BCIT

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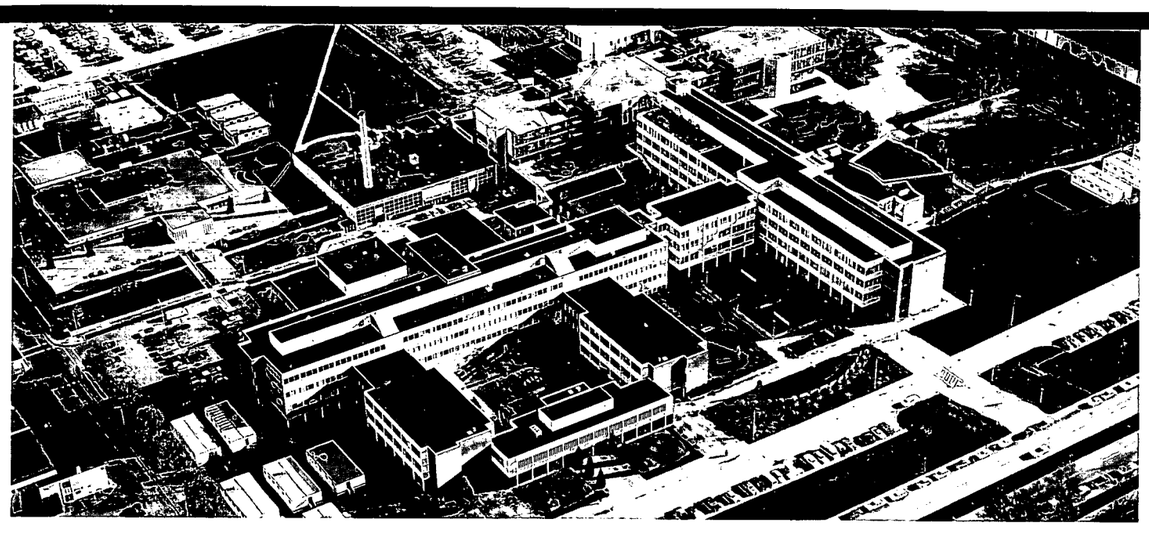

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

PRE-REQUISITE MATHEMATICS - ENGINEERING AND HEALTH DIVISIONS

WHERE A MATH COURSE REQUIREMENT IS SPECIFIED IN THE ENGINEERING AND HEALTH DIVISIONS, PLEASE NOTE THAT MATH 12 (COMPLETED AFTER 1978) AND GENERAL MATH 12 IS NOT AN ACCEPTABLE PRE-REQUISITE.

THE ONLY ACCEPTABLE MATH PRE-REQUISITE COURSES ARE MATH 12, SUCCESSFULLY COMPLETED IN 1978 OR EARLIER, OR ALGEBRA 12.

THE REGISTRAR

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

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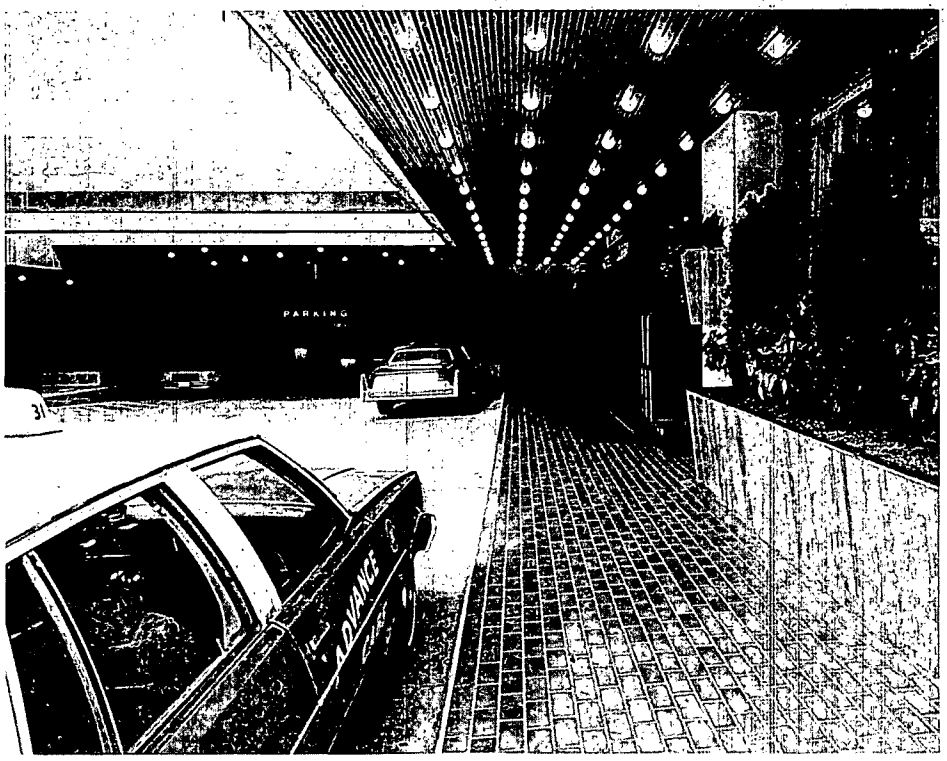
Business Management


