee, spices, confections and products of milling and baking. Characteristics of packaging materials and how they meet the package requirements of various foods.

44.303 Nutrition for Food Processing — A study of the nutrients found in food as to 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.

44.311, 44.411 Quality Control — Responsibilities and organization of a quality control department in the food industry. Equipping a control lab. Methods of measuring and controlling quality factors such as color, texture, flavor and consistency in foods. Principles of statistical quality control. Federal and provincial government standards. Lab periods will provide practical experience in the scoring and grading of processed foods and in the use of various control instruments.

44.312 Introductory Food Analysis — Chemistry of the principal components of the major representative classes of foods and feeds. Moisture in foods. Proximate composition and energy values. Standard methods of analysis for common constituents. Techniques and procedures in general use in food and agricultural products lab.

44.341 Mechanics of Machines — Basic mechanical principles of food processing and agricultural equipment force and motion, energy and power. Thermodynamics. Fluid mechanics as applied to pumps and pumping systems. Electrical power equipment. Materials of construction. Maintenance and lubrication of equipment.

44.343 Landscape Mechanics — A study of basic engineering principles of landscaping and nursery crop equipment. Spraying systems. Landscape irrigation. Operation and maintenance of engine-powered equipment. Electrical power as applied to greenhouse operation.

44.352 Applied Genetics — Principles of genetics, including heredity and environment, Mendel's law of segregation, expression and interaction of genes and multiple factor inheritance. Applied plant breeding and animal breeding.

44.361 Plant Technology — Plant environment and control. Plant processes and their manipulation in commercial crop plants. The application of the various techniques of plant culture in crop production, with reference to representative cereals, forages, vegetables, small fruits and tree fruits grown in British Columbia.

44.363 See 44.263

44.364 Nursery Crop Production — Propagation and field culture of nursery plants. Growing structures, storage. Inventory control, costing marketing and handling. Grades and grading of nursery stock.

44.366, 44.466 Landscape Structural Detail — Role of the technologist in the site planning and production of landscape architectural projects. Use of sketches and models for preliminary studies of site analysis and design concepts. Preparation of working drawings and contract documents.

44.371 Animal Technology — A general familiarization with the livestock and poultry industries as they relate to food production. Animal physiology. Role of basic nutrients in metabolism. Nutritive requirements of livestock during growth, reproduction and lactation. Feed ration formulation. Feed additives.

44.391, 44.491 Agricultural Business Organization and Management — Forms of business organization used by farm businesses; types, operating agreements, transfer arrangements, vertical integration, syndication, specialization, diversification, combination of enterprises, land tenure. The application of management to the agricultural business, including defining the responsibilities of the manager in setting objectives; formulating operational plans, acquiring resources and people; coordinating, controlling, analysing and evaluating the business operation. Practical business situations, including management games will be used. The student will be required to analyse existing operations and formulate complete operating plans for future operations. Extensive use will be made of the available CAN-FARM Business Management Programs throughout the course.

44.392 Agricultural Business Law and Taxes — Property, income and sales tax, estate and succession duties, income sharing, laws of contract liability. Various forms of agricultural business structure.

44.393 Agricultural Business Finance and Appraisal — Capital and credit in farm business administration, including a discussion of the available sources of agricultural funds; analysis and appraisal of commercial farms; insurance in relation to risk and uncertainty in modern agriculture; social security and its role in farm business.

44.394 Summer Technical Report — A detailed report on a phase of agricultural management from first-hand experience obtained during the summer on-farm practicum.

44.401 See 44.301

44.402 Process Analysis — This course is designed to acquaint the student with the basic engineering aspects of the unit operations encountered in food processing. The engineering principles of raw-

material operations, conversion and preservation operations, together with materials handling and plant design. Lab sessions will involve experimentation, demonstration and problem-solving.

44.411 See 44.311

44.412 Food Analysis — Detailed chemistry of the products of the food industry: fat and oil, sugar, cereal, fruit and vegetable, dairy, fishery, meat and poultry products. Vitamins and nutritional supplements. Chemistry of various types of food deterioration and its prevention. Food additives—preservatives, coloring, flavoring and sweetening agents. Physiochemical and instrumental methods used in food analysis.

44.413 Agricultural Analysis — Chemistry and standard methods of analysis of agricultural products. Determination of major and minor nutrients in feeds and fertilizers. Elemental analysis of plant materials and soils. Analysis of cereal grains and animal products. Chemistry of pesticides and fungicides. Instrumental and chromatographic procedures for determination of pesticide and other potentially hazardous residues in feeds.

44.414 Experimental Techniques — Design and layout of experiments using typical biological subjects. The application of the scientific method and of statistical methods. Recording and presentation of experimental data. Techniques in plant histology and microscopy.

44.431 Sanitation — Organization of a sanitation program in the food industry. The chemistry of cleaning. Properties of a good detergent. Types of cleaning compounds and formulation. Methods of disinfection and sterilization. Sanitary aspects of buildings and equipment. Safe water supply. Waste treatment and disposal. Effective insect and rodent control. Employee training in sanitary practices. Inspection techniques and lab tests.

44.442 Agricultural Mechanics — A study of basic engineering principles as applied to agricultural operations. Hydraulic systems. Agricultural spraying systems. Irrigation and drainage. Tillage and harvesting equipment. Introductory environmental control. Care of equipment.

44.462 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. The pesticides currently recommended are reviewed. Pesticide safety, pest and pesticide legislation. Students are examined under the provisions of the "Pharmacy Act" for Pesticide Applicator and Pesticide Dispenser certificates.

44.465 Landscape Field Practice — Landscape specifications, plan reading, estimating, project programming, construction, use of materials, planting procedures, fixtures in the landscape, cost control and equipment operation. Study of specific landscape practices as applied to parks and recreation facilities.

44.466 See 44.366

44.467 Advanced Plant Identification — A continuation of the plant identification studies in Applied Horticulture I and II and Nursery Crop Production, with particular reference to the species and cultivar level. The use of plants in the landscape.

44.468 Supervisory Practices — Effective supervisory practices in landscape horticulture; the principles of supervision; knowing the organization; work-scheduling; motivating, counselling and evaluating the employee; job and safety training; the supervisor's responsibility; public relations.

44.481 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.

44.491 Crop and Livestock Management — Detailed application of the principles learned in previous subjects. Students will be required to structure complete crop and livestock management systems for different types of agricultural sequences.

48.450 Instrumentation — An orientation course for the food processing option with emphasis on lab exposure to industrial equipment. Standard methods of applying commercial instruments to measure the following variables: density, pressure, level, flow, temperature and humidity. The course includes an introduction to the principles of regulators and controllers.

51.205 *Introduction to Surveying* — 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.

Faculty and Staff

R.B. Hyde, B.S.A., M.S., P.Ag., *Department Head*
S.B.J. Anderson, B.A., Senior Instructor
R.S. Berry, B.S.A., P.Ag.
K.G. Cummings
J.T. Gillingham, B.S.A., M.Sc., Ph.D.
R.N.E. Hargreaves, Dipl.T.
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.
J.H. Muir, B.S.A., P.Ag., Senior Instructor
B.E. Rothe
G.B. Scheibe, B.Sc., M.S.A., B.C.S.L.A., C.S.L.A.
J.K. Soutter, H.D.F.T.

Building

The spiralling advances in technology have caused us to expect much more of the communities we have constructed and the individual buildings in them. As owners and users of a variety of structures, we demand that they be managed and constructed to rigorous standards of workmanship and safety, and incorporate all the features which contribute to speed and financial efficiency. The construction industry is one of the major employment fields in Canada and turns over the largest dollar volume of business in the country.

These two factors—high public expectations of the industry and the dynamic nature of the industry present both a challenge and an opportunity—attractive criteria for a career.

Job Opportunities
Since all graduates will understand buildings three dimensionally—their architectural and structural elements; their mechanical, plumbing, drainage and electrical systems; their cost implications; and the contractual and managerial processes under which they are built—they will be able to fill technological positions which lie between the professional architect, engineer and contractor on the one hand, and the skilled tradesman on the other.

With experience, graduates become senior drafting personnel, job captains, specification writers, estimators or contracts managers, building inspectors, officials in property management departments, appraisers and assessors, partners in construction organizations and technical representatives for building supplies and equipment manufacturers. Many of the graduates will become estimators with general and subtrade contractors, preparing bids and checking job costs and progress. In cooperation with the provincial government, instruction is also given in appraisal and assessment, leading to employment in these areas with public and private agencies. This growing field presents opportunities in consulting offices assisting in design, specification writing and construction inspecting; with contractors doing estimating, shop drawings and supervision; with suppliers explaining the capabilities and application of equipment and systems; and as technicians with agencies doing testing and balancing of mechanical installations.

The Program
The Building Technology program is designed to give both men and women a sound preparation for a rewarding career 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. Both lecture instruction and drafting room practice are part of the program, and students are often able to further their education through summer jobs with architects, engineers, contractors or inspection work for public private agencies. In their second year, students may—subject to their demonstrated ability and departmental approval—choose one of three specialties or majors.

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

The Economics Major is concerned with costing and the evaluation of property and construction, either in the drawing stage or already constructed.

The Services Major offers subjects designed to extend expertise in the area of heating, ventilating and air conditioning.

Post-graduation
The Architectural Institute of British Columbia offers graduates credit for about half the examinations in their minimum syllabus of studies for articled students.

For those wishing to become quantity surveyors, the Canadian Institute of Quantity Surveyors will accept graduates as Probationer Members and give credit in a similar manner.

Prerequisites
Graduation from the Selected or Combined Studies Program with English 12, Algebra 12 or Math 12 plus Physics 11. Related work experience or skills will strengthen an application.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
31.140	Technical Communication	3
32.140	Basic Technical Mathematics	5
40.101	Drafting and Design	5
40.102	Building Construction	6
40.104	Materials and Methods	4
42.406	Building Structures	3
49.140	Building Services (Plumbing)	4
	Library and Research	5
		35

	Term 2	2A	2B
22.240	Operations Management	2	—
31.240	Technical Communication	—	3
32.240	Calculus I and II with Analytic Geometry	5	5
33.219	Applied Physics for Building Technology	4	4
40.201	Building Planning	3	3
40.202	Building Construction	6	6
40.204	Illumination	—	3
40.205	Construction Site Processes	3	—
40.206	Construction Contracts	—	2
42.406	Building Structures	4	4
49.240	Heating and Ventilating	3	—
	Library and Research	5	5
		35	35

Year 2	Term 3	Arch	Econ	Serv
22.340	Operations Management	2	4	2
33.319	Applied Physics for Building Technology	4	2	4
40.301	Architectural Major	6	—	—
40.302	Building Construction	6	6	6
40.303	Electrical Systems	4	4	4
40.304	Construction Specifications and Estimating	6	6	6
40.305	Economics Major	—	6	—
42.407	Building Structures	4	4	4
49.340	Mechanical Systems Major	—	—	6
	Library and Research	5	5	5
		36	36	36

	Term 4 Architectural	4A	4B
22.440	Basic Operations Management	2	2
31.340	Advanced Technical Communication	3	—
40.401	Architectural Major	6	6
40.402	Building Construction	6	6
40.404	Construction Specifications and Estimating	6	6
40.407	Acoustics	—	4
40.408	Codes and Regulations	—	4
42.407	Building Structures	4	—
49.540	Space Conditioning	4	1
51.206	Introduction to Survey	—	3
	Library and Research	5	5
		36	36

	Term 4 Economics	4A	4B
10.731	Industrial Management	—	4
22.440	Basic Operations Management	2	2
31.340	Advanced Technical Communication	3	—
32.440	Mathematical Methods and Computing	4	—
40.402	Building Construction	6	6
40.404	Construction Specifications and Estimating	6	6
40.405	Economics Major	7	7
40.408	Codes and Regulations	—	4
42.407	Building Structures	4	—
51.206	Introduction to Survey	—	3
	Library and Research	5	5
		37	37

	Term 4 Services	4A	4B
10.731	Industrial Management	—	4
22.440	Basic Operations Management	2	2
31.340	Advanced Technical Communication	3	—
40.402	Building Construction	6	6
40.404	Construction Specifications and Estimating	6	6
40.409	System Acoustics and Vibration	—	4
42.407	Building Structures	4	—
49.440	Mechanical Systems Major	6	6
49.540	Space Conditioning	4	—
51.206	Introduction to Survey	—	3
	Library and Research	5	5
		36	36

Subject Outlines

10.731 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.

22.240 Basic Operations Management — This course introduces first-year Building Technology students to the principles and concepts of the manual critical data method of planning and scheduling.

22.340 Basic Operations Management — Upon the successful completion of this course, the student will understand and be able to apply a systematic problem-solving and decision-making approach to construction industry problems. The course includes computerized C.P.M. using commercially available computer packages; work study, using recognized method study techniques to examine and improve the way in which a job is accomplished, and recognized work measurement techniques for estimating, planning and cost control; and total systems concept as applied to a firm or project with emphasis on supervision, interviewing, communications and organization.

22.440 Basic Operations Management — The techniques of management problem-solving and work simplification, with particular application to engineering and industrial organizations. Includes method study, some measurement techniques, layout, planning and scheduling. The course emphasizes practical applications in the building field.

31.140, 31.240 Technical Communication — This is an applied industrial communication course that concentrates on the techniques and applications of written and spoken communication. The discussion topics, explanations, illustrations and assignments are related as closely as possible to the vocational futures of Building Technology students.

31.240 See 31.140

31.340 Advanced Technical Communication — This is an applied communications course for second-year Building Technology students. It concentrates on two communication problems of particular relevance to second-year students: obtaining employment and writing presentation reports. Emphasis is on written communications. If time permits, instruction will also be given on oral presentations and students will be assigned one oral report.

32.140 Basic Technical Mathematics — Topics in algebra, matrices, logarithms, trigonometry, vectors, functions and linear programming, with emphasis on problems specific to the Building Technology.

32.240 Calculus I and II with Analytic Geometry — Analytic geometry and differential calculus with ordinary and partial derivatives. Integral calculus. Applications from the Building Technology.

32.440 Mathematical Methods and Computing — Linear programming (simplex), the transportation problem and computing related to the technology.

33.219, 33.319 Applied Physics for Building Technology — A general physics course designed to meet the specific needs of the Building Technology. No formal lab program. Topics include: mechanics—kinematics, dynamics statics, energy, simple machines; electricity and magnetism—basic electric circuits, magnetic and electromagnetic effects; matter—properties of solids, liquids, gases (mechanical and thermal); heat and thermodynamics—change of states, heat transfer, solar energy, heat engines; wave motion and sound—energy transformation, characteristics of harmonic motion, resonance, basic acoustics.

33.319 See 33.219

40.101 Drafting and Design — Elementary drafting techniques; lettering, orthographic, isometric and axonometric projection; perspective; shades and shadows. History of architecture with specific reference to technological development.

40.102, 40.202 Building Construction — Principles of building construction in terms of the assembly of materials; examination of typical systems of wood and masonry construction; study of architectural detailing. Origins and purposes of building regulations; typical zoning and building by-laws; National Building Code; other Acts, codes, by-laws. Aspects of common law and laws of contract related to building premises. Application of the above to the preparation of working drawings, in co-ordination with courses in building structures and building services.

40.104 Construction Materials and Methods — This course deals with some of the more common construction materials and methods used in contemporary commercial and institutional construction in Canada. The course is divided into a series of lectures on material considerations, and a series of lab periods on construction methods.

40.201 Building Planning — Fundamentals of design, with accent on functional aspects; planning and organization of residential space; design of simple utilitarian objects; elementary architectural design problems and presentation techniques.

40.202 See 40.102

40.203 See 40.103

40.204, 49.140, 49.240 Building Services — Introduction to building service systems, in regard to water supply, drainage, heating, ventilating and electrical illumination.

40.205 Construction Site Processes — This course will introduce the student to job site management of construction projects. It will study the planning, implementing and controlling of construction site processes from the point of view of the project superintendent.

40.206 Construction Contracts — Introduction to the fundamental nature of contracts; the basic forms of construction contracts (stipulated price and cost plus a fee) and their relationship to information and risk; other forms of construction contracts (maximum cost plus a fee and unit price); contract agreements; and an initial examination of some of the primary general conditions of construction contracts.

40.301, 40.401 Architectural Major — Short history of contemporary architecture and building. Conceptualization and planning; theory, aesthetics and structure as integral parts of the design process. Project realization. Graphics; freehand drawing and sketching of architectural and related subjects; advanced perspective drawing in variety of media; modelmaking. Guest lecturers and field trips.

40.302, 40.402 Building Construction — Principles of construction as applied to heavy timber, steel and concrete framed buildings; site fabrication and assembly; prefabrication. Theory of selection and location of materials in the building. Extensive preparation of working drawings throughout. Trips to building sites and plants.

40.303, 49.540 Electrical Systems, Space Conditioning — Ventilation; air conditioning; electrical systems and power supply; mechanical equipment; acoustics. Preparation of working drawings related to above, and to projects in design and building construction. Field trips.

40.304 Construction Specifications and Estimating — Fundamentals of the construction industry—land, buildings, contracts and people. Introduction to basic construction materials and methods. Specific aspects of contracts and contract documents; construction specifications; construction work and the analysis of its cost through unit prices.

40.305, 40.405 Economics Major — Principles of real property valuation, methods of appraisal, property assessment for taxation purposes, use of the assessment manual, land registration, sources of information, practical office and field work. Cost accounting and budget cost control methods at design and construction stages; development feasibility studies; financial management, contract management; bid procedures and strategy; practical work in measurement, costing, pricing and analysis.

40.410 See 40.301

40.402 See 40.302

40.404 Construction Specifications and Estimating — Techniques of specifying and measuring construction work for estimating and bidding; practical applications in estimating the costs of various kinds of construction work, particularly wood-frame and reinforced-concrete systems. Introduction to construction economics, labor productivity and cost accounting; the financial aspects of construction contracts; estimating various types of construction work.

40.405 See 40.305

40.407 Architectural Acoustics — Basic theory and principles including properties, propagation, sources and measurement of sound; noise criteria and control of noise; and room acoustics.

40.408 Codes and Regulations — A course designed to make the student familiar with the purpose, scope and content of the National Building Code of Canada.

40.409 Systems Acoustics and Vibration — Basic theory and principles in common with course 40.407, Acoustics. Goes on to cover overall systems noise control strategy; equipment sound sources, sound absorption and insulation; evaluation of sound propagated to occupied space via mechanical systems; equipment vibration control criteria; evaluation of vibration force and amplitude transmitted to the building structure from equipment distributing forces and practical measures for controlling machine vibration transmitted to piping and duct systems.

42.406 Building Structures — 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. 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. Compound stress and strain; ellipse of stress; Poisson's ratio; principal stress and strains; Mohr's circle. Testing techniques; machines; extensometers; strain gauges; brittle lacquers; photo elasticity; evaluation of results.

42.407 Building Structures — Reinforced-concrete beams; tension steel only; one-way and two-way slabs; compressive reinforcements; tee beams; axially and eccentrically loaded columns; simple footings and retaining walls; reinforcing detailing, schedule and placement; design of forms. Combined bending and axial loads; eccentric columns in steel and timber; built-up sections in steel and timber; beam-column connections. Restrained and continuous beams; strain energy; moment area; moment distribution; portal and multistorey frames; steel and timber detailing and fabrication. Discussion of ultimate load design, prestressed concrete, advanced structural forms and experimental stress analysis. Statics and materials behavior with special development for the Building Technology.

49.140 See 40.204

49.240 See 40.204

49.340, 49.440 Mechanical Systems Major — Gas supply systems; hot water space-heating system design; practical fan laws; air cleaning; steam-coil air heating; hot water coil heating; combined direct radiation and coil-heated air heating and ventilating systems; temperature control for space-heating and air conditioning processes and design; air conditioning controls.

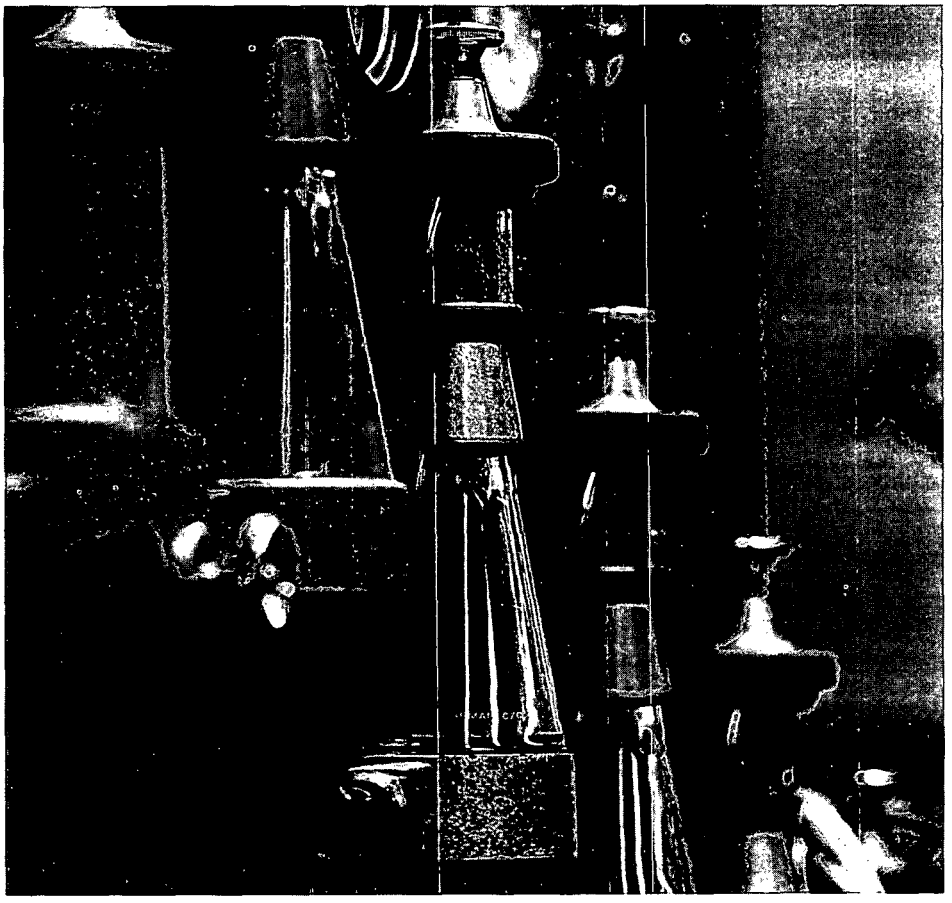
49.440 See 49.340

49.540 See 40.303

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

Faculty and Staff

D.A.D. Hickman, F.R.A.I.C., *Department Head*
F.A.A. Alfeld, Dipl.Eng.
G. Berkenpas, Senior Instructor
F. Chan, B.Sc. (Arch.), B.Arch., M.R.A.I.C.
M. Collins
G.M. Hardie, F.R.I.C.S., R.I.(B.C.)
J.Y. Johnstone, B.Arch, Des.R.C.A., M.R.A.I.C., Senior Instructor (on leave)
H.E. Kuckein, M.R.A.I.C.
J. Lancaster, B.Comm., M.C.I.Q.S.
A. Maharajh
J.P. Sullivan, B.Sc., P.Eng.
T. Thonig
D. Workman



Chemical and Metallurgical

The Chemical and Metallurgical Technology offers its graduates the satisfaction of being involved with the efficient development of natural resources and their protection, or with the efficient production of material goods. In a general sense, the primary emphasis of this technology is on the creative application of chemical principles to problems encountered in resource development, pollution control and manufacturing. In addition to chemistry, there is a heavy emphasis on math and physics.

Job Opportunities
Graduates are employed in research, commercial and industrial labs as chemists and analysts; in consulting firms as engineering assistants; in production plants as production supervisor trainees; in technical sales; or in waste disposal and pollution treatment. The majority of entry jobs are in chemical analysis since there is little secondary industry in this area. Graduates in extractive metallurgy must be prepared to go out of town.

The Program
The first-year curriculum emphasizes math, physics and chemistry and their application to general problems in the chemical process industries. In the second year, students choose one of four specialties: Organic Chemistry, Physical Metallurgy, Extractive Metallurgy or Pollution Treatment. Analytical lab practice, unit operations, process dynamics and unit projects are a major part of the second-year program. Some courses in the latter half of the second year may be chosen on an elective basis.

Prerequisites
Graduation from the Selected or Combined Studies Program with Algebra 12 or Math 12 and Chemistry 11. Applicants should have an interest in analytical chemistry and chemical analysis.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
30.101	Applied Chemical Principles	6
31.141	Communication	3
32.141	Mathematics	5
33.114	Physics	6
41.103	Engineering Materials	3½
49.101	Drafting	2
41.109	Environmental Science	4½

	Term 2	2A	2B
30.201	Applied Chemical Principles	6	6
31.241	Communication	3	—
32.241	Mathematics	5	5
33.214	Physics	6	6
41.203	Engineering Materials	3½	3½
41.202	Laboratory Workshop	1½	1½
30.204	Chemical Laboratory Techniques	3	3
49.201	Drafting	2	2
41.210	Industrial Chemical Processes	—	3

Students must take all the common courses listed for Term 3 plus one course in each specialty.

Year 2	Term 3	Clrm hrs/wk
	Common	
32.341	Mathematics	5
30.314	Analytical Chemistry	6
41.341	Unit Operations	6
30.310	Physical Chemistry	5
41.320	Unit Project	3
	Specialty 1	
30.309	Organic Chemistry	6
41.307	Extractive Metallurgy	6
41.304	Physical Metallurgy	6
41.311	Pollution Science	6

Term 4A
Students must take all the common courses in Term 4A plus one course in each specialty.

	Common	
30.414	Analytical Chemistry	6
41.441	Unit Operations	6
	Specialty 1	
30.409	Organic Chemistry	6
41.407	Extractive Metallurgy	6
41.404	Physical Metallurgy	6
41.411	Pollution Science and Microbiology	6
	Specialty 2	
41.408	Ore Analysis I	3
41.412	Waste Management I (Water Treatment)	3
	Specialty 3	
47.409	Process Dynamics	3
41.413	Environmental Analytical Methods I	3
	Specialty 4	
32.441	Calculus II	3
41.420	Project	3
	Specialty 5	
41.448	Advanced Pollution Control and Equipment	3
48.460	Process Instrumentation	3

Term 4B
Students must take all the common courses in Term 4B plus one course in each specialty.

	Common	
30.424	Analytical Chemistry	6
41.441	Unit Operations	6
	Specialty 1	
30.409	Organic Chemistry	6
41.407	Extractive Metallurgy	6
41.404	Physical Metallurgy	6
41.411	Pollution Science and Microbiology	6
	Specialty 2	
41.408	Ore Analysis II	3
41.412	Waste Management II (Air Treatment)	3
	Specialty 3	
47.409	Process Dynamics	3
41.413	Environmental Analytical Methods II	3
	Specialty 4	
32.441	Mathematics	3
41.420	Project	3
	Specialty 5	
30.416	Analytical Instrumentation	3
41.438	Coal Chemistry	3

Subject Outlines

30.101 Applied Chemical Principles — An applied course in basic inorganic chemistry including simple stoichiometry, solubility product, selective precipitation, solution preparation, pH, buffer solutions, oxidation-reduction, acid-base theory and titration calculations. Lab work consists of simple qualitative and quantitative analysis. Good lab techniques are emphasized.

30.201 Applied Chemical Principles — A continuation of 30.101 that includes theory of gravimetric and volumetric analysis, titration curves, chemical kinetics, simple physical chemistry, atomic structure, ionic and covalent bonding, periodicity and descriptive organic chemistry of selected groups. Lab work consists of qualitative and quantitative analysis and physical separations.

30.204 Chemical Laboratory Techniques — This course teaches basic techniques in sampling, weighing, moisture determination, ashing, extractions, filtration gravimetric methods and volumetric methods. Instrumental analysis and separation methods will be described, demonstrated and whenever possible, practised.

30.309, 30.409 Organic Chemistry — A general course covering properties, preparations and reactions of all major classes of organic compounds—aliphatic and aromatic hydrocarbons, halides, alcohols, ethers, carboxylic acids and derivatives of carboxylic acids, aldehyes, ketones, amines, amino acids, carbohydrates, heterocyclics, dyes, and polymers. Lab work emphasises organic techniques, qualitative chemical analysis and instrumental methods, infra-red, ultraviolet and gas chromatography.

30.310 Physical Chemistry — This course presents the kinetic theory of gases, the first and second laws of thermodynamics, phase equilibria, chemical kinetics and catalysis. Lab work consolidates lecture material and gives experience in practical physio-chemical measurements.

30.314 Analytical Chemistry — Conventional inorganic methods of analysis for the determination of the common metals in ores and alloys. Basic methods of fire assaying for gold and silver.

30.409 See 30.309

30.414, 30.424 Analytical Chemistry — Advanced analytical techniques using various instruments such as the polarograph, spectrophotometer, colorimeter, gas chromatograph, spectrograph, x-ray scintillometer and x-ray diffractometer.

30.416 Analytical Instrumentation — This course covers the practical aspects of the following topics: chemical cells and electrodes, electrical measurements, potentiometric recorders, power supplies, operation amplifiers, recording potentiometric and amperometric titration and instrumentation in d.c. polarography.

30.424 See 30.414

31.141, 31.241 Technical Communication — This course is designed to introduce students to the techniques and tools used in communicating technical information to people in business and industry. On completion of the two courses, students should be capable of analyzing information and designing an information package—report, proposal, letter or memo—intended for business or industrial audiences.

32.141 Basic Technical Mathematics — Topics in algebra, logarithms, trigonometry and analytic geometry.

32.241 Statistics I and Calculus I — An introduction to statistics and calculus. The statistics portion includes organization and presentation of data; measures of central tendency and dispersion; frequency distributions; sampling; estimation; hypothesis testing. The calculus section covers applications involving the differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions.

32.341 Numerical Methods I — Elementary numerical methods in theory and practice; iterative methods in the solution of algebraic and transcendental equations; finite differences; interpolation; numerical differentiation and integration; numerical solution of simple differential equations.

32.441 Calculus and Differential Equations — Calculus of logarithmic, trigonometric and exponential functions; integration by parts and trigonometric substitution. Separable variable differential equations; use of integrating factor; second order differential equations; applications.

33.114, 33.214 Physics — An introductory level course covering kinematics, dynamics, function, statics, angular motion, energy, momentum, simple machines, properties of matter, fluid mechanics, temperature and heat, thermal properties of matter, basic electricity and magnetism, wave motion and sound, electromagnetic waves, optics and atomic and nuclear phenomena. The lab program stresses the subjects of measurements, data analysis, experimental technique and report writing. Mathematical treatment requires algebra and trigonometry.

33.214 See 33.114

41.103, 41.203 Engineering Materials — Physical testing of materials including metals, plastics, wood and wood products, concrete, ceramics and soils. Nondestructive testing. Microscopy, photomicrography and photography.

41.119 Environmental Science — An introductory course to pollution measurement and control techniques.

41.202 Laboratory Workshop — Instruction in basic workshop techniques, including glass blowing, soldering, brazing and gas welding techniques. Use of hand and bench tools.

41.203 See 41.103

41.210 Industrial Chemical Processes — Description of chemical processes involved in major industrial chemical plants in B.C. Pulp and paper, oil refineries, mineral dressing, smelting, sulphuric acid, ammonia, caustic and chlorine and phenolic plants.

41.304, 41.404 Physical Metallurgy — Solidification of metals, casting methods and defects, metal-forming operations, phase diagrams, alloying of metals, heat-treatment. Lab sessions emphasize physical testing of materials, metallography and non-destructive testing.

41.307, 41.407 Extractive Metallurgy — Concerns itself with the unit operations of the recovery and upgrading of coal and nonferrous metals and with the unit processes of nonferrous and precious metal recovery from ores and concentrates. Mineral processing treats the basic operations of comminution, particle size analysis, classification, screening, flotation, gravity separation sampling and solids transport by pipeline. Extractive metallurgy covers the fundamental principles and processes of hydrometallurgy, pyrometallurgy and electrometallurgy. Some time is spent on mineralogy and microscopy. Solution of design and operating problems is emphasized.

41.311 Pollution Science — This is an introduction to organic chemistry with applications to industrial pollution problems.

41.320, 41.420 Unit Project — Projects relating to the student's chosen specialties are assigned in each term. Regular progress reports and a final term report are required.

41.341, 41.441 Unit Operations — First and second law of thermodynamics; enthalpy, entropy, phase rule, thermodynamic diagrams and tables; fluid flow and measurement in pipes and channels, piping, pipe fittings and valves; solid handling, grinding, crushing, screening, mixing, settling, sedimentation, filtration, flotation; flow of heat, conduction, convection, radiation, film and over-all transfer co-efficients, heat exchangers; principles and application of equipment for evaporation, distillation, absorption, extraction; humidification and dehumidification; drying, crystallization; ion exchange.

41.404 See 41.304

41.407 See 41.307

41.408 Ore Analysis — The identification of economically important minerals, general principles of quantitative analysis of ore samples, including representative volumetric determinations such as acid-base, oxidation-reduction and volumetric precipitation. Fire assaying, stressing fusion and combination wet-fire methods. Practical applications in instrumental and physiochemical analysis, including the latest analytical aids, polarography, spectrophotometry, atomic absorption and emission spectroscopy.

41.411 Pollution Science and Microbiology — Covers microbiology, pollution law, basic meteorology, air-sampling and air pollution control methods. This course complements the courses in environmental sampling techniques, waste disposal methods and environmental analytical methods.

41.412 Wastewater Treatment — Physical,

biological and chemical methods used in treating municipal and industrial wastewaters.

41.413 Environmental Analytical Methods — Physical and chemical methods of analysis of solid, liquid and gaseous streams; B.O.D., carbon in water, nitrogen and phosphorus in water, chlorides, sulphates, alkalinity, surfactants and pesticides. Use of Orsat midget impinger, x-ray and photofluorimeter.

41.420 See 41.320

41.438 Coal Chemistry — An introduction to coal chemistry with emphasis on coal preparation and coal testing techniques.

41.441 See 41.341

41.448 Advanced Pollution Control Equipment and Techniques — Pollution control techniques with emphasis on air treatment. Specific industrial applications.

47.409 Process Dynamics — Measurement transducers, interface devices, indicators and recorders. Controllers and control functions. Dynamics of process systems, lumped parametric solutions. Upset solutions. Computer applications of system modelling.

48.460 Instrumentation — An orientation course with emphasis on lab exposure to industrial equipment. Standard methods of applying commercial instruments to measure the following variables: pressure, level, flow and temperature. The course ends with an introduction to the principles of regulators and controllers.

49.101, 49.201 Drafting — Techniques of reading and producing orthographic drawings using standard format and the development of basic skills in applying these techniques. Use of instruments, line work, geometric constructions, orthographic projection, isometric drawing and sketching, sections and dimensioning.

49.201 See 49.101

Faculty and Staff

A.H. Manifold, B.Sc., M.A.Sc., P.Eng., *Department Head*
J. Berry, B.Sc., M.Sc., Ph.D.
W.J. Boygo, B.C.L.Ass.
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R. Drouin, Dipl.T.
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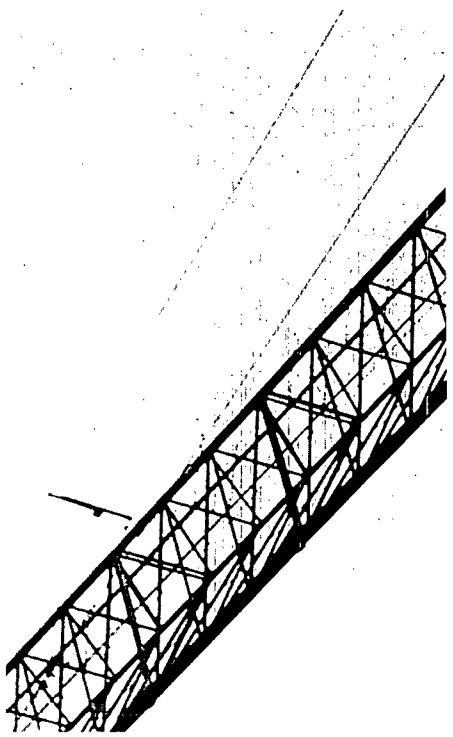
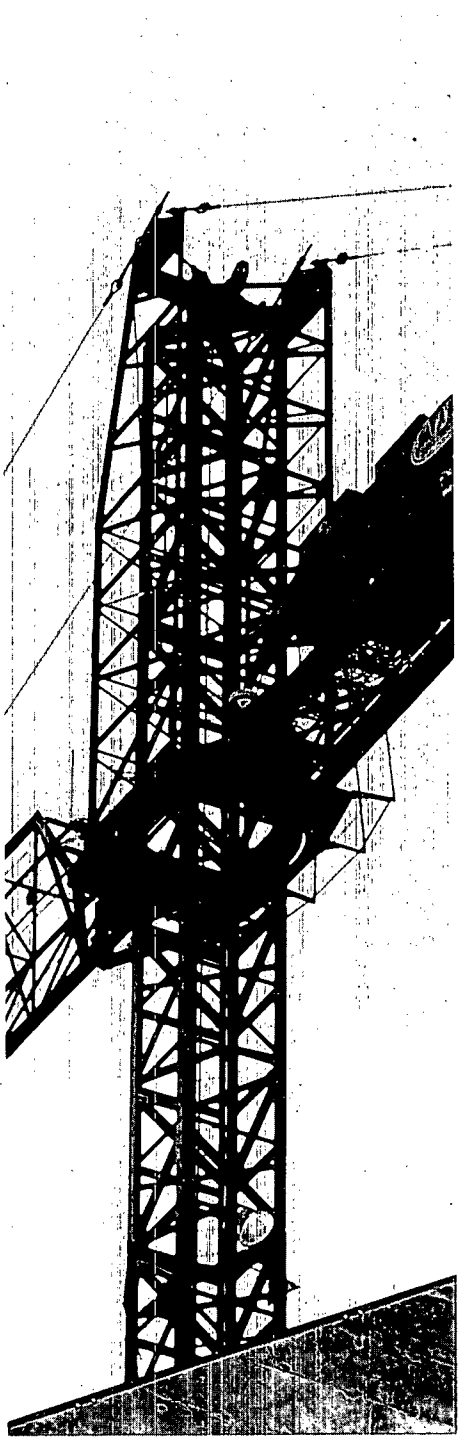
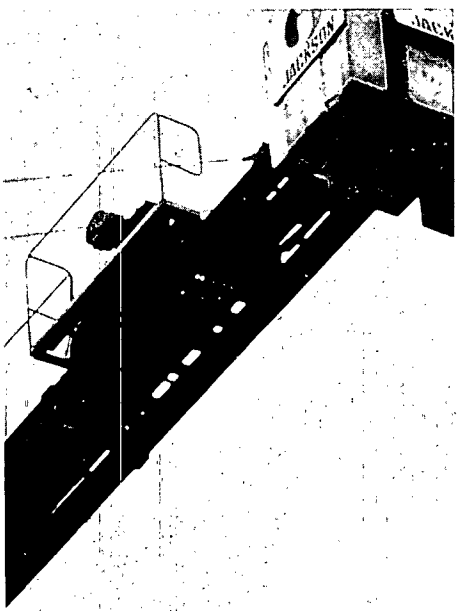
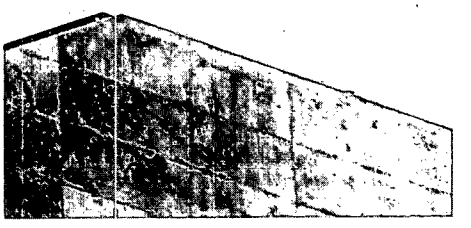
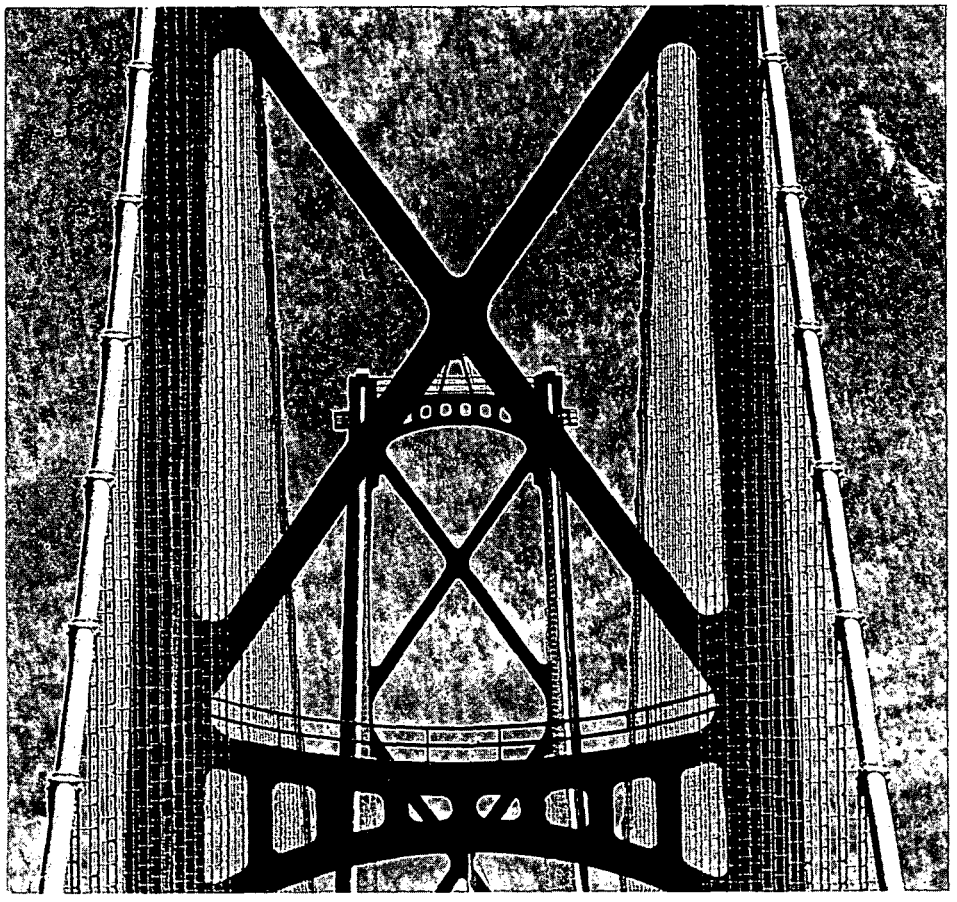
W.F. Roberts, B.A., B.A.Sc., P.Eng., Senior Instructor
T. Voksepp, B.A.Sc., P.Eng.











Civil and Structural

Civil and structural technologists are involved in the design and construction of highways, bridges, airports, railways, power developments, dams, canals, docks and harbors. The field has enormous creative potential and also has the appeal of involving the technologist in all phases of a project from the design stages to the 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. There is usually an equal portion of indoor and outdoor work; field work is generally conducted in spring through fall.

The Program
The diverse and stimulating program includes field trips which assist students to develop their creativity, ingenuity and critical abilities, as well as major projects in which the student develops, in consultation with professionals, an appropriate method of approach and solution.

Prerequisites
Graduation from the Selected or Combined Studies Program with Algebra 12 or Math 12 and Physics 11. Applicants should be skilled in the use of the English language, have good mathematical ability and be interested in the physical sciences. Drawing or sketching ability is useful.

Course of Studies

	Year 1	Clrm hrs/yr
31.142, 31.242	Technical Communication	100
32.142, 32.242	Mathematics	180
33.107, 33.207	Physics	180
42.001	Statics and Materials Behavior	240
42.002	Hydrology	60
42.003	Hydraulics	60
42.004	Transportation	60
49.101, 49.202	Drafting	70
49.209, 51.109	Surveying	100
		1,050

Year 2

Either list A or B must be followed by the student; however, the lists do not constitute an option.

	List A	Clrm hrs/yr
22.342	Operations Management I (½)	35
31.342, 31.442	Advanced Technical Communication	80
32.342, 32.442	Mathematics	140
42.020	Hydraulics (½)	35
42.021	Soil Mechanics (2)	140
42.025	Municipal Services A (2)	140
42.027	Highways (1)	70
42.030	Construction (1)	70
42.041	Structures I (1½)	100
51.209	Surveying	100

Credits for list A total 8½. An additional two credits of electives must be chosen as a minimum.

	List B	Clrm hrs/yr
22.342	Operations Management I (½)	35
31.342, 31.442	Advanced Technical Communication	80
32.342, 32.442	Mathematics	140
42.021	Soil Mechanics (2)	140
42.027	Highways (1)	70
42.030	Construction (1)	70
42.041	Structures I (1½)	100
42.042	Structures II (1½)	100
42.043	Structures III (1½)	110
42.045	Municipal Services B (1)	70
51.309, 51.409	Surveying	100

Credits for list B total 10. An additional one-half credit of electives must be chosen as minimum.

Elective List

14.424	Computer Applications (½)
22.442	Operations Management II (1)
42.043	Structures III (for students taking list A only) (1½)
42.060	Waste Treatment and Disposal (½)
42.063	Traffic Engineering (1)
42.918	Blasting (½)
.....	Special Projects (by arrangement)

A student may choose electives beyond the minimum with faculty approval.

Subject Outlines

14.424 Computer Applications — This course is designed to make students aware of the uses (and misuses) to which computers may be put in solving design and construction problems. Flow charting is practised through the logics of the computer and the industrial operation. A fundamental computer language is taught. Topics include history of computer development, commercial and scientific applications, logic systems development, flow charting and civil engineering applications, FORTRAN IV or alternatives, available programs, linear programming and CPM techniques on the computer.

22.342 Operations Management I — 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.

22.442 Operations Management II — Planning, scheduling, job loading and levelling, plant layout and critical path

network diagrams are considered and used in industry-type projects. The course is completed when the student submits a term project which encompasses much of the material studied in class. The projects are designed to meet the needs of the civil engineering student.

31.142, 31.242 Technical Communication — In the one lecture each week, students will receive information on basic writing skills, technical correspondence and related technical writing tasks, videotaping and other audio-visual techniques, oral presentations and informal and formal reports. The two labs per week will be devoted to practice in writing and speaking skills. Students will be expected to complete approximately ten assignments per term. The shorter assignments will be done in the labs, while the longer assignments—reports, oral presentations and videotaping projects—will require additional work out of class. Students will also take a month-long reading and study skills course during the first or second term.

31.242 See 31.142

31.342, 31.442 Advanced Technical Communication — In two hours of lab sessions per week, students will practice under supervision typical kinds of engineering communications such as letters, memos, reports, specifications, proposals and meetings. Some assignments will be done jointly with various civil and structural engineering courses. The equivalent of one short writing assignment per week will be required.

31.442 See 31.342

32.142 Basic Technical Mathematics — Topics in algebra, logarithms, trigonometry and analytic geometry.

32.242 Calculus — An introductory course in calculus dealing with the differentiation and integration of algebraic expressions and some trigonometric, logarithmic and exponential functions. Additional topics include conics and calculus problems associated with these, and partial differentiation.