PARKING
ADVANCE

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 with a C plus standing or better. 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

Year 1	Term 1	Clrm hrs/wk
10.100	Management I	3
10.110	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

Year 1	Term 2	
10.200	Management II	4
10.210	Economics	3
10.220	Organizational Behavior I	3
10.270	Government and Business	3
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
10.300	Management III	3	3	3
10.320	Organizational Behavior II	—	3	—
10.330	Industrial Relations	4	4	4
10.340	Organization Renewal and Development	—	3	—
10.360	Personnel Administration	—	3	—
10.370	Government and Politics in Canada	—	—	4
10.380	Business Law	3	3	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
20.335	Transportation and Distribution Management	3	—	—
20.350	Real Estate Management	3	—	—
20.352	Property Management	—	—	3
	Library and Research	7	8	6
		35	35	35

Year 2	Term 4			
10.400	Management IV	3	3	3
10.430	Industrial Relations	—	3	—
10.450	Training and Development	—	3	—
10.460	Personnel Administration	3	4	3
10.470	Government and Politics in Canada	—	—	4
10.480	Business Law	3	3	3
10.490	Directed Studies	6	6	6
16.445	Credit and Collections	3	—	—
16.450	Taxation	—	—	3
16.462	Finance	4	4	4
20.450	Real Estate Management	3	—	—
22.410	Management Engineering	4	4	4
	Library and Research	6	5	5
		35	35	35

Subject Outlines

10.100 Management I — An orientation to the nature of business in the private enterprise system, embracing forms of business ownership, organization, management 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.

10.110, 10.210 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.

10.200 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.

10.210 See 10.110

10.220 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.

10.270 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.

10.300 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.

10.320 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.

10.330 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.

10.340 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.

10.360, 10.460 Personnel Administration — An introduction to the fundamentals of personnel management, including organization of the personnel function: recruiting, testing, interviewing, selection; job descriptions and evaluation; salary administration, fringe benefits; training, management development and performance appraisal; constructive discipline, grievances and morale.

10.370, 10.470 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.

10.380, 10.480 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.

10.400 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 discussion. 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.

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

10.450 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.

10.460 See 10.360

10.470 See 10.370

10.480 See 10.380

10.490 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.

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 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

20.335 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.

20.350, 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.

20.352 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.

20.450 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.

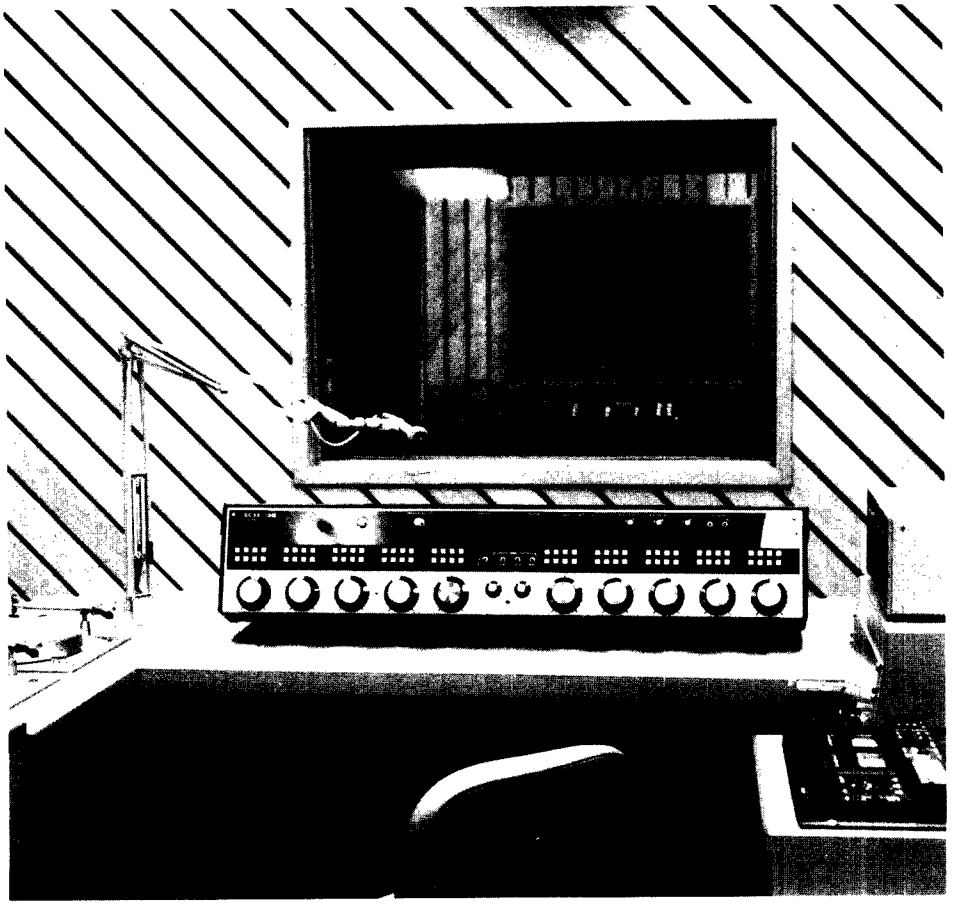
22.410 Management Engineering I — Scientific approach to problem-solving, with particular application to administrative management problems. Includes method study, systems and procedures, charting and analysis, forms design and control, work distribution, layout, planning and scheduling, measurement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

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.
D. Davis, B.A., M.A., LL.B.
Mrs. J.P. Dean, B.A., M.A.
C.J. Dickhoff, B.A., M.A. (Econ.), M.A. (Public Admin.), Chief Instructor
R.S. Diggon, B.A., M.Comm.
L.A. Fingarson, B.Comm.
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.
L. Jones, B.Sc., M.Sc.
T.P. Juzkow, B.A.Sc., M.B.A., P.Eng., Senior Instructor
J. Kyle, C.D., B.A., M.B.A., Ph.D.
A.G. Liddle, M.B.A.
T.L. McDaniels, B.A., M.A.
C.R. Riopel, B.Comm., M.A.
D. Schram, B.Comm., M.Sc. (Intn. Bus.)
R.M. Sharp, B.A.Sc., M.B.A., P.Eng.
G. Storey, B.A., M.Sc.
N.E. Stromgren, C.D., B.A.
B. van der Woerd, B.A.
J.H. Viger, B.Comm.
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 — 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 — This option prepares students for careers as news reporters, newscasters and editors in radio and television. Training includes the basic news broadcasting skills. and academic courses. Skills, such as news writing, audio and video editing, and announcing, are combined with substantive knowledge of politics, economics, and other topics. Actual newsroom and field reporting operations give the student experience in skill development and judgment.

Students must pass an audition, a news writing test and must prove ability to type 25 correct words per minute to qualify for entrance into this option.