32.342 Matrix Methods — An introduction to matrix algebra; basic operations; determinants; solution of simultaneous equations; eigenvalue problems. Applications of matrix algebra to technological problems.

32.442 Statistics and Numerical Methods — An introduction to statistics.Organization and presentation of data; measures of central tendency and dispersion; frequency distributions; sampling; estimation; hypothesis testing. An introduction to operations research techniques and the uses of mathematics in business decision-making. Linear programming; transportation; assignment; inventory models.

33.107, 33.207 Physics — This is a general level physics course emphasizing the application of physical principles in the Civil and Structural Technology. A section on the application of geophysical exploration techniques used in the technology is included. Topics covered include statics, kinematics, dynamics, energy and power, angular motion, thermal properties of matter, fluid mechanics, wave motion and waves in elastic media, basic electricity and magnetism and instrumentation, optics and atomic and nuclear phenomena. The lab program stresses measurements, data analysis and experimental techniques.

33.207 See 33.107

42.001 Statics and Materials Behavior — These are the classical basic areas of study for civil engineering personnel. Starting with vector representation of force systems, the student learns to analyse a large variety of equilibrium problems by both graphical and algebraic methods. The student works on a large number of problems representing common practical situations within structures and structural connections. After thorough grounding in force systems analysis, the student examines stresses produced in elements of a structure by forces and studies the behavior of various materials under those stresses. Finally, the student studies the behavior of entire structures under stress. This will include foundation settlements, deflections and structural failures. Materials are subjected to load in the lab and observed, cooperative problem sessions are supervised by faculty and lectures and discussions are held as necessary. There are special sessions on concrete, since quality control is often part of the responsibility of construction personnel. A representative topic list can be found in the table of contents of almost any text on the subject.

42.002 Hydrology — Through lectures and problem sessions, the occurrence of water in nature is studied. Its movement is examined with special regard to surface and subsurface runoff phases and the application of those phenomena to the development of flood control and water supply systems. Techniques of measurement of rainfall, flow, snowfall, solar radiation, snowmelt, storm characteristics and fluvial erosion are studied. All students finally participate in the study, assessment and analysis of a watershed area (including the campus) to determine probable sizes of floods and to evaluate the adequacy of existing drainage works within the area.

42.003 Hydraulics — 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 analyses a complex tank full of water to determine the forces and centres of pressure. Special problems on 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 analyses a simple pump-driven circulation system and graphs all energy gradients in profile along the system. Evaluation is by individual interview, problems and quizzes.

42.004 Transportation — This is an introductory course designed to introduce students to various modes of transportation and communications, such as highways, railways, pipelines, transmission lines and microwaves. The student will acquire a knowledge of basic engineering terminology in construction, design, inspection and specifications relating to these various modes. Students will gain knowledge of transportation design by using the highway as a learning vehicle. Students are evaluated on the basis of participation in various projects such as highway analysis, inspection techniques and special reports. Students will gain an understanding of horizontal and vertical curves, pavement design, asphalt and concrete pavements, superelevation, drainage, construction practices, specifications, profiles, cross-sections and quantities. Students are introduced to metric design through the recommended text R.T.A.C. Geometric Design Standard. Films and slide presentations are used to bring the engineering environment into the classroom.

42.020 Hydraulics — Assignments and lectures include distribution of flows in pipe networks, reservoir and elevation problems, waterhammer, thrust forces at points of flow direction changes, specific energy in open-channel flows, hydraulic element ratios in open-channel flows and culvert flows.

42.021 Soil Mechanics — Through lectures and lab work, the student becomes familiar with the basic elements of soil classification and soil behavior, learns to make standard lab tests and to present results in standard report form. Through application of soil mechanics principles and soil test data to a variety of geotechnical, foundations and drainage problems of design, the student learns to relate the behavior of soil material to common engineering requirements and conditions. Topics include volume-weight relationships, soil classification, compaction, geology, subsurface investigation, permeability and pore pressure distribution, effective stress, consolidation, shear strength, seepage analysis, slope stability, earth pressures, retaining structures, foundations, triaxial testing, field sampling. Lab tests include Atterburg, sieve gradation, specific-gravity, moisture-density, field density, permeability, shear testing, unconfined compression, consolidation and triaxial testing. Projects include earth-fill dam analysis, earth pressure calculation on a retaining wall, design of a drainage system, design of a sheet pile bulkhead, redesign of structures after failure analysis and common foundation design problems.

42.025 Municipal Services A — 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 the student. Some lectures on the bases of neighborhood planning and on design standards and methods are given as needed. The plan includes the waterworks distribution system, sanitary sewers and storm sewers and their design with full plans and profile drawings for each

service. Through preparatory lectures and discussions, the student is introduced to municipal road standards, crown and drainage, street geometry, street appurtenances, paving methods, domestic fire and industrial water demands, water distribution design methods, distribution reservoirs and pressure control, pumping, sewer flows and sewer design, sewage pumping stations and loads on buried conduits. Field trips are made to municipal operations.

42.027 Highways — Through individual progression through a highway design project, which includes interconnecting roads and attendant drainage structures, the student learns each element of highway design. The student must visit the site of the proposed work. The instructor acts as a design supervisor and consultant. Topics include preliminary investigations, design criteria, location, alignment, surface geometry, quantities, mass haul analysis, pavements and highway drainage.

42.030 Construction — The construction phase of structural and public works civil engineering is introduced by guest lecturers from the heavy construction industry and members of consulting and engineering and contracting businesses. Topics include contracts and specifications, estimating and bidding, labor-management relations, construction inspection and control, safety, environmental regard, construction problems abroad and specific current projects in the B.C. region. In addition, the student may participate in investigative projects on specific aspects of civil engineering construction or on construction techniques. Reports on planning or scheduling the construction of an already designed project like a bridge or approaches, wharf, dredging or an industrial building often involve the English Department.

42.041 Structures I — In general the course deals with elementary structural design through students' individual progress through projects, aided as necessary by lecture and discussion. Topics include moment distribution, continuous beams, non-sway frames, portal frames, one-way reinforced concrete slabs, column design and retaining wall design.

42.042 Structures II — Through analysis and design projects, the student applies moment distribution theory to multi-storey frames; designs and details multi-storey, multi-span, reinforced concrete frame elements; analyses two and three pin arches; and designs a three-pin laminated timber arch building. The instructor acts as design supervisor and consultant to each student through all projects.

42.043 Structures III — Through a bridge design project chosen in consultation with the instructor, the student designs, aligns and details the crossing as an alternative to an actual design. 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.

42.045 Municipal Services B — Through a subdivision servicing project, the student gains the experience of designing a minor street, a small storm sewer system, a small sanitary sewer system, including a pumping station and laying out waterworks distribution mains. This is all part of a subdivision plan laid out by the students and designed for an accessible piece of undeveloped land in the region. Design of municipal arterial streets and design of waterworks distribution systems (Bernoulli method) are discussed but not practised. Field trips to water and sewer pumping stations, a pressure reducing valve chamber, a municipal works yard and sewer cleaning operations are included.

42.060 Waste Treatment and Disposal — The course introduces the student to the fundamentals and techniques of water supply quality control, waste water treatment and renewal and solid wastes disposal. Typical problems are presented for solution aided by preparatory lectures. Field trips to treatment plants are arranged. Topics include B.O.D., re-aeration, pretreatment, sedimentation, theory of biological treatment, activated sludge,trickling filters, sludge digestion, sludge disposal, wastewater lagoons and refuse disposal.

42.063 Traffic Engineering — This course is offered in one evening per week of two terms. It is presented by practising traffic engineers from the region and introduces the student to the principles and techniques of traffic measurement and control on the public streets. This is accomplished through lectures, projects and assignments. Topics are signs and markings, signals, street capacities, volume counts, accident studies, speed studies, channelization and traffic planning.

42.918 Blasting — This course is given in the evenings through the Continuing Education and Industry Services Division. It is a desirable elective and it is the preparatory course for those who wish to write the Workers' Compensation Board Blaster's Examination. For a detailed coursed description contact Continuing Education.

42.202 Drafting — Intersections, developments, descriptive geometry, contours, sections, profiles, cut and fill problems. All treated in general on a project basis with Civil and Structural design procedures.

49.101 Drafting — Techniques of reading and producing orthographic drawings using standard format and the development of basic skills in applying these techniques. Use of instruments, line work,geometric constructions, orthographic projection, isometric drawing, sketching, sections and dimensioning.

51.109, 51.209 Engineering Surveying — 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.

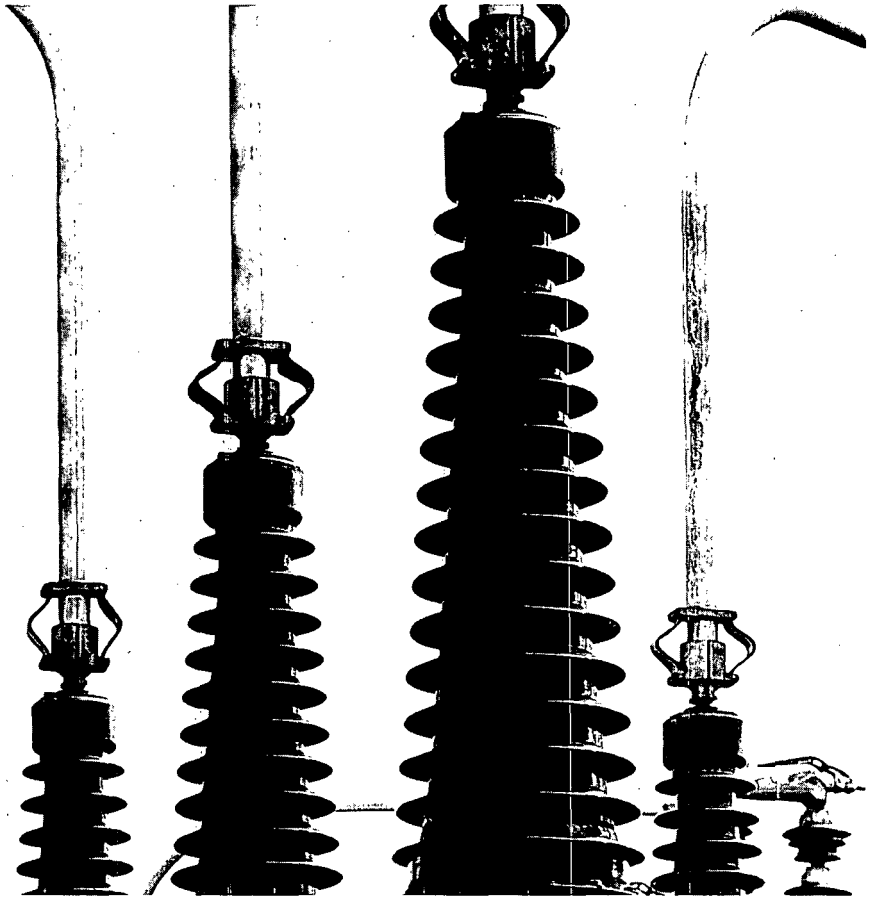
51.209 See 51.109

51.309, 51.409 Surveying — Application of survey methods to construction surveys, topographic surveys; triangulation; base-line measurement, use of electronic measuring devices; route surveys, including preliminary profile and cross-sections, calculation of quantities and volumes and plan preparation; site surveys, including horizontal and vertical control; bench-mark levelling and adjusting of nets; calculation of areas, volumes, closure, circular curves, transitional curves and vertical curves; elementary photogrammetry applied to planning, site surveys, route surveys, grades and quantities.

51.409 See 51.309

Faculty and Staff

R.C. Starr, B.Eng., M.A.Sc., P.Eng., *Acting Department Head*
A.R. Barren, B.Sc., Ph.D., P.Eng., Chief Instructor
R. Butler, C.Eng., P.Eng., M.I.C.E., M.I.Struct.E.
C.L. Doylend
A.J. Elston, B.E., P.Eng.
M.J. Heinekey, Dipl.T., C.E.T.
F.G. Katzel, B.Sc., M.Sc., P.Eng.
G.Q. Lake, B.A.Sc., P.Eng.
W.N. Quarry, Dipl.T., Dipl.Adult Ed., C.E.T.
R.B. Robins, C.Eng., M.I.C.E., P.Eng.



Electrical

Electrical energy, electronic controls, industrial instrumentation and control, together with electronic communications, form the base of modern technology. These disciplines and the related systsems and equipment are essential to the factory, the industrial process, the office, the store, the hospital and the home. Travel by airplane or ship could not exist on the present scale without electronic navigational aids.

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

Job Opportunities
Graduates who specialize in Control Electronics find employment in large organizations such as B.C. Hydro, B.C. Tel, and various government agencies, and in smaller companies specializing in sophisticated applications of electronics —Digital Equipment Corporation and McDonald, Dettwiler & Associates being typical examples. The graduates can choose whether they wish to work in any part of the job spectrum from research to maintenance.

In Instrumentation, new employment opportunites are arising every year in research, design, sales installation and maintenance, in positions ranging up to supervisor or manager.

Graduates of the Power Option find employment in many industries requiring knowledge of both power and associated control systems. B.C. Hydro to date has been the largest single employer of the graduates in such areas as relay and protection and distribution.

Graduating students in Telecommunications are employed in research and design, sales, installation and maintenance of communications and navigational aid equipment.

The Program
Four options are offered in the Technology: Control Electronics, Instrumentation, Power and Telecommunications.

The first-year program is common for all options. It is available, with the guaranteed acceptance of successful students, in some B.C. community colleges. The second-year program for all four options is practically-oriented, being primarily related to industrial practices. Throughout the two-year period, students spend a good portion of their time in the labs and workshops carrying out practical assignments.

The Control Electronics Option presents a broad-based electronics program designed to provide the student with the background necessary for entry into a wide variety of areas in the electronics career field. This program places some emphasis upon digital electronics, industrial electronics and digital computers since the techniques involved are common to all modern electronics systems. Rapport with local industry is stressed through the medium of a two-week industrial practicum and selected guest lectures.

The Instrumentation Option is concerned with the application of automation and control systems to industry's need for increased production with less waste and greater safety. It is one of the most rapidly expanding phases of industry today. Automatic control systems consist of devices which measure, compute and regulate plant conditions such as pressure, temperature, acidity and moisture content. These systems are applied in activities such as processing, pollution reduction, energy conservation, quality and safety improvements. Instrumentation is interdisciplinary. Using techniques from mechanical, electronic and chemical engineering, from physics topics such as optics, sonics and fluidics, and from computer science, new methods of control and more efficient process operations are being developed. Study and laboratory experience at BCIT is reinforced on field trips to industrial plants.

The Power Option is concerned primarily with the generation, distribution, utilization and control of electrical energy. However, in addition to the understanding of electrical power systems, the understanding of these technical aspects involves the study of such topics as digital systems and micro-processors, which are used to monitor and control the power systems and equipment. Approximately 20 per cent of the total time in the option is devoted to electronically-oriented material.

The Telecommunications Option emphasizes the application of electronics in the telecommunications industry, from simple broadcast and mobile transceivers to large density microwave radio systems, as well as electronic navigational systems and the use of new-generation computers. Much weight is placed on the practical aspects of all courses; consequently, a good portion of the student's time is spent carrying out practical assignments.

Prerequisites
Graduation on the Selected or Combined Studies Program with Algebra 12 or Math 12, Physics 11 and Chemistry 11, all with a C+ standing. For 1978 only, the Physics 11 and 12 and Chemistry 11 and 12 — all with a C standing — are acceptable. Applicants without Chemistry may be accepted for the 1978 term if they are enrolling in the Control Electronics, Power or Telecommunications options.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
31.143	Technical Writing	4
32.143, 32.243	Mathematics	7

Year 1	Term 1 cont	Clrm hrs/wk
33.106, 33.206	Physics	5
41.109	Materials	3
43.102, 43.202	Circuit Analysis	6
43.103, 43.203	Shop Practice	4
		29

	Term 2	
31.243	Technical Writing	3
32.143, 32.243	Mathematics	7
33.106, 33.206	Physics	5
43.102, 43.202	Circuit Analysis	5
43.103, 43.203	Shop Practice	2
43.201	Electronic Circuits I	6
43.204	Measurements	3
		31

Control Electonics Option

Year 2	Term 3	
10.732	Industrial Management	2½
32.343	Numerical Methods	3½
43.311	Electronic Circuits II	7
43.312	Digital Techniques I	6
43.313	Pulse Circuits	6
43.314	Telecommunications Circuits	6
		31

	Term 4		
31.343	Advanced Technical Writing	—	1
43.411	Industrial Electronics	6	—
43.412	Digital Systems	7	9
43.413	Industrial Audio Systems	—	7
43.414	Electrical Equipment	6	—
43.415	Electronic Systems	6	9
43.416	Electronic Fabrication	6	—
43.417	Data Communications	—	6
43.418	Practicum (2 weeks)	—	—
		31	32

Instrumentation Option

Year 2	Term 3	
30.302	Chemistry	6
41.341	Unit Operations	4
43.341	Instrumentation Electronics	5
43.342	Process Computer System	5
43.343	Process Measurements	6
43.344	Process Control	6
		32

	Term 4	
41.441	Unit Operations	4
43.441	Instrumentation Electronics	5
43.442	Process Computer System	5
43.443	Process Measurements	6
43.444	Process Control	6
43.445	Instrument Engineering Practices	4
		30

Power Option

Year 2	Term 3	Clrm hrs/wk
10.732	Industrial Management	2½
32.343	Numerical Methods	3½
43.321	Industrial Electronics	6
43.322	Digital Control	6
43.323	Three-Phase Power Circuits	6
43.324	Electrical Equipment	6
		30

	Term 4		
43.424	Electrical Equipment	6	—
43.421	Control Systems	6	6
43.422	Electrical Drafting	3	3
43.423	Power System Analysis	5	6
43.425	Utility Systems	—	7
43.426	Protective Systems	6	—
43.427	Industrial Systems	—	7
43.428	Lighting Systems	5	—
		31	29

Telecommunications Option

Year 2	Term 3	
32.343	Numerical Methods	3½
43.331	Electronic Circuits II	6
43.332	Digital Techniques	6
43.333	Non-linear Circuits	6
43.334	Telecommunications Principles	6
43.335	Electronic Fabrication	3½
		31

	Term 4		
10.732	Industrial Management	—	4
43.434	Telecommunications Principles	6	8
43.431	Voice and Data Networks	6	5
43.432	Digital Applications	7	6
43.433	Antennas and Transmission Lines	6	—
43.435	Radio Systems and Propagation	—	7
43.436	Microwave Techniques	6	—
		31	30

Subject Outlines

10.732 Industrial Management — Designed to give students an understanding of business management and an opportunity to apply principles and techniques through analysis of business case prolems.

30.302 Chemistry — The course covers the following topics: compound formation, chemical reactions, chemical kinetics, pH and acidity, electrochemistry, changes in physical states and properties of solutions.

31.143, 31.243 Technical Writing — The basics of English are briefly reviewed and tested in a series of directed self-study lessons. The theory and practice of effective letter writing are thoroughly covered, culminating in an intensive examination of the principles. Students will practice preparing all the documents needed in the job search; formal and informal reports, with emphasis on the most used forms of technical writing and graphics; and oral reporting, with some emphasis on the use of audio-visual devices.

31.343 Advanced Technical Writing — This course is a one-hour report writing seminar.

32.143 Basic Mathematics — A section on linear equations includes determinants, matrices, elimination methods, method of least squares and linear programming. A section on trigonometry includes sine and cosine laws, vectors, trigonometric identities, graphing and complex numbers. A section on logarithms and exponentials includes logarithmic and exponential equations, decibels, graphing on semi-log and log-log paper, transients with electrical and instrumentation applications. There will also be an introduction to solving problems with the aid of a computer.

32.243 Calculus — An introductory course with appropriate applications throughout in the electrical, electronics and instrumentation fields. Topics include differentiation and integration techniques, partial differentiation, infinite series, Fourier series, first and second order differential equations.

32.343 Numerical Mehods and Computing — An introduction to numerical methods: solution of systems of linear equations; the solution of algebraic and transcendental equations; numerical differentiation and integration; numerical solution of simple differential equations. Flow-charting, algorithms. Elements of a higher level computer language such as FORTRAN, WATFIV and BASIC. Students will write computer programs from applications in the Electrical Technology.

33.106, 33.206 Physics — A general level course covering basic electricity and magnetism, the band theory of solids and its application to semiconductor devices, kinematics, dynamics, statics, angular motion, energy, simple machines, properties of matter, fluid mechanics, temperture, heat, thermal properties of matter, vibrations and waves, electro-magnetic waves and optics. Mathematical treatment requires algebra and trigonometry.

33.206 See 33.106

41.109 Materials — Materials properties and selection including common causes of material failures such as corrosion, embrittlement and fatigue. Practical training in basic manipulative skills involving simple hand tools, power tools, torch brazing and soldering techniques. Simple methods of fabricating and forming metals and plastics.

41.341, 41.441 Unit Operations — First and Second Law of Thermodynamics; enthalpy, entropy, phase rule, thermodynamic diagrams and tables; fluid flow and measurement in pipes and channels, piping, pipe fittings and valves; filtration; flow of heat, conduction, convection, radiation, film and overall transfer coefficients, heat exchangers; principles and application of equipment for evaporation, distillation, absorption, liquid-liquid counter-current extraction and solid liquid extraction, drying and crystallization.

41.441 See 41.341

43.102, 43.202 Circuit Analysis — Teaches the principles and methods of analysis

related to d.c. and single phase a.c. circuits. Topics include work, energy, current, voltage, power, resistance, inductance, capacitance, impedance; SI units; circuit laws, rules and analysis methods (loop, nodal, superposition, equivalent circuit) applied to single-port and two-port networks; resonant circuits; transients in inductive and capacitive circuits. The lab portion of the course provides practice in the use of power supplies, function generators, multimeters, oscilloscopes and various circuit components.

43.103, 43.203 Shop Practice — Provides practical training for the development of manipulative skills, as well as familiarization with electrical and electronic components. Topics include safety procedures; sheet-metal fabrication; wiring methods and materials; electronic components; printed circuits; installation of equipment (distribution boxes, switch boxes); conduit bending and mounting; excerpts from electrical code; drawing standards and interpretation; drafting techniques and engineering standards.

43.201 Electronic Circuits I — Teaches how electronic circuits work, how to analyse them numerically and how to design, modify and combine them to perform complex functions. Topics include interpretation of transistor and tube characteristics curves; voltage and current amplifying circuits; loadline analysis; choice of Q-point; bias circuits, stability; a.c. equivalent circuits; interstage coupling and frequency response; feedback; oscillation and oscillator circuits; power supplies, including voltage and current regulating circuits in discrete and integrated form; low-frequency power amplifiers of various types; heatsink calculations; characteristics and application of other devices such as unijunction transistors, thyristors and field-effect transistors.

43.202 See 43.102

43.203 See 43.103

43.204 Measurements — Teaches the principles and methods of measuring quantities encountered in the electrical, electronic and instrumentation industries. Topics include measurement and error definitions; units and standards; safety procedures; transducers and instruments for the measurement of voltage, current, power, impedance, frequency, phase angle, decibels, Q, distortion, pressure, level and temperature.

43.311 Electronic Circuits II — Provides a knowledge of electronic circuits, including tuned amplifiers, wideband amplifiers (discrete and IC), operational amplifiers, comparators, non-linear op amp circuits and applications of a timer I.C. Detailed linear circuits analysis is applied to each topic.

43.312 Digital Techniques — Introduces digital circuits and techniques together with their applications in present day equipment. Topics include number systems; codes and coding; Boolean algebra; switch and relay logic; solid state logic TTL, MOS, CMOS); noise and loading considerations; flip flops; counters; shift registers; rate multipliers; encoding and decoding systems and arithmetic systems. Simple methods of digital to analog and analog to digital conversion.

43.313 Pulse Circuits — Teaches the analysis and synthesis of circuits (discrete and integrated) for the generation and shaping of nonsinusoidal waveforms. Topics include clippers, clamps and d.c. restoration; multi-vibrators (nonstable, astable and bistable); blocking oscillators; Schmitt trigger ramp and staircase generators; large signal transistor circuits; line-pulse generators and CRT deflection circuits.

43.314 Telecommunications Circuits — Introduces the organization and operating principles of transmitters, receivers and basic antenna systems. Topics include frequency generation, RF amplification and transmitter organization; superheterodyne principle, receiver organization; modulation including AM, FM, SSB; antenna and transmission line principles; performance evaluation and adjustment of transmitters and receivers.

43.321 Industrial Electronics — Emphasizes electronic circuits applicable to the control of electrical equipment. Topics include differential amplifiers; operational amplifiers; thyristors and their application to static switching; phase-controlled rectifiers (single phase and polyphase); d.c.-a.c. and d.c.-d.c. power conversion.

43.322 Digital Control — Deals with digital and electromechanical control logic and their application in utility and industrial control systems. Topics include switch, relay and solid state control, binary arithmetic, Boolean algebra, relay and switch types, solid state logic types — TTL, CMOS, HTL, counters, shift registers, A-D and D-A converters and conversion of relay logic to equivalent solid state logic.

43.323 Three-Phase Power Circuits — Reviews R, L and C circuits in parallel and series combinations and a.c. power concepts, with the application of polar notation to complex quantities and associated phasor, impedance and power diagrams. Introduces the per unit computation method and its adaptability for lab simulation of large power systems. Topics include three-wire distribution systems, balanced and unbalanced three-phase systems, power factor correction, power measurement, phase sequence determination, transformer polarities and three-phase transformer configuration and an introduction to symmetrical components. The course includes lab work and closely-monitored report writing.

43.324, 43.424 Electrical Equipment — Gives an understanding of the theory, characteristics and operation of equipment used in the electrical industry. Deals with items individually and their application to complete electrical systems and drives. Topics include d.c. and a.c. motors and generators (types, losses, efficiencies, load requirements, running characteristics), transformers (construction, losses efficiencies), magnetic motor starters, industry ratings, standards, temperature classifications.

43.424 See 43.324

43.331 Electronic Circuits II — Provides a further knowledge of electronic circuits, with particular emphasis on their application in the telecommunications industry. Topics include small-signal tuned amplifiers, tuned power amplifiers, stability of tuned amplifiers, wide-band amplifiers, operational amplifiers, parameter systems and their application to small-signal linear circuit analysis. Basic video circuits.

43.332 Digital Techniques — Teaches the basic techniques used in digital electronics and prepares the student towards application of these techniques in the succeeding terms. Topics include switch and relay control, number systems, Boolean algebra, codes and coding, solid state logic (TTL-MOS-CMOS), noise and loading, encoders/decoders, numeric displays, arithmetic devices, counters and shift registers.

43.333 Non-linear Circuits — Teaches the analysis and synthesis of circuits for the generation and shaping of nonsinusoidal waveforms. Topics include clippers, clamps and d.c. restoration; multivibrators, (monostable, bistable and astable); large-signal transistor circuits; blocking oscillators; Schmitt trigger; ramp and staircase generators; line-pulse generators; phase control and d.c. to d.c. converters.

43.334 Telecommunications Principles I — Introduces the principles of telecommunications to the student. Beginning with the history of communications and the nature of speech and waveform composition, discussion develops into the various modulation techniques. These include amplitude modulation and its derivative, single sideband and frequency and phase modulations. Associated demodulation and detection techniques are discussed for each modulation type. Other topics include frequency generation, frequency multipliers, frequency translation and filter circuits.

43.335 Electronic Fabrication — Deals with manufacturing techniques used in the electronics industry. Topics include printed circuits (layout design, components, component mounting, art work production process), interconnection of units, prototype design and assembly, high reliability soldering, developing photographic positives and negatives.

43.341, 43.441 Instrumentation Electronics — This course deals with the application of electronics to industrial measurement and control. It acquaints the student with types of equipment he is likely to find in industry by investigation of circuitry of various manufacturers' equipment. Topics will include wheatstone bridges applied to measurement of strain, flow, temperature and conductivity, operational amplifiers used as d.c. signal amplifiers, differential and instrumentation amplifiers, the 4-20 ma. current loop, 2-wire transmitters and other transducer circuits. Analog signal conditioning circuits such as multipliers, function generators and electronic controllers will

also be investigated. Lab practice will consist of construction of typical circuits as well as analysis of manufacturers' equipment.

43.342, 43.442 Process Computer Systems — This course introduces the student to digital logic and computers and shows how they are used in process monitoring and control. Topics include Boolean algebra, families of gating, flip flops, counters, registers, arithmetic units, serial and parallel data transmission, analog multiplexing, digital to analog and analog to digital conversion and interface techniques. Mini and micro-computer organization, language types, memory systems and input/output structures will also be discussed. Assembler language and BASIC will be used for implementation of analog input/output and controller routines for in-house processes such as level control loops. Strategies used in commercial installations such as analog backup and remote data acquisition will be investigated. Lab work will consist of practice using digital components and on-line programming consistent with course material.

43.343 Process Measurements — This course introduces the students to the concepts and principles of industrial instrumentation measurements. Topics studied are manometry, pressure gauges and differential pressure transmitters, as well as level and density measuring devices. In flow measurements, the principal sections to be studied are differential pressure flow meters, variable area meters and velocity meters, such as the magnetic flow meter. The course ends with the study of various temperature sensors. Included are bimetallic elements, filled systems, thermocouples and resistance thermometers.

43.344 Process Control I — The objective of this course is to provide a sound fundamental knowledge of the principles and practices used in the design, operation and application of common industrial process control systems. Topics covered include basic automatic control theory, block diagrams, open and closed loop control systems. Basic feedback circuit design principles using pneumatic, hydraulic and electronic amplifiers; mechanical, electrical and fluid final control elements; control valve specification and sizing; actuator circuits using electric, pneumatic and hydraulic position servos; signal conversion, boosting and computing; process static and dynamic characteristics related to process load, process resistance and capacitance, process gain and self-regulation.

43.411 Industrial Electronics — Investigates the application of electronics to industrial control. Topics include thyristor circuits such as SCR switches, TRIAC phase control and TRIAC proportional control, and d.c. power supplies and d.c. series, shunt and switching regulators are reviewed. Switching circuits, including relay logic, timing, sequential detection, photo transistor switches and stepper motor applications are also discussed.

43.412 Digital Systems — Applies the principles of digital techniques to electronic systems. Topics include complex analog to digital and digital to analog conversion methods; analog and digital multiplexing systems; introduction and use of the digital computer; CPU organization and operation; memory organization; timing considerations; machine language programming; Assembler language programming; serial and parallel inputs and outputs; teletypes and UARTS. The 8080 and 6800 microprocessors are used as the training vehicles for this course. The second half of this course will be project-oriented. Topics include magnetic storage; CRT terminals; interfacing; real time systems and applications in industrial and communications systems.

43.413 Industrial Audio Systems — This course familiarizes the student with techniques for measuring acoustic parameters in auditoriums and theatres. Topics include the nature of sound, sound transmission, reverberation, reinforcement, instrumeorption and reflection of sound. Opportunities are provided to design a complete sound system. This course is highly project-oriented.

43.414 Electrical Equipment — Deals with the electrical equipment associated with electronic control systems. Topics include industrial plan power distribution, three-phase synchronous generators (machines, controls, loads, power factor); single and three-phase induction motors (industrial types, starting, overload protection); three-phase synchronous motors and their control; electromagnetic control circuits; and d.c. generator and motor.

43.415 Electronic Systems — Emphasizes the theory and operation of feedback systems and the application of electronics to industrial systems. Topics include the application of signal flow techniques, analog modelling, transfer functions and stability criteria for feedback. These topics are applied to electromechanical positon servos, systems, motor speed controls and temperature control systems. Supervisory control systems and closed circuit TV systems (CCTV) using analog and digital techniques are covered during the second half of this course. Major individual student projects are developed in the lab.

43.416 Electronic Fabrication — Deals with manufacturing techniques used in the electronics industry. Topics include printed circuits (layout design, components, component mounting, artwork, production process); interconnection of units; prototype design and assembly; high reliability soldering; developing photographic positives and negatives. Production scheduling, including PERT charts, production costs and maintenance costs are discussed. Equipment reliability testing and accelerated life cycling are reviewed.

43.417 Data Communication Systems — Introduces the communications systems and techniques required to link computer-based systems together. Topics include data links via telephone, telegraphs and microwave radio channels. Transmission methods including frequency and time division multiplexing; FSK, PSK, PCM. Introductory transmission line theory; channel capacity, noise, distortion; line conditioning, signal measurements, error rates, codes and coding systems. Data modems and subscriber interfaces. RS-232 interfaces. Telemetering systems. Computer communications and communications protocol. This course is highly project-oriented.

43.418 Industrial Practicum — Each student is sent to a firm in local industry for a continuous two-week period of industrial contact. Upon completion of this period of training the student is required to submit a written report and make an oral presentation to the class.

43.421 Control Systems — The first ten weeks of the course teaches a systematic approach to the design, wiring and troubleshooting of industrial controls. Topics include mechanical, electromagnetic and solid state control devices (characteristics, relative merits and application to industrial control); control circuit design (electromagnetic and electronic); and motor control (d.c., induction and synchronous motors). The second ten weeks of the course emphasizes the application of feedback techniques to the control of electrical equipment. Topics include feedback principles; transfer functions and stability criteria and their application to practical electronic systems for the control of motors, generators and other electrical equipment; e.g., regulators for speed, torque, voltage and frequency.

43.422 Electrical Drafting — Gives an appreciation of the preparation and interpretation of electrical drawings. Topics include standard symbology; schematic, connection and black diagrams; single- and three-line diagrams; building layouts and equipment layouts.

43.423 Power System Analysis — Study of third harmonic distortion to wave shapes as caused by transformer saturation; three winding transformers and associated reactances; development of the per unit computation method as applicable to voltage regulation of industrial and utility type three-phase power systems under steady state and transient conditions; short circuit studies of power systems and the technique to select suitable power circuit breakers; further development of symmetrical components and the introduction of sequence networks; double line and single line to ground and line to line asymmetrical power system faults; grounding transformers; power transfer capabilities of transmission systems and power circle diagrams and transient stability of power systems under fault conditions. In addition to regular class tutorials, students are assigned an individual high voltage power project which will be computer-monitored to check its accuracy.

43.425 Utility Systems — Deals with organization of an electrical utility and the characteristics of its equipment. Topics include utility system organization; system operation; generating sources, hydro and thermal; synchronizing; load sharing; transmission sys-

tems; substations; protective relaying and rate structures.

43.426 Protective Systems — Deals with protection principles and equipment as applied in electrical power systems. Topics include purpose of protection; fuses; circuit-breakers; protective relays; current and potential transformers; lightning arrestors and coordination studies.

43.427 Industrial Systems — Teaches the design of electrical systems for industrial plants and commercial buildings. Topics include electrical system organization; feeder calculations and ratings; demand factors; motor feeders, motor control centres; switchboards; voltage levels; grounding, ground fault protection, system protection coordination; together with the appropriate sections of the Canadian Electrical Code.

43.428 Lighting Systems — Introduces the commonly-used electrical light sources and the calculations pertaining to lighting systems. Topics include incandescent and gaseous discharge light sources; lighting equipment, calculations and layouts and branch circuit wiring.

43.431 Voice and Data Networks — Course starts with the evolution of the telephone network. Topics will include the telephone instrument; external plant; introduction to switching systems; basic trunking and call routing through a step by step (S x S — strowger) local end office; power and signalling systems; the sequence and operation of linefinder, selector connector, repeater; the directorized step-by-step system; traffic appreciation, introduction to common control switching using crossbar and electronic stored program control and call processing; related power systems; the toll network and data sets and future trends in the industry.

43.432 Digital Applications — Applies the principles of digital techniques to the sub-systems used in industrial communication systems and the digital computer. Topics include analog-digital interfacing, digital instruments, analog-digital multiplexing, tri-state bus structures, large scale binary storage devices (RAM-ROM-DIODE MATRIX), introduction to mini and micro-computers (hardware organization) and use of the computer input/output structures to accomplish various tasks in the communications industry.

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

43.434 Telecommunications Principles II — Continues the development of the circuits and techniques introduced previously into transmitters and receivers. Typical AM, FM and SSB transmitters are examined in detail which includes automatic frequency control, metering and monitoring, input transducers and antenna coupling. Similarly, practical receivers are examined, including tuned radio frequency and superheterodyne. Receiver sensitivity, selectivity and fidelity are fully discussed. Other topics include oscillator tracking, beat frequency oscillator, automatic gain and frequency controls, squelch and the audio section. Evaluation of an SSB transceiver in accordance with the appropriate Department of Communications specification. Data communications and frequency/time division multiplex techniques are developed with a limited discussion of practical systems. Noise, emphasis, distortion and other transmitter and receiver performance criteria are discussed. The video signal and receiver are also studied. Other topics include an introduction to radar, direction finding and position location systems.

43.435 Radio Systems and Propagation — This course introduces the student to the modes of propagation of electromagnetic energy and the types of equipment used to establish telecommunication links. Topics include ground, sky and space-wave propagation; microwave paths; environmental factors; site considerations; point-to-point communications; and noise performance of communication systems.

43.436 Microwave Techniques — Students are introduced to the principles and practices of measurement of frequency, attenuation, impedance of circuit components at microwave frequencies; power sources; modulation; crystal and bolometer characteristics and their use in standing wave detectors and power meters; resonators and radiation.

43.441 See 43.341

43.442 See 43.342

43.443 Process Measurements — This course is essentially a continuation of Process Measurements (43.343). Topics include force, torque and strain: mechanical, optical, electrical strain gauges and load cells. Humidity and dewpoint: psychrometry, hygrometry, vapor equilibrium systems. Gas analysis: chemical absorption, thermal conductivity, paramagnetic, heat of combustion and polorgraphic methods. Electrolytic conductivity: electrode and electrodeless pH: dye and electrometric methods. Spectrometry: light sources, filters, dispersive elements and detectors. Chromatography: separation and detection methods.

43.444 Process Control II — Continuing from Process Control I. This course deals with process control strategies and hardware commonly used for simple single variable, multi-variable and feed-forward control systems. Topics include loop stability, gain and phase shift of loop components, loop natural frequency; control system objectives and criteria for optimum damping; simple controllers, two-position, multi-position, proportional, integral and derivative modes; cascade, ratio, non-linear and feed-forward control systems; function generators; adaptive control systems; process loop tuning; computer process control, strategies and algorithms.

43.445 Instrumentation Engineering Practices — This course introduces the student to common industrial standards and practices. Topics include standard symbology; preparation and interpretation of instrumentation flow diagrams and process flow diagrams, instrument specifications sheets; safety circuits and codes; design standards; preparation of an instrumentation and process control project proposal complete with drawings, instrument schedules and costs.

Faculty and Staff

R.E. Ridsdale, P.Eng., *Department Head*
R.J. Barrett
U.R. Bottcher
J.C. Browne
J.H. Casimir, B.A.Sc., P.Eng., Chief Instructor
R. Chadwick
E.I. Gaspard, C.E.T.
T.J. Glave, B.Sc.(Eng.), P.Eng.
C.F. Glazier, B.Sc.(Eng.), P.Eng.
R.W. Guy
E.G. Hancock, Dipl.T., C.E.T.
L.C. Hannah, Dipl.T.
J.A. Hopkins, Chief Instructor
J.G. Kenyon, P.Eng.
S.D. Hughes, B.A.Sc., P.Eng., Chief Instructor
E.H.V. Back, Dipl.T., C.E.T.
T.W. Coghlan, Dipl.T., C.E.T.
E.J. Kemp
G.R. Harland, Dipl.T.
K. Kajiwara, Dipl.T., C.E.T.
J. Leibel
E.E. McConechy, B.Sc. (Eng.), P.Eng., Chief Instructor
W.F. Miklas, Dipl.T., C.E.T.
B.H. Mulder, M.Sc.(Delft), P.Eng.
A.R. Murdoch, B.A.Sc., P.Eng.
R.T. Russell
J.W. Schoonover, Dipl.T., C.E.T.
E.W. Scratchley, B.A.Sc., M.A.Sc., P.Eng., Chief Instructor
J.N. Tompkin, B.Sc.(Eng.), P.Eng., Chief Instructor
T.L. Vishloff, Dipl.T.
J.E. Warkentin, Dipl.Adult.Ed., M.A.(Ed.), C.E.T.
E.A. Upward, Dipl.T., C.E.T., Chief Instructor
A.R. Walker, B.Sc.

Forest Resource

The forest industry is the largest industry in the province employing nearly half of our population, and as the industry continues to expand, new opportunities open up for technologists with expertise in resource management, forest harvesting and forest products manufacturing. The Forest Resource Technology offers training in four options: Forestry; Fish, Wildlife and Recreation; Pulp and Paper; and Wood Products.

Job Opportunities
Specialists in forestry find employment in a variety of industrial and government settings.

Fish, Wildlife and Recreation specialists are employed principally in government agencies. Because opportunities are limited, the number of students accepted into the Fish, Wildlife and Recreation Option is restricted.

Wood Products graduates are employed in the milling and plywood industry in production, production and control, quality control, pollution abatement and research.

Pulp and Paper graduates enter the industry as environmental control technicians, process technologists, engineering assistants, research and development technologists and sales and technical services representatives.

The Program
Students enrolling in the Forest Resource Technology enter one of four options: Forestry, Fish, Wildlife and Recreation, Wood Products or Pulp and Paper.

The Forestry Option curriculum emphasizes forest engineering and logging and includes the study of logging systems, log production, costing and accounting. Other courses include inventory methods, logging development, forest protection, forest management and silviculture. Labs and lectures are supplemented by visits to logging and milling operations.

The Fish, Wildlife and Recreation Option is concerned with the management and development of these resources.

The Wood Products Option curriculum includes the study of wood properties and processing, tallying, quality control and marketing. Students also complete the requirements for a certificate in lumber grading. Field trips and mill assignments are an important part of the course.

The Pulp and Paper Option course of studies concentrates on pulp and paper manufacture, wood chemistry, quality control and pollution abatement. An on-campus pilot plant is heavily used in instructing in plant operation and process control. Field trips are made to various industrial operations.

Prerequisites
Graduation from the Combined or Selected Studies Program is a general prerequisite. The following special prerequisites are required for individual options.

Forestry: Algebra 12 or Math 12 (Biology 11 is desirable). Fish, Wildlife and Recreation: Algebra 12 or Math 12 and Biology 11. Pulp and Paper: Algebra 12 or Math 12 and Chemistry 11. Wood Products: Algebra 12 or Math 12 and one science 11 (biology, chemistry or physics). Industrial experience strengthens an application for any of the options and skill in report writing is essential. Initiative, efficiency and leadership ability are important qualities.

Expenses
In addition to tuition fees, books and supplies, students will also incur expenses for field trips. In the Forestry and Fish, Wildlife and Recreation Options, these may exceed $200.

Financial Assistance
Students entering the Pulp and Paper or Wood Products Option are eligible for industry-sponsored scholarships ranging in value from $500 to $1200. The scholarships are for two years and include summer employment in milling or pulp and paper operations. For information, contact your high school counsellor, or the Forest Products Program at BCIT. Also see page 111 in this calendar.

Course of Studies
Forest Products Program

		Clrm hrs/wk	
		Pulp & Paper	Wood Prods
Year 1	**Term 1**		
30.103	Applied Chemical Principles	6	—
31.146	Technical Communication	3	3
32.146	Basic Technical Mathematics	5	5
33.118	Applied Physics	5	5
41.107	Engineering Materials	2	1
46.101	Forest Utilization	7	7
46.115	Lumber Grading I	—	2
46.198	Lumber Tallying*	—	2
46.199	Log Utilization	—	4
49.101	Drafting Fundamentals	2	2
	Tutorial	1	1
	Library and Research	4	4
		35	35
	Term 2A		
30.203	Applied Chemical Principles	6	—
31.246	Technical Communication	3	3
32.246	Calculus	5	—
32.264	Statistics and Quality Control	—	5
33.218	Applied Physics	5	5
41.207	Engineering Materials	2	—
41.208	Engineering Materials	—	3
46.212	Pulp and Paper Technology I	7	—
46.215	Lumber Grading II*	—	8
46.220	Wood Properties	—	4
49.205	Drafting	—	2
49.206	Drafting	2	—
	Library and Research	5	5
		35	35

	Term 2B		
30.203	Applied Chemical Principles	6	—
31.246	Technical Communications	3	3
32.246	Calculus	5	—
32.264	Statistics and Quality Control	—	5
33.218	Applied Physics	5	5
41.207	Engineering Materials	2	—
41.208	Engineering Materials	—	3
46.212	Pulp and Paper Technology I	7	—
46.215	Lumber Grading II*	—	8
46.220	Wood Properties	—	4
49.205	Drafting	—	2
49.206	Drafting	2	—
	Library and Research	5	5
		35	35
46.399	A summer technical report will be required for students continuing into second year.		

Year 2	Term 3		
14.320	Computer Applications	2	—
14.321	Computer Applications	—	3
22.346	Operations Management I	—	3
31.346	Advanced Technical Communication	2	2
32.346	Statistics	4	—
41.341	Unit Operations	6	—
43.353	Electrical Equipment Applications	—	4
46.301	Pulp and Paper Technology II	9	—
46.305	Pulp and Paper Testing I	6	—
46.307	Wood Chemistry	2	—
46.315	Wood Processing I	—	10
46.370	Mill Services I	—	8
46.399	Summer Technical Report	1	1
	Library and Research	3	4
		35	35

	Term 4A		
14.408	Linear Programming	—	3
14.420	Computer Applications	2	—
22.446	Operations Management II	—	4
30.312	Instrumental Analytical Methods	3	—
31.446	Advanced Technical Communication	2	2
32.446	Statistics	3	—
41.441	Unit Operations	6	—
43.453	Process Measurement and Control	2	—
46.401	Pulp and Paper Technology III	7	—
46.405	Pulp and Paper Testing II	5	—
46.415	Wood Processing II	—	11
46.470	Mill Services II	—	8
49.471	Mechanical Equipment	—	3
	Library and Research	5	4
		35	35

	Term 4B		
14.408	Linear Programming	—	3
14.420	Computer Applications	2	—
22.446	Operations Management II	—	4
30.312	Instrumental Analytical Methods	3	—
31.446	Industrial Communication	2	2
32.446	Statistics	3	—
41.441	Unit Operations	6	—
43.453	Process Measurement and Control	2	—
46.401	Pulp and Paper Technology III	7	—
46.405	Pulp and Paper Testing II	5	—
46.415	Wood Processing II	—	11
46.470	Mill Services II	—	8
49.471	Mechanical Equipment	—	3
	Library and Research	5	4
		35	35

**The attainment of a recognized industrial certificate with a minimum mark of 70 per cent is required as a condition of graduation.*

Forestry Program

Year 1	Term 1	Forestry	F.W.R.
31.145	Communication	3	3
32.145	Mathematics for Forestry I	5	5
45.102	Forest Measurements I	6	6
45.103	Wood Utilization	2	—
45.106	Photo Interpretation and Mapping	4	4
45.110	Fire Control I	3	3
45.120	Plants and Soils	6	6
45.125	Public Information Techniques	—	2
45.128	Field Skills	2	2
	Library and Research	4	4
		35	35

	Term 2		
10.241	Public Administration in Canada	—	3
31.245	Communication	3	3
32.245	Mathematics for Forestry II	6	6
44.224	Zoology	—	5
45.201	Forest Land Management	2	2
45.202	Forest Measurements II	8	—
45.206	Photo Interpretation and Mapping	4	4
45.220	Plants and Soils	4	4
45.226	Ecology	2	2
45.228	Field Skills	2	2
	Library and Research	3	3
		35	34

A summer technical report will be required for students continuing into second year.

Year 2	Term 3		
10.381	Organizational Behavior	3	3
31.345	Advanced Technical Communication	2	2
45.302	Forest Measurements III	6	—
45.305	Timber Harvesting	5	—
45.308	Roads and Transportation I	6	—
45.313	Forest Pestology I	4	—
45.316	Forest Management	4	—
45.321	Recreational Land Management I	—	5
45.322	Wildlife Management I	—	5
45.323	Fish Management I	—	6
45.326	Community and Habitat Ecology	—	5
45.327	Projects	—	6
45.328	Summer Technical Report	1	2
	Library and Research	4	1
		35	35

	Term 4		
31.445	Advanced Technical Communication	2	2
45.402	Forest Measurements IV	4	—
45.405	Log Production and Cost Control	5	—
45.408	Roads and Transportation II	5	—
45.410	Fire Control II	4	—
45.413	Forest Pestology II	3½	—
45.416	Forest Management	6½	—
45.421	Recreational Land Management II	—	6
45.422	Wildlife Management II	—	6
45.423	Fish Management II	—	6
45.427	Projects	—	5
45.429	Environmental Inventory Techniques	—	4
45.430	Law Enforcement	—	3
	Library and Research	5	3
		35	35

Subject Outlines

10.241 Public Administration in Canada — A study of the fundamentals of government organization and public administration in Canada. The course will examine such things as federalism, federal-provincial relations, policy formation, the bureaucracy, budget formation and control, power and responsibilities of departments, crown corporations and administrative tribunals.

10.381 Organizational Behavior — This course is the study of man's behavior and attitudes in an organizational setting, the organization's effect on his perceptions, feelings, and actions and his effect on the organization, particularly how his behavior affects the achievement of the organization's purposes. Within this context, such concepts as leadership, communications, power, authority, change and conflict will be examined.

14.320, 14.321 Computer Applications — Applications of the computer 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 will be demonstrated and used by students. FORTRAN or BASIC programming language is taught.

14.321 See 14.320

14.408 Linear Programming — Graphical method; algebraic method; simplex method; analysis of simplex results; LP 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.

14.420 Computer Applications — More advanced applications of the computer in the pulp and paper industry using WATFIV, FORTRAN and BASIC computer languages. Concept of computer similation and its application to the design of a production process. Use of minicomputers and micro-processors in process control.

22.346 Operations Management I — The course is an organized approach to problem-solving with emphasis on the forest resource industry. It covers such method study techniques as problem selection, process charting, multiple activity charting, activity sampling, motion economy and critical examination and development of alternatives. The course includes an introduction to work measurement. Throughout the course, the importance of establishing good human relations with the employees is stressed.

22.446 Operations Management II — The techniques required to solve plant layout and materials handling problems are covered and the student applies these techniques to solve a comprehensive in-house project. As a term project, the student selects for study a job in an industrial plant in the forest resource industry. The student applies the techniques learned in 22.346 and the first part of 22.446 to the solution of his plant project and submits a written report on his findings including conclusions and recommendations.

30.103 Applied Chemical Principles — An applied course of basic inorganic chemistry, including simple stoichiometry, solubility product, selective precipitation, solution preparation, pH, buffer solutions, oxidation-reduction, acid-base theory and titration calculations. Lab work consists of simple qualitative and quantitative analysis. Good lab techniques are emphasized.

30.203 Applied Chemical Principles — A continuation of 30.101 that includes theory of gravimetric and volumetric analysis, titration curves, chemical kinetics, simple physical chemistry, atomic structure, ionic and covalent bonding, periodicity and descriptive organic chemistry of selected groups. Lab work consists of qualitative and quantitative analysis and physical separations.

30.312 Instrumental Analytical Methods — This course introduces basic theoretical concepts, instrument construction and operation, and general application of the following methods: potentiometry, polarography, refractometry, polarimetry, visible, ultra-violet and infra-red and includes absorption and emission flame photometry and gas chromatography.

31.145, 31.245 Technical Communication — Writing basics are reviewed and an introduction to technical writing is presented. A lecture each week is followed by two lab sessions where various writing tasks are undertaken, under supervision. Some feedback for students will occur directly in the lab periods and some will take place via written comments on assignments handed in. Every student is expected to make an oral presentation to his or her peers. Also included in the course are units of study concerning reading and study skills and job application strategies.

31.146, 31.246 Technical Communication — This course prepares the student for writing technical material relevant to the forest products industry. In a one-hour lecture and a two-hour lab each week, the student studies and practices the principles of clear, concise and precise writing. The student learns to apply this skill to various business formats: descriptions of hardware and processes, directions, summaries, letters and memos and technical reports.

31.245 See 31.145

31.246 See 31.146

31.345, 31.445 Advanced Technical Communication — In a two-hour lab each week, students discuss and practice the writing process in general, and technical reports and correspondence in particular. Students are expected to complete about one writing assignment per week, ranging from one-page letters and memoranda to ten-page formal technical reports. In addition, students study and practice oral communication skills and principles of logical reasoning.

31.346, 31.446 Advanced Technical Communication — In a two-hour lab each week, students discuss and practice the writing process in general and technical reports and correspondence in particular. Students are expected to complete about one writing assignment per week, ranging rom one-page letters and memoranda to ten-page formal technical reports. In addition, students study and practice oral communication skills and principles of logical reasoning.

31.445 See 31.345

31.446 See 31.346

32.145 Mathematics for Forestry I — Topics in algebra, trigonometry, logarithms, analytical geometry and vectors, with emphasis on application to the forest industry.

32.146 Basic Technical Mathematics — Topics in algebra, logarithms and trigonometry with emphasis on technical applications, including linear programming.

32.245 Mathematics for Forestry II — An introductory course in statistics. Organization and presentation of data; measures of central tendency and dispersion; frequency distributions; probability distributions; sampling; estimation; hypothesis testing; regression and correlation theory. Special emphasis on application of principles to the forest industry.

32.246 Calculus for Pulp and Paper — An introductory course in calculus and its applications involving the differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions. The course also includes some numerical methods using the computer to solve applied problems.

32.264 Statistics and Quality Control — An introduction to statistics (covering the organization and presentation of data, measures of central tendency and dispersion, probability distributions, estimation and hypothesis testing), and in addition, linear regression, non-parametric statistics and topics in quality control.

32.346 Statistics — Organization and presentation of data, measures of location and dispersion, probability, frequency distributions, sampling and estimation.

32.446 Statistics — Hypothesis testing, correlation and regression and quality control charts.

33.118, 33.218 Physics — An introductory level course covering statics, dynamics, momentum, force, friction, energy, power, angular momentum, simple machines, properties of solids, fluids, fluid mechanics, thermal properties of matter, thermal energy, basic electricity and magnetism, optics and atomic and nuclear phenomena.

33.218 See 33.118

41.107, 41.207 Engineering Materials for Pulp and Paper Option — Comparison of materials of importance in pulp and paper technology including wood and wood products, concrete, metals, alloys, polymers and ceramics. Common causes of failure in service including corrosion, wear, fatigue and embrittlement.

41.207 See 41.107

41.208 Engineering Materials for Wood Option — Comparison of materials of importance in wood 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 testing and non-destructive testing.

41.341, 41.441 Unit Operations — First and second law of thermodynamics; enthalpy, entropy, phase rule, thermodynamic diagrams and tables; fluid flow and measurement in pipes and channels, piping, pipe fittings and valves; filtration, flow of heat, conduction, convection, radiation, film and over-all transfer coefficients, heat exchangers; principles and application of equipment for evaporation, distillation, absorption, extraction; humidification and dehumidification; drying.

41.441 See 41.341

44.224 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.

45.101 Introduction to Forest Land Management — This course provides students with background information and understanding regarding the important uses of forest land. It covers the resources associated with forest land and the problems of administration, management, multiple use and utilization. The principal resources considered are forest, fish, wildlife, range land, water, recreation and minerals.

45.102 Forest Measurements I — Fundamental concepts of forest engineering—measurement of distances, direction and elevation. Traverse calculations, obtaining, recording and plotting topographic detail. Care, maintenance and adjustment of equipment. This course will familiarize the student with forest surveying methods used in logging layout and forest measurements.

45.103 Wood Utilization — This subject is designed to enable students to appreciate the nature of the woods of the commercial tree species in British Columbia and be aware of how wood in the growing tree is affected by the natural environment and forest practices. Topics include botanical origin of wood, structure, preservation and utilization of waste wood. Non-mechanical and mechanical properties of wood are emphasized.

45.106, 45.206 Photo Interpretation and Mapping I and II — Practical use and application of aerial photography in forestry. Classification, reconnaissance, planning and inventory and using aerial photos. Practice in the use of photo-interpretation aids, including the use of stereometers. Construction of forest maps and plans. Transfer of detail from aerial photos, using Sketchmasters, Map-O-Graph, Kail plotters and pantographs. Drafting and map reproduction techniques.

45.110, 45.410 Fire Control I and II — 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 pre-organization of industrial and government agencies. "Forest Act", Part XI. Fire suppression techniques through fire-simulation training in initial action and problem-solving.

45.120, 45.220 Plants and Soils — Structure, physiology, taxonomy and uses of plants, with emphasis on those having important biological and economic significance in the biotic zones of British Columbia. Introduction to reproduction of plants with particular emphasis on conifers. Recognition and evaluation of common plant association in the forest, range land and alpine habitats of British Columbia and their uses in land management practices. A study of the geology, land forms and development of soils in British Columbia. Physical and chemical nature of soils. Soil erosion and preventive measures. Soil surveys and land-use studies.

45.125 Public Information Techniques — The course objective is to introduce the student to the practical techniques of effective communication in his or her chosen field. The preparation, design and use of audio-visual and other communication media will be emphasized and encouraged in the development of all written and oral presentations. The oral presentation of topics prepared from related courses in the option, supplemented by library research and literature survey, will be required of the student in a variety of speaking practicums.

45.128, 45.228 Field Skills — A course designed to give a knowledge of many of the tools of the trade; e.g., power saws and outboard motors plus basic skills related to outdoor living, survival and logging techniques. Current certification in survival first aid course or equivalent is required for credit in this course.

45.201 Introduction to Forest Land Management — This course provides students with background information and understanding regarding the important uses of forest land. It covers the resources associated with forest land and the problems of administration, management, multiple use and utilization. The principal resources considered are forest, fish, wildlife, range land, water, recreation and minerals.

45.202 Forest Measurement II — Methods of measurement of standing and felled timber. Direct measurement of tree diameters, heights and ages. Characteristics and use of standard volume tables. Construction of local volume tables. Types of sampling and design. Application of aerial sampling and point sampling with elementary statistical analysis. Compilation methods for sample data. Report writing.

45.206 See 45.106

45.220 See 45.120

45.226 Ecology — Introduction to basic concepts of ecology, with emphasis on their application to management of renewable resources. The course is divided into two main aspects. The first portion deals with ecological principles; the second portion with the practical application of these principles to renewable resource management. Examples are drawn from current environmental issues.

45.228 See 45.128

45.302, 45.402 Forest Management III and IV — Field application of cruising techniques and data compilation by computer. Cruise-report preparation, including recommendations for environmental considerations. Preparation of forest maps. Familiarization with British Columbia cruising systems. Inventory as opposed to operational cruising. Logging-waste assessment. British Columbia log scale applications to coast and Interior operations. British Columbia board-foot rule. Weight-scaling.

45.305 Timber Harvesting — Description and analysis of timber-harvesting systems presently used on the British Columbia Coast and in the Interior. Techniques in the theory and application of logging layout. Environmental considerations in timber harvesting. Multiple land-use concepts. Woods safety.

45.308, 45.408 Roads and Transportation I and II — Truck load location, construction and maintenance. Preparation of plans and profiles. Measurement of earth and rock work. Optimum road standards. Road costing. Culvert and simple log-span bridge design. Hauling costs. Log dumps, dry land sorting areas and booming grounds. Water transportation of logs.

45.313, 45.413 Forest Pestology I and II — An integrated study of forest insect and disease problems. Basic life histories. The interactions of damage agencies in the forest. Improved cruise techniques related to insect and disease damage. Use of subject literature. Cooperation with authoritative government agencies. Prevention and control of damage. Measuring and reporting of insect and disease damage. Recognition of the currently important insects and diseases.

45.316, 45.416 Forest Management — Principles of forest management and administration; relation of timber production to other forest land uses. Management for sustained yield; ownership and tenure; business aspects. Foundations of forest management; site, stocking, spacing; silviculture, field and nursery; forest yield; forest growth; forest regulation; determination of cut; stumpage appraisal.

45.321, 45.421 Recreational Land Management I and II — An introductory course in recreational land management. Development and recreational use of areas designed as natural parks. Survey of outdoor recreation, history and organization of agencies providing recreational activities in parks. Park development, planning and design. Practical exercises in site analysis, planning and design for specific uses. Park and natural-history interpretation. Park operation and administration. Assessment and development of wildlife recreational areas both in and out of established parks. Recognition of recreational sites by aerial photo interpretation of land forms. Private and public programs in forest recreation. Land tenures and land acquisition for recreation. Wildland landscaping. Summer and winter sports area developments. Water-oriented activities, wildland access problems and trail design, mountaineering, search and rescue.

45.322, 45.422 Wildlife Management I and II — The principles and practice of wildlife management, with particular reference to problems and procedures in British Columbia wildlife environments. The 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.

45.323, 45.423 Fish Management I and II — The biology of British Columbia fishes, including anatomy, taxonomy, physio-

logy, behavior and ecology. Management aspects of fisheries, including population dynamics, habitat evaluation and improvement, harvesting, pollution and fishery regulations. Labs will deal with methodology as it applies to the above, and much of the training in this regard will be done in the field. Emphasis throughout is on the British Columbia situation.

45.326 Community and Habitat Ecology — A review study of the roles of geology, soils, climate and vegetation in the formation and development of major habitat types in British Columbia, based on the framework of the biogeoclimatic zones of the province. Evaluation of the effects of management practices on the maintenance and alteration of these habits. Practice of the description and evaluation of any habitats in a report. Field identification and evaluation of habitats is aided by a five-day field trip to the Central Interior of British Columbia.

45.327, 45.427 Projects — Special study seminars or projects designed to introduce students to current problems and solutions in resource management. Partial or complete involvement with potential employers will be encouraged.

45.328 Summer Technical Report — A detailed report on a phase of resource management from first-hand experience or from approved library research.

45.402 See 45.302

45.405 Lab Production and Cost Control — Log production planning and scheduling. Production and cost control. Cost analysis. Operations research techniques. Contracts and contract logging. Woods organization. Industry and government relationships in logging, particularly as related to development and management of the related resources.

45.408 See 45.308

45.410 See 45.110

45.413 See 45.313

45.416 See 45.316

45.421 See 45.321

45.422 See 45.322

45.423 See 45.323

45.427 See 45.327

45.429 Environmental Inventory Techniques — Basic techniques used in establishing the quality and quantity of a variety of resources. The course includes practical exercises in such areas as human use studies, animal population analysis, basic survey techniques, stream and lake survey techniques, hydrological and meteorological techniques, forest inventory and pollution sampling techniques.

45.430 Law Enforcement — This course deals with the many aspects involved in the interpretation and enforcement of legislative acts relating to the management of Canada's wildland resource. Among these are the "Fisheries Act", "Parks Act" and the "Wildlife Act".

46.101 Forest Utilization — An introduction to the manufacture of forest products. Topics include elementary botany, identification of British Columbia commercial tree species, forest management and logging, 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.

46.115 Lumber Grading I — This course is given to Wood Option students in Term I in preparation for Lumber Grading II. The course covers material fundamental to the grading of western softwood lumber, including tree growth and wood structure, species identification, classification of products and the recognition of characteristics as found naturally and as caused in manufacture.

46.198 Lumber Tallying — A full course on the tallying and shipping of lumber followed by an industrial examination. Material covers the conversion of order data to quantities in foot-board measure, specified lengths, pieces, bundles and packages. Also covered is information on moisture content and shrinkage of wood, metric conversion and lumber price calculations. Final examinations for certification are given by C.O.F.I., at which time the student must achieve a 70 per cent pass mark as a requisite to obtaining the BCIT Diploma of Technology. Students must also obtain the required 50 per cent term marks for the in-school portion of the course.

46.199 Log Utilization — Course introduces basic log-scaling procedures used for coastal mills. Material also includes different log-sorting methods and recovery calculations used in the sawmill and plywood industries. Considerable time is spent practising scaling techniques on selected log booms.

46.212 Pulp and Paper Technology I — An introduction to the commercially important pulping process with the emphasis on the kraft and mechanical systems. Raw material analysis includes water, fibre and chemicals. The use of the microscope as an aid to manufacturing is covered. Major and auxiliary items of mill equipment will be covered. The lab portion of the course is designed to equip students to undertake summer employment in a routine mill-testing function.

46.215 Lumber Grading II — Students attend the industry lumber grading classes sponsored by the Council of Forest Industries (C.O.F.I.) and receive further instruction at BCIT classes. Final examinations for certification are given by C.O.F.I., at which time the student must achieve a 70 per cent pass mark as a requisite to obtaining the BCIT Diploma of Technology. Students must also obtain the required 50 per cent term marks for the in-school portion of the course.

46.220 Wood Properties — Topics covered include wood and chip units and conversion factors, mechanical and rheological properties, chemical properties, micro- and ultra-structure, wood protection and preservation.

46.301, 46.401 Pulp and Paper Technology II and III — Pulp and paper technology concerned mainly with the kraft process, chemical and heat recovery, bleaching, papermaking, newsprint manufacture and wood chemistry. Pulp and paper instrumentation, with emphasis on the theory and application of process control, including computer control systems. Pollution abatement technology—application of physical, chemical and biochemical methods to reduce air and water effluents.

46.305, 46.405 Pulp and Paper Testing I and II — Standard tab techniques. Process control and product testing, including pulp viscosity, bleachability, screening and cleaning efficiency and dirt count utilizing electronic test equipment. The study and application of advanced techniques in the physical, optical and chemical evaluation of paper pulps and manufactured papers. Projects are undertaken in conjunction with the lab section of the Pulp and Paper course. A large portion of this course will be devoted to pollution control testing.

46.307 Wood Chemistry — A lecture course designed to provide the student with a basic understanding of the structures of the major components of British Columbia wood species and the changes imposed in pulping and bleaching.

46.315, 46.415 Wood Processing I and II — Students receive instruction in sawmill and planer-mill operation, sawing technology, lumber seasoning, plywood and particle-board manufacture and shipping procedures. Also, methods to control quality, recovery and productivity are examined. Coastal and inland operations are compared in the classroom and by way of field trips.

46.370, 46.470 Mill Services I and II — The course is designed to supplement material covered in Wood Processing I and II (46.315, 46.415). 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 the time is spent on specific assignments in various manufacturing plants.

46.399 Summer Technical Report — A detailed report on a phase of the technical operation of a forest products plant from first-hand experience or from approved research sources.

46.401 See 46.301

46.405 See 46.305

46.415 See 46.315

46.470 See 46.370

49.101 Drafting Fundamentals — Techniques of reading and producing orthographic drawings using standard format and the development of basic skills in applying these techniques. Use of instruments, line work, geometric constructions, orthographic projects, isometric drawing and sketching, sections, dimensioning and threads and fasteners, as required.

49.205 Drafting — Covers topics on intersections, developments, descriptive geometry, isometrics and piping drawings and mechanical equipment detail

and layout projects associated with lumber production. Prerequisite: 49.101 Drafting Fundamentals.

49.206 Drafting—Forest Products, Pulp Option II — Includes isometric plant layout, intersections, descriptive geometry, a typical pump base design project, isometric single line piping. Drawing, recausticizing and brown stock washing, flow sheets and other applicable pulp mill diagrams. Prerequisite: 49.101 Drafting Fundamentals.

49.471 Mechanical Equipment — 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. Reference to steam generation, steam processes and power generation, as well as preventive maintenance are made.

Faculty and Staff

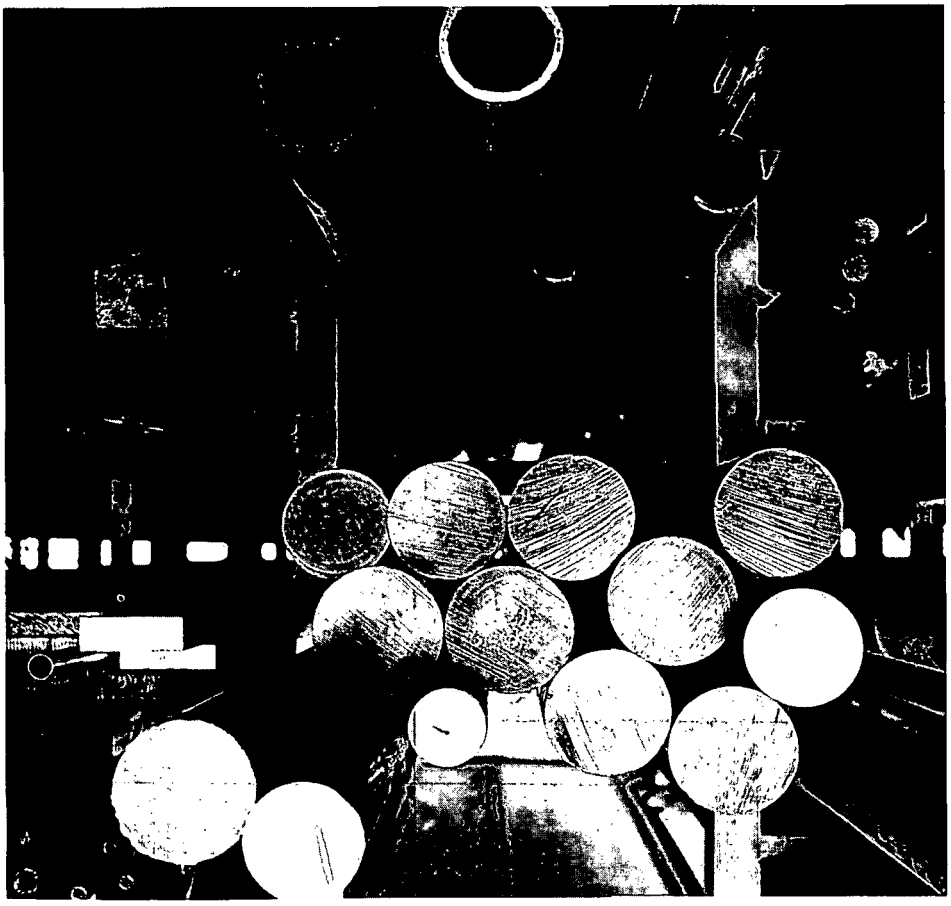
V. Heath, B.S.F., R.P.F., *Department Head*

Forestry Program

N.E. Alexander, M.P.M.
M.R. Angelo, B.S.F., M.F.
D. Campbell, Dipl.T.
W.R. Cannon, B.A.
F. Cassetta, B.Sc.F., R.P.F.
C.W. Chestnut, B.A., Ph.D.
T.D. Chisholm, B.Ed.
E.C. Crossin, B.S.F., R.P.F.
J.A. Cuthbert, B.S.F., R.P.F., Senior Instructor (on leave)
G. Daykin, B.A.Sc., P.Eng.
C.J. Diebold, C.A.M.
S. Drosdovech, Dipl.T.
D.C. Holmes, B.A.Sc., M.F., R.P.F., P.Eng., Chief Instructor (on leave)
E.W. Howard, M.F., Senior Instructor
A.G. Jakoy, B.S.F., M.F., R.P.F.
H. Kermode, B.A.Sc., R.P.F., P.Eng.
R.J. Kerr
E. Kozier
H. Lenko, B.S.F., R.P.F.
K. Loewe
H. Lynum, B.Sc.F., R.P.F.
A. McLeod, B.S.F.
R.W. Reisen, E.T.I.
J. Simpson, B.Sc.F., M.Sc.
E. Sivak, Ph.D.
P. Willms, Dipl.T.
P. Yanciw, B.A.Sc.

Forest Products Program

S. Berghold
G.R. Harris, B.A., M.A., Chief Instructor
H. Kettner
B.R. Leslie
J.T. Neilson, B.A.Sc., P.Eng.
G.A. Smook, B.S., P.Eng.



Mechanical

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 analyse 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 and 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 specialty. In the final term of their second year, students stream into one of two options: Design or Production.

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

Prerequisites
Graduation from the Selected or Combined Studies Program with Algebra 12 or Math 12 and Physics 11. Applicants should have a solid academic background and good communications skills, be able to apply ideas in practical situations and be able to work effectively with people in a team situation.

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
31.149	Technical Communication	4
32.149	Basic Technical Mathematics	5
41.105	Engineering Materials	4
49.100	Mechanical Drafting I	4
49.107	Applied Mechanics	8
49.145	Manufacturing Processes I	5
	Library and Research	5
		35
	Term 2	
31.249	Technical Communication	4
32.249	Calculus I	4
33.216	Physics	4
41.205	Engineering Materials	4
49.200	Mechanical Drafting II	4
49.208	Mechanics of Materials	4
49.210	Fluid and Thermal Processes	3
49.245	Manufacturing Processes II	4
	Library Research and Field Trips	4
		35
Year 2	**Term 3**	
32.349	Numerical Methods with FORTRAN	4
43.373	Electrical Equipment Applications	4
49.312	Machine Design I	5
49.325	Thermal Engineering I	5
49.335	Fluid Engineering I	5
49.360	Engineering Economics	4
49.365	Analysis of Machining Techniques	3
	Library Research and Field Trips	5
	Production Term 4	
22.449	Operations Management	4
32.449	Statistics and Quality Control	4
49.435	Fluid Engineering II	5
49.450	Production Engineering Management	4
49.455	Tool Design	3
49.445	Manufacturing Processes III	4
49.460	Metrology	4
	Library Research and Field Trips	7
		35
	Design Term 4	
43.414, 49.413	Theory of Mechanisms and Design Project	4
48.450	Instrumentation	4
49.412	Machine Design II	5
49.425	Thermal Engineering II	4
49.430	Heating Ventilation and Air Conditioning	4
49.435	Fluid Engineering II	5
49.455	Tool Design	3
	Library Research and Field Trips	6
		35

Subject Outlines

22.449 Operations Management — Planning and scheduling, job loading and levelling, network diagrams and plant layout are considered in practical applications. The student carries out studies in an industrial plant and presents a term project which encompasses much of the course material studied in class. The course and project work are closely associated with the mechanical engineering field.

31.149, 31.249 Technical Communication — The lectures in this course will introduce students to communication theory, to the style, content and graphics of technical writing, to job application and

meeting procedures and to the specific forms of communication used in industry. The labs will review basic writing and speaking skills and then apply these to technical writing and research. Specific assignments will include the preparation of letters, memos and reports and the submission of a formal technical report.

31.249 See 31.149

32.149 Basic Technical Mathematics — Topics in algebra, logarithmic theory, trigonometry and analytical geometry, with emphasis on technical applications in the mechanical field. Prerequisite for course 32.249.

32.249 Calculus — An introductory course in calculus and its technical applications. Topics included are the differentiation and integration of algebraic functions, related rates, curve sketching, applied maxima and minima, areas, volumes, centroids, moments of inertia, hydrostatic pressure, differentiation and integration of trigonometric, logarithmic and exponential functions, the conics, power series, partial differentiation, solution of equations by iterative methods and an introduction to differential equations.

32.349 Numerical Methods with FORTRAN — Numerical integration, numerical solution of differential equations, iterative solution of equations, linear programming (simplex) and an introduction to computer programming.

32.449 Statistics and Quality Control — An introduction to statistics covering the organization and presentation of data, measures of central tendency and dispersion, probability distributions, estimation and hypothesis testing and, in addition, linear regression, non-parametric statistics and topics in quality control.

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

41.105, 41.205 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.

41.205 See 41.105

43.373 Electrical Equipment Applications — An introduction to industrial electrical equipment. Topics include a.c. and d.c. motors and their application to electromechanical drive systems; protecting and controlling motors; industrial electrical power systems and related equipment; sources of energy; utility rate structures, transformation into primary and secondary voltage levels; distribution of power throughout the plant; switching; voltage control; power-factor correction.

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

49.100 Mechanical Drafting I — 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.

49.107 Applied Mechanics — (i) 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. Redundances. Beams, principle of moments and centroids. Second moment of area. Fluid statics. (ii) Dynamics. Kinematics. Basic equations of motion. Engineers' and physicists' units. Kinetics: Newton's laws. Problems involving space, velocity and acceleration diagrams. Work, energy and power. Impulse and momentum. Mechanical vibrations.

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

49.200 Mechanical Drafting II — Advanced techniques including limits and fits, isometric and orthographic single line piping diagrams, descriptive geometry, intersections, developments, gears, threads and fasteners, weld symbols and working drawings and projects. A study of more advanced practices covering geometric tolerancing, cams, cranks and linkage motion, graphical integration for deflections, structural steel and plant layout, motor and pump mounting, material handling conveyor system is also included.

49.207 See 49.107

49.208 Mechanics of Materials — Study of stresses, strains and deflections resulting from action of tensile, compressive, shear and torsion forces on simple types of structural and machine elements. Consideration of beams, columns, shafts, thin-walled cylinders, riveted and welded joints. Lab testing of engineering materials and common machine elements.

49.210 Thermal and Fluid Processes — This course is intended to provide the student with thermal and fluid engineering principles as a foundation for 49.325/335. Topics include fluid properties, fluid statics, energy equation, heat, energy, work, processes and systems. Ideal gases, enthalpy and entropy, first and second laws of thermodynamics.

49.245 Manufacturing Processes II — Metal removal processes: the study of modern machine tools, practical experience in their use and application, effective application of tool materials, tool life, cutting speeds, metal removal, rates and power requirements with experimental work to demonstrate these principles, costs and economics related to metal removal.

49.312 Machine Design I — This course consists of a study of basic principles of machine design. Topics include stress analysis, design factors, stress concentration, notch sensitivity and fatigue. Study of design is provided including practical design of beams and columns with axial and/or transverse loading, belts, chain-drives and gearing.

49.325 Thermal Engineering I — Basic principles of energy, work and heat. Units, 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 I.C. engine cycles. Air compressors. Refrigeration cycles.

49.335 Fluid Engineering I — Introduction of fluid power symbols and circuits; operation of common pneumatic valves; assembly of pneumatic circuits for desired actuator movement; introduction to logic states; Boolean algebra and fluidic devices; compressors and compressed air systems.

49.360 Engineering Economics — Designed to emphasize the importance of making sound economical decisions when solving technical problems. Interest, inflation, annual cost, equivalent present worth, equipment depreciation, equipment replacement, break-even points and tax considerations are analysed.

49.365 Analysis of Machining Techniques — This course includes several lab projects designed to enable the student to utilize information and studies covered in previous courses. Emphasis is placed on analysing the machining operation from the initial stage to completion of a job lot order. Each project includes organizing the sequence of operations, processing, programming, time and cost estimating, machine and tool set up, manufacture, inspection, quality control and the learning process.

49.412 Machine Design II — Basic principles derived in 49.312 are applied to various design elements. Topics include springs, roller bearings, power screws, spur and helical gearing, bevel and worm gearing, couplings, brakes, clutches.

49.413 Theory of Mechanisms — This course is designed to provide a study of motion in machines. Topics include velocity and acceleration diagrams, gearing and cams.

49.414 Design Project — A course to encourage design decision-making as regards selection of materials, proportion and function of parts, drawings, dimensions, specifications and economy.

49.425 Thermal Engineering II — 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; heat transfer theory, heat exchangers and black body radiation.

Practical lab investigations by students will reinforce theoretical work during the course.

49.430 Heating Ventilation and Air Conditioning — Energy considerations of heating with different fuels; heating units, cooling units; design of supply air systems, exhaust air systems, hydronic heating systems; air cleaning; heating and cooling loads; refrigeration and air cycles; balancing and control of systems.

49.435 Fluid Engineering II — Basic principles of fluid properties, energy losses, types of flow, Reynolds number. Moody diagram, flow measuring devices, centrifugal pumps, cavitation, air movement and fan performance. Hydraulic valves, pressure control valves; rotating actuators, industrial use of fluid power circuits, fluid couplings and torque convertors.

49.445 Manufacturing Processes III — In this course the student will make a detailed study of processes such as casting hot and cold foaming, extruding, forging, stamping, pressing and material joining, including machines and materials. Quantities/costs will be investigated: manufacturing processes recently introduced into industry will be discussed in oral presentations by the student. Visits to local industries will be arranged.

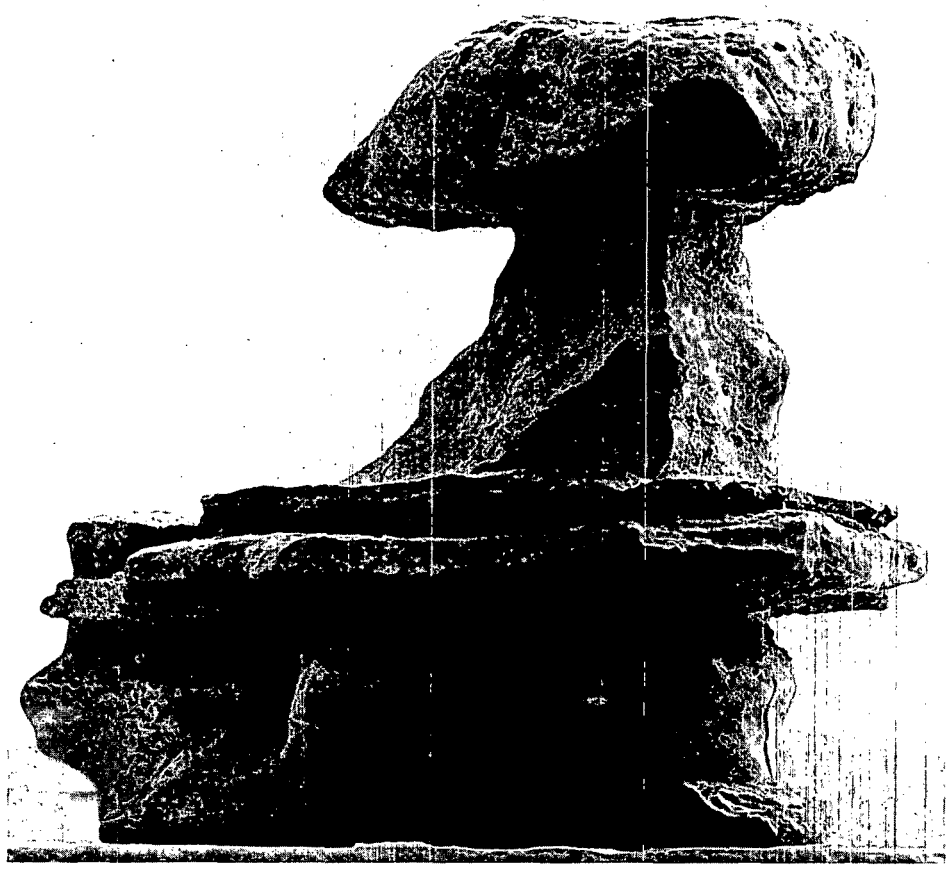
49.450 Production Engineering Management — Plant organization and management, plant locations and layouts. Labor-management relations, personnel practices, case studies, inventory control, production control and maintenance control.

49.455 Tool Design — Design of special purpose tooling as related to manufacturing. Consideration of design principles for jigs, fictures, blank and pierce, bend and draw dies, gauging practices and standard parts.

49.460 Metrology — Interferometers and associated devices. Optical comparators, measurement of surface texture and surface flatness. Air electronic, mechanical and pneumatic gauging procedures. Metrology of angles and screw threads. Use of precision measuring instruments. Fundamentals of inspection and mass production gauging.

Faculty and Staff

S.C. Todd, M.I.Mech.E., C.Eng., F.I.E.D., P.Eng., *Department Head*
A.P. Adamo, B.Sc.
D.K. Bannerman, B.A.Sc., S.M., P.Eng., M.A.S.M.E.
G.T. Benson
R.M. Brown
R.O. Darling, B.Sc., P.Eng., Chief Instructor
D.C. Gerlitz, B.Sc., M.S., P.Eng.
E. Graham, C.E.T., M.A.S.M.E., H.N.C.
R.G. Graham, B.Sc., M.A.S.H.R.A.E., P.Eng.
B.E. Horlacher, Dipl.T., Senior Instructor
J.H. Irvine, C.E.T.
G.D. Johnson, M.I.Mech.E., C.Eng., M.I.Prod.E., P.Eng., Chief Instructor
K. Johnson, A.S.T.M.E. (on exchange leave)
W.D. Mason, C.E.T.
R.B. Pennington, C.E.T.
J.R. Raby, B.E., M.S.E., A.M.B.I.M., P.Eng.
J.P. Sullivan, B.Sc., P.Eng.
W. Wilson (on exchange from U.K.)



Mining

Technologists have an important role to play in the mining industry in exploration, in mine development and operation and in mineral-processing plant design and operation. In B.C., technological expertise is particularly vital because of the high costs incurred in exploring and developing the rugged terrain. While local mining activity has slowed in the past few years, exploration has picked up in recent months indicating a general upturn in the industry. In other parts of Canada and throughout the world, mining is flourishing, offering those with a sense of adventure a wide range of career opportunities.

Job Opportunities
Some graduates enter the industry as exploration assistants and are involved in mapping structure, logging drill core or performing field tests. Others obtain positions as engineering assistants and work in surveying, gathering samples or in production control in the mines. Additional opportunities are found in the mineral processing industry as technicians in test labs, assayers or junior operators. Following approximately five years experience, opportunities for advancement to supervisory posts are excellent. Applicants should bear in mind that a willingness to travel and work in remote areas will greatly enhance their employment prospects.

The Program
Courses include math, physics and chemistry, as well as geology, surveying, assaying, mining operations and mineral processing.

Prerequisites
Graduation from the Selected or Combined Studies Program with Algebra 12 or Math 12, Physics 11 and Chemistry 11. A medical exam and chest x-ray are important if applicants plan to work in or near a mine.

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
30.101	Applied Chemical Principles	6
31.150	Technical Communication	3
32.150	Basic Technical Mathematics	5
33.101	General Physics	6
49.101	Drafting	2
50.101	Geology	3
50.102	Mining	2
51.110	Surveying	3
	Library and Research	5
		35
	Term 2	
30.201	Applied Chemical Principles	6
31.250	Technical Communication	3
32.250	Calculus I and II	5
33.201	General Physics	6
49.201	Drafting	2
50.201	Geology	3
50.202	Mining	2
51.210	Surveying	3
	Library and Research	5
		35
Year 2	**Term 3**	
31.350	Advanced Technical Communication	2
32.350	Statistics I	5
33.304	Mining Geophysics	1½
41.305	Assaying	4
41.314	Mineral Processing	3½
42.501	Statics and Strength of Materials	4
50.301	Geology Structural	3½
50.302	Mining—Operation and Equipment	3½
51.310	Surveying	3
	Library and Research	5
		35
	Term 4	
31.450	Advanced Technical Communication	2
32.450	Numerical Methods I and II	5
41.405	Assaying	4
41.414	Mineral Processing	3½
42.503	Hydraulics	3
42.501	Strength of Materials	2
50.401	Geology—Mineral Deposits	3½
50.402	Mining—Operation and Equipment	4
51.410	Surveying	3
	Library and Research	5
		35

Subject Outlines

30.101 Applied Chemical Principles — An applied course of basic inorganic chemistry, including simple stoichiometry, solubility product, selective precipitation, solution preparation, pH, buffer solutions, oxidation-reduction, acid-base theory and titration calculations. Lab work consists of simple qualitative and quantitative analysis. Good lab techniques are emphasized.

30.201 Applied Chemical Principles — A continuation of 30.101 that includes theory of gravimetric and volumetric analysis, titration curves, chemical kinetics, simple physical chemistry, atomic structure, ionic and covalent bonding, periodicity and descriptive organic chemistry of selected groups. Lab work consists of qualitative and quantitative analysis and physical separations.

31.150, 31.250 Technical Communication — In the one-hour lecture each week, students cover information on basic writing skills, technical correspondence, resumés and formal and informal reports. The weekly two-hour lab will be used to apply the principles learned in the lecture. Students will also practice oral communication skills and will participate in a month-long reading and study skills course.

31.350, 31.450 Advanced Technical Communication — This course will include brief reviews of memoranda writing, oral reports and discussions, write-ups of field trips and lab reports. Notetaking from

oral reports or articles as used at conferences, abstract writing from technical articles, information retrieval and the technical roots of English will also be included. As much as possible, the course will be integrated with the other courses in mining, geology and chemistry.

31.450 See 31.350

32.150 Basic Technical Mathematics — The application of methods of algebra, logarithms, geometry and trigonometry to technical problems in mining and engineering fields.

32.250 Calculus — Methods of differential and integral calculus and their application to mining and engineering problems. Topics include maxima, minima, curve sketching, related rates, areas, volumes and basic differential equations.

32.350 Statistics I — An introduction to statistics. Organization and presentation of data; measures of central tendency and dispersion; frequency distributions; sampling; estimation; hypothesis testing; linear regression and correlation.

32.450 Numerical Methods — An introduction to operations research techniques and the use of mathematics in decision-making. The course will include topics selected from linear programming, transportation, assignment, inventory models, queueing theory and decision-making under uncertainty. To solve some of the problems illustrating these topics, use will be made of the computing facilities of the Institute and the course will include an introduction to computer programming.

33.101, 33.201 General Physics — A general level course including mechanics, dynamics, properties of solids and fluids, thermal properties of matter, waves electricity, magnetism, electromagnetism and atomic and nuclear physics. The lab program in 33.201 includes lectures and experiments in geophysical exploration methods as preparation for 33.304 Mining Geophysics.

33.201 See 33.101

33.304 Mining Geophysics — This course consists of field work on geophysical methods of mineral exploration and development.

41.305, 41.405 Assaying — Analytical chemistry applied to the ore minerals, with special attention to fire assaying for gold and silver. Gravimitsic, volumetric and instrumental methods are developed for the more common metals. Students are encouraged to attempt the examinations for the provincial government licence to practise assaying in B.C. after at least one year's experience following graduation.

41.314, 41.414 Mineral Processing — The essential unit operations applied to mineral processing techniques for mining students. Crushing, grinding, gravity separation, flotation, cyclone classification, materials handling and storage, statistics applied to sampling problems. An introduction to chemical and bacterial leaching as applied to precious metals and nonferrous ores. The course emphasizes the numerical solution of operating-type problems.

41.405 See 41.305

41.414 See 41.314

42.202 Hydraulics — Hydrostatics, properties of fluids, pressure, centre of pressure; flow of fluids, equation of continuity, velocity head, venturi, jets; orifices; notch and weir, friction and pipe flow; Reynolds' experiments, water hammer; flow laminar and turbulent; open-channel flow, regular channels, hydraulic jump, irregular channels; meters, valves, pumps. Lab experiments form a part of this course.

42.501 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, earth pressures and slope stability.

49.101 Drafting — Techniques of reading and producing orthographic drawings using standard format and the development of basic skills in applying these techniques. Use of instruments, line work, geometric constructions, orthographic projection, isometric drawing and sketching, sections and dimensioning.

49.201 Drafting — Involves techniques in ink, contours, intersection and developments, dip, strike and outcrop, sections, profiles, descriptive geometry and other graphical mining problems. Prerequisite: 49.101 Drafting Fundamentals.

50.101, 50.201 Geology — Definition, basic concepts, earth's crust, geologic time; atomic structure of minerals, crystal forms and symmetry systems; properties of common minerals, sedimentary rock types, clastic and chemical sedimentaries; igneous rock types, classification; deformation of earth's crust, folds, faults; metamorphic rocks; weathering, erosion and glaciation; economic geology, mineral fuels, non-metallics, ore deposits and their controls; geological history, pre-cambrian, paleozoic, mesozoic, tertiary, pleistocene; geologic maps.

50.102, 50.202 Mining — Nature of mineral industries, brief history, classification, search for economic mineral deposits, prospecting techniques; preliminary exploration methods; terminology; evaluation; production and treatment methods; recoverable unit value, smelter contracts, evaluation, sampling methods, weighted arithmetic mean, determination of average grade, ore reserves; the "Mineral Act"; exploitation of mineral deposits, planned systems of extraction and classification of mining methods. In addition an introduction to some unit operations in mining; e.g., drilling and haulage.

50.201 See 50.101

50.202 See 50.102

50.301 Geology—Structural — 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.

50.302, 50.402 Mining—Operation and Equipment — Mining economics; cost components; selection and utilization of equipment; break-even ratio; breaking ground; ground support; ore-and waste-removal; development drives; examples of mining practice; control of water, drainage, grouting; ventilation; occupational hazards; "Mines Regulation Act", mine organization. Lab sessions; field trips to mines and suppliers of mining equipment for familiarization with mining methods, systems and equipment. Also sessions are given on power generation and distribution and electrical equipment for mine service, pumping, ventilation, V-belt drives, dust and noise control, hoisting and compressed-air practice. Certificate in mine-rescue work can usually be otained.

50.401 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 will illustrate and develop techniques in megascopic study and identification of hand specimens; valuation of mineral deposits. Field trips will be correlated with all classroom work in geology.

50.402 See 50.302

51.110, 51.210 Engineering Surveying — 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.

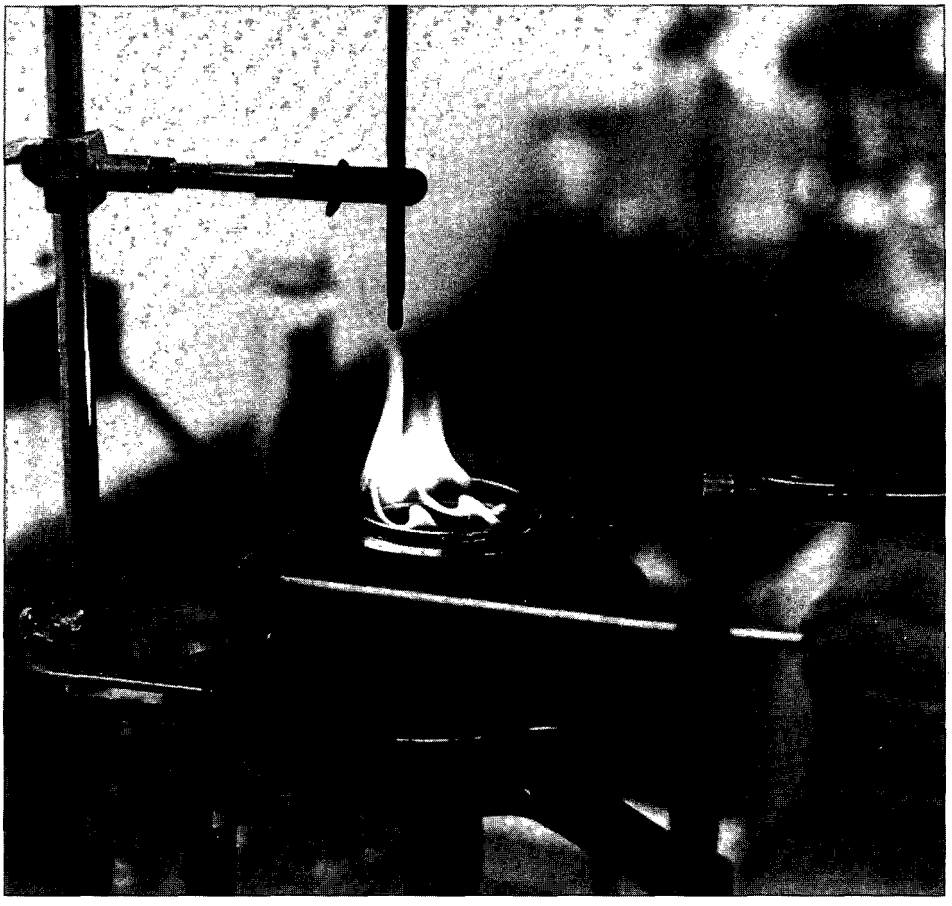
51.210 See 51.110

51.310, 51.410 Surveying — Application of survey methods to underground surveying; illumination of stations; use of mining transits, connecting surface and underground surveys, location and control of tunnels, construction of plans and sections related to mining, elementary astronomy, elementary photogrammetry applied to mining, stope surveys and quantity calculations. Mining acts related to surveying.

51.410 See 51.310

Faculty and Staff

A.H. Manifold, B.Sc., M.A.Sc., P.Eng., *Department Head*
J.F. Fairley, B.A.Sc., P.Eng.
D.J. Hardie, H.N.C.



Natural Gas and Petroleum

The gas and oil industry is comprised of two branches: transmission and refining. The industry is a fast-changing one, offering technologists a wide variety of career opportunities with broad scope. These include lab work, studies of the corrosion of above-ground and buried structures, analyses of oils, gases and petroleum products and right-of-way land work, as well as plant operation in pumping stations and refineries.

Job Opportunities
Employment possibilities in the transmission branch includes the operation of pumping stations and the maintenance of pipelines. Most of the work is outdoors in remote locations. The refining branch, on the other hand, has opportunities for those who prefer to work in or near the larger centres of population.

The Program
The first year of the program covers basic scientific and engineering principles as a foundation for specialized petrochemical training in the second year. Training will be given in the distribution and utilization of gas in both the industrial and domestic sectors. There will be considerable emphasis on measurement and automatic control. The curriculum will also cover the transmission of oil and its utilization in automated refineries and the chemistry of petroleum products. Field trips to local installations will supplement the labs and lectures.

Prerequisites
Graduation on the Selected or Combined Studies Program with Algebra 12 or Math 12 and Physics 11 or Chemistry 11. Students should have a keen interest in the operation of large-scale equipmment, be prepared to work outdoors and, with training, must be capable of assuming responsibility for the satisfactory and safe operation of highly complex plant equipment.

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
30.101	Applied Chemical Principles	6
31.147	Technical Communication	3
32.147	Basic Technical Mathematics	5
33.101	General Physics	6
41.106	Engineering Materials	3½
47.101	Introduction to Petroleum Hydrocarbons	3
50.101	Geology	3
	Library and Research	5½
		35
	Term 2	
22.247	Basic Operations Management	2
30.201	Applied Chemical Principles	6
31.247	Technical Communication	3
32.247	Calculus I and II	5
33.201	General Physics	6
47.202	Petroleum Geology	3
49.266	Introduction to Machine Tools	2
51.204	Introduction to Surveying	3
	Library and Research	5
		35
Year 2	**Term 3**	
30.302	Physical Chemistry	5
32.347	Differential Equations	5
41.341	Unit Operations	6
41.351	Pollution Control	3
47.221	Gas Distribution and Utilization	6
47.311	Gas and Oil Production and Transmission	6
	Library and Research	4
		35
	Term 4	
14.351	Computer Applications	2
30.404	Petroleum Chemistry	5
32.447	Numerical Methods and Statistics	5
33.406	Petroleum Geophysics	1
41.441	Unit Operations	6
47.409	Process Dynamics	3
47.431	Oil Refining and Utilization	8
	Library and Research	5
		35

Subject Outlines

14.351 Computer Applications — Applications of the computer; 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 will be demonstrated and used by students.

22.247 Basic Operations Management — Management problem-solving and work simplification with particular application to the natural gas and petroleum industry. Includes method study, some measurement techniques, plant layout, planning and scheduling.

30.101 Applied Chemical Principles — An applied course of basic inorganic chemistry, including simple stoichiometry, solubility product, selective precipitation, solution preparation, pH, buffer solutions, oxidation-reduction, acid-base theory and titration calculations. Lab work consists of simple qualitative and quantitative analysis. Good lab techniques are emphasized.

30.201 Applied Chemical Principles — A continuation of 30.101 that includes theory of gravimetric and volumetric analysis, titration curves, chemical kinetrics, simple physical chemistry, atomic structure, ionic and covalent bonding, periodicity and descriptive organic chemistry of selected groups. Lab work consists of qualitative and quantitative analysis and physical separations.

30.302 Physical Chemistry — This course 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 physical chemical measurements.

30.404 Organic Chemistry — This course presents a survey of the properties and common reactions of the classes of organic compounds which are found in petroleum or are of importance in the petrochemical industry. The chemistry of the refining processes, instrumental lab analysis and synthesis of some petrochemicals are presented.

31.147, 31.247 Technical Communication — This is an applied industrial communication course that concentrates on the techniques and applications of written and spoken communication. The discussion topics, explanations, illustrations and assignments are related as closely as possible to the vocational futures of natural gas and petroleum students. The intent of this course is to prepare natural gas and petroleum students with the skills necessary to on-the-job communication. By the end of the course, they should be as well equipped to handle the communication aspects of their vocations as they will be equipped to handle the purely technical aspects.

31.247 See 31.147

32.147 Mathematics —Topics in algebra, logarithms and trigonometry, with emphasis on technological applications and problem solving.

32.247 Calculus I and II — Conic sections. Differential calculus with ordinary and partial derivatives. Integral calculus. Applications from gas and oil technology.

32.347 Differential Equations — Differential equations, their analytic and numerical solutions.

32.447 Numerical Methods and Statistics — Topics in numerical methods. Computer solutions are introduced for the solution of polynomial equations, quadrature problems and some linear programming problems. An introduction to statistics. Descriptive statistics, estimation, hypothesis testing and some non-parametric methods.

33.101, 33.201 General Physics — A general level course for the Natural Gas and Petroleum Technology. The second term includes an introduction to geophysics as a prerequisite to 33.406 Petroleum Geophysics.

33.201 See 33.101

33.406 Petroleum Geophysics — This course consists of lectures on geophysical methods used in the exploration for natural gas and petroleum. Emphasis is placed on seismic methods and well logging techniques.

41.351 Pollution Control — Fundamentals of waste treatment and management systems. Basic sampling and testing techniques.

41.106 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.

41.341, 41.441 Unit Operations — First and second law of thermodynamics; enthalpy, entropy, phase rule, thermodynamic diagrams and tables; fluid flow and measurement in pipes and channels, piping, pipe fittings and valves; solid handling, grinding, crushing, screening, mixing, settling, sedimentation, filtration, flotation; flow of heat, conduction, convection, radiation, film and over-all transfer coefficients, heat exchangers; principles and application of equipment for evaporation, distillation, absorption, extraction; humidification and dehumidification; drying, crystallization; ion exchange.

41.441 See 41.341

47.101 Introduction to Petroleum Hydrocarbons — Hydrocarbon families, alkanes, olefins, ring molecules, isomers. Hydrocarbon content of crude oils and classification. Phase behavior of petroleum hydrocarbons at high pressures.

47.202 Petroleum Geology — Origin of petroleum. Historic and structural geology of reservoirs. Well logging. Construction of isopach and isochore subsurface maps. Porosity and permiability of rocks. Petroleum geology of Western Canada.

47.221 Distribution and Utilization (Gas) — City gate stations; regulation and odorization; high, medium and low pressure distribution systems; network analysis; services; service regulators; meters; combustion stoichiometry; furnaces, boilers; installation codes; industrial and power utilization; corrosion control; peak shaving; storage.

47.311 Gas and Oil: Production and Transmission — Hydrocarbon reservoirs; exploration; well drilling; field production and treatment; conservation; gathering and transmission systems; pipeline construction and maintenance; corrosion protection; compressor and pumping stations; flow computations; economics of design; measurement; laws and regulations.

47.409 Process Dynamics — Measurement transducers, interface devices, indicators and recorders. Controllers and control functions. Dynamics of process systems, lumped parametric solutions. Upset solutions. Computer applications of system modelling.

47.431 Oil Refining and Utilization — Crude oil, distillation; cracking, thermal and catylitic; reforming; hydrogenation; oil products, product testing, storage, loading, combustion stoichiometry; oil and gas engines, oil burners.

49.266 Introduction to Machine Tools — A basic course designed to familiarize the student with shop tools and equipment and with shop terminology and established standards of workmanship. Demonstrations are carried out to provide a practical understanding of the subject.

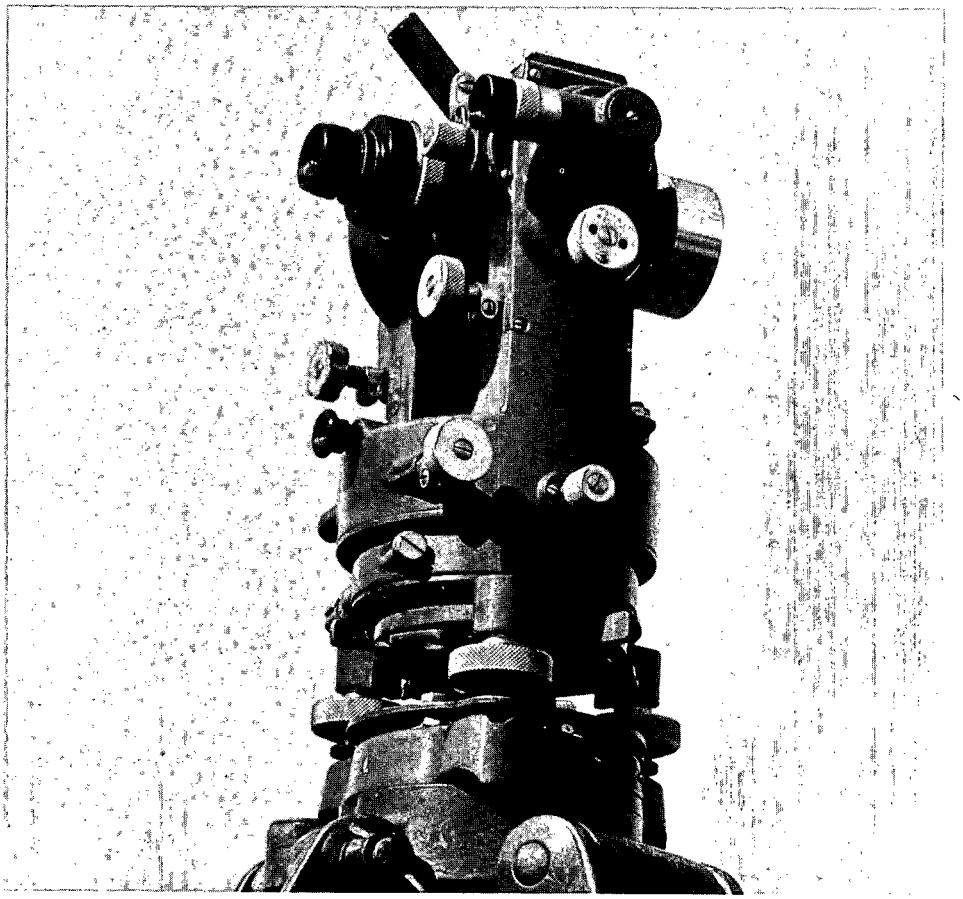
50.101, 50.201 Geology — Definition, basic concepts, earth's crust, geologic time; atomic structure of minerals, crystal forms and symmetry systems; properties of common minerals, sedimentary rock types, clastic and chemical sedimentaries; igneous rock types, classification; deformation of earth's crust, folds, faults; metamorphic rocks; weathering, erosion and glaciation; economic geology, mineral fuels, non-metallics, ore deposits and their controls; geological history, pre-cambrian, paleozoic, mesozoic, tertiary, pleistocene; geologic maps.

51.204, 51.205 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.

51.205 See 51.105

Faculty and Staff

I.M. Anderson, M.I.GasE., C.Eng., *Acting Department Head*
D.A. Campbell, B.A. (Hons.), M.Ed.



Surveying

The skills of the survey technologist are in demand in a large number of businesses and industries. Surveying and photogrammetry are essential to many phases of industrial and business development including construction, natural resource exploration and development, and mapping. Surveying techniques have become more sophisticated through the use of electronic devices and computers so that shape, size and location of objects or land masses can be determined with precision and speed.

Job Opportunities
Surveying firms, consulting engineers, the oil and gas industry, government mapping, highway, planning and engineering departments and utility companies are some of the job possibilities for surveying graduates. Employment may be found throughout Canada and around the world.

The Program
Students acquire a solid background in math, physics, astronomy, photogrammetry and plane and geodetic surveying theory and the practical skills of notekeeping, drafting, field operations and calculation. In the second year, students will enter either the Survey Option or the Photogrammetry Option.

Post-graduation
Following completion of the BCIT diploma program, graduates are eligible for membership in the Society of Engineering Technologists. Graduates are also granted some concessions towards qualification for membership in the Corporation of Land Surveyors of British Columbia.

Prerequisites
Graduation from the Selected or Combined Studies Program with Algebra 12 or Math 12 and Physics 11. Applicants should have a good understanding of math and physics to the university level. Good health is also important because of the physical demands of survey work. Photogrammetry Option students must have depth of perception.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
31.151	Technical Communication	3
32.151	Basic Mathematics	7
33.115	Physics for Surveying Technology	5
42.512	Elementary Hydrology	3
49.101	Drafting	2
51.101	Surveying	11
	Library and Research	4
		35
	Term 2	
14.222	Computer Applications	2
31.251	Technical Communication	3
32.251	Calculus	7
33.215	Physics for Surveying Technology	5
49.203	Drafting	2
51.201	Surveying	11
	Library and Research	5
		35

Survey Option

Year 2	Term 3	Clrm hrs/wk
14.322	Computer Applications	2
32.351	Statistics	3
51.301	Plane Surveying Computations	2
51.302	Geodetic Surveying II	3
51.303	Mathematical Cartography	3
51.304	Field Surveying II	7
51.305	Drafting	3
51.306	Astronomy	2
51.307	Photogrammetry	2
51.308	Description for Deeds	2
	Library and Research	6
		35
	Term 4	
32.451	Matrix Algebra and Numerical Methods	4
51.401	Plane Surveying Computations	2
51.402	Geodetic Surveying II	2
51.403	Adjustments of Surveying Measurements	3
51.404	Field Surveying II	6
51.406	Astronomy	3
51.407	Photogrammetry	4
51.408	Plane Surveying II	2
51.420	Planning and Land Utilization	2
51.421	Natural Sciences	3
	Library and Research	4
		35

Photogrammetry Option

Year 2	Term 3	Clrm hrs/wk
14.322	Computer Applications	2
32.351	Statistics	3
51.301	Plane Surveying Computations	2
51.302	Geodetic Surveying II	3
51.303	Mathematical Cartography	3
51.306	Astronomy	2
51.311	Surveying	2
51.315	Cartography	2
51.317	Photogrammetry	11
	Library and Research	5
		35
	Term 4	
32.451	Matrix Algebra and Numerical Methods	4
51.401	Plane Surveying Computations	2
51.402	Geodetic Surveying II	2
51.403	Adjustments of Surveying Measurements	3
51.415	Cartography	3
51.411	Surveying	2
51.417	Photogrammetry	13
51.420	Planning and Land Utilization	2
	Library and Research	4
		35

Subject Outlines

14.222 Computer Applications — Applications of the computer 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.

14.322 Computer Applications — Advanced programming techniques in FORTRAN are taught and applied to more complicated surveying applications. Packaged programs in surveying are also taught to familiarize students as users of these programs in industry.

31.151, 31.251 Technical Communication — The emphasis of this course is on clear and concise technical writing, although some time will be spent on oral skills also. Students will receive core information in the one-hour weekly lab. This information will be applied to specific writing and speaking tasks in the weekly two-hour lab. Students will also participate in a month-long reading and study skills course during their first year.

31.251 See 31.151

32.151 Basic Mathematics — Logarithmic theory; Euclidean and analytical geometry; plane trigonometry; spherical trigonometry.

32.251 Calculus — Derivatives; Taylor's and Maclaurin's series; the differential; partial derivatives; the definite integrals; multiple integrals.

32.351 Statistics — Descriptive statistics; probability and probability distributions; sampling and estimation; error theory; quality control.

32.451 Matrix Algebra and Numerical Methods — Basic matrix algebra operations; least square theory; correlation; solution of normal equations.

33.115, 33.215 Physics for Surveying Technology — General topics covered include light and optical instruments, kinematics, statics, dynamics, angular motion, energy, work properties of matter, temperature, thermal properties of matter, wave motion, basic electricity and magnetism and electronic distance measuring. The lab program stresses the subjects of 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.

33.215 See 33.115

42.512 Elementary Hydrology — The application of precipitation data to various run-off areas is learned in order to predict run-off yield and flood magnitude. Measurement of storages and flows in the field is studied, together with characteristics of open-channel flows.

49.101 Drafting — Techniques of reading and producing orthographic drawings using standard format and the development of basic skills in applying these techniques. Use of instruments, line work, geometric constructions, orthographic projection, isometric drawing and sketching, sections and dimensioning.

49.203 Drafting—Survey — Techniques in ink; intersections and developments; contours; profiles; rights-of-way; survey problems and projects.

51.101, 51.201 Surveying — Introduction; types of survey; fundamental principles, accuracy and precision; linear measurements, trigonometric and differential levelling; angular measurements by theodolites; plane table, computations and adjustments of traverses; determination of areas and volumes; tacheometry; maintenance and adjustments of surveying equipment; circular curves; compound curves; reserve curves; vertical curves; transition curves; eccentric angular and linear observations; resection; intersection; in accessible base.

51.201 See 51.101

51.301, 51.401 Plane Surveying Computations — Expansion of the computation program from 51.101 and 51.201. Traversing and adjustments by the Crandall method, nonsymmetrical vertical curves, transition curves (Sullivan spiral, lemniscate), laying-out and dividing problems of legal survey, volume problems related to engineering surveys.

51.302, 51.402 Geodetic Surveying II — Generally deals with surveys which take into account curvature of the earth; covers computations on the ellipsoid, triangulation, trilateration, trigonometric levelling, geodetic levelling, satellite geodesy, electronic surveying.

51.303 Mathematical Cartography — Concepts and properties of maps; classifications of maps; theory of distortions; conformality; equivalency; Jissot's indicatrix; conical projections; cylindrical projections; perspective projections, polyconic projection of British Columbia; UTM projection; stereographic projection of New Brunswick.

51.304, 51.404 Field Surveying II — Deals with the field methods used in conjunction with plane and geodetic surveying and is done in conjunction with these subjects; 51.304 consists mainly in the students learning how to use the different instruments, and 51.404 mainly in practical projects making use of these. Projects are aimed at engineering hydrographic, mining, legal and precise surveys and include some triangulation and trilateration work.

51.305 Drafting — Application of drafting for the preparation of topographical plans. Subdivision plans. Drafting principles for scribing and inking of contours. Drafting materials and reproduction procedures.

51.306, 51.406 Astronomy — Introduction to practical astronomy; spherical trigonometry; the celestial sphere; the astronomical triangle; universal time; mean solar time, sidereal time; the ephemeris and star almanacs; instruments used in soalr and stellar observations; star identification; observations for latitude; observations for time and longitude; observations for azimuth.

51.307, 51.407 Photogrammetry — Introduction to photogrammetry; optics and uses of cameras; principles of photography; photographic measurements and refinements; geometry of the vertical, oblique and terrestrial photographs; light planning; stereoviewing; photogrammetric coordinate systems; determination of heights and scales from photographs; photo interpretation; mapping and revisions from photographs; mosaics; stero-plotting instruments; control for photogrammetric mapping; limitations in photogrammetry; general specifications.

51.308 Description for Deeds — Purpose and characteristics of descriptions; systems of survey, township system and district lot system, the preamble; the correct use of the words "more or less" descriptions by adjoiners, descriptions by aliquot parts, description by metes and bounds, descriptions by exceptions, descriptions of right-of-way by means of centre line; plans to accompany descriptions; Land Registry Office procedure, strata and space titles.

51.311, 51.411 Surveying — Control surveys by triangulation, trilateration and traversing; indirect optical distance measurement; electro-magnetic distance measurements; the gyro-theodolite; trigonometrical and barometric levelling.

51.315, 51.415 Cartography — Drafting principles as applied to photogrammetric compilation and cartography; inking and scribing techniques; surround detail; lettering and scales; production procedures.

51.317, 51.417 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.

51.401 See 51.301

51.402 See 51.302

51.403 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 of traversing.

51.404 See 51.304

51.406 See 51.306

51.407 See 51.307

51.408 Plane Surveying II — Generally deals with surveys which do not have to account for curvature of the earth. Analysis of methods and instrumental errors, use of specialized equipment. Application of survey methods to engineering surveys, mining surveys, hydrographic surveys, legal surveys and higher order surveys.

51.411 See 51.311

51.415 See 51.315

51.417 See 51.317

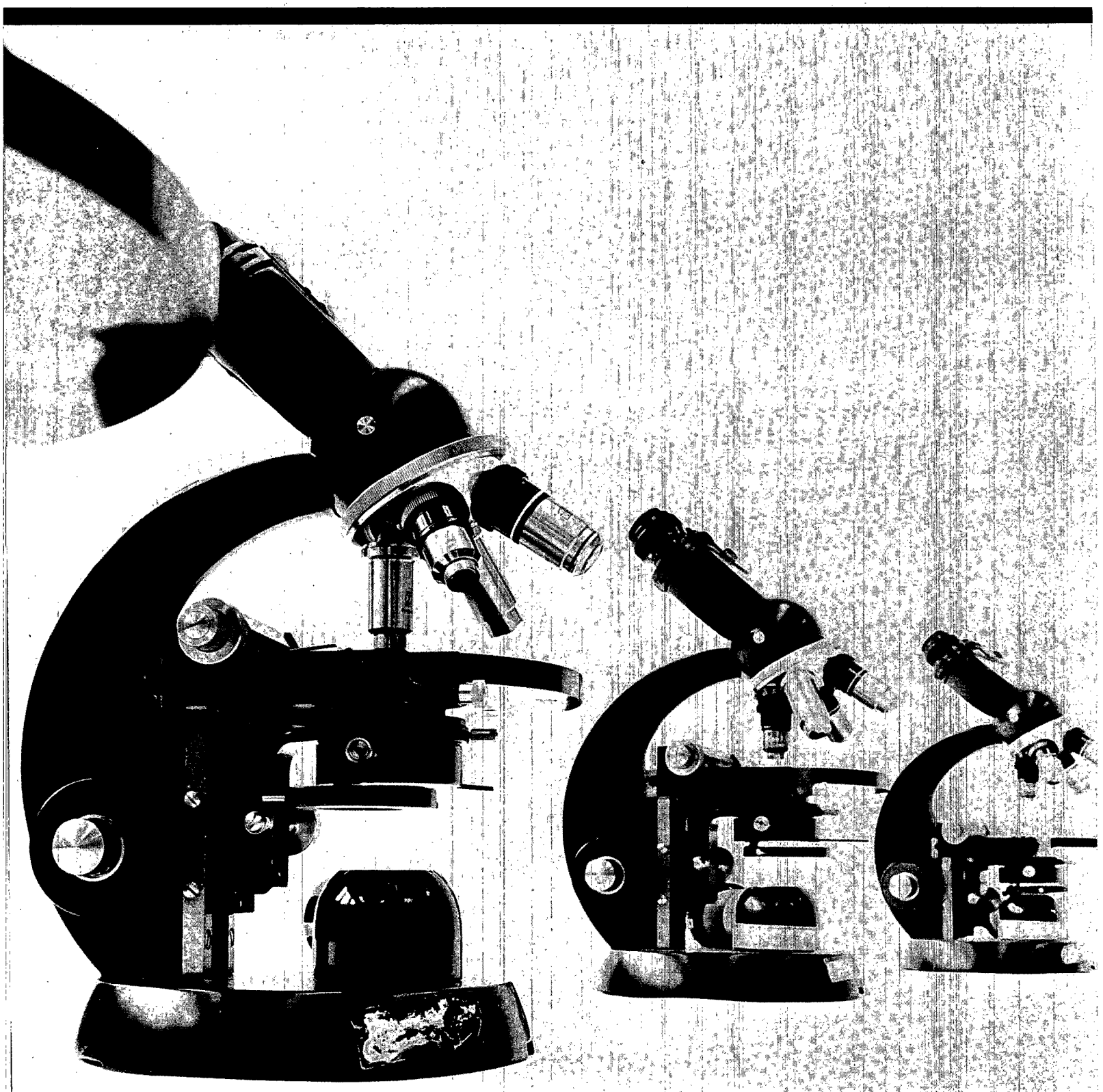
51.420 Planning and Land Utilization — The planning process as it applies to physical planning. Planning authorities and their powers. Government legislation in the planning field. Zoning and its implications in land use and development. Land use and land use studies. Subdivision design and economics.

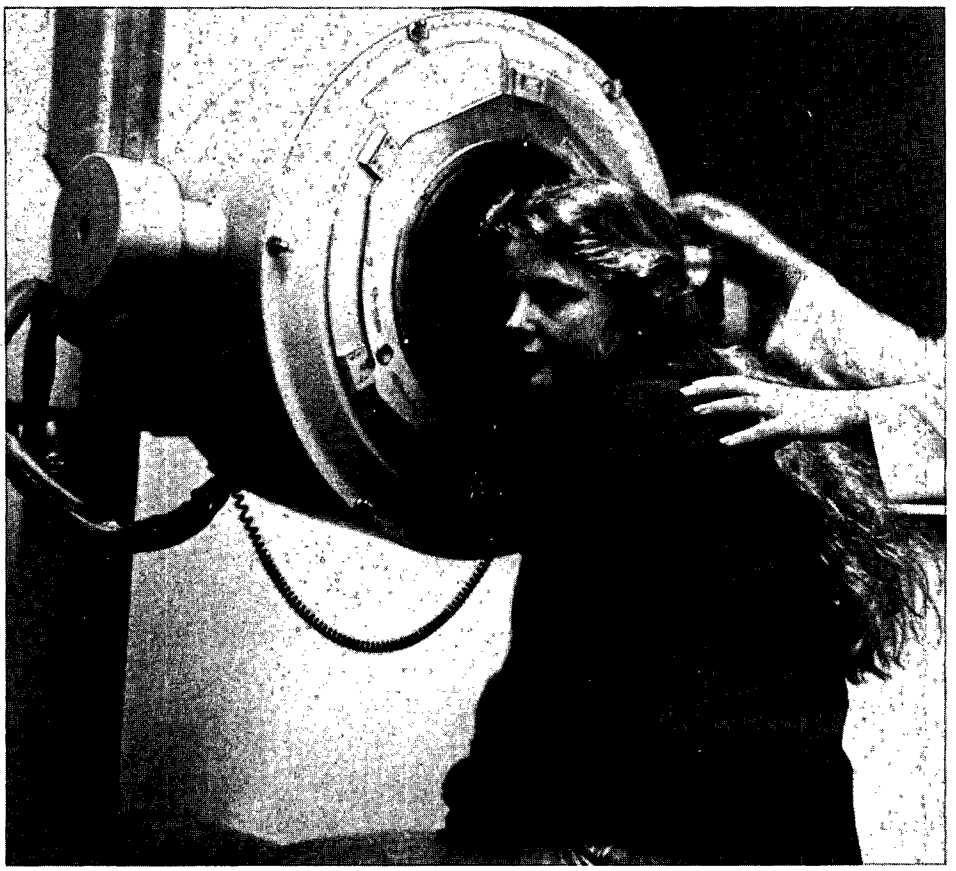
51.421 Natural Sciences — Study of the forest flora of British Columbia; the characteristics of native trees, identifying features and common uses. Elementary geology, including the study of rocks and minerals; geologic structures, general location and uses of common ores, soil classification and location.

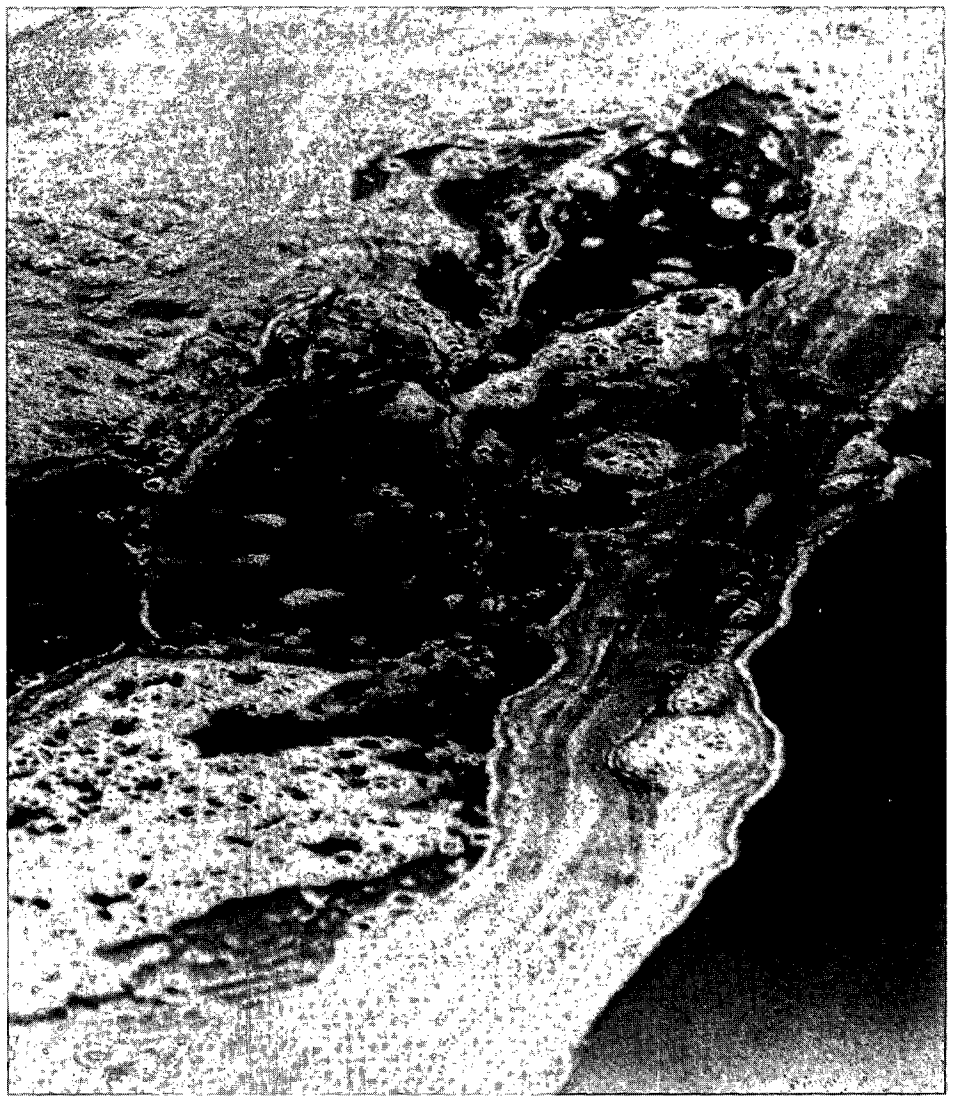
Faculty and Staff

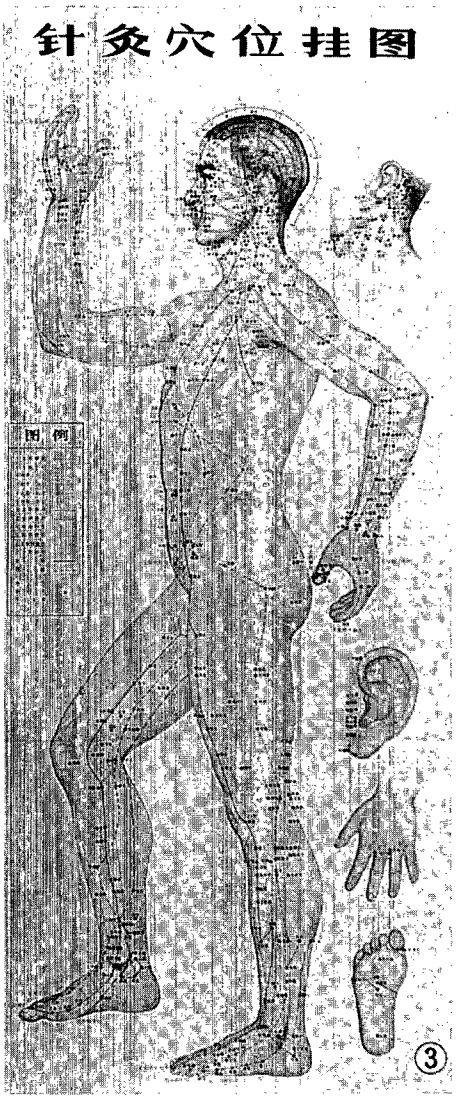
R.I. McNeil, B.Surv., B.C.L.S., D.L.S., Dipl. Adult Ed., P.Eng., *Department Head*
G.E. Anderson, Dipl.Adult Ed.
G.T. Bedwell
R. Bremner, Dipl.T.
J.S. Caldwell
D.C. Deans
K. Errington, B.C.L.S., Cert.Min.Surv.
K. Frankich, Dipl.Ing., M.A.Sc.
K. Gysler, B.Eng., M.Eng., D.L.S., P.Eng., Senior Instructor
D. Jarvos, Dipl.T.
G. Kehoe, B.A.Sc., B.C.L.S.
D.R. Mason, B.Sc., B.C.L.S.
A.M. Nelson, C.E.T., Senior Instructor
E.H. Schlegel
W.A. Tupper, Dipl.Ing.
N. Wong, Dipl.Ing., A.R.I.C.S.

Health





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Basic Health Sciences

Department of Basic Health Sciences

This department provides basic courses in human anatomy and physiology, genetics, immunology, microbiology and the behavioral sciences for students enrolled in health technology programs. These courses are designated by the prefix "98". Each course is oriented towards a particular technology so that, although the material studied is introductory in nature, the student quickly becomes aware of applications. In many cases these courses become the foundation upon which specific technology subjects are built. The Department's responsibility, therefore, is to teach those concepts of the biological and behavioral sciences which are most important for the health technology student and graduate.

Faculty and Staff

D.W. Martin, B.Sc. (Hons.), M.S.R.,
Department Head
B.M. Alder, B.S.N., R.N.
R. Bakan, B.A., M.A., Ph.D.
Miss M.E. DuVernet, B.A.
J.H. Emes, B.Sc. (Hons.), M.Sc., Ph.D.
G.R. Marshall, B.Sc. (Kines.),
M.Sc. (Kines.)
T.J. Nowak, B.A., Dipl.Ed.
E. Shkurhan, B.Sc., M.Sc., Chief Instructor

Environmental Health

Department of Environmental Health Services

Public Health Inspector Training

The public health inspector is a vital member of the community health delivery system. His or her role includes improving the environment through the use of education, consultation, inspection and monitoring techniques and, if necessary, by the enforcement of health legislation. This role is applied in the areas of food hygiene, insect and rodent control, communicable disease investigation, public accommodation, community care facilities, public recreational facilities, water supply and waste disposal systems, occupational health and safety and environmental pollution—air, water, soil and noise.

The graduate provides leadership and technical expertise in the development of long-range planning to protect and improve community health.

To meet these demands the candidate must be a mature, practical person and must 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 business and industries, such as food processing, catering and fisheries. Occasional openings occur in the teaching field. Some employment opportunities exist in the industrial health and hygiene area for students who also possess an undergraduate degree.

The Program

The cross-disciplinary curriculum includes general studies in health, engineering, math and the physical and social sciences in order to give students a thorough understanding of the many health hazards in the environment and to equip them to measure, evaluate and recommend controls of these hazards. Modes of instruction include lectures, labs and field experience.

Prerequisites

Graduation on the Selected or Combined Studies Program with Algebra 12 or Math 12 and Physics 11 and Chemistry 12. Applicants must be in good health. The nature of the work precludes individuals who are severely handicapped, who are color blind, or who cannot distinguish odors. Applicants should be able to show evidence of maturity, have a positive outlook and be interested in serving the community.

Post-graduation

After completing the requirements of the two-year program leading to a Diploma of Technology, graduates must complete six month's 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 oral examination to qualify for a Certificate in Public Health Inspection (Canada) granted by the Board of Certification of the Canadian Public Health Association.

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
30.108	General Chemistry for Environmental Health	6
32.182	Basic Mathematics	4
82.101	Environmental Health and Engineering I	4
82.102	Food Sanitation	4
82.103	Public Health Inspection I	4
98.123	Public Health and Pollution Control Microbiology	3
	Library and Research	10
		35
Year 1	**Term 2**	
30.208	General Chemistry for Environmental Health	6
31.282	Communication for Health Technologists	2
32.282	Statistics	3
33.212	Environmental Physics	3
82.204	Drafting and Blueprint Reading (and Surveying)	2
82.205	Public Health Inspection II	4
82.206	Private Water Supplies and Waste Disposal Systems	4
98.204	Basic Anatomy and Physiology	2
98.223	Public Health and Pollution Control Microbiology	3
	Library and Research	6
		35
Year 2	**Term 3**	
30.313	Instrumental Analysis	4
31.382	Advanced Communication for Health Technologists	2
82.307	Public Health Administration I	2
82.308	Environmental Health and Engineering II	4
82.309	Air Pollution and Noise	7
82.310	Technical Research Methods	7
82.311	Environmental Health Relations	5
	Library and Research	4
		35
Year 2	**Term 4**	
31.482	Advanced Communication for Health Technologists	1
41.413	Environmental Analytical Methods	3
82.412	Industrial Chemical Processes	2
82.413	Food Hygiene	3
82.414	Public Health Administration II	2
82.415	Personnel Administration	3

Year 2	Term 4 cont	Clrm hrs/wk
82.416	Public Health Law	3
82.417	Municipal Water and Sewage Treatment Systems	3
82.418	Industrial Hygiene and Toxicology	5
82.419	Technical Research Methods	3
98.424	Communicable Disease Control	3
	Library and Research	4
		35

Subject Outlines

30.108, 30.208 General Chemistry for Environmental Health — A special introductory course which covers general organic biochemistry and a selection of topics of special interest to the environmental health field. The general chemistry deals with stoichiometry and examples stress the calculations associated with water and waste water analysis. Structures of the most common organic functional groups, and the physical properties of these are discussed. When organic chemicals are introduced they are related to environmental problems that occur in oil refining, fuel combustion and pesticides. Biochemistry covers proteins, carbohydrates and fats with particular emphasis on the end-products of biological degradation. Special topics like alkalinity, hardness, water softening, colloids, swimming pool chemistry, volatile acids, biological oxygen demand and chemical oxygen demand are covered.

30.208 See 30.108

30.313 Instrumental Analysis — This course introduces basic theoretical concepts, instrument construction and operation and general application of the following methods: potentiometry, polarography, refractometry, polarimetry, visible, ultra-violet and infra-red, and includes absorption and emission flame photometry and gas chromatography.

31.282 Communication for Health Technologists — This course provides an introduction to the general principles of writing and their application to professional writing tasks. A short course in reading and study skills is included.

31.382 Advanced Communication for Health Technologists — This course offers an intensive study of report formats commonly used in the public health field: memoranda, field reports, formal reports and letters.

31.482 Advanced Communication for Health Technologists — This course is a continued study of report writing. There is also some practice in oral reports and meeting participation.

32.182 Basic Mathematics — Measurements, systems of units; review of algebra, functions and graphs; exponents and logarithms, logarithmic and exponential equations; log-log and semi-log graphs; trigonometry.

32.282 Statistics — Descriptive statistics; probability; binomial and normal distributions; sample mean and estimation; hypothesis testing; regression and correlation.

33.212 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.

32.311 Environmental Health Relations — This course examines the inter-relationships and interactions between various government departments, agencies and corporations. Additionally, the forces which underlie 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.

41.413 Environmental Analytical Methods — This course embraces a survey of methods suitable for the examination of many types of water, waste water and materials related to control of sanitation and water quality. Reference is made from the "Standards Methods" for the analysis of water and waste water, 13th edition, published by the American Public Health Association. However, in many instances adaptations and improvements are introduced. Typical industrial pollution problems related to local industry are discussed during the lab periods and special attention is given to proper sampling techniques. Ecosystems are discussed leading to various methods from B.O.D.-analysis and C.O.D. A selection is made from the following analysis of field samples: cyanide (Serfass distillation method), pesticides (sampling, extraction, clean-up and detection methods), arsenic, mercury, nitrogen (ammonia, nitrate, organic), oxygen (D.O., B.O.D., C.O.D.), surfactants, phosphates (total, ortho, poly), sulphates, chlorides, proteins, carbohydrates, tarmin and lignin, phenols, heavy metals (Cu, Fe, Pb, Cr, Hg, and Cd). Two field trips are included on practical water sampling and the provincial environmental water resources lab.

82.101, 82.308 Environmental Health and Engineering I and II — This course will cover a number of topics relevant to the field of environmental health. Topics included will be insect and rodent control, solid waste collection and disposal, emergency measures, camp and recreational sanitation, housing, community planning and swimming pools.

82.102 Food Sanitation — An introductory course in sanitary practices and inspection techniques associated with the production, processing and distribution of food. Visits are made to food premises.

82.103, 82.205 Public Health Inspection I and II — This course will provide the student with a knowledge of duties and responsibilities in governmental 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 governmental organizations is stressed.

82.204 Drafting and Blueprint Reading (and Surveying) — Fundamental introduction to drafting: lettering, oblique and isometric perspective presentation techniques, charts and graphs, topographic maps, subdivisions and plan and profile of sewer systems. Fundamental introduction to blueprint reading: principles of design of buildings; food processing plants, swimming pools, campsites; plumbing, ventilation, lighting, acoustics, floor and building layouts. Surveying.

82.205 See 82.103

82.206 Private Water Supplies and Waste Disposal Systems — An introductory course which examines the means, methods and the design and construction of facilities required to provide adequate potable water and sewage disposal in areas where municipal treatment systems are not available. 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.

82.307, 82.414 Public Health Administration I and II — 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 governmental agencies and health departments. Particular reference will be made to Canadian governmental organization.

82.308 See 82.101

82.309 Air Pollution and Noise — The air pollution portion of this course will place emphasis on the contemporary problem of air pollution in terms of the nature, sources and effects of air pollutants, regulatory guidelines and the application of engineering control measures. The associated lab work will emphasize sampling and analytical procedures for evaluating atmospheric contaminants and stack emissions. The noise portion of this course will cover noise topics relevant to the field of environmental health with emphasis on occupational and environmental noise assessment and control. The lab course will emphasize audiometry, noise measurement and analysis and calibration techniques, utilizing state-of-the-art instrumentation. The air pollution and noise topics are approximately equally divided.

82.310, 82.419 Technical Research Methods — This course provides for the development of research methods and communication skills necessary in design-

ing technical research reports. Special emphasis will be placed on predicting future trends in the field of public health. This course is designed to encourage the student to be self-assertive and creative.

82.412 Industrial Chemical Processes — This course is designed to give the student an overview of the various chemical processes used in industry; the chemicals used, chemical reactions, products manufactured, waste products and pollutants produced and the hazards to personnel. Students will make field trips to selected industries.

82.413 Food Hygiene — This course examines in depth the production-processing methods of primary food operations; ie., milk, meat and related by-products, fish, baked goods and canned foods. Sanitary control measures in relation to processing, transportation and storage for consumer sales are detailed. Field trips to food plants augment this course.

82.414 See 82.307

82.415 Personnel Administration — An introduction to the fundamental procedures of personnel administration as applied to the public health organizations. Particular emphasis will be placed on individual interaction within the structure and techniques used to obtain the maximum effectiveness and efficiency of public health personnel.

82.416 Public Health Law — An examination of the legal system which serves our society, followed by a detailed look at certain areas of substantive law which the public health official is likely to come in contact with in carrying out his or her duties. Special attention will be given to that body of legislation designed for the protection and promotion of individual and community health. Court procedure and evidence giving are examined in depth.

82.417 Municipal Water and Sewage—Treatment Systems — This course is designed to familiarize the student with the protection, treatment and distribution and associated problems of municipal water supplies. Various methods of municipal sewage treatment, the collection system, characteristics of domestic and industrial wastes and treatment and disposal problems will be studied. Future trends will be considered.

82.418 Industrial Hygiene and Toxicology — The anticipation, recognition and measurement of potential health hazards in the working environment. Values, meanings and limitations of threshold limit values in personal exposure to solvents, gases, dusts, ionizing and non-ionizing radiation. Dermatitis, heat stress, ergonomics and proper lighting. Associated lab work.

82.419 See 82.310

98.123, 98.223 Public Health and Pollution Control/Microbiology — An introduction to those areas of microbiology which the public health inspector will use in his or her daily work. The areas include the structure and physiological characteristics of bacteria, viruses and fungi and their significance as related to food, water, sewage and waste disposal.

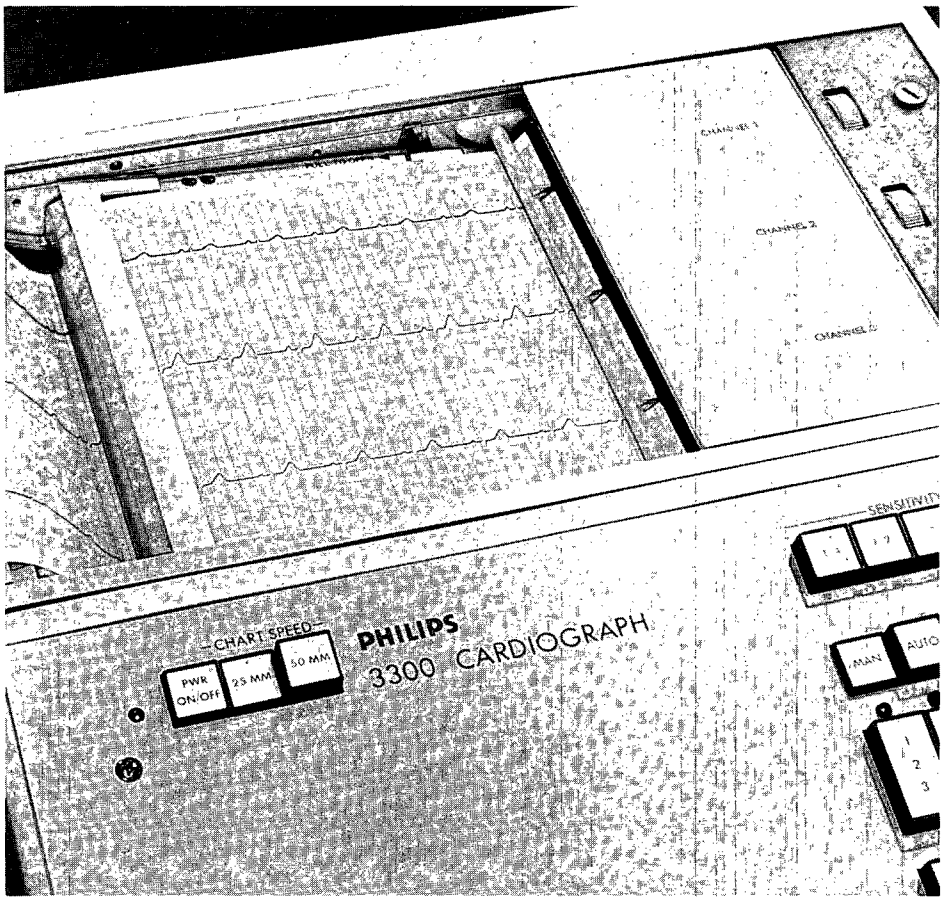
98.204 Basic Anatomy and Physiology — This course is designed to provide a basic knowledge of human anatomy and physiology. Emphasis is placed on the physiology of the human body systems and how environmental factors can affect these systems.

98.223 See 98.123

98.424 Communicable Disease Control — This course is designed to provide 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.

Faculty and Staff

John M. Pelton, B.A., C.P.H.I. (C), *Department Head*
E.J. Borsky, Dipl.T.
A.A. Guite, B.Sc., C.P.H.I. (C)
K.D. Smith, B.A., C.P.H.I. (C)
P.W. Soper, P.Eng.
R. Watkins, C.P.H.I. (C)



Biomedical Electronics

Department of Health Engineering Services

In recent years there has been a growing demand for skilled professionals who have been trained in both medicine and engineering. The widespread use of medical electronic apparatus for the measurements of blood flow, pulse rate, respiration, nerve activity and other bodily functions has further increased this demand. This trend will accelerate in the future.

Job Opportunities

A biomedical electronics technologist is a worker in a hospital, a research lab or in industry. His or her basic capability is to maintain and repair electronic equipment used in medicine and biology. Such equipment may include patient monitors, ECG machines, electrosurgical units, tape recorders, x-ray machines, telemetry devices and lab instruments such as spectromphotometers. Some of the servicing may involve mechanical devices, such as optical instruments or pumps.

The biomedical electronics technologist may also do some minor design of equipment and equipment modification, be responsible for equipment inventory control, operation of equipment and instruction of workers in equipment operation. Other activities include consultation with engineers, medical doctors and scientists in equipment purchasing, preventive maintenance of equipment and equipment safety inspection. Some technologists from this program work as sales or technical representatives for equipment supply companies.

Biomedical electronics technologists may work with equipment used directly with patients. They may have contact with experimental subjects, such as animals, or may be concerned primarily with the equipment itself. They may also work in close liaison with customers who use equipment.

Biomedical electronics as a specialty is new and expanding. The use and care of electronic instrumentation in medicine and biology is certain to demand growing numbers of technologists in this field.

The Program

The Biomedical Electronics Program provides the education and training required for the technologist who works in close association with medical engineers, physicians and others engaged in operating, maintaining, designing and supplying scientific medical equipment.

In both years of study the student will learn the fundamentals necessary to the understanding of the medical and technical aspects of the specialty. Mathematics and electronics play a large part in the training, as does detailed study of the processes which take place in the human body. During the second year, each student spends one month working under supervision in a local hospital, research agency or equipment supply company.

Prerequisites

High school graduation from the Selected or Combined Studies Program with Algebra 12 or Math 12, Physics 11 and Chemistry 11.

Persons wishing to enter this new and growing field should be interested in the welfare of people and have an aptitude for electronics and things mechanical and electrical.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
30.107	General Chemistry	6
31.178	Technical Writing	3
32.178	Basic Mathematics	8
78.100	Electronics Principles and Practice	9
98.102	Human Anatomy and Physiology	4
	Library and Research	5
		35
	Term 2A	
30.207	General Chemistry	6
31.278	Technical Writing	3
32.278	Calculus	8
78.101	Electronics Principles and Practice	9
98.202	Human Anatomy and Physiology	4
	Library and Research	5
		35
	Term 2B	
30.307	General Chemistry	6
31.278	Technical Writing	3
32.278	Calculus	5
32.279	Numerical Methods and Boolean Algebra	4
78.102	Electronics Principles and Practice	10
98.221	Introductory Microbiology	2
	Library and Research	5
		35
Year 2	**Term 3**	
32.378	Transform Calculus	3
33.330	Biophysics	3
41.591	Materials	4
43.351	Methods of Electrical Measurement	4
43.352	Medical Instrumentation	3
78.103	Biomedical Electronics	6
78.104	Electronics Principles and Practice	7
	Library and Research	5
		35
	Term 4A	
41.691	Laboratory Workshop	4
43.451	Electronics Principles and Practice	4
43.452	Medical Instrumentation	3
78.105	Biomedical Electronics	9
78.106	Digital Principles and Techniques I	7
98.402	Physiology	3
	Library and Research	5
		35

	Term 4B	
43.452	Medical Instrumentation	4
43.454	Digital Principles and Techniques II	8
78.107	Biomedical Electronics	14
78.108	Practical Experience in Biomedical Electronics	(4 wks)
78.109	Microprocessor Systems and Programming	4
	Library and Research	5
		35

Subject Outlines

30.107, 30.207, 30.307 General Chemistry — This course covers basic general chemistry, electrochemistry and an introduction to organic chemistry, including the naming, properties and reactions of the major classes of organic compounds, as well as an introduction to biochemistry, including the nature and metabolism of carbohydrates, fats and proteins. Lab work consists of quantitative analysis, both gravimetric and volumetric, techniques and syntheses in organic chemistry and some biochemical techniques frequently encountered in the clinical lab.

30.207 See 30.107

30.307 See 30.107

31.178, 31.278 Technical Writing — The basics of English are briefly reviewed and tested in a series of directed self-study lessons. The theory and practice of effective letter writing are thoroughly covered, culminating in an intensive examination of the principles. Students will practice preparing all the documents needed in the job search; formal and informal reports, with emphasis on the most used forms of technical writing and graphics; and oral reporting, with some emphasis on the use of audio-visual devices.

31.278 See 31.178

32.178 Basic Mathematics — Linear equations, matrices and determinants with application to mesh circuit analysis. Logarithmic and exponential functions with applications to transient and power problems. Trigonometry with emphasis on wave-forms, vectors and use of identities. Complex numbers and their use in a.c. circuit analysis.

32.278 Calculus — A course in calculus dealing with the following topics with applications throughout in the electrical and electronics fields: the differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions; techniques of integration, partial differentiation, first and second order differential equations.

32.279 Numerical Methods and Boolean Algebra — Numerical methods: an introduction to numerical methods using the computer to solve problems. Boolean algebra: an introduction to Boolean algebra concepts which can be applied to electric circuit simplification.

32.378 Transform Calculus — Laplace transforms; transform pairs of functions and operations, inverse transforms, applications to circuits involving integro-differential equations, the transfer function, pole-zero configurations. Analysis in the s-domain.

33.330 Biophysics — A study of biophysics, which covers mechanics, fluids, waves and heat. The emphasis in lectures, seminars and projects is on the application of physics to biological systems.

41.591 Materials — Comparative properties of all classes of engineering materials with emphasis on biomedical applications, including metals, plastic materials, adhesives and composite materials; bonding forces in solids, microstructures, plastic deformation and annealing, alloying, heat treatment of steels and nonferrous metals; polymers, elastomers and organic adhesives; corrosion and aging of materials; interaction of materials with biological tissues, toxicity; reference sources and materials selection.

41.691 Laboratory Workshop — Use of hand and bench tools; soldering, brazing, welding, adhesive bonding; basic glassworking; sheet-metal working; compression fittings.

43.351 Methods of Electrical Measurement — The student learns and must demonstrate the safe use of correct techniques and proper choice of equipment for the measurement of voltage, current, power, resistance, capacitance, inductance, time, frequency, period and phase. He or she is also introduced to methods of testing basic electrical components and devices for continuity, leakage and failure; methods of reducing electrical noise; and use of differential measurements. Safety of personnel and equipments is stressed throughout the course.

43.352, 43.452 Medical Instrumentation — 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 infra-red spectroscopy; flame photometry; paper and column chromatrography; electrophoresis and refractometric methods. Concept of regulation and feedback control.

43.451 Electronics Principles and Practice — The course covers the use of the transistor as a switch, various multivibrator designs, Schmitt trigger, blocking oscillators and others. Lab exercises will be coordinated with course content.

43.452 See 43.352

43.454 Digital Principles and Techniques II — Teaches the fundamental principles of digital techniques to the subsystems of control, instrumentation and medical systems.

78.100 Electronics Principles and Practice — This course provides the students with basic knowledge of electrical quantities, their units and the relationship between them. It will cover d.c. circuit analysis techniques for resistive, resistive-capacitive, resistive-inductive and magnetic circuits. Examples of applications will be included. Lab exercises will be coordinated with course content.

78.101 Electronics Principles and Practice — The course analyses the properties of RLC circuits when driven by a.c. energy sources. Equivalent circuit analysis techniques similar to those in 78.100 will be developed for the a.c. circuits. Lab exercises will be coordinated with course content.

78.102 Electronics Principles and Practice — This course includes the following topics: basic semi-conductor principles, transistor biasing and stability, transistor amplifier designs, impedance transformation, power amplifiers, power supplies and oscillators. Lab exercises will be coordinated with course content.

78.103 Biomedical Electronics — This course introduces the students to some basic properties of biomedical signals, various types of transducers used in the biomedical environment and requirements and problems encountered in the processing and display of biomedical signals. Lab exercises will be coordinated with course content.

78.104 Electronics Principles and Practice — The course covers advanced topics such as tuned amplifiers, integrated circuit components and the use of various other semi-conductor components; e.g., FET, SCR and so on. Lab exercises will be coordinated with course content.

78.105 Biomedical Electronics — The course introduces the student to various types of electronic equipment used in the biomedical environment. Selected equipment types will be covered in detail: patient monitoring, cardiac resuscitation, E.E.G., electrosurgical, x-ray and telemetry. General and specific electrical safety considerations will also be included. Lab exercises will be coordinated with course content.

78.106 Digital Principles and Techniques I — Teaches the techniques basic to digital equipment and their application in communications, instrumentation and industrial control systems. Topics include switch and relay control; number systems; Boolean algebra; codes and coding; solid state logic (TTL, CMOS, HTL); noise and loading; encoders, decoders, display generators, relay drivers and delay devices; counters, shift registers and arithmetic systems; digital to analog and analog to digital converters.

78.107 Biomedical Electronics — This course is divided into two parts. The first part is a continuation of 78.105, covering more equipment areas. The second part requires the student to construct a simple piece of biomedical equipment from a pre-determined schematic diagram. Lab exercises will be coordinated with course content.

78.108 Practical Experience in Biomedical Electronics — During this term, students gain practical experience in biomedical electronics and related fields while working under supervision at a number of local hospitals, research agencies and private companies.

78.109 Microprocessor Systems and Programming — A lecture/lab course that introduces the student to the concepts of the stored-program digital computer

using the micro-processor/microcomputer as an example. Topics to be discussed include microprocessor fundamentals; micro-computer system organization; microprocessor instruction set; assembler level programming; I/O; subroutines; interrupt processing and real-time concepts.

98.102, 98.202 Human Anatomy and Physiology — A study of human anatomy and physiology carried out by a consideration of the body systems. During the first term attention is given to the structure and function of cells, tissues, and the skeletal, muscular and nervous systems. The remaining body systems are considered during the following term.

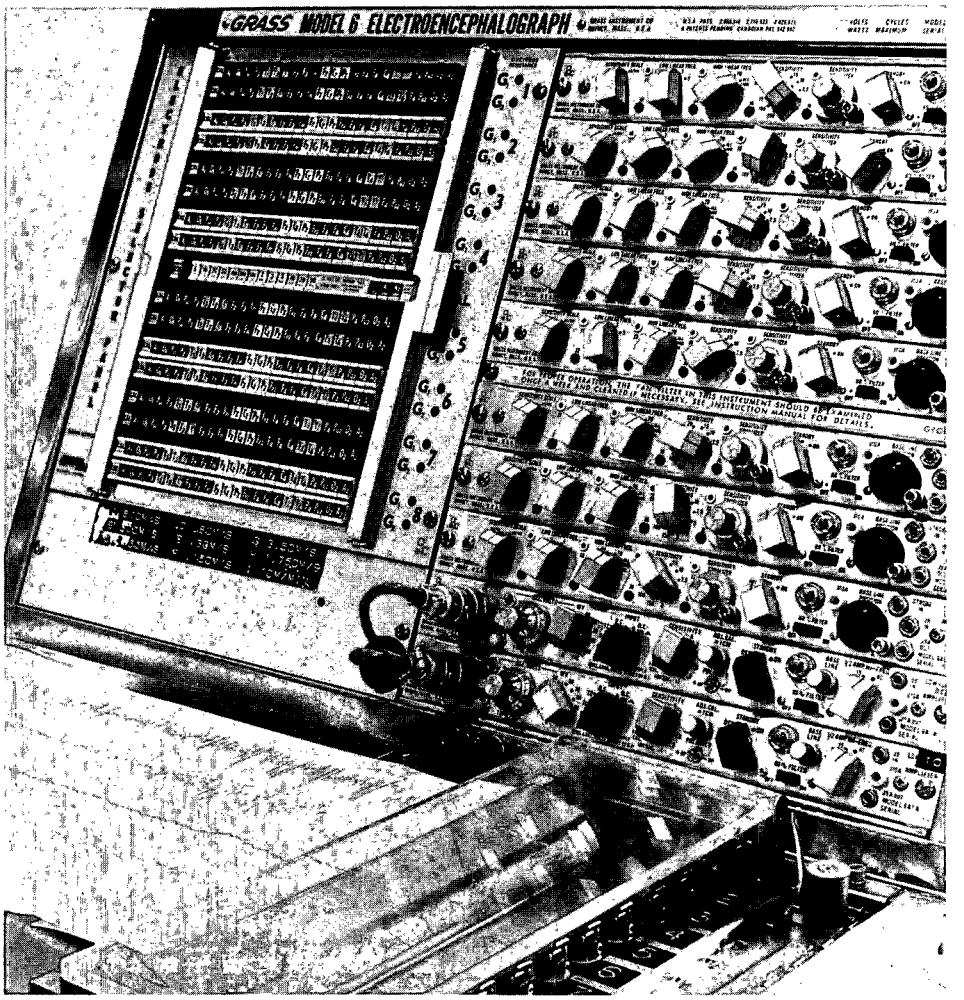
98.202 See 98.102

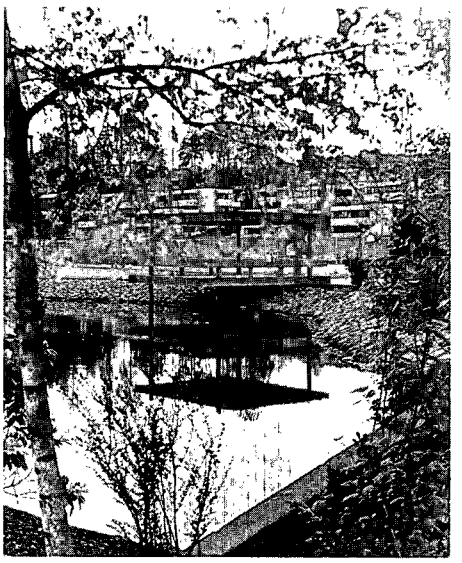
98.221 Introductory Microbiology — An introduction to the basic characteristics of bacteria, rickettsia, viruses and pathogenic fungi. The concepts of infection, host resistance, disinfection, sterility and aseptic technique are included.

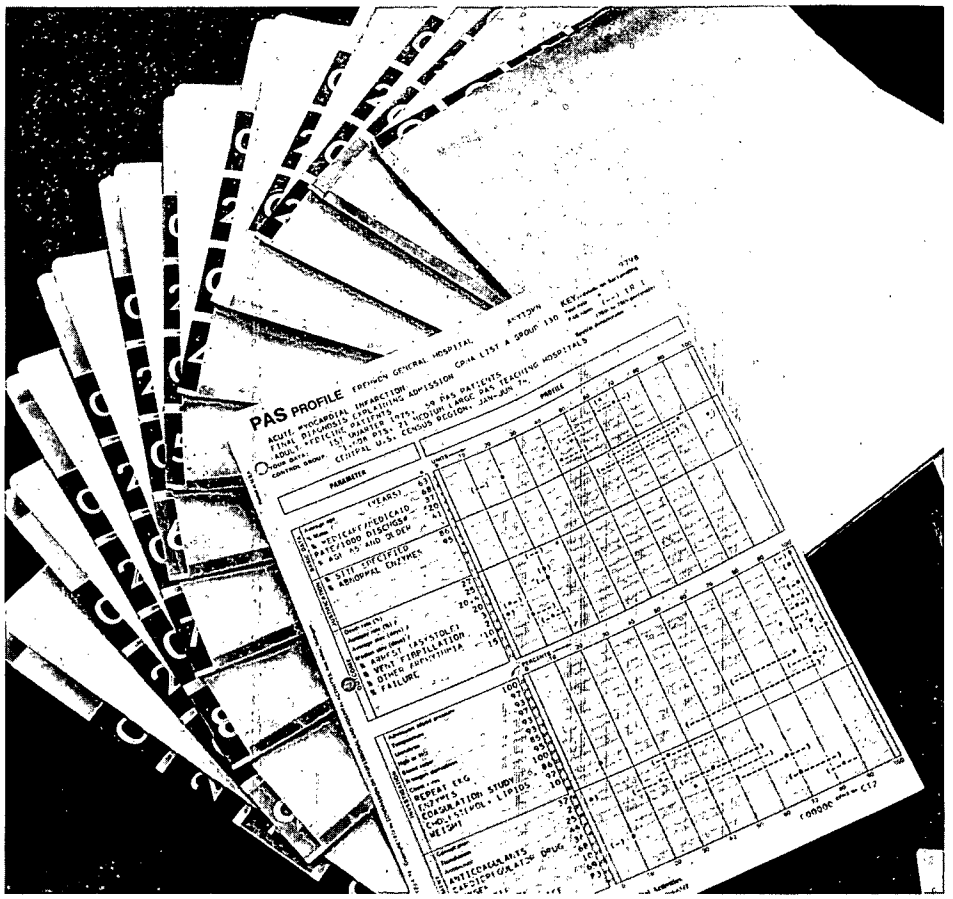
98.402 Physiology — A review of human physiology for Biomedical Electronics students with emphasis on the cardiovascular, nervous, respiratory, muscular and urinary systems.

Faculty and Staff

A. Ridgway, R.T., F.S.R., *Department Head*
M.J. Barrett, Dipl.T., C.E.T.
P.K. Chiu, B.Eng., M.Sc., Ph.D., Senior Instructor
A.D. Nichols, B.A.Sc., P.Eng.







Health Data

Department of Health Engineering Services
(Medical Records)

A health record is a confidential document of a person's medical care. It may contain reports such as doctors' histories and physical examinations, progress notes, x-ray and lab reports, electrocardiogram tracings, dietary notes and nurses notes. Health data technologists work in the medical records department of a hospital, clinic or other health agency. They are responsible for encouraging the use of records and preparing, analysing and preserving the health information required by the hospital or agency, the medical staff, the patient and the public. In addition, they may be expected to perform medical transcription.

The importance of documentation in health care is increasing rapidly. Health records are an important tool in providing high quality patient care and in evaluating the standards of care given on a current and retrospective basis. In addition to the traditional use by hospitals, other health facilities such as community health centres and physicians' offices are using health records personnel to develop their recordkeeping systems. Computerization is becoming an important consideration both as a means of recording data and of linking records. The increasing amount of health information and its use as a means of analysis and a source of valuable statistics have produced a demand for a specialist in health records—the health data technologist.

Job Opportunities

In large hospitals, technologists work under the direction of the Director of Medical Records. However, in small hospitals, they may be called upon to perform all the functions of the department. Other employment possibilities include clinics and health agencies. Health record management is an expanding field. With initiative, the health data technologist today could enter any area in which knowledge of medical data is necessary. The use of computers is growing in hospital information systems and the health data technologist of tomorrow may expect to use computers for record linkage within a total community care program.

The Program

BCIT, in collaboration with the Health Record Association of British Columbia and several affiliated hospitals, has designed the Health Data Technology program which provides two years of instruction in the form of lectures, lab exercises and practical experience. In the first year, the student concentrates on the basic health sciences and will acquire a fundamental knowledge of health record science. In the second year, the classroom and lab instruction at the Institute will be supplemented by experience in the medical record departments of local hospitals and community health agencies. Students may incur costs of travel and living expenses for practicum sessions.

Students are expected to become members of the Health Record Association of British Columbia (HRABC) while attending first and second years. During the second year, students are given free membership in the Canadian Health Record Association (CHRA). Graduates are expected to become members of the Canadian College of Health Record Administrators (CCHRA), as well as continue their memberships in the HRABC and the CHRA.

Graduates of this program will be granted a Diploma of Technology and will possess the skills required to meet today's demand for a technologist trained in health record procedures while introducing him or her to the needs of the future. Upon graduation, students will write the national Associate level examination of the CCHRA.

Prerequisites

Graduation from the Selected or Combined Studies Program plus Algebra 12 or Math 12 and Typing 11.

Maturity, responsibility and an interest in health care and information handling are essential for a successful career in the health data field. The work involved demands attention to detail, accuracy and initiative.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
31.180	Communication for Health Technologists	5
32.180	Basic Mathematics	5
80.100	Health Record Science*	7
80.101	Concepts of Disease Processes	5
98.103	Human Anatomy and Physiology	4
98.122	Microbiology and Epidemiology	4
	Library and Research	5
		35
	Term 2A	
31.280	Communication for Health Technologists	4
32.280	Statistics	5
76.190	Introduction to Pharmacology	2
80.102	Health Record Science	9
80.103	Concepts of Disease Processes	7
98.203	Human Anatomy and Physiology	4
	Library and Research	5
		36
	Term 2B	
14.210	Introduction to Data Processing	5
32.280	Statistics	5
80.104	Health Record Science	11
80.105	Medical and Surgical Transcription	4
98.203	Human Anatomy and Physiology	4
	Library and Research	5
		34

Year 2	Term 3	Clrm hrs/wk
14.310	Computer Applications I	3
22.380	Management Engineering I	4
70.307	Introduction to Clinical Laboratory Procedures	2
80.106	Health Record Science	4
80.107	Health Information Processing	9
80.108	Medical and Surgical Transcription	4
98.337	Organizational Psychology	3
	Library and Research	5
		34

	Term 4A	
14.410	Computer Applications II	4
22.480	Management Engineering II	4
40.309	Building Renovation and Planning Procedures	4
80.109	Health Record Science	3
80.110	Health Information Processing	6
80.111	Medical and Surgical Transcription	4
98.415	Genetics	3
98.437	Organizational Psychology	3
	Library and Research	5
		36

	Term 4B	
80.112	Health Data Practicum*	35

**includes a one-week practicum in the last week of term*

Subject Outlines

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

14.310 Computer Applications I — Introduction to computer concepts, input and output devices. File design consideration and proper choice of file storage medium for proper information retrieval as applied in the Health Data Technology. Record design and form design are also stressed.

14.410 Computer Applications II — Introduction to coding structures as applied in health data. Real time systems vs. batched systems. Case studies of converting manual systems to computer systems in medical recordkeeping. An overview of the problem-oriented medical record in a computerized system.

22.380 Management Engineering I — The development of the scientific principles of problem-solving covering the selection, recording and examination of data leading to improved systems of management combined with the basic principles of office layout.

22.480 Management Engineering II — A continuation of the scientific principles into analysis of paper flow, forms design and application of self-recording methods of work measurement, as well as work-sampling techniques. The study of an actual department with the presentation of a formal report in respect to the field project.

31.180, 31.280 Communication for Health Technologists — This course introduces the student to the general principles of effective written and oral communications. Students will also be exposed to some Canadian literature.

31.280 See 31.180

32.180 Basic Mathematics — Algebra review, functions, graphs, exponents and logarithms, exponential growth, demography and vital statistics.

32.280 Statistics — Frequency distributions, measures of central tendency and dispersion, converted scores, probability, normal and binomial distributions, sampling theory, confidence limits, hypothesis testing, correlation and regression and chi-square test.

40.309 Building Renovation and Planning Procedures — An introduction to design and construction with specific reference to medical record departments. Principles of functional programming and facilities evaluation, planning, documentation, construction systems and basics of interior design, including lighting, acoustics and equipment.

70.307 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 conducting a medical audit.

76.190 Introduction to Pharmacology — This course is designed to familiarize the student with common drugs and acceptable abbreviations used in the health field. The legal implications of drug usage are also discussed.

80.100, 80.102, 80.104 Health Record Science — The first-year health record science course provides the student with a knowledge of the fundamental principles and practices of health record science. After a brief orientation to the Health Data Technology and to the hospital scene, the areas studied in the fall term will include a detailed examination of all aspects of the health record from formation to completion, the patients' index, numbering and filing systems, B.C. Hospital Programs and confidentiality and release of medical information. The first term will include a one week practicum in a local acute care general hospital. In the winter term, studies include an analysis of the health record practitioner's professional responsibilities, introduction to the problem-oriented record, primary care records, micro- filming and record retention, and in-depth review of the Canadian Council on Hospital Accreditation and its effect on the medical record department. Coding records according to ICD-9-CM will be initiated. In the spring term, other coding systems will be examined and the students will be given the opportunity to become proficient in a variety of systems. Instructions and practice in PAS abstracting will accompany the coding sessions.

80.101, 80.103 Concepts of Disease Processes — An introduction to the concepts of pathophysiology, including a detailed study of medical terminology. Basic rules of medical terminology, medical abbreviations, medical specialties, medical prefixes, stems and suffixes are studied. Diseases, including medical and surgical treatments, are studied according to body systems.

80.102 See 80.100

80.103 See 80.101

80.104 See 80.100

80.105, 80.108, 80.111 Medical and Surgical Transcription — Transcription practice with medical, pathological and surgical report dictation taken from actual health records. Introductory and advanced-level dictation is transcribed. Considerable increase in production standards is expected.

80.106, 80.109 Health Record Science — A problem-solving approach to certain aspects of health record science is studied, focusing on such areas as interdisciplinary relationships; specialized hospitals and their records (psychiatric, rehabilitative, extended-care); current trends in health care (community health centres, the changing role of emergency departments); medical record linkage and the medicolegal aspects of health records.

80.109 See 80.106

80.107, 80.110 Health Information Processing — This course emphasizes the processing and use of health information from an analytical and statistical point of view. Included in the fall term are an analysis and definition of various hospital terms, services and formulae for compilation of certain basic statistical data in a hospital or other health facility. The student learns how to manually tabulate data and how to prepare and present a proper statistical report using appropriate techniques. Federal and provincial vital statistics are studied, particularly as they relate to the health data technologist. Statistics for specialized records are investigated and examined from the viewpoint of what is required and how the data can be collected. Studies also include a detailed examination of medical staff committee structure and functions and their relationship with the health data technologist. Emphasis is placed on the role of the health data technologist in the quality assurance process with physicians, nurses and other health professions. In the winter term, the Commission on Professional and Hospital Activities and its various programs are studied in depth, with emphasis on data retrieval. Other automated health information systems,

such as the Hospital Medical Records Institute, are examined. Both terms include weekly lab exercises in PAS coding and abstracting.

80.110 See 80.107

80.112 Health Data Practicum — Practical experience in the medical records departments of general and specialized hospitals and other health facilities, under the supervision of the Director of Medical Record Services and a faculty member. The student spends two intramural sessions in various hospitals and other health care facilities for a total of 10 weeks' practicum. The final week is spent at BCIT in comparative analysis and discussion of the health record procedures as performed at the practicum sites. In addition, a general health record science review is conducted. A preliminary practicum will be held for one week at the end of the first term of the first year. See 80.100 Health Record Science.

98.103, 98.203 Human Anatomy and Physiology — The course provides a basic knowledge of anatomy and physiology. It relates this knowledge to medical terminology used by health data technologists and to other aspects of their work; e.g., pathology, operative procedures and coding.

98.122 Microbiology and Epidemiology — This course deals with the basic characteristics of the various types of micro-organisms that cause disease in man. The concepts of communicability and host resistance are included. The epidemiology of specific infectious diseases is also considered.

98.203 See 98.103

98.337, 98.437 Organizational Psychology — A study of organizational psychology as it pertains to health care organizations. Emphasis is placed on acquiring knowledge and skills to enable the health data technologist to communicate, supervise and evaluate in the medical records work situation.

98.415 Genetics — An introduction to the basics of medical genetics. The course relates the knowledge of the basic principles of hereditary transmission to the medical terminology used by medical and paramedical personnel.

98.437 See 98.337

Faculty and Staff

A. Ridgway, R.T., F.S.R., *Department Head*
Ms. E.L. Gibson, C.C.H.R.A. (C)
Mrs. B.J. Nelson, C.C.H.R.A. (C)), Senior Instructor

Medical Laboratory

Department of Medical Laboratory Services

The medical laboratory technologist, as a member of the health team, performs the many and varied laboratory procedures which are used by physicians as important aids to the diagnosis and treatment of the patient. Lab screening programs are being developed to alert the physician to disease processes which, though not yet clinically evident, are nevertheless present in the patient. Automation, instead of decreasing the need for the medical laboratory technologist, has created a demand for more highly trained technologists. The increasing use of sophisticated lab procedures and the rising demand generally for health services assure a wide range of opportunities for employment.

Job Opportunities

Medical laboratory technology offers a variety of scientific pursuits within the modern hospital, the private clinical lab and the research lab. These fields include histotechnology, clinical chemistry, hematology, microbiology and immunohematology. The trained technologist may pursue any one or a combination of these fields after completion of training.

The Program

An academic, science-oriented first year is followed by a didactic second year, during which the five disciplines within medical technology are studied in depth. Students spend these two years at the Institute, and a third and final year of training in a medical laboratory approved by the Canadian Medical Association and the Canadian Society of Laboratory Technologists. At the end of this year, the student is eligible to sit the Canadian Society of Laboratory Technologists examination which leads to the Registered Technologist, the recognized qualification for working as a technologist in a medical laboratory.

Prerequisites

Graduation from the Selected or Combined Studies program with Algebra 12 or Math 12, Chemistry 11 and 12, plus one other science 11 or 12. Preference will be given to those students who have their second science at the grade 12 level or to those who have two other sciences at the grade 11 level. Applicants should have a strong interest in science and be meticulous in their work habits. Color blindness precludes admission.

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
30.103	General Chemistry for Medical Laboratory Technologists	6
31.170	Communication	4
32.170	Mathematics for Medical Laboratory Technologists	5
33.110	Physics for Medical Laboratory Technologists	5
70.101	Medical Laboratory Orientation	4
98.101	Human Anatomy and Physiology	4
98.136	Behavioral Sciences	3
	Library and Research	4
		35
	Term 2	
14.211	Data Processing	3
30.203	General Chemistry for Medical Laboratory Technologists	6
32.270	Mathematics for Medical Laboratory Technologists	5
33.210	Physics for Medical Laboratory Technologists	5
70.201	Medical Laboratory Orientation	4
98.201	Human Anatomy and Physiology	4
98.230	Immunology	3
	Library and Research	5
		35
Year 2	**Term 3**	
70.302	Clinical Chemistry	9
70.303	Hematology	4
70.304	Histotechnology	9
70.305	Microbiology	9
	Library and Research	4
		35
	Term 4	
70.402	Clinical Chemistry	10
70.403	Hematology	5
70.406	Immunohematology	8
70.405	Microbiology	9
	Library and Research	3
		35

Subject Outlines

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

30.103, 30.203 General Chemistry for Medical Laboratory Technologists — This course includes basic inorganic and physical chemical principles, an introduction to organic chemistry and the properties and reactions of the major classes of organic compounds, as well as a selection of biochemical materials such as carbohydrate and fat metabolism, amino acid metabolism, properties of proteins and their synthesis, enzyme action, hormones, pesticides and herbicides. Lab work consists of quantitative analysis, with emphasis on gravimetric and volumetric techniques, organic techniques and synthesis, properties of biological materials, enzyme reactions and physical methods of analysis.

30.203 See 30.103

31.170 Communication — An introduction to the oral and written communications applicable to the health field. Students will be taught the basic skills of effective writing to prepare reports, letters, job applications and resumés and memoranda. Students will also be instructed in the techniques and skills necessary to effectively present an oral report and to function effectively in meetings.

32.170 Mathematics for the Medical Laboratory Technologists — Review of basic algebra with applications. Functions and graphs. Logarithms, general base and natural logarithms. Logarithmic response. Logarithmic and exponential functions with applications. Use of logarithmic graph-paper. Introduction to calculus. Limits and slopes. The derivative. Differentiation of algebraic functions.

32.270 Mathematics for the Medical Laboratory Technologist — Further differentiation. Applications of the derivative. Max-min problems, rate of change, error computations. Integration. Area and volume by integration. Simple differential equations with application to the medical laboratory reaction kinetics. Mechanical methods of integration. Introduction to statistical problems in the lab. Descriptive statistics. Measures of central tendency and spread. Probability. Poisson, binomial and normal distributions. Sampling and estimating. The t-distribution. Hypothesis testing. Comparison of means. Linear regression.

33.110, 33.210 Physics for Medical Laboratory Technologists — An introductory level course (no previous physics required) for the Medical Laboratory Technology with emphasis on the applications of physics within the health fields. Topics covered include kinematics, dynamics, friction, statics, angular motion, energy, momentum, simple machines, properties of matter, fluid mechanics, temperature and heat, basic electricity and magnetism, wave motion and sound, optics and atomic and nuclear phenomena. The lab program stresses the subjects of measurements, data analysis, experimental technique and report writing. Mathematical treatment requires algebra and trigonometry.

33.210 See 33.110

70.101, 70.201 Medical Laboratory Orientation — A critical review of the basic theory and use of various types of microscopes. An introduction to principles and use of precision instruments and equipment pertaining to the clinical lab. The principles and procedures of volumetric analysis and of the preparation and use of buffers. An introduction to the clinical lab as a potentially hazardous environment, with precautions necessary to make it a safe environment.

70.201 See 70.101

70.302, 70.402 Clinical Chemistry — An introduction to the varied medical laboratory instruments used in the chemical analysis of biological specimens with emphasis on the principles, components, operation and care of these instruments. The study of protein and related nitrogenous substances—metabolism, function, measurement and relationship to disease states. The physiology of liver, kidney, brain and gastrointestinal tract. The study of electrolytes, acid-base balance, enzymes, carbohydrates, lipids, urine, gastric juice and cerebrospinal fluid. The measurement of various consituents of body fluids and the association of their levels with pathological conditions. The methods and importance of quality control as applied to clinical chemistry.

70.303, 70.403 Hematology — Consists of a study of the cellular composition of the blood and of the blood-forming tissues with emphasis placed on normal levels and functions. An introduction to abnormal functions and test results is also included. Detailed studies of cell series, both normal and abnormal, in blood and in bone marrow are stressed. The anemias, abnormal hemoglobins, leukemias, certain infectious disorders, coagulation and performance of special test procedures conclude the course.

70.304 Histotechnology — The course is designed to acquaint and familiarize the student with current techniques used in medical lab and to prepare tissue for pathological diagnosis and morphological study. The course deals with concepts and factors affecting tissues from specimen reception to final diagnosis both histologically and histochemically.

70.305, 70.405 Microbiology — An introduction to the principles and procedures of microbiology including the detailed study of methodology and lab techniques utilized in clinical microbiology and in parasitology.

70.402 See 70.302

70.403 See 70.303

70.405 See 70.305

70.406 Immunohematology — An introduction to the general principles of blood grouping, inheritance of blood groups, immunology, equipment and reagents required. Methodologies with their advantages and limitations, donations and their utilization and blood group systems.

98.101, 98.201 Human Anatomy and Physiology — The course involves a systematic approach to the study of human anatomy and physiology for Medical Laboratory Technology students. This course includes basic cytology, and introduction to histology and the skeletal, muscular, nervous, circulatory, respiratory, digestive, urinary and reproductive systems. The primary emphasis is on the physiology of these systems. Basic biochemistry related to each system is also included.

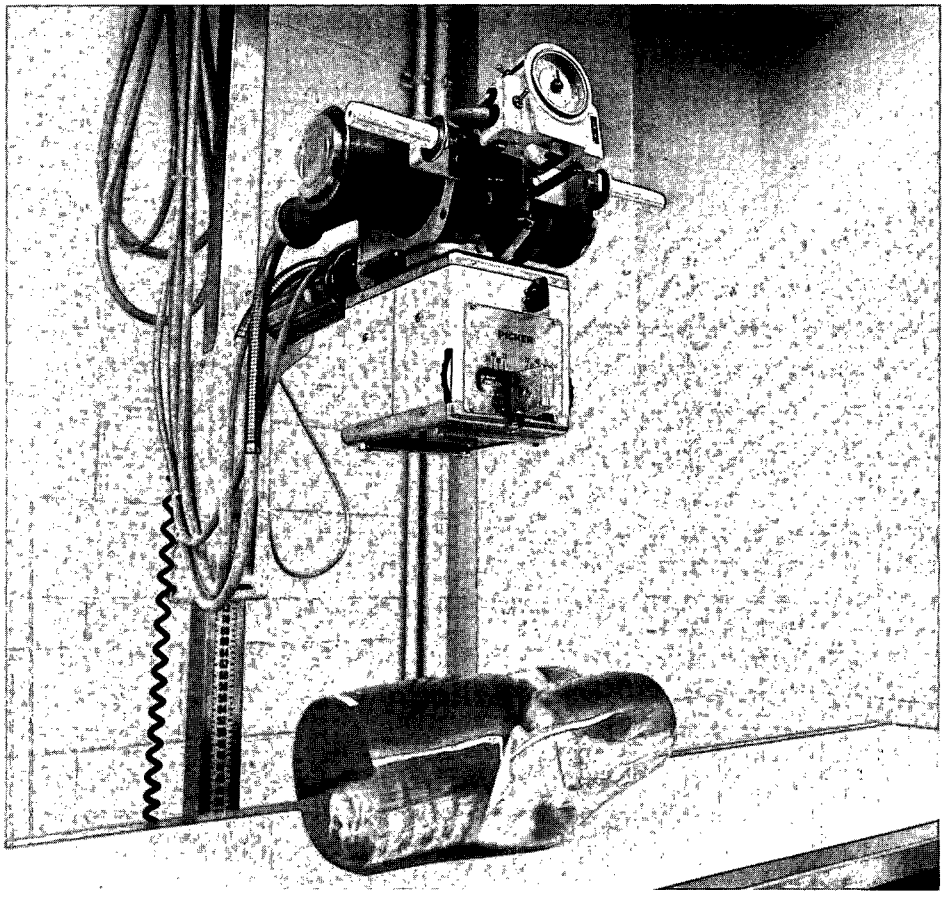
98.136 Behavioral Sciences — This course presents basic psychological and sociological concepts of health and illness behavior. Emphasis is placed on analytical examination of these concepts.

98.201 See 98.101

98.230 Introductory Principles of Immunology — A basic course designed to give the medical laboratory 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.

Faculty and Staff

Mrs. M.J. Blair, B.A., A.R.T., *Department Head*
J. Bradley, F.I.M.L.T., A.R.T.
Miss N.E. Bruce, L.C.S.L.T.
Mrs. G.M. Camden, B.A., A.R.T., Chief Instructor
Miss C. McAloney, R.T.
Miss L.J. Marshall, A.R.T.
Miss G.S. Matheson, R.T.
Mrs. K.E. Nicholson, B.Sc., R.T.
Mrs. J.M. Scriabin, B.Sc. (Hons.), A.R.T., Senior Instructor
Mrs. W. Southwick, R.T.
Mrs. A.J. Striha, A.R.T.
Miss E.A. Whiteside, B.A., R.T., Senior Instructor
Miss D. Yarema, B.Sc., R.T.



Medical Radiography

Department of Radiological Technical Services

The medical radiographer is an x-ray technician who works as part of a health team composed of radiologists, internists, surgeons, nurses, lab technicians, biomedical technicians and other specialists. X-rays are widely used as an aid in making medical diagnoses. A radiograph (x-ray picture) may be a routine film of the chest or a broken finger, or it may form part of the sophisticated examinations used in the detection of heart or brain abnormalities. X-ray technicians work under the direction of a medical specialist (a radiologist), and may work in the hospital x-ray department, at the patient's bedside or in the operating room. Radiographers are also employed in private x-ray clinics. Medical radiography is not a hazardous occupation. The dangers of radiation are well-recognized and rigidly controlled. The conscientious radiographer can derive much personal satisfaction as a contributor to the success of the health team.

Job Opportunities

BCIT graduates in medical radiography find employment in hospitals and private laboratories. These vary in size employing from one to thirty-five technicians. Most x-ray technicians work a thirty-five hour week with the usual statutory holidays. Night work and on-call duty may be necessary, depending on the requirements of the department. It is also possible to work outside Canada since certification by the Canadian Society of Radiological Technicians is recognized in the U.K., the U.S. and several other countries.

Prerequisites

Graduation from the Selected or Combined Studies Program with Algebra 12 or Math 12, two science 11s and a science 12. Applicants must have a strong sense of responsibility, an interest in the welfare of others, particularly the sick and injured, and meticulous work habits.

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
31.172	Communication for Health Technologists	3
32.172	Basic Mathematics of Radiography	4
33.109	Physics of Medical Radiography	5
72.101	Introduction to Medical Radiography	4½
72.102	Apparatus and Image Recording	3½
98.107	Basic Anatomy and Physiology	6
		26
	Term 2A	
31.272	Communication	4
33.209	Physics of Medical Radiography	5
72.201	Basic Medical Radiography	7
72.203	Radiographic Anatomy and Physiology	6
72.204	First Aid	1
76.106	Patient Care	1
		24
	Term 2B	
33.209	Physics of Medical Radiography	5
72.201	Basic Medical Radiography and Clinical Orientation	10
72.202	Apparatus and Image Recording	5
72.203	Radiographic Anatomy and Physiology	6
98.240	Behavioral Sciences	4
		30
Year 2	**Term 1**	
72.301	Radiographic Technique	8
72.302	Imaging Equipment	6
72.307	Pathology	4
72.305	Radiobiology and Protection	4
76.306	Patient Care	6
		28
72.306	Clinical Experience in Radiography (Hospital)	35*
	Term 2A	
72.401	Radiographic Technique	8
72.402	Imaging Equipment	6
72.405	Radiobiology and Protection	4
72.407	Pathology	4
98.427	Microbiology and Epidemiology	3
		25
72.406	Clinical Experience in Radiography (Hospital)	35*
	Term 2B	
72.401	Radiographic Technique	14
72.408	Film Critique	2
98.441	Microbiology and Epidemiology	4
		20
72.406	Clinical Experience in Radiography (Hospital)	35*

**alternate weeks*

Subject Outlines

31.172, 31.272 Communication for Health Technologists — An introduction to the oral and written communications applicable to the health field. Students will be taught the basic skills of effective writing to prepare reports, letters, job applications, resumés and memoranda. Students will also be instructed in the techniques and skills necessary to effectively present an oral report and to function effectively in meetings.

31.272 See 31.172

32.172 Basic Mathematics — Plane geometry. Functions and graphs. Exponents, common and natural logarithms, exponential growth and decay, log-log and semi-log graphs. Trigonometry and sinu-

soidal functions. Applications of the above topics to radiography and to relevant physics.

33.109, 33.209 Physics of Medical Radiography — An introductory level 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, ultrasound, thermodynamics, optics, quantum concepts, production of x-rays, interaction of x-rays with matter, radioactivity, x-ray tubes, photomultipliers and other detectors of radiation.

33.209 See 33.109

72.101 Introduction to Medical Radiography — This course will acquaint the student with the activities of the x-ray department and the role of a radiographer. A study is made of the application of basic factors in producing a radiograph.

72.102 Apparatus and Image Recording — This course introduces the student 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. Lab work related to all these is included.

72.201 Basic Medical Radiography — The student becomes familiar with the fundamentals involved in setting up a technique chart and the evaluation of the patient with regard to body habitus. Basic radiographic positioning in the examination of the upper and lower extremities, the vertebral column and thoracic cage is studied. An introductory study is made of radiography of the digestive, urinary and biliary systems. During the second half of this term the students spend time in the x-ray department of one of the affiliated hospitals as an orientation to the clinical aspects of the course.

72.202 Apparatus and Image Recording — Rectification, control circuits and x-ray tubes comprise the apparatus studied in this course. The image-recording portion covers sensitometry and all aspects of radiographic processing. This includes developers, replenishers, fixers, ancillary chemicals, deep-tank and various automatic processing systems.

72.203 Radiographic Anatomy and Physiology — The human skeleton is studied in detail as well as the various organs, vessels and other non-bony parts of the head, neck, chest, abdomen and limbs. Emphasis is placed upon the structure and function relevant to radiographic procedures, the location and related surface anatomy and the radiographic appearance of each part.

72.204 First Aid

72.301 Radiographic Technique — This course presents a continuation of the study of the urinary, digestive and biliary systems which was introduced in 72.201. Special techniques related to the skeletal system are studied. Instruction is given in the use of contrast media. This course runs concurrently with 72.306.

72.302 Imaging Equipment — The apparatus studied in this course comprises nonstandard equipment such as tomographic, fluoroscopic, photofluorographic, rapid-serial exposure, dental radiographic and mobile units. The radiograpic image is studied in detail. Included are storage and retrieval, illuminators and photographic recording equipment, such as still, rapid and motion-picture cameras. Specialized image processing is also covered. This includes videotape and videodisc storage, photographic reproduction, subtraction and image enhancement methods.

72.305 Radiobiology and Protection — A study is made of ionizing radiation and its interaction with matter. The roentgen, rad and rem and their measurement are studied. Permissible exposures and their rationale are considered.

72.306 Clinical Experience in Medical Radiography (Hospital) — This course runs concurrently with 72.301. The student acquires a basic knowledge of medical radiographic techniques by applying classroom and laboratory training in actual clinical situations in the affiliated hospitals.

72.307 Pathology for Medical Radiographers — A study is made of the common pathological conditions which can be diagnosed radiologically.

72.401 Radiographic Technique — This course, given concurrently with 72.406, provides detailed instruction in radiographic examination of the skull. Included also are pediatric radiography and special radiographic procedures.

72.402 Imaging Equipment — This course includes the study of image amplifiers and closed-circuit television equipment. X-ray department planning and equipment faults are covered.

72.405 Radiobiology and Protection — The mechanism of radiation injury is studied. Somatic and hereditary injury are considered. The operating procedures and equipment which will reduce radiation exposure to both operator and patient are covered in detail.

72.406 Clinical Experience in Medical Radiography (Hospital) — This course runs concurrently with 72.401. The student applies the more advanced classroom and lab training in the clinical situation.

72.407 Pathology for Medical Radiographers — A study is made of the effect of pathology upon the technical factors used in radiography. During this term the student is taught to make a critical assessment of film quality as it is affected by pathology.

72.408 Film Critique — Instruction is offered in the methods of critically examining radiographs with regard to patient positioning, technique and film quality. The student is then given the opportunity to apply this knowledge in the assessment of actual patient radiographs.

76.106 Patient Care — This course introduces the student to the basic safety concepts of patient care. It includes observational and communication skills, body mechanics, fire safety and medical and surgical asepsis.

76.306 Patient Care — This course provides the student with advanced concepts and techniques necessary to meet the comfort and safety measures of patients undergoing x-ray. Emphasis is placed on patients who have complex problems such as altered consciousness, altered body sensation, various traction, drainage and suction devices and problems that require emergency action.

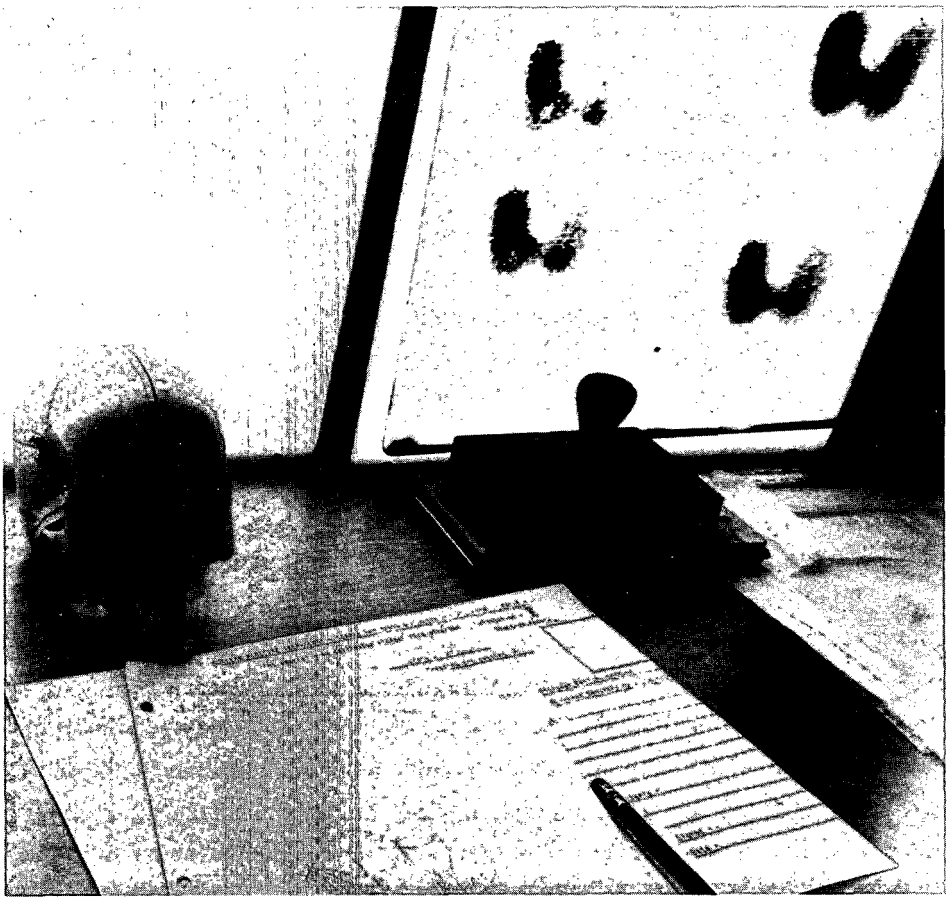
98.107 Basic Anatomy and Physiology — This course is a systemic study of the basics of human anatomy and physiology to prepare the student for the course 72.203. Included are basic physiological chemistry, cytology and histology.

98.240 Behavioral Sciences — A basic knowledge of human behavior as it pertains to health and illness behavior is presented. Emphasis is placed on the understanding and problem-solving of actual situations that are likely to be encountered in the working environment.

98.427 Microbiology and Epidemiology — An introductory course designed to present the student with a basic knowledge of medically important microorganisms; host-parasite relationships; communicability of infection; sources of infection, particularly as they exist in a hospital environment; methods of control, including asepsis and use of destructive agents.

Faculty and Staff

W.E. Noel, R.T.&N., *Department Head*
Miss P.E. Godley, R.T.
Miss A. McMillen, R.T.
Miss P.M. Rogers, R.T., Chief Instructor
E. Seeram, B.Sc., R.T.
Miss N.Smith, B.A., R.T.
R.J. Smith, M.S.R., R.T.
Mrs. O.H. Tomasky, R.T.&N.
Mrs. S.G. Williams, R.T.



Nuclear Medicine

Department of Radiological Technical Services

Nuclear medicine is the application of radioactive materials to the diagnosis and management of disease in humans. It is a relatively young diagnostic 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 concentration of certain substances in blood plasma and other body materials. Nuclear medicine is responsible for a host of revolutionary, safe, non-invasive diagnostic procedures that are now available to physicians in all branches of medicine.

Job Opportunities

A nuclear medicine technologist performs the diagnostic procedures of nuclear medicine. Certified graduates work primarily in the nuclear medicine departments of hospitals. In addition to performing a wide variety of tests on patients, the technologist may also perform lab tests on patients' samples; prepare radiopharmaceuticals for injection into patients; record test results; receive, handle, record, store and measure radioactive materials; and perform quality control procedures on a wide variety of instrumentation and imaging devices.

The Program

Designed to prepare graduates to function as technologists in nuclear medicine departments, the program is a combination of lecture and lab instruction at BCIT and clinical experience in the nuclear medicine departments of the seven hospitals presently affiliated with the program.

The student will spend terms 1 and 2 of first year at BCIT for lectures and labs in basic subjects applicable to nuclear medicine technology and patient care. The Institute is equipped with a lab containing facilities and equipment commonly used in nuclear medicine departments. The student spends the summer term of first year in the nuclear medicine department of a hospital.

In the second year at BCIT, the student spends alternate weeks at BCIT and the nuclear medicine department of one of the Lower Mainland hospitals. The summer term of second year is spent in a nuclear medicine department gaining further clinical experience.

On successful completion of the two-year (six term) program, the student receives the BCIT Diploma of Nuclear Medicine Technology and is eligible to write national certification examinations.

Post-graduation

Graduates of the BCIT program are eligible to sit the National Certification Examinations set by the Canadian Society of Radiological Technicians. The successful candidates may use the designation "R.T. (N.M.)" after their name and work as a registered nuclear medicine technologist anywhere in Canada or in many other parts of the world. An "Advanced Certification" is now available for those technologists wishing to advance in the field.

Prerequisites

Graduation on the Selected or Combined Studies Program with Algebra 12 or Math 12, two science 11s and Chemistry 12. Since the work is highly technical and exacting, the student must feel at home with complex instruments and possess meticulous work habits. Applicants must have a strong sense of responsibility and a desire to work with and for sick people of all ages. The Nuclear Medicine Technology is open to both men and women.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
30.106	General Chemistry for Nuclear Medicine Technology	6
32.174	Basic Technical Mathematics	4
33.105	Basic Physics for Nuclear Medicine	6
70.109	Clinical Laboratory Orientation	3
74.107	Radioassay Procedures	3
98.106	Basic Anatomy and Physiology	4
98.126	Basic Medical Microbiology and Immunology	2
		28
	Term 2	
30.206	General Chemistry for Nuclear Medicine Technology	6
32.274	Statistics and Calculus	4
33.205	Radioactivity and Instrumentation	7
74.204	Applied Physiology	2
74.205	Radiobiology and Protection	2
74.207	Radiopharmaceuticals	3
76.202	Fundamentals of Patient Care	2
98.206	Physiology and Pathophysiology	4
		30
	Summer Term	
74.209	Clinical Experience in Diagnostic Procedures	35

Year 2	Term 1	Clrm hrs/wk
33.305	Measurement of Radioactivity	6
74.304	Applied Physiology	14
74.308	Imaging	5
98.306	Physiology and Pathophysiology	4
		29*
74.305	Clinical Experience	35*
Year 2	**Term 2**	
31.474	Communication for Health Technology	3
98.439	Human Behavior	4
14.412	Computer Applications	4
74.404	Applied Physiology	17
		28*
74.405	Clinical Experience in Diagnostic Procedures	35*
	Summer Term	
74.409	Clinical Experience in Diagnostic Procedures	35

**Alternate weeks*

Subject Outlines

14.412 *Computer Applications* — Applications of the computer 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.

30.106, 30.206 General Chemistry for Nuclear Medicine Technology — This course covers basic general chemistry, including electrochemistry, an introduction to organic chemistry including the naming, properties and reactions of the major classes of organic compounds, and also an introduction to biochemistry, including the nature and metabolism of carbohydrates, fats and proteins. Lab work consists of quantitative analysis, both gravimetric and volumetric, techniques and syntheses in organic chemistry and some biochemical techniques frequently encountered in the clinical lab.

30.206 See 30.106

31.474 Communication for Health Technologists — An introduction to the oral and written communications applicable to the health field. Students will be taught the basic skills of effective writing to prepare reports, letters, job applications and resumés and memoranda. Students will also be instructed in the techniques and skills necessary to effectively present an oral report and to function effectively in meetings.

32.174 Basic Technical Mathematics — Topics in algebra, logarithms (common and natural), logarithmic and exponential equations, graphical analysis and statistics (organization and presentation of data, measures of central tendency and dispersion).

32.274 Statistics and Calculus — Frequency distributions; estimations; sampling; hypothesis testing; nuclear medicine counting statistics; linear and curvilinear regression. An introductory course in calculus with applications involving differentiation and integration of algebraic, logarithmic and exponential functions.

33.105 Basic Physics for Nuclear Medicine — A special introductory level course covering topics of forces and motion, energy, static electricity, d.c. electricity, magnetism, a.c. electricity, atomic structure, nuclear structure and forces and nuclides.

33.205 Radioactivity and Instrumentation — The theory portion of this course includes topics on nature and production of x-rays, measures of radioactive decay, modes of decay, interaction of radiation with matter and nuclear reactions. The measurement portion of the course concentrates on instrumentation. Topics include the following: scintillation detector systems, determinate errors in measurement, G.M. detectors, proportional counters, spark chambers, ionization chambers, gamma camera systems and liquid scintillation counting.

33.305 Measurement of Radioactivity — This course completes the instrumentation work begun in 33.205. Topics include sensitivity and resolution in scanning, collimators, semiconductor detectors, solid state dosimeters, tomography, position scanning and multicrystal cameras.

70.109 Clinical Laboratory Orientation — An introduction to the principles and use of precision instruments employed in the lab, along with an introduction to hematology pertinent to the nuclear medicine lab.

74.107 Radioassay Procedures — The student is introduced to basic safety procedures in the handling, storage and disposal of radioactive materials. The course covers the principles, essential components and the performance of radioassays. Venipuncture technique is covered in theory and in practice.

74.205 Radiobiology and Protection — A detailed study is made of ionizing radiation and its interaction with matter. The roentgen, the rad and the rem are studied. Primary and secondary guide levels and their rationale are considered in detail, as well as the estimation of safe working procedures in special situations.

74.206, 74.306, 74.406 Applied Physiology — In this course the student is instructed in all aspects of current applied physiology, including criteria, methodology, instrumentation, patient problems and approach, data collection and manipulation.

74.306 See 74.206

74.406 See 74.206

74.207 Radiopharmaceuticals — A study is made of the production and quality control of radiopharmaceuticals currently in use. Emphasis is placed on the radionuclide generator. The calculation and preparation of injection doses is covered along with the methods of record keeping.

74.209, 74.305, 74.405, 74.409 Clinical Experience in Diagnostic Procedures — These courses consist of full-time attendance in the nuclear medicine department of an affiliated hospital. The purpose is to further develop the skills necessary for the student 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.

74.305 See 74.209

74.308 Imaging — This course is designed to familiarize the nuclear medicine technology student 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.

74.405 See 74.209

74.409 See 74.209

76.202 Fundamentals of Patient Care — This course assists the student to understand the hospital environment and the health problems of the patient. Emphasis will be placed upon observation and communication appropriate for the nuclear medicine technologist. The nursing lab will be used to practice basic techical skills and procedures required in emergency situations.

98.106 Basic Anatomy and Physiology — An introduction to cellular structure and function followed by a survey of the anatomy and physiology of the body systems.

98.126 Basic Medical Microbiology and Immunology — This course deals with basic properties of medically important micro-organisms, the communicability of infection, host-parasite relationships and methods of destruction and control of micro-organisms with particular attention to the safe preparation of radiopharmaceuticals used for injection. The course also deals with basic immunologic concepts including their related in-vitro applications.

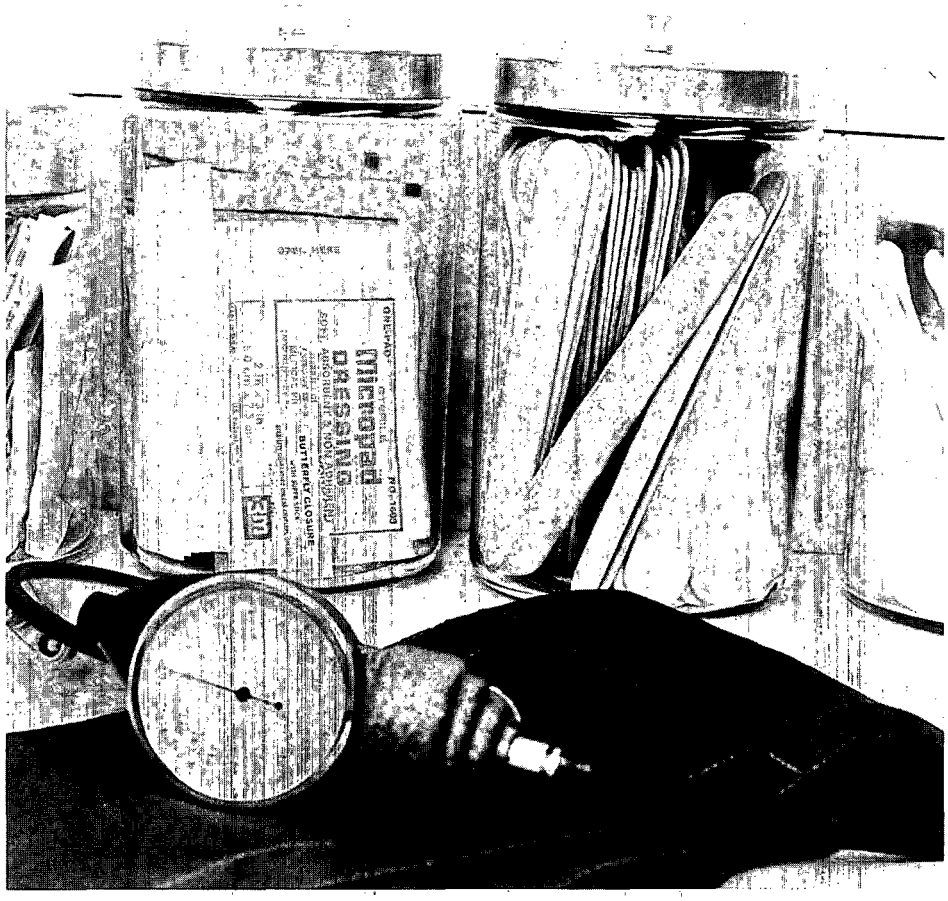
98.206, 98.306 Physiology and Pathophysiology — A systematic examination of the normal physiology of the human body and its derangement in disease states. General concepts of the disease process are included, as well as disturbance in function of specific body systems. Pathological examples are chosen to complement those conditions commonly encountered by students of nuclear medicine.

98.306 See 98.206

98.439 Human Behavior — An introduction to the basics of the psychological and social environment of health care organization with the aim of understanding how communication patterns affect task activities.

Faculty and Staff

W.E. Noel, R.T. and N., *Department Head*
Ms. B. Clark, M.S.R., R.T., Senior Instructor
Miss A. McMillen, R.T.
Miss J. Miki, R.T. (N.M.), R.T. C.S.L.T.
R.J. Smith, M.S.R., R.T.



General Nursing

Department of General Nursing
Today's nurse works in concert with other members of the health care team—physicians, physiotherapists, orderlies and social workers—to assist people in meeting their health needs. Demands made upon nursing professionals range from providing information on health concerns to promoting proper health care and preventing disease, as well as providing restorative care and emotional support. Although it is a high-stress profession, both men and women find meeting the challenges of general nursing a deeply satisfying career experience.

Job Opportunities
The graduate of this nursing program is eligible to apply for licensure as a Registered Nurse in the Province of British Columbia. Graduates who pass the R.N. licensure exams may seek employment in hospitals and community agencies. Positions for the new graduate are available in medicine, surgery, pediatrics, maternity, psychiatry and in extended care units.

The Program
In accordance with the recommendations of the Registered Nurses' Association of British Columbia, the nursing program prepares graduates to seek employment in general hospitals (or other health care agencies) where a comparable level of patient care and nursing judgement are required. It provides 22 months of instruction during a 2-1/3 year interval. Enrolment in the program is in January or August of each year. The program has five general areas of instruction: medicine, surgery, maternity, pediatrics and psychiatric nursing. Lectures, tutorials and lab sessions are complemented by clinical experience in a variety of settings.

These include Burnaby General Hospital, Children's Hospital, Lion's Gate Hospital, St. Mary's Hospital, St. Paul's Hospital, St. Vincent's Hospital, Surrey Memorial Hospital, Vancouver General Hospital, Addiction Prevention Project, Canadian Arthritic and Rheumatism Society (B.C. Division), Burnaby Association for the Mentally Retarded, day care centres in the Lower Mainland, Burnaby Parks and Recreation, Canadian National Institute for the Blind, Canadian Paraplegic Association, Century House (New Westminster Parks and Recreation), Children's House (North Vancouver), community health centres in the Lower Mainland, Cystic Fibrosis Outpatient Clinic (Vancouver General Hospital), elder citizen's programs in the Lower Mainland, personal care homes for senior citizens in the Lower Mainland, G.F. Strong Rehabilitation Centre, Jericho Hill School, Metropolitan Health Services, Victorian Order of Nurses (Burnaby and North Shore branches), Western Institute for the Deaf, Worker's Compensation Board and selected doctors' offices throughout the Lower Mainland.

Students enrolled from August 1978 will complete a program consisting of five terms. Each term is 4½ months in length. The fall term extends from mid-August to Christmas and the winter term from January to mid-May. Students are free of studies from mid-May to mid-August.

Prerequisites
Graduation on the Selected or Combined Studies Program with Chemistry 11 and either Biology 12 or Chemistry 12. Grades of C+ (65 per cent) or better are preferred. There is provision for "mature student" admission. Candidates in this category must be 25 years or older and will be assessed on an individual basis. Successful completion of a recent course of study is preferred. All applicants should be physically healthy and emotionally stable. Applicants must pass a physical examination and have a satisfactory interview prior to acceptance. Students are expected to be competent in written and oral English. Students are also advised to complete the Safety-oriented First Aid Course prior to admission. The course may be taken during the first term of the program on the student's own time and at his or her own expense.

Expenses
In addition to tuition fees, students will spend approximately $300 for textbooks over the two-year program. Uniforms and shoes are about $200. The registration examination fee is $80. Most students also purchase a graduation pin for $60.

The student is also responsible for transportation to the community agencies and hospitals where he or she will have selected learning experiences.

Financial Assistance
The Ministry of Health gives an allowance of $150 per month of instruction to all general nursing students. Information on the allowance and application forms will be forwarded to students after they have been accepted into the program.

Special Note on Applications
Applications are accepted for review by the Student Selections Committee during January 2 to May 31 for the August class and June 1 to October 31 for the January class.

Post-graduation
Following completion of the nursing diploma program, students may write the Canadian licensure examinations in order to obtain the R.N. (Registered Nurse) designation. After gaining some experience, graduates may elect to undertake one of many post-basic programs available in Canada or the U.S. to further their knowledge and skills in specialty areas of nursing. Most universities in the major cities also offer Bachelor of Nursing programs for graduates from diploma programs.

Course of Studies

(Students who enrolled in March 1977 and September 1977 will complete the following program.)

Year 2	Quarter E	Clrm hrs/wk
31.E04	English I	4
76.E30	The Childbearing Family	8
	and	
76.E35	Experience with the Childbearing Family	18
	or	
76.E39	Ambulatory Care	4
	and	
76.E40	Mental Health Nursing	4
	and	
76.E44	Clinical Experience for Ambulatory Care	9
	and	
76.E45	Experience for Mental Health Nursing	9
	or	
76.E50	Medical-Surgical Nursing	9
	and	
76.E55	Experience for Medical-Surgical Nursing	12
	Library and Research	5
		35
	Quarter F	
31.F04	English II	4
76.E30	The Childbearing Family	8
	and	
76.E35	Experience with the Childbearing Family	18
	or	
76.E39	Ambulatory Care	4
	and	
76.E40	Mental Health Nursing	4
	and	
76.E44	Clinical Experience for Ambulatory Care	9
	and	
76.E45	Experience for Mental Health Nursing	9
	or	
76.E50	Medical-Surgical Nursing	9
	and	
76.E55	Experience for Medical-Surgical Nursing	17
	Library and Research	5
		35
	Quarter G	
	Elective	3
	and	
76.E30	The Childbearing Family	8
	and	
76.E35	Experience with the Childbearing Family	18
	or	
76.E39	Ambulatory Care	4
	and	
76.E40	Mental Health Nursing	4
	and	
76.E44	Clinical Experience for Ambulatory Care	4
	and	
76.E45	Experience for Mental Health Nursing	9
	or	
76.E50	Medical-Surgical Nursing	9
	and	
76.E55	Experience for Medical-Surgical Nursing	17
	Library and Research	5
		34
	Quarter H	
76.H70	Advanced Nursing	4
76.H75	Experience for Advanced Nursing	32
		36

Students beginning in August 1978 will enrol for the following courses.

Year 1	Term 1	Clrm hrs/wk
76.100	Nursing I Theory	8
	Clinical	12
98.105	Anatomy and Physiology	3
98.138	Human Behavior	3
77.130	Physical Fitness	2
	Library and Research	7
		35
	Term 2	
76.150	Nursing II Theory	7
	Clinical	12
98.205	Physiology	3
98.225	Microbiology and Immunology	2
98.238	Human Development	3
	Library and Research	5
		32
Year 2	**Term 3**	
31.276	English for General Nursing	3
76.200	Nursing III Theory	9
	Clinical	18
	Library and Research	5
		35
	Term 4A	
76.250	Nursing IV Theory	7
	Clinical	24
	Library and Research	4
		35
	Term 4B	
31.376	English for General Nursing	3
76.300	Nursing V Theory (for 3 weeks of term)	28
	Clinical (for 14 weeks of term)	35

Subject Outlines

(for March 1977 and September 1977 students—Quarters E, F, G and H)

31.E04, 31.F04, 31.G04, 31.H04 English for Nurses — This course runs for two quarters: the first covers the general principles of writing; the second involves a study of modern English literature.

76.E30 The Childbearing Family — This course is designed to focus upon the physiological, psychological and social adjustments which occur in individuals and expectant families during childbearing. Some emphasis will be placed upon nursing intervention in risk situations. All first-year courses except 76.D26 are prerequisites.

76.E35 Experience with the Childbearing Family — This course provides the student with the opportunity to apply the nursing process and related manual skills when caring for the childbearing family. Experience in doctors' offices, health agencies and hospitals will be provided. This course must be taken concurrently with 76.E30.

76.E39 Ambulatory Care — A study of the role of the nurse in the planning and provision of health care in the community. Selected handicapping conditions of children and adults are viewed in terms of presenting problems, family dynamics, principles of ambulatory care in the community, pathophysiology of the condition, community resources and nursing interventions. Emergency care and accident prevention are presented as vital components of nursing responsibilities in the community. All first-year nursing courses are prerequisite, except 76.D26.

76.E40 Mental Health Nursing — This course provides the student with a basic theoretical framework for the understanding of human behavior which can be utilized in any encounter with people. Helpful ways of responding to a variety of behaviors are explored. All first-year courses are prerequisites for this course, except 98.C44 and 76.D26.

76.E44 Clinical Experience for Ambulatory Care — A supplement to 76.D39, Ambulatory Care, this course stresses self-directed utilization of the nursing process in the assessment of health care and provides the opportunity to visit and assess community agencies, to visit the homes and communities of handicapped individuals and their families, to interview children and adults concerning their health, to observe the family physician as he or she interacts with children and adults, and to participate in health teaching and counselling.

76.E50 Medical-Surgical Nursing — This course is designed to focus upon the nursing intervention required in medical and surgical crisis situations for both children and adults. Previously learned concepts such as obstruction, inflammation, hemorrhage, stress, grief and loss will be applied to crisis situations. All first-year courses, except 76.D26 and 98.B04, are prerequisites.

76.E55 Experience for Medical-Surgical Nursing — This course is designed to provide an opportunity for students to apply the nursing process and related manual skills to medical-surgical crisis situations in hospitals. This course must be taken with 76.E50.

76.H70 Advanced Nursing — This course is designed to focus upon the responsibilities of a beginning nurse practitioner. Emphasis will be placed upon group dynamics in the work-setting, organizational skills, legal implications and professional responsibilities. Career opportunities and changes in nursing education and nursing practice will also be discussed. Prerequisite courses are 76.E50, 76.E30, 76.E39 and 76.E40.

76.H75 Experience for Advanced Nursing

— This course involves the student in clinical practice in an area of his or her choice. In addition to using the nursing process and reinforcing and learning new skills, an opportunity is provided to assume some of the functions of a beginning practitioner. This course must be taken with 76.H70.

Subject Outlines

(for students beginning in August 1978)

31.276, 31.376 English for General Nursing — This course runs for two terms and consists of a study of the general principles of writing and their application to professional writing tasks and a study of modern literature. The course also includes an intensive short course in reading and study skills. This is a university transfer course equivalent to UBC English 100.

76.100 Nursing I — An overview of the nursing curriculum and the study of individuals who are able to satisfy needs or who require minimal assistance to satisfy needs. Emphasis will be placed on the normal requirements for need satisfaction and the stressors associated with lifestyle patterns. The student will be introduced to the nursing process, the basic concepts of communication and the nurse-patient relationship, organizational skills and the responsibilities of the professional nurse. Concurrent theory, lab and clinical practice will focus on assessment skills, basic communication skills and psychomotor skills related to comfort. Clinical experience will be provided in community and hospital settings.

76.150 Nursing II — The study of individuals of all ages whose responses to stressors may be appropriate and/or inappropriate and have no immediate potential to interfere with survival. Emphasis will be placed on the stressors associated with the stages and tasks of growth and development. Concurrent theory, lab and clinical practice will focus on the nursing skills required to assist individuals to satisfy needs. Clinical experience will be provided in community agencies where normal growth and development can be emphasized, and in hospital, extended care units and general surgical units. Prerequisite: Nursing I (76.100)

76.190 Introduction to Pharmacology — This course is designed to help the student understand drug terminology and know the major drug groups. Common drugs in each classification are discussed so the student understands actions, effects and uses and appreciates the dangers of drug abuse. This course is part of 76.100 Nursing I and 76.150 Nursing II.

76.200 Nursing II — The study of individuals of all ages whose responses to stressors may be appropriate and/or inappropriate but have the potential to interfere with survival. Emphasis will be placed on the stressors associated with both the selected unanticipated events and the growth and development tasks related to birth. Concurrent theory, lab and clinical practice will focus on the nursing skills required to assist individuals to satisfy needs. Emphasis will be placed on developing supportive relationships with individuals and their involved family members. Clinical experience will be provided in hospital settings on family-centered maternity units, general medical-surgical and pediatric units. Community visits will be integrated throughout the course. Prerequisite: Nursing II (76.150).

76.250 Nursing IV — The study of individuals of all ages whose inappropriate responses to stressors threaten survival. Emphasis will be placed on the stressors associated with selected unanticipated events. Concurrent theory, lab and clinical practice will focus on the nursing skills required to assist individuals to satisfy needs. Emphasis will be placed on developing therapeutic relationships with individuals and their involved family members. Clinical experience will be provided in hospital settings on psychiatric, general medical-surgical and pediatric units. Community visits will be integrated throughout the course. Prerequisite: Nursing III (76.200).

76.300 Nursing V — Nursing V emphasizes the integration of previously presented knowledge and skills. Theory will focus on leadership skills and the responsiblities of the graduate nurse. Clinical experience will be provided primarily on general medical-surgical units. The student will be assigned to a registered nurse on the unit who assumes the role of a preceptor. Prerequisite: Nursing IV (76.250).

77.130 Physical Fitness — A combined theory and practice course designed to emphasize the relationship of physical fitness to lifestyle patterns. The focus will be placed on the student's own activity pattern.

98.105 Anatomy and Physiology — A survey of the basic structure and function of the systems of the human body. An introduction to the basic principles of genetics is also included.

98.138 Human Behavior — This course provides an interdisciplinary approach to the study of human behavior. Basic terminology and concepts of psychology and sociology are presented. Emphasis is placed on the study of the family as a social institution, as well as on other forms of group process and collective behavior. The relationship between behavioral sciences and problems of health care is explored.

98.205 Physiology — A study of physiological regulation and control based on the fundamentals established in 98.105.

98.225 Microbiology and Immunology — An introduction to microbiological and immunological concepts. The first part of the course provides an introduction to basic microbiological concepts, including the distinguishing characteristics of micro-organisms, methods of controlling infectious disease and host-parasite relationships. The second part is devoted to an understanding of the macromolecules of the immune response and the immune response as it applies to immunity, immunohematology, surveillance and hemeostasis, hypersensitivity, autoimmunity and transplantation. The lack of and dysfunction of the immune response is included in the discussion.

98.238 Human Development — The course focuses on the processes of growth and development throughout the life cycle. Physical, cognitive, affective and social development are surveyed. Emphasis is placed on relating developmental concepts to health care.

Faculty and Staff

Ms. B.B. Kozier, M.N., B.S.N., B.A., R.N., *Department Head*
Ms. L. Barratt, R.N.
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Ms. M. Wiens, B.S.N., Dipl.T.S., R.N.
Ms. P. Zabawski, B.Sc.N., R.N.

Psychiatric Nursing

Department of Psychiatric Nursing
The psychiatric nurse works with people of all ages who have mental health problems or who are mentally retarded. These patients may also have common medical conditions such as diabetes. As a member of a health care team, the psychiatric nurse is able to assist individuals to solve mental health problems more effectively.

Job Opportunities
Graduates of the program are prepared to provide direct patient care in a variety of hospital and mental health services in which they will have opportunity for supervision and consultation concerning psychiatric nursing practice. British Columbia agencies that employ psychiatric nurses include: Dellview Hospital, Vernon;* Glendale Lodge, Victoria;* Riverview Hospital, Essondale;* Skeenaview Hospital, Terrace;* Tranquille School, Kamloops;* Woodlands School, New Westminster;* Burnaby Psychiatric Services, Burnaby; Chilliwack General Hospital, Chilliwack; Cranbrook and District Hospital, Cranbrook; Eric Martin Institute, Victoria; Forensic Psychiatric Institute, Port Coquitlam; Kelowna General Hospital, Kelowna; Lion's Gate Hospital, North Vancouver; Mills Memorial Hospital, Terrace; Regional Hospital, Penticton; Regional Hospital, Trail; Regional Psychiatric Centre of Canadian Penitentiary Service, Matsqui; St. Paul's Hospital, Vancouver; St. Vincent's Hospital, Vancouver; Shaughnessy Hospital, Vancouver; Valleyview Hospital, Essondale; and Vernon Jubilee Hospital, Vernon.

Some agencies employ psychiatric nurses to work in extended care services.

After two years experience in one of the above settings, graduates become eligible to seek employment in community settings such as mental health centres, community care teams, alcohol and drug treatment services and boarding homes.

**Designated as employers for graduates who received mental health bursaries.*

The Program
The Psychiatric Nursing Program is designed to provide basic preparation for practice in psychiatric nursing. It provides 22 months of instruction in classrooms, lab and clinical settings during a 2-1/2 year interval. Throughout the program, theoretical and clinical nursing courses are given concurrently supported by courses from English and the physical and behavioral sciences.

Clinical experience is provided in a variety of hospitals, health centres and community agencies. Psychiatric nursing students are assigned to selected agencies for clinical experience. In general hospitals, students are placed in medical-surgical, extended care and pediatric units. In psychiatric and mental retardation services, students receive experience in acute, long-term and community agencies. During the first four terms, clinical assignments are in the Greater Vancouver area. In the fifth term, placements will be in agencies throughout British Columbia.

Students enrolled in August 1978 and January 1979 will complete a program consisting of five terms. Each term is 4½ months in length. The fall term extends from mid-August to Christmas and the winter term from January to mid-May. From mid-May to mid-August students are not enrolled in studies. Depending upon the individual student's needs, this interval may be used for remedial study or program related employment. However, it is strongly recommended that students plan a month's vacation to assure physical and mental readiness for the next term of studies.

Prerequisites
Graduation from the Selected or Combined Studies Program with Chemistry 11 and either Chemistry 12 or Biology 12, plus the St. John Safety-Oriented First Aid Program, or equivalent. Students who are unable to complete a satisfactory first aid course before admission are expected to do so before the second term in their own time and at their own expense. Students are expected to be competent in written and oral English communication. Those whose English language performance in course work is unsatisfactory may be required to undertake remedial instruction during the program.

Students electing the psychiatric nursing program should have a strong desire to work with people especially those who are mentally retarded or who have mental health problems. It is important that the student's physical and mental health is compatible with the requirements of the educational program and practice in psychiatric nursing.

A health examination and an interview are required as part of the selection procedure following completion of the application forms. Applicants are required to complete a specified immunization program as condition of acceptance into the program. The immunization program includes: smallpox vaccination, diphtheria and tetanus toxoid, Sabin oral poliomyelitis vaccine, rubella H.1. test and tuberculin tests. The immunization program for tuberculosis is strongly recommended but not required. The immunization program is one component of a health program to protect faculty, students and patients.

Expenses
In addition to regular tuition fees, students should be prepared to spend $75 for uniforms and $225 per year for books. The student is also responsible for transportation to community agencies and hospitals. Most graduates purchase a school pin which costs approximately $60. These estimates are subject to change.

Financial Assistance
The Ministry of Health provides an allowance of $150 per month of instruction for each student enrolled in a diploma nursing program. In addition, students may apply for a Mental Health

Bursary that provides a further $100 for each month of instruction upon condition that the student work for an equivalent time in designated institutions in B.C. (See the section above on Job Opportunities for a list.) Information and application forms are available from the Counselling Centre. Students may apply at the beginning of first or second year. (See Financial Assistance section of the calendar for further information.)

Post-graduation

The Registered Psychiatric Nurses Association of B.C. serves as a registering body and a professional association. It also provides labor relations service for its members.

Requirements for registration of BCIT graduates are:

1. Successful completion of the Psychiatric Nursing Program
2. Recommendation by the Psychiatric Nursing Department to write the registration examinations
3. Proof of age and legal name
4. Writing and passing the registration examinations within one year of graduation from BCIT (fees currently $60)
5. Payment of an initial registration fee within one year of passing the examinations.
6. Fluency in writing and understanding English
7. Good moral and ethical standing in the practice of psychiatric nursing

Students are advised to apply for registration at least by the completion of the seventh quarter or fourth term in order to ensure that documentation is complete, so that they are eligible to write the registration examinations following graduation from BCIT.

How to Apply

The program welcomes applications from men as well as recent high school graduates.

Preferred dates of application are January 2 to May 31 for the August class and June 1 to October 31 for the January class.

Applicants are advised to apply as early as possible within the stated time period. Applicants are only considered for one academic year; therefore, unsuccessful applicants should re-apply if they wish to be considered for classes in a later year.

Registered nurses who wish increased skill in psychiatric nursing will be considered for admission to the second year of the program. Such students are required to complete one academic year of studies at the Institute before they are eligible for a Diploma in Psychiatric Nursing.

Course of Studies

(Students who enrolled in March 1977 and September 1977 will complete the following program.)

	Quarter E	Clrm hrs/wk
31:E04	English I	4
77:E41	Psychiatric Nursing I	8
77:E46	Experience for Psychiatric Nursing I	12
77:E47	Social Learning Methodology	2
	Library and Research	5
		31
	Quarter F	
77:F41	Psychiatric Nursing II	7
77:F46	Experience for Psychiatric Nursing II	18
77:F48	Introductory Neurophysiology	2
98:F29	Sociology of Mental Health	2
	Library and Research	5
		34
	Quarter G	
31:G04	English II	4
77:G41	Psychiatric Nursing III	7
77:G46	Experience for Psychiatric Nursing III	18
	Library and Research	5
		34
	Quarter H	
77:H41	Advanced Psychiatric Nursing	5
77:H46	Experience for Advanced Psychiatric Nursing	30
		35

Students beginning in August 1978 or January 1979 will enrol for the following courses.

Year 1	Term 1 (Fall)	Clrm hrs/wk
77.100	Psychiatric Nursing I	6
77.105	Psychiatric Nursing Practicum I	8
77.110	Interpersonal Relationship Laboratory I	2
77.120	Psychomotor Laboratory I	3
98.105	Anatomy and Physiology	3
98.118	Physical Fitness	2
98.141	Human Behavior I	3
	Term 2 (Winter-Spring)	
77.150	Psychiatric Nursing II	6
77.155	Psychiatric Nursing Practicum II	10
77.160	Interpersonal Relationship Laboratory II	2
77.170	Psychomotor Laboratory II	2
98.208	Physiology I	3
98.225	Microbiology and Immunology	2
98.241	Human Behavior II	3

Please note: The course of studies for the remaining terms will appear in the next edition of the calender.

Subject Outlines

(for March 1977 and September 1977 students—Quarters E, F, G and H)

Courses with the prefix 31 are taught by the English Department; with the prefix 77 by the Psychiatric Nursing Department; with the prefix 98 by the Basic Health Services Department.

31.E04 English I — This course runs for two quarters. The first covers the general principles of writing; the second involves a study of modern English literature.

31.G04 English II — This course runs for two quarters. The first covers the general principles of writing; the second involves a study of modern English literature.

77.E41 Psychiatric Nursing I — This course introduces the basic concepts of psychiatric nursing, providing the student with an understanding of patterns of mental illness and learning problems in all age groups. All first-year courses, except 77.D26, are prerequisites.

77.F41 Psychiatric Nursing II — This course presents concepts of family interaction as they relate to mental health and mental illness. The basic concepts of nursing intervention in distressed family situations are introduced. Course 77.E41 is prerequisite.

77.G41 Psychiatric Nursing III — The student studies the major psychiatric theories and forms of treatment as they relate to an understanding of behavior and to psychiatric nursing. Group dynamics and interactional concepts related to providing a therapeutic environment are introduced.

77.H41 Advanced Psychiatric Nursing — This course is designed to focus upon the responsibilities of a beginning nurse practitioner in psychiatry. Emphasis will be placed upon group dynamics in the work setting, organizational skills, legal implications and professional responsibilities. Career opportunities and changes in nursing education and nursing practice will also be discussed. Course 76.G46 is prerequisite.

77.E46 Experience for Psychiatric Nursing I — This course provides clinical practice in psychiatric treatment areas. Emphasis is placed upon the development of skills of observation, the nursing process and communication at a beginning level. This course must be taken concurrently with 77.E41.

77.F46 Experience for Psychiatric Nursing II — The student practises, in a variety of hospital and community settings, integrating his or her knowledge of behavior patterns and family interaction and further developing therapeutic communication skills. This course must be taken concurrently with 77.F41.

77.G46 Experience for Psychiatric Nursing III — The student is expected to assume responsibility for planning, implementing and evaluating nursing care for patients in a variety of mental health settings. Emphasis will be placed upon the development of effective group skills.

77.H46 Experience for Advanced Psychiatric Nursing — This course involves the student in clinical practise in psychiatric treatment areas. Emphasis is placed on a final integration of previously acquired knowledge and skill. The student has an opportunity to assume the role of a beginning practitioner in

psychiatric nursing. This course must be taken concurrently with 76.H41.

77.E47 Social Learning Methodology — This course introduces concepts of learning theory as they relate to the understanding of human behavior. Principles of learning, motivation and problem-solving are considered.

77.F48 Social Learning Methodology — This course discusses the relationship of basic neurological processes to behavior. Basic neuroanatomy and physiology are reviewed and concepts of dynamic brain function are introduced.

98.F29 Sociology of Mental Health — This course examines various concepts and theories of mental health and mental ill-health as reflected in the individual, in the community and in society.

Subject Outlines

(for students beginning in August 1978)

77.100 Psychiatric Nursing I — An overview of psychiatric nursing and the health care system as it relates to mental health. Emphasis will be placed on man's adaptive behavior in response to stressors in his environment. The student will be introduced to the problem-solving process, a conceptual model for psychiatric nursing practice and the professional responsibilities of a psychiatric nurse.

77.105 Psychiatric Nursing Practicum I — A clinical practice course offered concurrently with Psychiatric Nursing I. Experiences are provided in general hospitals, mental health, mental retardation and community settings with clients of all ages. Emphasis is placed on development of skills related to assessment and activities of daily living and the development of interpersonal relationships.

77.110 Interpersonal Relationship Laboratory I — A lab practice course offered concurrently with Psychiatric Nursing I. Emphasis is placed upon development of self awareness and basic communication skills.

77.120 Psychomotor Laboratory I — A lab practice course offered concurrently with Psychiatric Nursing I. Emphasis is placed upon those nursing skills related to basic assessment and activities of daily living.

77.150 Psychiatric Nursing II — The study of children in relation to their growth and development and family environment. Emphasis is placed upon the care of children who have physical and emotional problems. Prerequisites: all first-term courses.

77.155 Psychiatric Nursing Practicum II — A clinical practise course offered concurrently with Psychiatric Nursing II. Experiences are provided in the pediatric areas of general hospitals and mental retardation settings. Emphasis is placed on developing therapeutic relationships and selected nursing skills. Prerequisites: all first-term courses.

77.160 Interpersonal Relationship Laboratory II — A lab practise course offered concurrently with Psychiatric Nursing II. Emphasis is placed upon the development of therapeutic relationships with children. Prerequisites: all first-term courses.

77.170 Psychomotor Laboratory II — A lab practise course offered concurrently with Psychiatric Nursing II. Emphasis is placed on the development of selected nursing skills. Prerequisites: all first-term courses.

98.105 Anatomy and Physiology — A survey of the basic structure and function of the systems of the human body. An introduction to the basic principles of genetics is also included.

98.118 Physical Fitness — A combined theory and practice course designed to emphasize the relationship of physical fitness to lifestyle. The focus will be placed on the student's own activity.

98.141 Human Behavior — This course presents those concepts and methods of psychology and sociology which are most pertinent to the psychiatric nurse's understanding of human behavior in a social context. The internal and external components of man's environment are investigated. Social and epidemiological factors related to mental illness are reviewed.

98.208 Physiology I — An introduction to the concept of homeostasis and its disturbance in pathological conditions. The specific body systems are discussed in terms of normal physiology and common disease states. Wherever possible the course content corresponds with conditions encountered in the clinical experience of the psychiatric nursing student. Prerequisite: 98.105 Anatomy and Physiology

98.225 Microbiology and Immunology — An introduction to microbiological and immunological concepts. The first part of the course provides an introduction to basic microbiology concepts, including the distinguishing characteristics of micro-organisms, methods of controlling infectious disease and host-parasite relationships. The second part is devoted to an understanding of the macromolecules of the immune response and the immune response as it applies to immunity, immunohematology, surveillance and homeostasis, hypersensitivity, autoimmunity and transplantation. The lack of and dysfunction of the immune response is included in the discussion. Prerequisite: 98.105 Anatomy and Physiology

98.241 Human Development — This course provides students with an introduction to concepts basic to understanding normal human development throughout the life cycle. Particular attention is given to relating the development of the individual to that of the family. Prerequisite: 98.141 Human Behavior

Faculty and Staff

Margaret S. Neylan, R.N., B.S.N., M.A., *Department Head*
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Phyllis Gilchrist, R.N., B.Sc.N.
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Ross Stewart, R.P.N., R.M.N., R.N.
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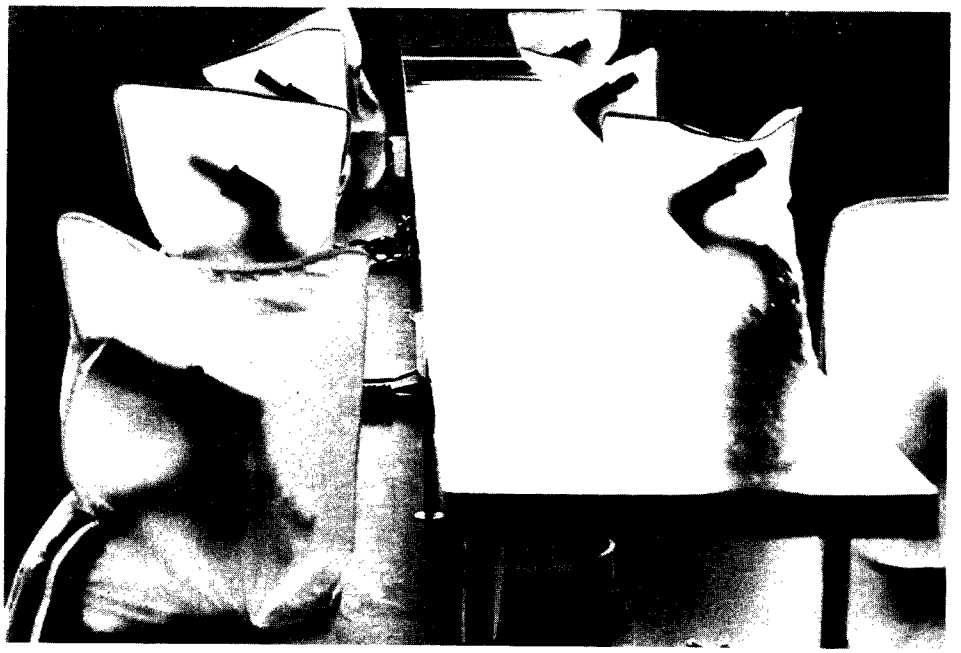
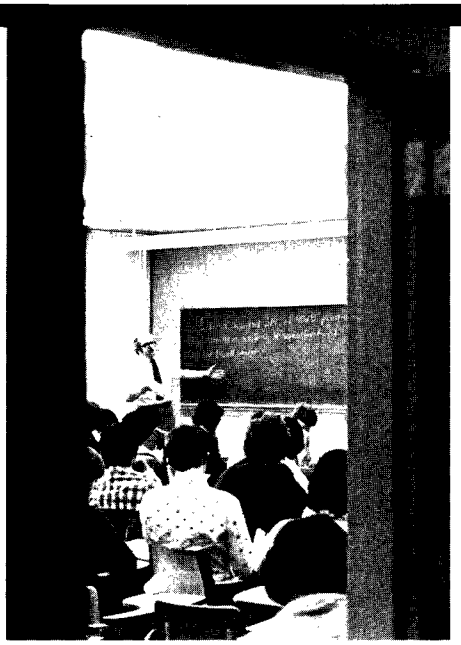
Sessional Appointments

Anne Houseman, B.Sc.N., R.N.
Emiko Kordyback, R.N., B.A.
Helen Roxborough, R.N., B.A.



Core



The Core Division consists of the departments of Chemistry, English, Mathematics and Physics. It offers courses to students enrolled in all technology programs of the Business Management, Engineering and Health divisions. It also offers a program of non-credit preparatory courses to students who may require upgrading for admission to BCIT through the Continuing Education Division.

Courses taught by the Core Division are extensions of material covered in the same subjects in secondary school. Specialization is relevant to the technology of the student's choice. Many of the courses are complemented by reading and writing labs in English and regular noon hour tutorials in physics and chemistry.

These courses include the "core" of knowledge, both theoretical and practical, which students need in order to understand and to make the best use of the specialized technological training. Good knowledge of the basic principles and some specialized knowledge of physics and chemistry are required of health and engineering technologists. All technologists require advanced skills in mathematics and English to communicate intelligently and clearly with others.

The core courses are developed, for the most part, in conjunction with technology departments and advisory committees in order to maintain a balance between the applied and the theoretical.

For further information concerning day school courses or their prerequisites, contact the appropriate department head or the Director of the Core Division. For information on the BCIT preparatory program consult this calendar, the continuing education calendar, the appropriate department head or the Director of the Core Division.

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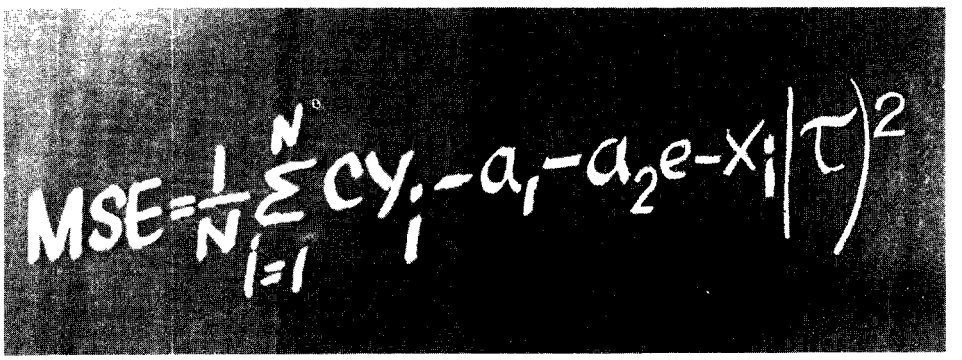
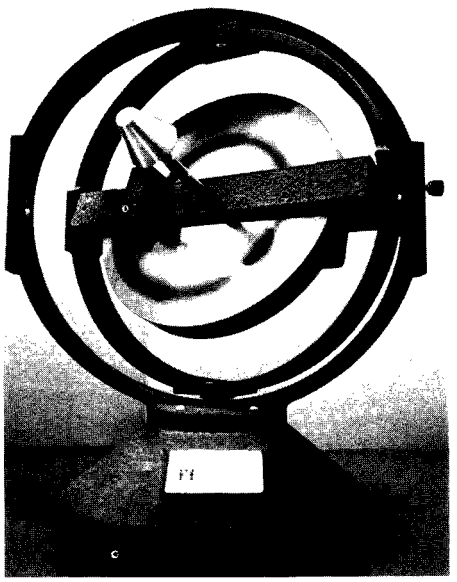
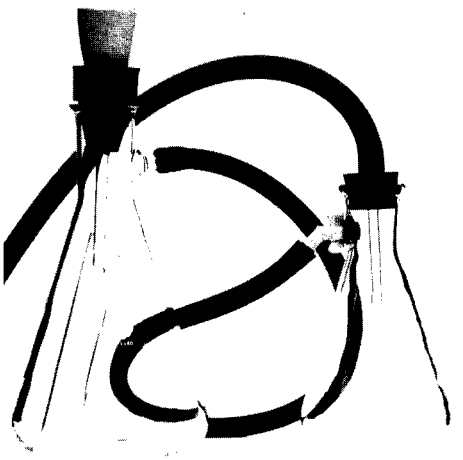
L. Warren, B.A., M.A.
W.T. Withers
K.A. Yakel, B.Sc.(Hons.), M.Sc.







Part-time Studies

Students unable to attend BCIT full-time may take courses in business, engineering and health technologies offered by the Division of Continuing Education and Industry Services.

Evening and Saturday morning classes, weekend workshops and week-long courses are conducted on campus from September through June. Occasionally, there are seats available in regular day classes.

Full details on courses and certificate programs are in the calendar for part-time students. Write to BCIT, or phone 434-5734, local 204 or 205, for your copy.

Correspondence courses are available through the Directed Study Centre at BCIT. Write for information or phone 434-5734, local 648.

A variety of courses and programs are also prepared under contract for companies, government agencies and professional organizations through our Industry Services section.

Every year, thousands of students take advantage of the career-oriented BCIT programs.

Join us on the career campus!

Library and Audio-Visual

The Library and Audio-visual Services Division takes an active role in the education programs at BCIT. Full instruction is provided in information research skills, as well as media materials preparation and presentation.

As a technologist, one of the greatest challenges you will face is keeping up-to-date in a changing and innovative work environment. To help you develop your research skills and become familiar with resource materials in your field, the curriculum at BCIT includes five hours a week for library and research.

The BCIT Library is recognized as the major technological information resource centre in the Province. The Library contains the latest books, journals, indexes, maps, microforms, films and learning kits in all technologies.

The best way to begin making productive use of these resources is to take an orientation tour early in the term. Later, when you receive your first major assignment, ask your instructor to arrange for a research seminar with the reference specialist for your technology. With specially packaged guides, the reference specialist will unravel many of your problems in technical information research. Time is a precious commodity during your two years at BCIT and the reference staff encourages you to seek help early in all your projects. In addition to the seminars, librarians are always on hand to answer your individual questions.

Since audio-visual presentations are widely used in business and industry for promotion and sales, and as training and educational aids, students at BCIT are given the opportunity to acquire some expertise in creating materials, assembling audio-visual packages and operating equipment.

The Audio-Visual Department, located in room 308 of the Library, has a program production unit with a knowledgeable staff to help plan slides, tape, video, film and graphic productions. A materials preparation lab where you can make overhead transparencies and slides or mount photographs is also available. A graphic artist and a photographer will help create materials for student projects, provided instructor authorization is given. Do allow ample time to plan and complete a project since facilities are limited and are overbooked during certain parts of the term.

To complement the production area, the audio-visual circulation area in the main foyer of the Library will provide projectors, cameras, audio and video tape recorders and auxiliary equipment to students with instructor authorization. Students who are unsure of the operation of such equipment can arrange for individual or group training.

There are two areas where students may view program materials. The listening and viewing area on the main floor of the Library provides individual areas with playback equipment. Upstairs in room 308, there is a screening room available for groups of up to 20 people.

Quick Facts

about the Library Audio-visual Services Division

Hours: Sept.-May (subject to change)

Library	
Mon.-Thurs.	8:00 a.m. - 11:00 p.m.
Fri.	8:00 a.m. - 5:00 p.m.
Sat.	9:00 a.m. - 5:00 p.m.
Sun.	noon - 6:00 p.m.
AV Equipment	
Mon.-Fri.	8:00 a.m. - 5:00 p.m.
AV Production	
Mon.-Fri.	8:30 a.m. - 4:30 p.m.

Holidays: The Library will be open the following statutory holidays (AV will be closed)

Thanksgiving	9:00 a.m. - 5:00 p.m.
Remembrance Day	9:00 a.m. - 5:00 p.m.
Victoria Day	8:00 a.m. - 11:00 p.m.

Borrowers: Cards are issued free to day and night school students, staff and faculty. There is a five dollar charge for extramural borrowers.

Applications: Apply for your library card at the Library circulation counter. An $8 charge is levied to reprocess lost cards.

Inquiries:

Circulation Desk
434-5734, local 370 days 434-5738 eves.
Reference Desk
434-5734, local 371 days 434-5737 eves.

Loans:

Circulating books — two weeks
Journals, reference books — Library use
Exams, reserve material — two hours
AV equipment — varies, authorized by instructor

Renewals: In person. Two weeks, unless requested by another borrower.

Returns: Circulation counter and night deposit in lobby

Overdue Reminders:
First notice—five days after due date
Final notice—15 days after due date

Book Replacement Fee: Levied 30 days after due date. The $25 non-refundable fee covers the purchase and processing of a replacement copy of material long overdue and out of circulation to other borrowers.

Penalties: Failure to pay the book replacement fee will result in suspended library privileges and the withholding of student transcripts.

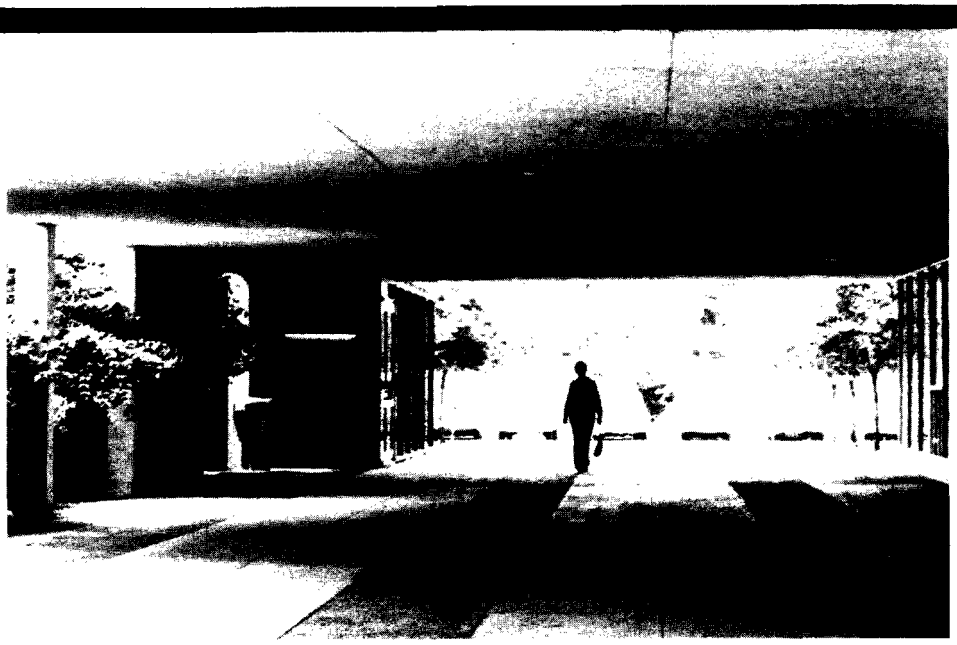
Payments: Book replacement fees are paid at the Finance Division.

Special Services: Research methods seminars, media production courses, equipment training, typewriters, photocopiers, computer-assisted instruction terminals, interlibrary loans, film preview booths, film screening room, popular music and paperback collection.

Staff

Jos E. Carver, C.D., B.L.S., Director
Margot Allingham, B.A., M.L.S., Reference Librarian, Engineering
Carlene Besner, B.A., Systems Analyst
John Borseth, Special Projects and Technical Systems
John Boyle, Maintenance and Distribution Supervisor
Maureen Brooks, Equipment Circulation
Leslie Chan, Dipl.T., Maintenance and Distribution Systems
Sheila Ferry, B.A., B.L.S., Reference Librarian, Industry Services and Forestry
Jim Frith, Media Audio Slide Production
Trudy Handel, Dipl.T., Media Training
Frank Knor, Dipl.T., B.Ed., B.L.S., Systems Librarian
Trish Labonté, B.Sc., M.L.S., Reference Services Coordinator
Marjorie McLeod, B.L.S., Reference Librarian, Health
Jo Rix, Media Preparation
Robert Roy, B.A., M.A., B.L.S., Technical Services Coordinator
Charles Saunders, Dipl.T., AV Services Coordinator
Ken Shum, Equipment Circulation
Egon Steinebach, Photographic Production
Gerald Weeks, B.A., M.L.S., Reference Librarian, Business
Christopher Wilson, Dipl.T., B.A., Video Production and Scripting
Kin Yim, Equipment Circulation
Ray Young, Media Graphic Production
Robert Young, B.Sc., B.L.S., Reference Librarian, Core and Administration

Admissions



BCIT Admissions Policy

BCIT was built to serve the residents of British Columbia. In the selection of applicants, Canadian citizens who are British Columbia residents and landed immigrants who have resided in B.C. at least one year have a first priority. Out-of-province Canadian citizens and landed immigrants who have resided in Canada at least one year have a second priority. Out-of-country candidates are selected only when there is a lack of applications for the first two priorities. Because of limited enrolment in the health technologies and selected business management and engineering technologies, out-of-country applicants on a student visa are only considered for acceptance into Biological Sciences, Chemical and Metallurgical, Civil and Structural, Forest Products, Mechanical, Mining, Natural gas and Petroleum and Surveying. *BCIT does not accept applications from persons who are on a visitor's visa.*

Academic Requirements for Admission

Graduation from a senior secondary school on the Selected or Combined Studies Program, as prescribed by the British Columbia Ministry of Education, or equivalent, with satisfactory grades. In addition, certain special prerequisites are necessary for the various technologies. All candidates are requested to submit official academic credentials for review.

Business Management Division

Administrative Management — Algebra 11 or Math 11 or Business and Consumer Math 11

Broadcast Communications — Nil

Computer Programming and Systems
- Business Systems — Algebra 11 or Math 11
- Management Science — Algebra 12 or Math 12 (must be successfully completed prior to second year)

Financial Management — Algebra 11 or Math 11 or Business and Consumer Math 11

Hospitality and Tourism Administration — Math 11 or Business and Consumer Math 11

Marketing Management — Algebra 11 or Math 11

Operations Management — Algebra 11 or Math 11 or Business and Consumer Math 11

Engineering Division

Biological Sciences
- Biological Sciences Program — Algebra 12 or Math 12 and Chemistry 11
- Management in Agriculture Program — Algebra 11 or Math 11

Building — Algebra 12 or Math 12, Physics 11 and English 12

Chemical and Metallurgical — Algebra 12 or Math 12 and Chemistry 11

Civil and Structural — Algebra 12 or Math 12 and Physics 11

Electrical — Algebra 12 or Math 12, Chemistry 11 and Physics 11 (all with C+ standing). For 1978 only, the Physics 11 and 12 and Chemistry 11 and 12—all with a C standing—are acceptable. Applicants without Chemistry may be accepted for the 1978 term if they are enrolling in the Control Electronics, Power or Telecommunications options.

Forest Resource
- Forest Program — Algebra 12 or Math 12 and science 11 (Biology)
- Fish, Wildlife and Recreation — Algebra 12 or Math 12 and Biology 11
- Forest Products Program
- Pulp and Paper — Algebra 12 or Math 12 and Chemistry 11
- Wood Products — Algebra 12 or Math 12 and one other science 11

Mechanical — Algebra 12 or Math 12 and Physics 11

Mining — Algebra 12 or Math 12, Physics 11 and Chemistry 11

Natural Gas and Petroleum — Algebra 12 or Math 12 and Physics 11 or Chemistry 11

Surveying — Algebra 12 or Math 12 and Physics 11

Health Division

Biomedical Electronics — Algebra 12 or Math 12, Physics 11 and Chemistry 11

Health Data — Algebra 12 or Math 12 and Typing 11

Environmental Health — Algebra 12 or Math 12, Physics 11 and Chemistry 12

Medical Laboratory — Algebra 12 or Math 12, Chemistry 11 and 12, and at least one other science 11 or 12 (preferably a 12 or two other 11s)

Medical Radiography — Algebra 12 or Math 12, two science 11s, one science 12 (Physics, Chemistry or Biology)

Nuclear Medicine — Algebra 12 or Math 12, two science 11s and Chemistry 12

General Nursing (R.N.) — Chemistry 11 and either Biology 12 or Chemistry 12 and the St. John Safety-oriented First Aid Course (or equivalent). First aid course may be completed between first and second year.

Psychiatric Nursing (R.P.N.) — Chemistry 11 and either Biology 12 or Chemistry 12 and the St. John Safety-Oriented First Aid Course (or equivalent). First aid course may be completed between first and second year.

Basic Training for Skills Development Upgrading—Level 4

Experience has indicated those students who have taken the five months upgrading course could not successfully compete with those students who have the academic level of achievement in the

engineering, health and certain business technologies. The mathematics and sciences which BCIT students are required to assimilate are too difficult for those who have had such limited exposure to these subjects.

General Educational Development Tests
This test is 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 the general development a person may have accomplished, mathematical and science ability and knowledge may not have necessarily been strengthened.

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

How to Make up Course Deficiencies
Summer preparatory programs are available through the BCIT Continuing Education Division for those students who lack specific prerequisites or desire refresher courses. For information, please contact Continuing Education at 434-5734, local 204 or 205.

Mature Student Entry
Those persons whose formal admission requirements may be lacking and who can provide evidence of probable success in the technology of their choice, may be admitted as mature students. They must, however, have the special prerequisites, *or acceptable equivalent,* for the program they are applying to. Applications of this nature are reviewed on an individual basis by the Board of Admissions.

Advanced Standing and Course Credit
Those persons who have successfully completed one or more years of study at a level equal to, or higher than, that of a BCIT course may apply for direct entry into second year of the program, providing course content is similar and if, in the opinion of the Board of Admissions, the applicant's academic record justifies advanced standing.

Students requesting consideration of the granting of credit for individual subjects (either taken previously at BCIT or comparable to subjects in the selected program) should make application at the Admissions Centre as soon as possible following notification of acceptance for admission.

Application for course credit must be made within 10 school days of the commencement of classes. If course credit is granted, students will not be eligible for BCIT scholarships, but will be eligible for BCIT bursaries and government grants, *provided they are carrying at least a 75 per cent class work load.*

Transfer Students
BCIT offers transfer programs for various technologies with recognized regional colleges within British Columbia. Further information may be obtained by directing your inquiry to the Admissions Centre at BCIT.

English Language Proficiency
Since all BCIT students are expected to possess an acceptable level of language skill, applicants whose primary language is not English may be required to demonstrate their competence in one of the following ways:
1. by scoring a minimum of 115 on the Vancouver Community College English Language Assessment Test;
2. by scoring a minimum of 550 on the TOEFL;
3. by completing English 12 (B.C.) with a C+ or better;
4. by successfully completing English 099 at Vancouver Community College; or
5. by individual assessments.

To obtain a bulletin of information which outlines world-wide test locations and application procedures, applicants are advised to direct their enquiries to: Test of English as a Foreign Language, Box 889, Princeton, New Jersey, 08540, U.S.A.

Age Limit
All prospective students must be at least 16 years of age. However, there is no upper age limit.

Medical Coverage Requirement
Students who have been selected for admission must show proof of medical insurance coverage prior to registration.

Out-of-country students who have been selected for admission must apply in person to the Admissions Centre prior to attending BCIT for an Application for Student Medical and Hospital Plan. 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.

Accident Insurance
All students enrolled at BCIT are insured by an accident policy underwritten by Seaboard Life Insurance Company. Coverage is on a 24-hour per-day basis throughout the term or quarter in which students are enrolled. Detailed information may be obtained from the Office of the Registrar.

How to Apply

For each current school year, with classes commencing in September, application forms may be obtained from the Admissions Centre. These should be completed and returned as early as possible.

Selection procedures have been established so that eligible applications to all technologies will be generally accepted on a "first apply, first accept" basis, if they meet the special prerequisites of the technology.

Certain programs at BCIT are very well-known and very popular and applications for admission to these technologies by far exceed the number of seats available. It is therefore advisable to submit applications as early as possible for review by the Board of Admissions.

Applications for General Nursing will be accepted for review by the Board of Admissions from January 2 to May 31 for the August classes and from May 1 to September 30 for the January classes.

Applications for Psychiatric Nursing will be accepted for review by the Board of Admissions from January 2 to May 31 for the August classes and from June 1 to October 31 for the January classes.

The following documents must accompany the completed application form:

A senior secondary school transcript of marks and, if applicable, all post-secondary school statements of marks indicating credits and grades achieved, or an interim statement of marks from the principal of a senior secondary school indicating that the applicant is expected to obtain the required academic standing on completion of grade 12 on the Selected or Combined Studies Program. This interim statement of marks must be substantiated by a final senior secondary school transcript of marks when it becomes available.

Transfer students are required to submit an application form and a transcript of marks, indicating satisfactory grades achieved, from the regional college from which they are transferring. The Registrar will request the required student recommendation from the college.

Out-of-country applicants must submit evidence of Landed Immigrant Status or Student Visa.

Health Division applicants are required to complete a medical questionnaire and return it to Medical Services at BCIT. Some of the Health technologies require their students to present evidence of having had a recent chest x-ray, as well as having completed an immunization program. If, due to extenuating circumstances, supporting documentation is not available at that time, students will be required to complete the necessary procedure at Medical Services.

Final acceptance for admission to BCIT, or non-acceptance, is based on the decision of the Board of Admissions. The Board reserves the right to accept only those applicants who appear to have the capabilities necessary to succeed in the program.

If an accepted applicant is unable to enrol, he or she may reapply the following year. The new applications will be reviewed again with those applications received for the new school year. It will not be necessary to resubmit documents, if reapplying within one year, as the original submission will remain on file. In effect, acceptance for a program is not transferrable from year to year; applications are considered for the current school year only.

Please note: Whether or not a person is accepted for admission, academic documents will not be returned.

Readmissions
Those students returning to complete requirements toward a Diploma of Technology are readmitted in both December and January each year.

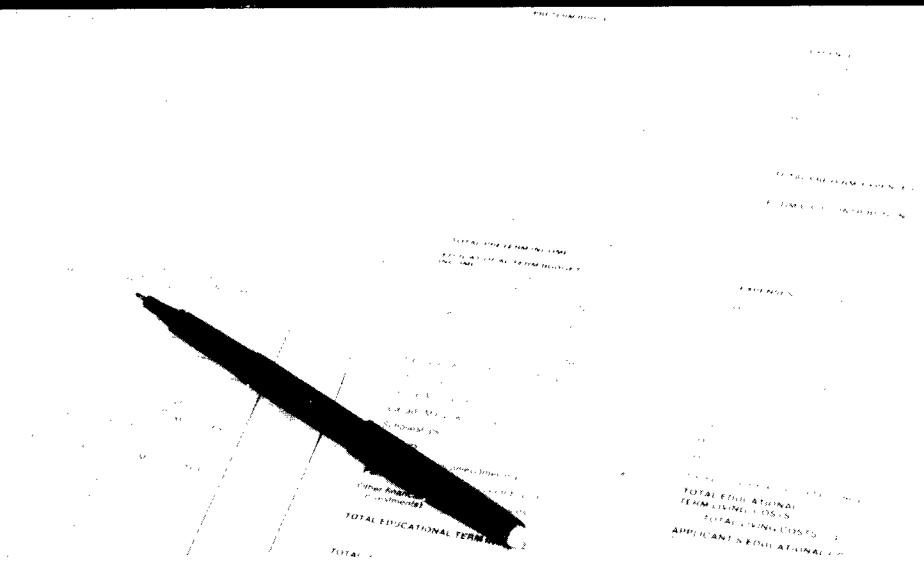
Students may interrupt their studies after completion of any term. However, on return to the program, an application form must be completed and returned to the Admissions Centre prior to the date of readmission.

Change of Program
Permission must be granted by the Board of Admissions before a change in program can be affected.

Changes in Curricula and Regulations

Although it is proposed to adhere to the program of study as set forth in the 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.

Fees and Expenses



If you're considering enrolling at BCIT, you should prepare a budget of your resources and estimated expenses. The example below should be used only as a guide.

Average Budget

Tuition	$445
Student activity fee	40
Caution deposit	20
Books and supplies	200
Room and board	2200
Local transportation by bus	250
Miscellaneous (clothing, entertainment, incidentals)	600
Total expenses	$3755
Summer job earnings	$1000
Savings	1000
Parents	500
Part-time earnings during school year	1000
Other income	100
Total resources	$3600
Minus total expenses	3755
Shortfall	$155*

*If you estimated expenses exceed your resources, don't despair! At BCIT, we have a comprehensive financial assistance program—loans, grants, scholarships and bursaries—to help you. See pages 107 to 111 for more details.

Fees for 1978-79 academic year

General tuition	$445
Student activity fee	40
Caution deposit*	20
Total payment of fees	505

All students except those who enrolled in general nursing and psychiatric nursing prior to September 1978 must pay their fees according to the following schedule.

First-term fees are due July 7, 1978

General tuition (includes $75 commitment fee)	$225
Student activity fee	40
Caution deposit*	20
	$285

Second-term fees are due the week of January 3, 1979

General tuition	$220
Total first and second-term fees:	$505

Students on the quarterly system must pay their fees according to the following schedules.

General nursing and psychiatric nursing students enrolled prior to September 1978; i.e., class of Sept./77-Aug./79-Set E5; class of Sept./77-Aug./79-Set F6; class of Sept./77-Aug./79-Set G7; and class of Sept./77-Aug./79-Set H8.

First quarter fees are due 30 days before the commencement of classes.

General tuition (includes $75 commitment fee)	$151
Student activity fee	40
Caution deposit*	20
	$211

Second quarter fees are due the first week of classes in the second quarter

General tuition	$98

Third quarter fees are due the first week of classes in the third quarter

General tuition	$98

Fourth quarter fees are due the first week of classes in the fourth quarter

General tuition	$98
Total fees:	$505

General and psychiatric nursing students enrolled prior to Sept. 1978; i.e., class of Mar./77-Feb./79-Set E7 and class of Mar./77-Feb./79-Set F8.

First quarter fees are due 30 days before the commencement of classes

General tuition (includes $75 commitment fee)	$142.50
Student activity fee	35.00
Caution deposit*	20.00
	$197.50

Second quarter fees are due the first week of classes in the second quarter

General tuition	$92.50

Third quarter fees are due the first week of classes in the third quarter

General tuition	$92.50

Fourth quarter fees are due the first week of classes in the fourth quarter

General tuition	$92.50
Total fees:	$475.00

*The caution deposit covers any breakage at BCIT. Any unused portion is refundable at academic year-end.

Note: Fees are subject to change by action of the British Columbia Institute of Technology Board of Governors.

Additional Expenditures

Textbooks, instruments and supplies

The costs vary according to the program and are approximately $150 to $200. The Institute bookstore carries a complete line of drafting and writing supplies. Students are advised not to make any

purchases until they have received a book list showing the required texts. Some technologies require purchase of a pocket calculator costing approximately $150 to $250.

Field trips
In some technologies, periodic field trips are a part of the program. These expenses are the responsibility of the student. Accommodation and food costs vary from $25 to $100.

Tuition Fee Policy

First-year students
1. A non-refundable commitment fee of $75 is due and payable upon an applicant's acceptance. This fee is applied toward the tuition fees for the first term of studies.
2. An accepted applicant whose commitment fee has not been paid within 30 days of acceptance will forfeit the seat which has been reserved.
3. An accepted applicant is required to pay the remainder of full first-term fees 60 days before the commencement of classes, or make other suitable arrangements with the Comptroller.
4. An applicant accepted less than 60 days before the commencement of classes is required to pay full first-term fees upon acceptance, or make other suitable arrangements with the Comptroller.

Second-year students
A student returning to begin the second year of the two-year program is required to pay full term or quarter fees 30 days before the commencement of classes.

Payment of tuition fees for subsequent terms or quarters
Both first and second-year students returning for a subsequent term or quarter; e.g., term 2, are required to pay full fees during the first week of the term or quarter.

Cancellation of registration for non-payment

A student whose fees are outstanding will be excluded from classes and have his or her registration cancelled. An additional $10 will be levied for reinstatement to classes.

Cheques and money orders

All cheques and money orders should be made payable to the "British Columbia Institute of Technology" or "BCIT". A charge of $10 will be levied for costs of handling cheques returned because of nonsufficient funds or for other reasons.

Refunds of fees for students who withdraw

Up to 14 calendar days after the commencement of classes
General tuition: complete refund, less $75
Student activity fee: complete refund
Caution deposit: balance of account
From the day following the last day specified above until the end of term or quarter
General tuition: no refund
Student activity fee: a refund of $3 per month for each full month the student is not in attendance and has officially withdrawn from BCIT. (The maximum repayable would be $30.)
Caution deposit: balance of account
No refunds of student activity fees will be made after February 29. The refund must be claimed in writing from the BCIT Student Association office and the student ID card(s) turned in on receipt of the refund. Withdrawal verification will be made by the BCIT Student Association before processing the claim.

Students are required to withdraw officially from BCIT by reporting to the Counselling Centre.

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

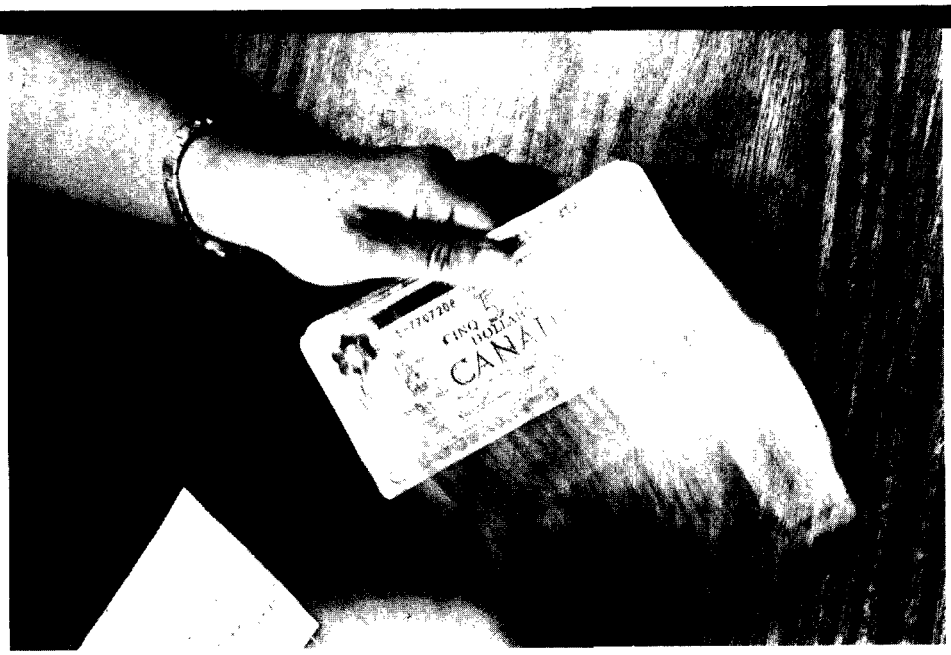
Miscellaneous Fees

Re-read of examination	$5.00 (per subject)
Transcript of marks (per copy)	1.00
Duplicate of diploma	3.00

(A duplicate diploma will be issued only when written confirmation of loss of the original diploma has been submitted to the Admissions Centre.)

Application for the first two items should be made through the Registrar's Office.

Financial Assistance



There are several types of financial assistance available for BCIT students, including scholarships, bursaries and loans. The Financial Awards Counsellor and Financial Awards Advisor in the Counselling Centre (room D205, 1976 Building) have full details on these programs and can also help work out a personal budget.

BCIT Scholarship and Bursary Fund

The British Columbia Institute of Technology Scholarship and Bursary Fund has been established through private means and awards are made annually to deserving students of the Institute.

Scholarships are automatically awarded to top academic students on the basis of their first year average, so no application procedure is necessary on the part of students. Values range from $50 to $500. Some scholarships are designated to be awarded in specific technologies while others are unspecified. Scholarship monies are made available through private contributions from commerce and industry as well as from other interested persons. Students must carry a full program of studies during their first year to be eligible for scholarships.

The presentation ceremony is held in the Fall.

Although bursaries are mainly awarded on the basis of financial need, academic standing as well as school and community involvement may also be considered.

Bursaries are non-repayable grants of money which generally range from $25 to $500. Students must apply for bursaries by completing an application form available at the Counselling Centre. Deadline for submission of applications is October 15 for the fall term (second year students only) and January 31 for the spring term (first and second year students).

1977 Contributors

Acres Consulting Services Limited contributed a $25 bursary for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Active Chemicals Limited contributed $420 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Akhurst Machinery Limited contributed a $150 scholarship to be awarded to a student in the Mechanical Technology.

The Amalgamated Construction Association of B.C. contributed a $150 scholarship for a deserving student entering the second year of the Building Technology.

The American Society for Metals contributed a $200 scholarship to be awarded to a student in the Physical Metallurgy Option of the Chemical and Metallurgical Technology.

The Amoco Foundation, Incorporated, contributed $300 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Argus Installations Limited contributed $150 to be awarded to a deserving student in the Services Option of the Building Technology.

Associated Engineering Services Limited contributed $420 for deserving students at the Institute, to be awarded at the discretion of the Financial Awards Committee.

The Gary A. Barr Memorial Fund was established by various donors, the annual interest of which is to be awarded to deserving students in the Building Technology.

Bay Forest Products Limited contributed a $475 bursary fund to be awarded to deserving students in the Forest Products program.

The Wesley A. Bell Memorial Fund was established by Mr. and Mrs. A.B. Bell, in memory of their late son. The $500 bursary is to be awarded to a deserving student in the Nursing Technology.

The Bethlehem Copper Corporation contributed a $1,000 bursary fund to be awarded to deserving students in the Chemical and Metallurgical Technology.

The Birks Family Foundation contributed $250 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

The British Columbia Association of Broadcasters contributed a $500 scholarship for a deserving student in the Broadcast Communications Technology.

British Columbia Bio-Medical Laboratories contributed a $200 bursary for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

The British Columbia Council of Garden Clubs contributed a $225 scholarship to be awarded to a deserving student in the Biological Sciences Technology, Landscape Horticultural Option.

The British Columbia Floral Art Club contributed a $200 bursary for a deserving student in the Biological Sciences Technology, Landscape Horticulture Option.

British Columbia Forest Products Limited contributed $1,800 for nine $200 scholarships for deserving students with the highest scholastic standings other than those who have already won substantial awards in the following options of the Business Management Division: Adminis-

trative Management—Administration Option and the Personnel and Industrial Relations Administration Option; Computer Programming and Systems—Business Systems Option and the Management Science Option; Financial Management—Accounting Option and the Finance Option; Marketing Management—Marketing Option and the Traffic and Transportation Option; Operations Management.

TheBritish Columbia Hotels' Association contributed $1,750 for two $250 scholarships and five $250 bursaries to be awarded to students in the Hospitality and Tourism Administration Technology.

British Columbia Hydro and Power Authority contributed $1,200 for eight scholarships to be awarded to students in the Electrical, Natural Gas and Petroleum, Mechanical and Civil and Structural technologies, or students in other engineering programs having a direct interest to a public utility.

The British Columbia Institute of Technology Health Society contributed a $500 bursary to be awarded to a deserving second year student in the Health Division.

British Columbia Packers Limited contributed $500 for two scholarships in the Administrative Management Technology, one at $300 and a second at $200.

The British Columbia Sugar Refining Company Limited contributed $500 for deserving students at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

The British Columbia Tuberculosis—Christmas Seal Society contributed a $500 bursary to be awarded to a deserving student in the Nursing Technology. The bursary is to be referred to as the Helen Findlay Memorial Bursary.

Canada Cement LaFarge Limited contributed $300 to the scholarship fund for deserving students at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Canada Packers Limited contributed $150 for a scholarship to be awarded to a student in the Agricultural Management Option of the Biological Sciences Technology.

Canada Safeway Limited contributed $250 for bursaries to be awarded to deserving students in the Marketing Management Technology.

Canadian Auto Carriers Limited contributed $200 to be awarded to deserving students in either the Administrative Management Technology or the Financial Management Technology.

The Canadian Cellulose Company Limited contributed a $500 bursary to be awarded to a deserving student in the Forest Products Program.

Canadian Forest Products Ltd. contributed a $300 bursary to be awarded to a deserving student from the Mount Waddington Regional District. The donation is to be known as the Owen B. Hennigar Bursary.

The Canadian Forestry Association of British Columbia contributed a $200 bursary to be awarded to a student in the Forestry Option or the Fish, Wildlife and Recreation Option of the Forest Resource Technology who has been a member of the Junior Forest Wardens or Girl Forest Guard Movement.

The Canadian Institute of Mining and Metallurgy, South Central B.C. Branch, contributed two $250 bursaries to be awarded to second-year students in the Mining Technology. Preference is given to students who reside in south central B.C.

The Canadian Institute of Public Health Inspectors, contributed $2,500, the annual interest of which is to be awarded as a bursary to a second year student in the Environmental Health Technology. This bursary is to be referred to as the D.D. McNab Bursary.

The Canadian Institute of Public Health Inspectors, B.C. Branch, contributed $2,500, the annual interest of which is to be awarded as a bursary to a first year student in the Environmental Health Technology. This bursary is to be referred to as the Canadian Institute of Public Health Inspectors, B.C. Branch Bursary.

The Canadian Johns-Manville Company Limited contributed a $300 bursary for a deserving student in the Civil and Structural Technology.

Canadian Kenworth Limited contributed $100 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Canadian Occidental Petroleum Limited contributed $150 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

The Canadian Pulp and Paper Association contributed two $175 bursaries to be awarded to deserving students in the Pulp and Paper Option of the Forest Resourse Technology.

The Canadian Society of Radiological Technicians, British Columbia Division, contributed a $100 scholarship to be awarded to a deserving student in the first year of the Medical Radiography Technology.

The Canadian Society of Radiological Technicians, Mainland Branch, contributed $500 for bursaries in the Medical Radiography and Nuclear Medicine Technologies.

The Canadian Stevedoring Company Limited contributed $300 for a deserving student at the Institute of Technology to be awarded at the discretion of the Financial Awards Committee.

Canadian Telephones and Supplies Limited contributed $100 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

The Ralph S. Carey Memorial Fund was established by various donors to honor the memory of the late Ralph S. Carey. The monies are to be awarded at the discretion of the Financial Awards Committee.

The Cassiar Asbestos Corporation Limited contributed $1,500 for three $500 scholarships to be awarded to deserving students in mining-related technologies. These scholarships are to be referred to as the Cassiar-Bell Asbestos Scholarships.

Chapter A.S. of the P.E.O. Sisterhood contributed a $150 bursary for a deserving student in the Nursing Technology.

Chevron Canada Limited contributed $1,500 for three $500 bursaries to be awarded to deserving students in the Business Management Division.

Coast Steel Fabricators Limited contributed $50 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Cominco Limited contributed $600 for two $300 scholarships; one to be awarded to a student in the Chemical and Metallurgical Technology, and one to be awarded to a student in the Mining Technology.

Commonwealth Cosntruction Limited contributed a $250 bursary for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Craigmont Mines Limited contributed $700 for two $350 scholarships to be awarded to students in any of the following technologies: Chemical and Metallurgical, Mining and Surveying.

The Credit Union Foundation of British Columbia contributed a $300 bursary fund for deserving students at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee of the Institute.

Cullen Detroit Diesel Allison Limited contributed $100 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee. Preference to be given to students in the Engineering Division.

Data Processing Management Association contributed a $150 scholarship to be awarded to a deserving student in the Computer Programming and Systems Technology.

Delta Hotels Limited contributed a $300 scholarship to be awarded to a student in the Hospitality and Tourism Administration Technology.

The Dillingham Corporation Canada Ltd. contributed a $250 bursary to be awarded to a deserving student in the Civil and Structural Technology.

Doorman Agencies Limited contributed $600 for three $200 scholarships for deserving students in the Hospitality and Tourism Administration Technology at the Institute on behalf of the Arthur Bell and Sons, Perth, Scotland (Bells Scotch), Marnier Lapostolle, Paris, France (Grand Marniér), Heineken Breweries, Amsterdam, Holland.

The Durand Machine Company Limited contributed a $250 bursary for a deserving student at the Institute of Technology, to

be awarded at the discretion of the Financial Awards Committee.

The East Asiatic Company (Canada) Limited contributed $50 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

A scholarship of $400, the gift of the Eaton Foundation, will be available to a student in the Marketing Option of the Marketing Management Technology in the Business Managment Division.

The Edelweiss Credit Union contributed a $250 bursary for a student who is an active member, or a son or daughter of an active member of the Edelweiss Credit Union.

The Electrical Equipment Association of British Columbia contributed a $100 bursary for a deserving student in the Electrical Technology.

The 1976-77 Electrical Technology class contributed $114.74 for a bursary to be awarded to a needy student in the second year of the Electrical Technology.

Endako Mines, Division of Canex Paper Limited, contributed $700 for two $350 scholarships to be awarded to students in any fo the following technologies: Chemical and Metallurgical, Mining or Surveying.

Fiberglas Canada Limited contributed $150 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Field's Stores Limited contributed $150 for a bursary to be known as the Field's Stores Lew Rogers Memorial Bursary, to be awarded to a student in the Marketing Management Technology.

The Fisheries Association of British Columbia contributed $900 for six $150 bursaries to be awarded to deserving students in the Food Processing Option of the Biological Sciences Technology.

Flanders Installations Limited contributed $840 for two $420 bursaries for a deserving student in the Mechanical Technology and for a deserving student in the Electrical Technology.

The Fraser Valley Milk Producers Association contributed $150 for a bursary to be awarded to a deserving student in the Biological Sciences Technology, Food Production or Food Processing Options.

Fresh Pak Limited contributed a $100 bursary to be awarded to a deserving student in the Hospitality and Tourism Administration Technology.

Garland Commercial Ranges Limited contributed a $100 scholarship for a deserving student entering his second year at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Gibraltar Mines Limited contributed $700 for two $350 scholarships to be awarded to students in any of the following technologies: Chemical and Metallurgical, Mining or Surveying.

Dean H. Goard contributed $100 for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee. Mr. Goard was the former principal of the B.C. Institute of Technology.

Gray Beverage Company Limited contributed a $300 bursary fund to be awarded to deserving students in the Marketing Management Technology.

The Gulf of Georgia Towing Company Limited contributed $200 for two $100 scholarships to be awarded to students in the Accounting Option of the Financial Management Technology.

Gulf Oil of Canada Limited contributed a $300 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Hard Corps (Western International Hotels Scholarships Foundation) contributed a $400 scholarship to be awarded to a student in the Hospitality and Tourism Administration Technology.

The M.C.D. Hobbs Bursary Fund was established by Mr. M.C.D. Hobbs, a past member of the Board of Governors. The interest from the $1,00 donation is to be awarded to a deserving student of the Institute at the discretion of the Financial Awards Committee.

Hudson's Bay Company contributed $500 for deserving students at the Institute of Technology, to be awarded to students in the Business Division at the discretion of the Financial Awards Committee.

Imperial Oil Limited contributed $550 to deserving students at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Imperial Order Daughters of the Empire —Colonel Burnaby Chapter contributed a $250 bursary for a deserving student in the Health Division residing in Burnaby. The Bursary is known as the Beatrice Pontifex Bursary.

I.C.L. Engineering Limited contributed $300 for a bursary or bursaries to be awarded to a deserving student or students in the Mechanical Technology.

Inland Natural Gas Company Limited contributed a $250 scholarship to be awarded to a student in the Natural Gas and Petroleum Technology residing in the area serviced by Inland Natural Gas Company Limited.

The Institute of Chartered Accountants of British Columbia has contributed a $100 bursary to be awarded to a second year Financial Management student with an overall second class standing and a good record in accounting. The student should also be interested in entering the accounting profession.

International Business Machines, Canada Limited, contributed $600 for two $300 scholarships; one to be awarded to a student in the Computer Programming and Systems Technology, and one to be awarded to a student in the Electrical Technology.

The Laurie Jack Memorial Bursary was established by various donors in memory of Laurie Jack, former president of the BCIT Student Council, the annual interest of which is to be awarded to a deserving student at the discretion of the Financial Awards Committee.

Kauwinch River Logging contributed $250 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Kelly, Douglas & Company Limited contributed a $100 scholarship to be awarded to a student in the Business Management Division.

Kennco Explorations, (Western) Limited, contributed $250 for a scholarship to be awarded to a student in the Mining Technology.

Kodak Canada Limited contributed $200 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

The Lapidary Rock & Mineral Society of British Columbia contributed $200 for two $100 bursaries to be awarded to students in the Mining Technology.

Laurentide Financial Corporation Limited contributed $500 for two $250 scholarships to be awarded to students in the Financial Management Technology.

Lawson Graphics Pacific Limited contributed $45 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Mr. W. Lee contributed a $200 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee. This bursary was established by Mr. W. Lee in memory of his mother, Mrs. Sue Lee.

MacMillan Bloedel Limited contributed $700 for two $350 scholarships to be awarded to a student in both the Forestry Program and Forest Products Program of the Forest Resource Technology.

The Derek S. Mann Memorial Fund was established by various donors, the annual interest of which is to be awarded to deserving students in the Building Technology.

McCarter, Nairne & Partners contributed a $150 scholarship to be awarded to a student in the Building Technology.

Mill & Timber Products Ltd., established the Sam Hughes Memorial Bursary Fund to honor the memory of the late Mr. Sam Hughes, principal of the company. The fund is to contribute $300 for two $150 busaries; one to be awarded to a deserving student in the Forest Resource Technology, and one to be awarded to a deserving student in the Administrative Management Technology. The fund was supported by an initial contribution of $2,049, representing the total proceeds of donations to the Sam Hughes Memorial Fund.

Mohawk Oil Company Limited contributed $500 to be distributed as follows: one $125 bursary to a deserving student in the Marketing Management Technology; one $125 bursary to a deserving student in the Operations Management Technology; and $200 to be awarded to deserving students in the Natural Gas and Petroleum

Technology.

Nabob Foods Limited contributed $500 for two $250 scholarships for deserving students in the Food Processing and Food Production Options of the Biological Sciences Technology.

The Nuclear Medicine Advisory Committee contributed a $150 scholarship to be awarded to a deserving student in the first year of the Nuclear Medicine Technology.

Overseas Monitor Corporation Limited contributed a $100 scholarship for a deserving student in the Biomedical Electronics Technology.

Pacific Logging Company Limited contributed $750 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Pacific Press Limited contributed a $250 bursary for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Pacific Western Airlines contributed $250 for deserving students at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Pannell, Kerr, Forster & Associates contributed a $200 scholarship to be awarded to a deserving student in the Hospitality and Tourism Administration Technology.

E.B. Peerless Limited contributed $50 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Philips Cables Limited contributed $250 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Placer Development Limited contributed $700 for two $350 scholarships to be awarded to students in the Financial Management Technology.

Robert Quinn Associates contributed a $50 bursary to be awarded to a deserving student in the Marketing Management Technology.

Rayonier Canada (B.C.) Limited contributed $1,050 for three $350 scholarships; one to be awarded to a student in the Wood Option, one to be awarded to a student in the Pulp and Paper Option of the Forest Products Program, and the third to be awarded to a student in the Forestry Program—all in the Forest Resource Technology.

Read Jones Christoffersen Limited contributed $100 for a bursary to be awarded to a student in either the Building Technology or the Civil and Structural Technology.

William Robinson Limited contributed a $150 bursary to be awarded to a deserving student in the Food Option of the Biological Sciences Technology.

The Rotary Club of Vancouver contributed a $1,000 bursary fund for deserving students at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Royal City Foods Limited contributed $200 for a scholarship to be awarded to a student in the Food Processing or Food Production Option of the Biological Sciences Technology.

Russell Food Equipment Limited contributed $300 for a scholarship to be awarded to a student in the Hospitality and Tourism Administration Technology.

Gordon Russell Limited contributed $50 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Sauder Industries Limited contributed $2,500 for deserving students at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Seaspan International Limited contributed a $100 bursary for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

R.P. Shaflik Engineering Limited contributed $50 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Shell Canada Limited contributed a $250 bursary for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

H.A. Simons (International) Limited contributed $1,250 for deserving students at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Smith Paper Limited contributed $400 to the bursary fund for deserving students at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

The Society of Engineering Technologists of the Province of British Columbia contributed $200 for four bursaries of $50 each to be awarded to deserving students in the Building, Chemical and Metallurgical, Civil and Structural, Electrical, Forest Resource, Mechanical, Mining, Natural Gas and Petroleum and Surveying technologies. This bursary is to be known as the James Irwin Thompson Memorial Fund.

Mrs. Mabel Stringer, in memory of her late husband, contributed $3,000, the annual interest of which is to be awarded as a bursary to a second year student in the Environmental Health Technology. This bursary is to be referred to as the John A. Stringer Bursary.

Sun-Rype Products Limited contributed $150 for a scholarship to be awarded to a deserving student in the Biological Sciences Technology.

Tahsis Company Limited contributed $500 for two $250 scholarships; one to be awarded to a student in the Forest Products Program, and one to be awarded to a student in the Forestry Program of the Forest Resource Technology.

The Telephone Supervisors' Association of B.C. contributed a $50 bursary for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

The This 'n' That Campus Shop contributed a $500 bursary for a deserving student entering second year in any one of the Engineering Division technologies. This bursary is in memory of the late Mr. W.V. Rudd, a former instructor of the Civil and Structural Engineering Technology.

Thompson, Berwick, Pratt & Partners contributed a $100 scholarship to be awarded to a student in the Building Technology.

Trans Mountain Pipe Line Company Limited contributed $1,000 for four $250 bursaries for deserving students at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Vancouver Cablevision Limited contributed a $300 scholarship for a deserving student in the Television Option of the Broadcast Communications Technology.

The Vancouver Milk Foundation contributed $10,000 during 1972 to provide on an annual basis two $250 bursaries to deserving students entering, or in, the Biological Sciences Technology.

The Vancouver Shellfish & Fish Company Limited contributed a $100 bursary for a student in the Hospitality and Tourism Administration Technology.

The Vancouver Women's Transportation Club contributed $200 for deserving students in second year in the Traffic and Transportation Option of the Marketing Management Technology.

The Victoria Milk Foundation contributed $10,000 during 1972 to provide on an annual basis two $250 bursaries to deserving students from Vancouver Island entering, or in, the Biological Sciences Technology.

Weldwood of Canada Limited contributed a $750 bursary fund to be awarded to deserving students in the Forest Resource Technology.

Western Canada Steel Limited contributed $400 for a deserving student in a steel manufacturing related technology.

Western Guides and Outfitters Association contributed a $150 bursary for a student in the Fish, Wildlife and Recreation Option of the Forest Resource Technology.

Wilkinson Company Limited contributed $250 for deserving students at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Wire Rope Industries Ltd. contributed $100 to be awarded to the highest academic graduating student in the Physical Metallurgy Option of the Chemical and Metallurgical Technology.

Wright Engineers Limited contributed a $250 scholarship to be awarded to a student in the Mechanical Technology.

Xerox of Canada Limited contributed a $500 scholarship for a deserving student in the Business Management Division or

the Electrical Technology. This award is known as the Xerox of Canada Fellowship Award.

Engineering Division Entrance Scholarships
These scholarship awards are available to high school graduates who have been accepted into the first year of specific programs of study in the Engineering Division of the Institute. The scholarships consist of a financial award to the student and an undertaking by the donor company to provide him or her with employment during the summer prior to the commencement of the first year of study and during the summer prior to the second year of the program.

The selection is normally based on scholastic achievement in grades 11 and 12, although other special conditions may apply as specified by the donor. The donors are companies presently engaged in the forest products industry of British Columbia and preference is given to sons or daughters of employees.

British Columbia Forest Products Limited awarded four entrance scholarships of $700 each to students entering the first year of the Instrumentation Technology and the first year of the Pulp and Paper Option, the Wood Products Option and the Forestry Option of the Forest Resource Technology.

Canadian Cellulose Company Limited awarded three entrance scholarships of $1,200 each to students entering the first year of the Pulp and Paper and Wood Products options of the Forest Resource Technology. Preference is given to students graduating from school districts in which the company maintains its principal operations.

Canadian Forest Products Ltd. awarded two entrance scholarships of $750 each to students entering the first year of the Pulp and Paper Option of the Forest Resource Technology. These awards are known as the Howe Sound Pulp Division awards.

Joint Ventures Companies awarded two entrance scholarships of $500 each to students entering the first year of the Pulp and Paper Option of the Forest Resource Technology.

MacMillan Bloedel Limited awarded two entrance scholarships of $700 each to students entering the first year of the Pulp and Paper and Wood Products Options of the Forest Resource Technology.

Northwood Pulp and Timber Limited awarded two entrance scholarships of $750 each to students entering the first year of the Pulp and Paper and Wood Products Options of the Forest Resource Technology.

Weyerhaeuser Canada Ltd. awarded one entrance scholarship of $700 to a student entering the first year of the Pulp and Paper Option of the Forest Resource Technology.

Health Division Bursaries
At present, the Ministry of Health of the provincial government through the auspices of the B.C. Hospital Insurance Services is allocating bursaries of $150 per month to all students in the following Health technologies: Biomedical Electronics, Health Data, Medical Laboratory, Medical Radiography, Nuclear Medicine, Psychiatric Nursing and General Nursing.

Financial Assistance for Part-Time Students
The Kiwanis Club of Vancouver has established an assistance fund at BCIT as a memorial to the late Honorable H. Stevens. Interested businesses, individuals or organizations are encouraged to contribute to this worthwhile fund.

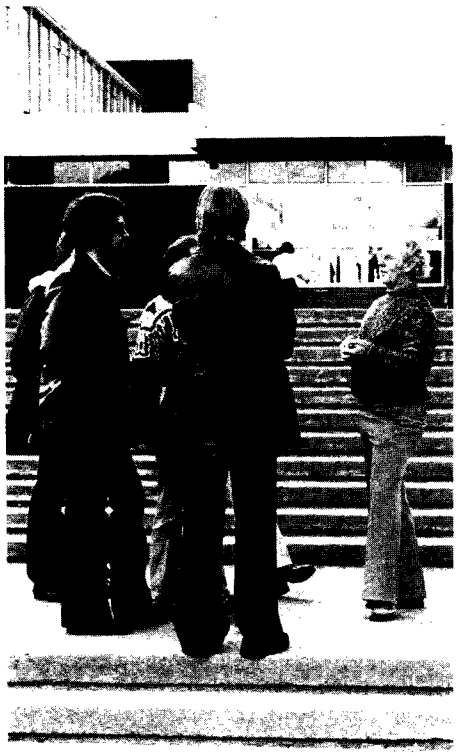
An initial contribution of $1,000 to start this fund was made by B.H. Campbell, Director of Training, The Western Joint Electrical Training Society.

To be eligible, an applicant must demonstrate financial need, must be a part-time student at BCIT, upgrading existing skills or retaining for his or her betterment, and a B.C. resident for at least one year prior to application for assistance. Special cases who do not meet all of these criteria will also be considered.

Application forms are available from either the Counselling Centre or through Continuing Education.

Special Funds
Kwikasair Limited — Traffic and Transportation Management Fund. Kwikasair Limited has donated $1,000 to the Institute to assist students in our Traffic and Transportation Management Option. These funds will be administered by the Director of the Business Management Division and will be used to assist students in deferring expenses associated with field trips, class projects and student participation in conferences related to their studies.

Business Management Director's Fund
This fund is available without restrictions to the Director of the Business Management Division for special projects and activities. Organizations and companies who have contributed to this fund include Air Canada, B.C. Association of Broadcasters, B.C. Television Broadcasting System Ltd., CP Air, Canadian Pacific Hotels Ltd., T. Eaton Company Ltd., The Hotel Vancouver, Hudson's Bay Company, Institute of Chartered Accountants, Johnston Terminals Ltd., Pacific Western Airlines, Pemberton Securities Limited, Real Estate Council of B.C., Scott Paper Limited, Simpsons-Sears Limited, Society of Industrial Accountants of B.C. and Trans Mountain Pipe Line Company Ltd.




BCIT
18,000.00

Examinations and Marks

Examinations
Formal examinations are written at the conclusion of each term.

Determination of Standing
Final standing is determined on the basis of term or quarterly progress and examination results. A minimum of 50 per cent in each subject is required for course credit. Final standing is computed according to the following schedule:

First class	80% or more
Second class	65% to 79%
Pass	50% to 64%
Failure	Below 50%

The symbol "A" (aegrotat) indicates that the student was absent from the final examination because of medical reasons but was granted standing on the basis of the term or quarter achievement. "Aegrotat" standing may apply to all subjects or to a single subject.

Statements of Marks and Transcripts
A statement of first or third-term marks will be given to each student at the beginning of the following term. These will be handed out in class and will indicate whether the student is eligible to begin the next term.

A transcript of marks is mailed to the student's home address as soon as the Marks Review Committee releases the final examination results in June of each year.

A fee of $1 is charged for each transcript of an undergraduate's or graduate's statement of marks, available from the Admissions Centre. The fee must be paid before the transcript is made up.

No statement of marks, transcript, diploma or certificate will be issued until the student has cleared up all financial and other obligations to the Institute in the way of fees, overdue library books or outstanding fines. These documents may also be withheld on such other grounds as the Board of Governors may from time to time direct.

Return of Examinations
Mid-term and Christmas examination papers may be returned to students 10 school days after the student has received his or her statement of marks and six weeks following the examination. Only those examinations designated as "restricted exams" by the Division Director shall not be returned.

Rereads
If a student wishes to appeal a final mark, a written request for a reread of the examination in question should be submitted to the Office of the Registrar within 10 school days after he or she has received the statement of marks. There is a fee of $5 for each subject reread. If the original mark is favorably adjusted, the fee will be refunded.

Failure and Repetition
A student who fails a term may be permitted to repeat the term only at the discretion of the Division Director and the Registrar. It is the responsibility of the student who has failed one or more subjects, but is permitted to continue with his or her program of studies, to present evidence of successful completion of the failed subject(s) to the Office of the Registrar for verification before a Diploma of Technology will be awarded.

Diplomas

Graduates of the British Columbia Institute of Technology will be awarded a nationally-recognized Diploma of Technology at the convocation exercises. An Honors Diploma is awarded to a graduating student whose average of all courses that constitute a second-year program of studies is 80 per cent or greater. A student must take a full second-year program load to qualify for an Honors Diploma; that is, 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 academic year or its equivalent. This program may be made up of courses within one Division or more than one Division. Each program will be developed in consultation with the student's department head, giving special recognition to the student's individual needs. Each program leading to a double diploma must be approved by the Division Director(s) concerned and the Registrar.

Awards, Medals and Prizes

Academic Awards

Academic awards are presented on three occasions during the school year: the Governor General's medal, diplomas and honor awards at convocation; academic medals and prizes at a special awards ceremony held in conjunction with the convocation exercises; entrance scholarships, first year scholarships and prizes at the fall scholarship ceremony. See page 107 for a full list.

Honor Awards

Three honor awards are presented at convocation.

The Governor General's medal is presented to the top academic student in his or her graduating year.

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

The Principal's Award is presented to a student for outstanding personal contribution to BCIT.

Service Awards

Hudson's Bay Company Service Awards
These awards are available to first-year students proceeding to their second year in one of the business management technologies. The award includes payment of tuition fees and dues for the second year, full-time summer employment, and part-time employment according to the students availability during the academic year. Applicants for these awards should have some interest in and aptitude for retailing, but successful candidates are under no obligation of any kind. Applications are invited from first-year students in March of each year. Recipients are selected from a list recommended by the Institute.

Weiser Lock Company Limited
An award is available to a first-year student proceeding to his or her second year in the Mechanical Technology in the Engineering Division. The award includes payment of tuition fees and dues for the second year, plus summer employment. Applications are invited from first-year students in March of each year. Recipients are selected from a list recommended by the Institute.

Academic Medals

Silver medals are awarded annually to the graduate who has achieved the highest academic standing in his or her program of studies. The following medals were awarded at the 1977 convocation ceremonies. As indicated, most of the awards included a $100 prize.

Outstanding Academic Achievement
The Governor General's Silver Medal

Business Management Division

Administrative Management
Administration: The Bank of British Columbia Award ($100)
Manpower: The Finning Tractor & Equipment Co. Ltd. Award ($250)
Public Administration: The Municipal Officers' Association of British Columbia Award ($100)

Broadcast Communications
The British Columbia Association of Broadcasters' Award

Computer Programming and Systems
The British Columbia Telephone Company Award ($100)

Financial Management
Accounting: The Society of Industrial Accountants of British Columbia ($100)
Finance: BCIT Alumni Association Award ($100)

Hospitality and Tourism Administration
The British Columbia Hotels' Association Award ($100)

Marketing Management
Marketing: The Vancouver Sun Award ($100)
Traffic and Transportation: The Dow Chemical of Canada Ltd. Award ($150)

Engineering Division

Biological Sciences
Agri-Management: B.C. Federation of Agriculture ($100)
Food Production: Agricultural-Chemical Industry of Vancouver Award ($100)
Food Processing: Food Executives Club of Vancouver Award ($100)
Landscape Horticulture: The British Columbia Nursery Trades Association Award ($100)

Building
The Architectural Institute of British Columbia Award ($200)

Chemical and Metallurgical
Industrial Chemistry: The Chemical Institute of Canada Award
Physical Metallurgy: The Wire Rope Industries of Canada Limited, Award ($100)
Extractive Metallurgy: The Canadian Institute of Mining and Metallurgy, British Columbia Section, Award ($100)

Civil and Structural
The Col. W.G. Swan Award ($100)

Electrical
Control Electronics: The MacDonald Dettwiler and Associates Ltd. Award ($100)
Power: The Federal Pioneer Ltd. Award ($100)
Telecommunications: The Lenkurt Electric (Canada) Ltd. Award ($100)

Forest Resource
Forestry: The Council of the Forest Industries of British Columbia Award ($100)
Forest Products (Wood Option): The Council of Forest Industries of British Columbia Award ($100)
Forest Products (Pulp and Paper Option): The Canadian Pulp and Paper Association, Technical Section, Pacific Coast and Western Branches Award ($200)

Mechanical
The Canadian Manufacturers' Association British Columbia Division Award in Production ($100)
The Canadian Society for Mechanical Engineering Award in Design

Mining
The Canadian Institute of Mining and Metallurgy, British Columbia Section Award ($100)

Surveying
The David H. Burnett & Associates Award ($100)

Health Division

Health Data
The Health Record Association of British Columbia Award ($50)

Medical Laboratory
The British Columbia Society of Medical Technologists Award

Medical Radiography
The British Columbia Radiological Society Award ($150)

Nuclear Medicine
The Charles E. Frosst & Company Award ($100)

Psychiatric Nursing
The Richard Strong Memorial Award ($250)

Prizes

The following prizes were awarded at the 1977 convocation ceremonies to graduates who had gained the highest standing in specific subjects related to the pertinent industry, or who had shown the greatest combination of academic ability and leadership to warrant unusual recognition.

Business Management Division

Administrative Management
The Administrative Management Society ($100)
Block Bros. Realty Ltd. awarded a prize of $100 to a graduating student in Real Estate.
The Westcoast Transmission Company Limited awarded a $100 prize to the top student in the Management IV course.

Financial Management
Canada Permanent Trust Company awarded a prize of $150 to the outstanding graduate in Finance 16.361 and 16.461.
The Dow Jones and Company Inc. awarded a prize to an outstanding student in the Finance Option of the Financial Management Technology.
The Certified General Accountants Association of British Columbia awarded a prize in the form of a Continuing Education Tuition Scholarship to a student in the Financial Management Technology.
The Financial Executives' Institute, Vancouver Chapter, awarded a $200 prize to the best all-round student in the Financial Management Technology.

Hospitality and Tourism Administration Technology
The Bayshore Inn awarded a prize of $200 to an outstanding student in the Hospitality and Tourism Administration Technology.
The Restaurant & Foodservices Association of British Columbia awarded a prize of $100 to an outstanding student in the Hospitality and Tourism Administration Technology.
The Food Service Executives Association awarded three prizes of $100 each to three graduates of the Hospitality and Tourism Administration Technology.
The Georgia Hotel awarded a prize of $125 to a student in the Hospitality and Tourism Administration Technology.
The Hotel Vancouver awarded a prize of $250 to an outstanding student in the Hospitality and Tourism Administration Technology.
S.J. Renard Hospitality Consultants Limited, Bill Dow Prize of $100 for hospitality and goodwill.
White Spot Limited awarded two prizes, one of $300 and one of $200, to students who had obtained outstanding achievement in the Hospitality and Tourism Administration Technology.

Marketing Management
The Vancouver Transportation Club awarded a $300 prize to a student graduating in Traffic and Transportation.
The Block Bros. Realty awarded a $100 prize to a student graduating in Real Estate Management.

Operations Management
The Margery A. Smylie Memorial Prize ($100)

Engineering Division

Building
The Clay Brick Association of Canada awarded a prize of $100 to a student who had obtained outstanding achievement in the Building Technology.
The Royal Institution of Chartered Surveyors Book Prize was awarded to the outstanding student in Construction Specifications and Estimating 40.304 and 40.404.
P.B. Ford and Company awarded $100 to a student who had obtained outstanding achievement in the Building Technology.
The Quantity Surveyors Society of British Columbia awarded a $100 prize to the top graduating student in the Economics Option.

Chemical and Metallurgical
The Chemical and Metallurgical Department Prize was awarded to the student obtaining the highest average in the third and fourth terms of the Pollution Treatment Option.

Electrical
The Instrument Society of America, Vancouver Section, J.J. Garey Award was presented to a graduating student known to the Instrument Society of America.

Forest Resource
The Canadian Institute of Forestry, Vancouver Section, Prize was awarded to an outstanding graduate in the Forestry Program of the Forest Resource Technology.
The Canadian Pulp and Paper Association, Technical Section, Pacific Coast and Western Branches, awarded a prize of $200 and a scroll to an outstanding graduate in the Pulp and Paper Option of the Forest Resource Technology.

Mechanical
The Institution of Mechanical Engineers Western Canada Branch Book Prize was awarded to the graduate in the Mechanical Technology who gained the highest marks in the other option from that followed by the student who was awarded the Canadian Manufacturers' Association medallion.
Bennett Pollution Controls Limited awarded a prize of $50 to an outstanding student in Mechanical Technology.
The Bingham-Willamette Limited awarded a prize of $100 to an outstanding student in Mechanical Technology.
The Windsor Machine Company Limited awarded a prize of $100 to an outstanding student in Mechanical Technology.

Surveying
The Corporation of Land Surveyors of the Province of British Columbia Prize was awarded to an outstanding graduating student in the Surveying Technology.

Health Division

Medical Laboratory
The Metropolitan Bio-Medical Laboratories Ltd. awarded two prizes of $100 each to the best student in bacteriology and the best student in biochemistry.
The Orth-Diagnostics (Canada) Ltd. awarded a prize of $50 to the graduate in the Medical Laboratory Program who had gained the highest standing in Blood Banking.
The Warner-Chilcott Laboratories Co. Limited awarded a General Proficiency Prize of $100 to an outstanding student in the Medical Laboratory Technology.

Nuclear Medicine
The Metropolitan Biomedical Laboratories Ltd. awarded a prize of $100 to an outstanding student in Nuclear Medicine.

General Nursing
The W.B. Saunders Company Canada Limited Prize was awarded to an outstanding student in Nursing.
The Registered Nurses' Association of Lions Gate Hospital awarded a $100 prize to the best bedside nurse.

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 an exemplary fashion at all times and pay diligent attention to their studies. If the Principal believes a student's conduct is such that it is detrimental to the interest of the Institute, he or she may be excluded from further attendance. In assessing a student's capability, the Principal will take into consideration his or her conduct and attitude, both on and off the campus. A student who has been expelled or suspended will not be admitted to the Institute grounds or buildings. A student may appeal an expulsion or suspension to the Principal. The decision of the Principal will be final.

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

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

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

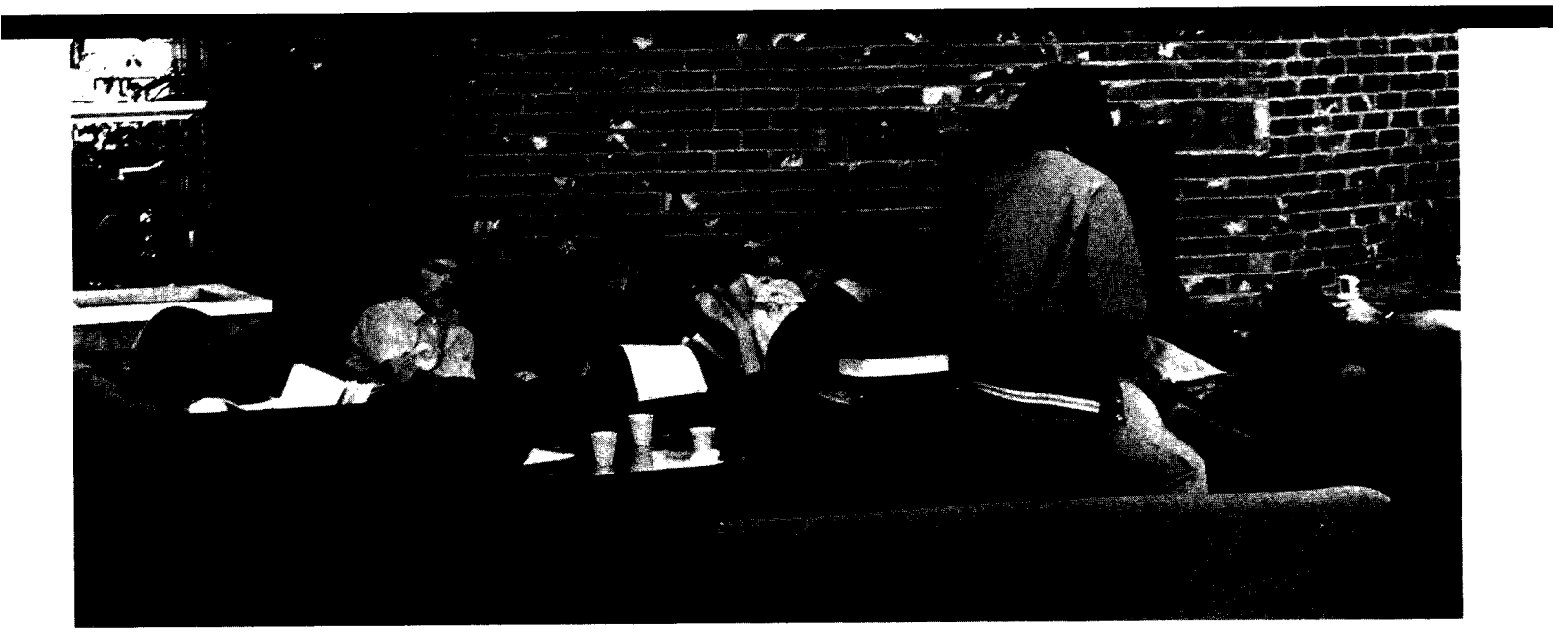
5. General supervision over all forms of entertainment given under the auspices of a student organization comes under the jurisdiction of the Principal.

6. It is the policy of BCIT to rely on the judgment 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 trip 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; e.g., hospital, or otherwise dress himself or 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. Technology faculty are prepared to advise students in the area of acceptable attire.

7. Regular attendance in lectures, seminars and laboratory periods is required of all students. If a student is absent for any cause other than illness for more than 10 per cent of the time prescribed for any subject, he or she may be prohibited from writing the final examination in that subject. In case of illness or other unavoidable cause of absence, the student should communicate immediately with his Department Head, stating the cause of absence. Special regulations governing attendance in clinical experience areas are prescribed by the Health Division.

Campus Life



The staff of the Campus Life Department want your two years at BCIT to be as enjoyable and as hassle-free as possible. The Department is responsible for admissions, student records, athletics, recreation and housing.

The course load at BCIT is heavy, and in a pressured environment, things can get you down. A policy or regulation may seem unfair, you may face an unexpected move or you might wonder why croquet isn't part of the intramurals program. Whatever your concern may be, please feel free to see one of the people in the Campus Life Department.

Located in the Admissions Centre (Administration Building, main entrance):

G.N. (Jerry) Lloyd	Director of Campus Life and Admissions
Happy Koch	Secretary to the Director
Terry Field	Registrar
Elaine Del Gobbo	Manager of Admissions and Systems

Located in the Campus Life Trailer (next to the Student Activity Centre):

Wally Rowan	Campus Recreation Coordinator
Derek Swain	Athletics Manager
Karen Ford	Secretary to the Athletics Department
Graham Fane	Student Affairs Coordinator

Located in the Maquinna residence office:

Val Karpinsky	Manager of Student and Conference Housing
Cathy Davies	Secretary

Located in the Athletic Office (in the SAC Building):

Jim Mitchell	Assistant Athletics Manager
Sherri Clarke	Athletics Therapist
Earl Scott	Stockman

In Your Spare Time . . . . .
Classes break for three hours every Wednesday from 11:30 a.m. to 2:30 p.m. Special events, intramural athletics and club meetings are traditionally scheduled at this time, although activities take place throughout the week.

Recreation
Coed volleyball, ice hockey, flag football, indoor soccer, cross-country and basketball teams are organized at the beginning of the school year. Teams participate in tournament or league play and may be made up of one or several technology groups. Play is geared to recreation rather than competition. Watch the student newspaper ("The Link") in September for details.

An activity room in the Student Activity Centre is equipped with weights, speedbags, table tennis and a universal gym, and is open from 7:30 a.m. to 11:00 p.m. during the week and from 10:00 a.m. to 10:00 p.m. on weekends and holidays. The gym is also available for impromptu badminton and basketball. Four tennis courts, an all-weather track and a regulation grass sports field are located to the south of SAC. Another all-weather field is available for intramurals and recreational play.

For more competitive sports enthusiasts, there is a varied extramural program for men and women in basketball, volleyball, golf, ice hockey, soccer and rugby. BCIT is a founding member of the province-wide Totem Conference, and a member of the Western Canada 4-West Championships, as well as the nation-wide Canadian College Athletic Association. BCIT has been notably successful in Totem Conference and Western Canada league play. A full-time athletics trainer is on staff to treat and prevent sports injuries.

BCIT also has the distinction of having one of the finest logger sports fields in Western Canada. The field was created by students in the Forest Resource Technology and is the site of the annual King of the Woods logger sports competition.

Special Events
Social functions such as pubs and dances, as well as guest lecturers, folk singers and theatre groups are scheduled throughout the year in the Student Activity Centre.

When You Need a Friend . . . . .
The Student Affairs Coordinator is available to help you to cut through the red tape and put you in touch with the right people who can solve problems ranging from academic concerns to parking.

BCIT Student Association

The BCIT Student Association works to provide services and representation for all the students at BCIT. All full-time day school students are members of the Association and are entitled to use its facilities.

The BCIT Student Association is comprised of the President and his or her eight-member Executive, elected in February of each year. The Executive includes the Vice President, Internal; Vice President, External; Treasurer; Sports Chairperson; Health Society Chairperson; Engineering Society Chairperson; Business Society Chairperson; and the Activities Chairperson. The responsibilities of the Executive include representation to the administration of the Institute, other student associations and all levels of government, and fulfilling the varied needs of the student population.

The student activity fee is the main source of operating capital for the Association. These monies are used for equipment, facilities and administrative expenses of clubs, athletics and social activities.

A business manager is hired by the Association to guide the Executive in financial matters and to coordinate the Association offices. If you have any questions that cannot be answered elsewhere, Business Manager Phil Henderson is a good source of information. The business office of the Association in the Student Activity Centre is open from 8 a.m. to 5 p.m. weekdays. Our secretary, Janice Eden, will assist you with matters pertaining to the Association.

Our Student Publications Centre, managed by Michael Kluckner, produces the orientation newspaper, "BCIT Daze", the student newspaper, "The Link", and the yearbook.

Each Division of BCIT elects a division council comprised of a chairperson and one member for each group of 250 students in the Division. Each Division Council has its own budget for student activities. The three chairpersons are responsible to both the BCIT Student Association Executive and the students of their Division. Students' suggestions are welcomed by Division Council representatives and chairpersons. The health, business and engineering societies' offices are located in SAC.

Activities and Events

Each September BCIT students take to the streets to shine shoes to raise money for cystic fibrosis research. Shinerama has become a traditional back-to-classes event and has generated well over $60,000 for the cystic fibrosis campaign in the past seven years, as well as giving student shiners a chance to get to know their classmates. BCIT's contributions rank in the top six of the 42 participating Canadian college and university groups. Over 700 students sign up as shiners and receive a free ticket to the Shinerama dance as a "thank you".

The Variety Club Telethon held in February also attracts high student participation. Our students take telephone pledges during the Telethon and also make a donation. In 1978, the BCIT Student Association presented a cheque for $18,000 to the Telethon, bringing our donation total to over $70,000 since we first became involved in 1973. The Telethon funds go towards a variety of charitable causes. The current project is the Children's Hospital.

In addition to the spirited Bierfest celebrations in the fall, a beer garden is held from 4:40 to 9:30 p.m. Monday through Thursday in the SAC and pubs are held almost every Friday and Saturday night. Some are sponsored by technology groups. Top-name groups from the Lower Mainland are booked as entertainment.

Clubs

Students interested in forming clubs can contact the Activities Chairperson or Sports Chairperson. Present groups include motorsports, scuba diving, winemaking, kung fu, karate, the Outdoors Club and the BCIT Band. The BCIT Student Association also operates the Whistler Lodge in Garibaldi Park on a year-round basis for students and their guests.

The BCIT Student Association also operates the This and That (T 'n' T) campus shops and a used bookstore. See page 125 for details.

Housing

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

You may wish to apply for accommodation in the Willingdon Residences or in the new on-campus residence slated to open in September 1978. Or you may prefer private housing.

New BCIT Residence
Located on campus less than one minute's walk from classes, the campus residence consists of five low-rise split-level houses with a total of 250 beds and common cooking and living facilities. Parking and administrative services are also provided.

Six single study-bedrooms, carpeted and comfortably furnished with bed, desk, bureau and linens, are located on each floor and share individualized washroom facilities. Two bedroom floors of six students share a kitchen, dining area and living room. The common kitchen area includes two refrigerators, two stoves and two sinks, and adequate cupboard space. Each house accommodates 50 people and has a don's apartment. There are separate laundry and storage facilities for each house. Houses will accommodate students on an all-male, all-female or co-educational basis.

Willingdon Residence, located across the street from the BCIT campus, is adjacent to a complex which combines a justice training centre and a juvenile remand and assessment centre. The residence is comprised of three cottages; two for males, one for females. Each cottage accommodates 22 persons in single rooms with kitchen facilities for each 11 persons. Linen and furniture are provided, but each person must supply his or her own kitchen utensils.

A few one-bedroom apartments for married students are available. Interested students should apply by letter directly to the Housing Manager at BCIT.

How to apply for residence accommodation
First priority for residence accommodation is given to students from outside the Lower Mainland. There is equal priority for first-year, second-year and transfer students. Every student receives an application for residence following notification of acceptance by the BCIT Admissions Centre. The residence application should be completed and returned to the Housing Office immediately. Applicants will be informed of their status by August.

If you'd rather live off campus
Most BCIT students live in off-campus housing, since residence accommodation is limited. The Housing Office compiles a listing of accommodation offered by residents of the surrounding communities and has established a regular resource of off-campus housing for BCIT students. Maps, telephone service, general information and listings are available for use in the Housing Office during the week with some weekend service during the late summer. Please contact the Housing Office by mail or telephone to check on weekend hours.

Medical Services

A five-bed Medical Service, located in the Student Activity Centre, is staffed by a physician and a public health nurse, Monday through Friday, 8:30 a.m. to 4:30 p.m. A doctor is on call at all times and the Burnaby General Hospital is ten minutes from campus. Interviews with the doctor are chargeable to the student's medical plan. Students must be covered under their parents' medical plan or make their own arrangements for coverage before registration. Some medication is dispensed free-of-charge and most immunizations are free. There is no dentist on staff, but the Medical Service can usually assist with dental appointments.

Staff

Barbara E. Copping, B.Sc., M.Sc., M.D., Director-Physician
David Mullard, M.B., B.S., Physician
Keith Chambers, B.Sc., M.D., Physician
Eelin C. Fenner, C.H.N., Nurse
Joan Barrett, Receptionist

Counselling

Free confidential counselling services are available to all students or prospective students who wish assistance with career, vocational, academic, personal and social concerns. The personnel in the Counselling Centre are qualified counselling psychologists and social workers with a sincere interest in the well-being and personal growth of students.

Appointments are recommended for prospective students and may be made in person or by phoning 434-5734, local 327.

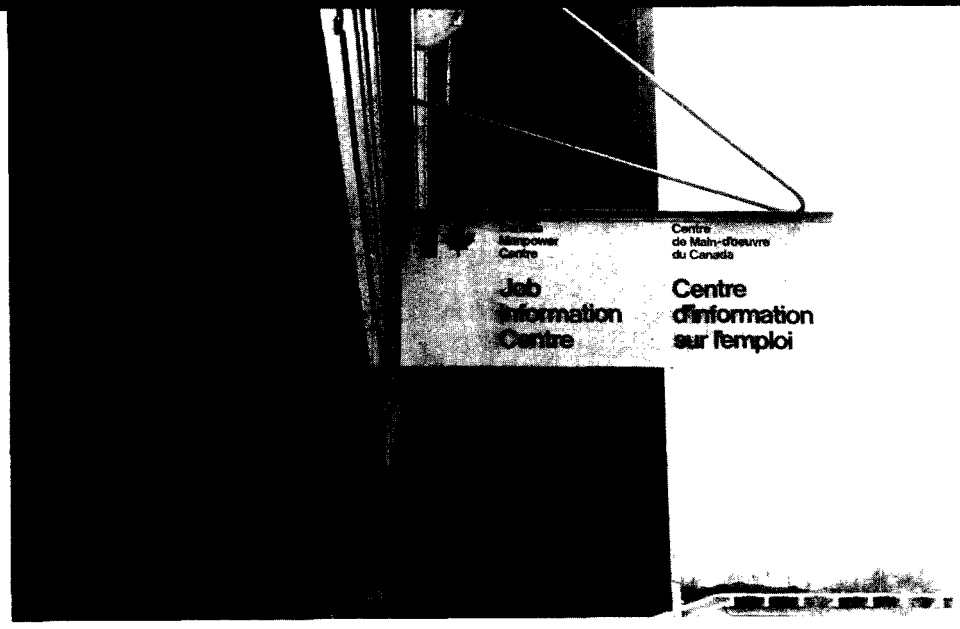
Location: Room D205, 1976 Building

Office hours: 8:00 a.m. to 4:30 p.m., Monday through Friday. Open until 9:00 p.m. on Tuesdays.

Staff

A.S. McLean, B.A., B.S.W., M.S.W., Coordinator
S.R. Gibbs, B.A., P.T.T., Counsellor
N.J. Hawkes, B.A., M.Ed., D.Ed., Counsellor
R.J. Misuraca, Dipl.T., B.Ed., M.Ed., Counsellor
J. Say-Yee, B.A., B.S.W., M.S.W., Counsellor
J. Clemmons, B.Ed., Counsellor, Financial Awards
Y. Choate, Admissions Advisor

Placement



Canada Manpower Centre, a placement and career counselling centre staffed by federal government personnel, is located in room D204 of the 1976 Building. Hours are 8:00 a.m. to 4:30 p.m., Monday through Friday, throughout the year.

The Centre assists graduating and undergraduate students seeking employment by arranging on-campus seminars and interviews with employers for both career and summer jobs. Both full-time and part-time job opportunities are posted on the job information boards located in the office.

To assist students in developing a career plan and preparing for interviews, a library of current information on companies is maintained. In addition, a counsellor is always available to discuss employment problems, resumés and job search techniques.

Staff

R.D. Forbes-Roberts, Branch Manager
D. King, B.A., Counsellor
W.K.S. Joe, Counsellor Assistant

Etcetera

The Institute and campus have several features which make student life more convenient.

Campus Food Service operates the main cafeteria with full meal service and snacks at moderate prices, Monday through Thursday, 6:30 a.m. to 6:30 p.m. and from 6:30 a.m. to 5:30 p.m. on Friday. A snack bar with short order grill service neighbors the main cafeteria. Hours vary but are usually 7:30 a.m. to 1:30 p.m. weekdays. A smaller cafeteria in the Student Activity Centre offers delicatessan-type fare, and a take-out service for light lunches and snacks is located in the 1962 Building. Vending machines are located at several points around campus.

The Bookstore, located on the east side of the Library, sells all books and supplies necessary for each program. Lists of required course materials are included in the registration package sent to students. Total cost is approximately $150 to $200. The Used Bookstore, operated on a non-profit basis by the BCIT Student Association, is open from August 15 to September 30.

Parking is available for students in specially-designed unreserved areas at the east side of the campus. Special parking arrangements for handicapped students may be made through the Department of Public Works at 4570 Canada Way (434-4247). Limited visitor parking is available at the Willingdon entrance to the campus. Bus service to BCIT includes the 30 Willingdon and the 820 Canada Way.

Lockers are assigned on an individual basis whenever possible; however, sharing may be necessary. Students are advised to have identification marks—name, address, social insurance number—on all personal effects, including books and clothing. All personal valuables should be kept on the student's person or secured in the locker.

The students in some technologies require the use of special field lockers and they will be made available as necessary.

Permission to use sports lockers in the gymnasium may be obtained from the equipment room in the Student Activity Centre.

The following should be borne in mind:
(a) Students must provide their own locks.
(b) No locker is to be occupied other than the one allocated.
(c) Locks must not be cut or forcibly removed except on the approval of the Locker Coordinator (Physical Plant Office).
(d) The Institute will not accept responsibility for any loss of, or damage to, students' personal property.
(e) All lockers must be left open and empty at the conclusion of the academic year.

The This and That (T 'n' T) campus store has two outlets on campus; one in the north foyer of the 1962 Building and one on the ground level of the 1976 Building. The shops sell stationery and school supplies, as well as BCIT sourvenir items and confectionaries. The T 'n' T is operated by the BCIT Student Association and profits go towards student activities.

Banking services are available through the Canadian Imperial Bank of Commerce branch on campus, located at the north end of the Administration Building.

Board of Governors

The Institute is governed by a fifteen-member Board appointed by the Lieutenant-Governor in Council.

Chairman:
Paul C. Trussel, Ph.D.
Director, B.C. Research

Vice Chairman:
Michael C.D. Hobbs
General Manager
Cominco Limited

Dennis Barkman
President and General Manager
Fraser Valley Broadcasters Limited

George T. Bedwell
Surveying Technology
B.C. Institute of Technology

W. Michael Ferrie, B.Comm.
Assistant Vice President/Director of Personnel
Scott Paper Limited

John E. Leech, Dipl.T., C.E.T.
Registrar
Society of Engineering Technologists

G. Rex McMeekin, B.Sc. (Chem.Eng.)
Manager, Public and Community Relations
Cominco Limited

Robert T. Morrison, M.D., Ph.D.
Head of Department of Nuclear Medicine
Vancouver General Hospital

Barbara J. Rae, M.B.A.
President
Office Assistance

William J. Sheriff, B.Sc., B.A.
Operations Management Technology
B.C. Institute of Technology

George Suart, B.Sc., Hon. B.Sc., M.B.A.
Vice President, Administration
Simon Fraser University

Marie Taylor
Training Manager, B.C. Operations
Simpson-Sears Limited

Hugh B. Weydert
President
International Association of Machinists and Aero Space Workers

Joseph L. Whitehead
President and Publisher
Journal of Commerce

Bernard A. Wuttke
Student, Financial Management Technology
B.C. Institute of Technology

Academic and Administrative Personnel

G.A. Thom, B.Comm., M.B.A., M.Ed., Principal

Administration and Finance Division
D.M. Macpherson, C.A., Executive Director, Administration and Bursar
R.V. Skulski, C.A., Comptroller

Human Resources Division
J. Dale Michaels, B.A.(Hons.), B.Sc., M.B.A., Executive Director
D. Dickson Melville, Director, Information Services

Technological Education
D.J. Svetic, B.A.Sc., P.Eng., Executive Director
D. Brousson, B.Sc., P.Eng., Director, Continuing Education and Industry Services
Jos. E. Carver, C.D., B.A., B.L.S., Director, Library and Audio-visual Services Division
B. Gillespie, B.Sc., M.Sc., Director, Core Division
E.M. Iannacone, B.Comm., M.B.A., Director, Business Management Division
G.N. Lloyd, B.Sc., P.T.T., Director, Campus Life and Admissions
J. MacKay, B.Comm., Dipl.H.A., F.A.C.H.A., Director, Health Division
R.C. Mason, B.A.Sc., P.Eng., Director, Engineering Division

Calendars of Events

Business Management, Engineering and Health Divisions 1978-79 (except General Nursing and Psychiatric Nursing)

Sept. 4/78	Labor Day
Sept. 5	Orientation day for new students
Sept. 6	Terms 1 and 3 classes begin
Sept. 20	Shinerama and Staff Professional Development Day
Oct. 9	Thanksgiving
Nov. 13	Remembrance Day
Dec. 11-15	Terms 1 and 3 exams
Dec. 20-Jan. 2/79	Christmas break
Jan. 3	Terms 2 and 4 classes begin
Mar. 12-16	Spring break
Mar. 23-25	Open House
Apr. 13	Good Friday
Apr. 16	Easter Monday
May 21	Victoria Day
May 22-28	Terms 2 and 4 exams
June 15	Convocation

General Nursing and Psychiatric Nursing 1978-79

Quarter System (for students who enrolled before Sept. 1978)

Sept. 4/78	Labor Day
Sept. 5	Quarters E and G classes begin
Sept. 20	Shinerama
Oct. 9	Thanksgiving
Nov. 13	Remembrance Day
Nov. 20-24	Quarters E and G exams
Nov. 27-Dec. 1	Quarter break
Dec. 4	Quarters F and H classes begin
Dec. 20-Jan. 2/79	Christmas break
Jan. 3	Classes resume
Feb. 26-Mar. 2	Quarters F and H exams
Mar. 12-16	Spring break
Mar. 13	Quarter G classes begin
Apr. 13	Good Friday
Apr. 16	Easter Monday
May 21	Victoria Day
May 23-26	Quarter G exams
May 29-June 2	Quarter break
June 2	
June 4	Quarter H classes begin
June 2	Canada Day
July 27	Last day of classes for Quarter H

Term System (for students beginning the program in Sept. 1978)

Aug. 14/78	Orientation day for new students (term 1)
Aug. 15	Term 1 classes begin
Sept. 4	Labor Day
Sept. 20	Shinerama
Oct. 9	Thanksgiving
Nov. 13	Remembrance Day
Dec. 11-15	Term 1 exams
Jan. 3/79	Orientation day for new students (term 1) Term 2 classes begin
Jan. 4	Term 1 classes begin
Mar. 12-16	Spring break
Apr. 13	Good Friday
Apr. 16	Easter Monday
May 7-11	Terms 1 and 2 exams

Business Management, Engineering and Health Divisions 1979-80

Sept. 3/79	Labor Day
Sept. 4	Orientation day for new students (term 1)
Sept. 5	Terms 1 and 3 classes begin
Sept. 19	Shinerama
Oct. 15	Thanksgiving
Nov. 12	Remembrance Day
Dec. 10-14	Terms 1 and 3 exams
Dec. 17-Jan. 2/80	Christmas break
Jan. 3	Terms 2 and 4 classes begin
Mar. 10-14	Spring break
Apr. 4	Good Friday
Apr. 7	Easter Monday
May 19	Victoria Day (may be changed by Order in Council)
May 26-30	Terms 2 and 4 exams
June 13	Convocation

General Nursing and Psychiatric Nursing 1979-80

Aug. 13/79	Orientation day for new students (term 1)
Aug. 14	Term 1 classes begin
Sept. 3	Labor Day
Sept. 19	Shinerama
Oct. 15	Thanksgiving
Nov. 12	Remembrance Day
Dec. 10-14	Terms 1, 2 and 3 exams
Jan. 7/80	Orientation day for new students (term 1) Terms 2, 3 and 4 classes begin
Jan. 8	Term 1 classes begin
Mar. 10-14	Spring break
Apr. 4	Good Friday
Apr. 7	Easter Monday
May 12-16	Terms 1, 2, 3 and 4 exams