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

				Clrm hrs/wk
Year 1	**Term 1**	Rad	TV	Jrn
10.111	Economic Issues for Journalists	—	—	3
10.121	Personal Relationships	2	2	—
12.101	Radio Operations I	9	—	—
12.102	Introduction to TV	—	15	—
12.105	Industry Organization	2	2	—
12.107	Technical Introduction	2	2	—
12.108	TV News	—	1	—
12.111	Announcing I	8	—	—
12.113	Introduction to Broadcast News	2	—	2
12.114	Announcing - Introduction	—	—	3
12.115	Broadcast News Writing	—	—	3
12.116	Radio Basics	—	—	3
12.117	Television Basics	—	—	8
12.118	Film Basics	—	—	2
12.131	Municipal Government for Reporters	—	—	2
12.190	Writing and Sales	4	4	—
31.112	Communication for Broadcasters Library, Research and Special Projects	4	4	4
		2	5	5
		35	35	35
Year 1	**Term 2**			
12.201	Radio Operations II	9	—	—
12.202	Introduction to TV	—	15	—
12.205	Industry Organization	2	2	—
12.206	History and Current Events	2	2	2
12.208	TV News	—	2	—
12.211	Announcing II	8	—	—
12.213	Introduction to Broadcast News	—	—	3
12.214	Announcing for Newspersons	—	—	3
12.215	Newsroom Operations I	—	—	10

Year 1	Term 2 cont.	Rad	TV	Clrm hrs/wk Jrn
12.217	E.N.G. Techniques (term 2)	—	— 4	
12.218	Television News Production (term 2b)	—	— 4	4
12.219	Newsroom Operations II (End of term)	—	—	Full time
12.220	Computer Systems for Broadcasting (term 2B)	2	—	—
12.232	Government and Politics	—	—	4
12.233	Current News Issues (term 2a)*	—	—	2
12.234	Field Trip - Interior, B.C. Industry	—	—	(1 wk)
12.290	Writing and Sales	3	3	—
12.209	Introduction to Computers for Broadcast (term 2b)*	—	—	2
22.212	Introduction to Statistical Analysis and Research (term 2b)	2	2	—
31.212	Communication for Broadcasters Library, Research and Special Projects	4	4	4
		5	5	5
		37	35	35

* *There are a total of two classroom hours per week.*

Year 2	Term 3	Rad	TV	Jrn
12.301	Radio	22	—	—
12.302	Television Production	—	16	—
12.304	Photography and Darkroom Techniques	—	1	—
12.307	Radio News	4	—	—
12.308	TV News	—	3	—
12.310	TV Production Planning	—	3	—
12.313	Investigative Reporting	—	—	2
12.314	Announcing - Advanced I	—	—	2
12.315	Newsroom Operations - Advanced	—	—	6
12.316	Radio News Reporting (lab)	—	—	10
12.317	Television News Reporting (lab)	—	—	10
12.319	News Practicum I	—	—	*
12.320	Computer Systems for TV	—	2	—
31.312	Advanced Communication for Broadcasters Library, Research and Special Projects	4	4	3
		5	6	2
		35	35	35

Year 2	Term 4	Rad	TV	Clrm hrs/wk Jrn
12.401	Radio	22	—	—
12.402	Television Production	—	16	—
12.404	Film for TV	—	3	—
12.406	History and Current Events	2	2	—
12.407	Marketing, Sales and Promotion	2	2	—
12.408	TV News	—	3	—
12.413	Newsroom Management and Editorial Policy	—	—	2
12.414	Announcing - Advanced II	—	—	2
12.415	Newsroom Operations - Advanced	—	—	6
12.416	Radio News Reporting (lab)	—	—	10
12.417	Television News Reporting (lab)	—	—	10
12.419	News Practicum II	—	—	*
31.412	Advanced Communication for Broadcasters Library, Research and Special Projects	3	3	3
		6	6	2
		35	35	35

* *A total of six weeks is spent on practicum; two weeks before Christmas and the four final weeks of the term.*

Subject Outlines

10.111 Economic Issues for Journalists — In one lecture and two seminar hours per week, students will be acquainted with fundamental analytic tools in economics and with economic issues in Canada.

10.181 Personal Relationships — Broadcasting involves an unusually close interaction among its participants, who work together to provide information, entertainment and station revenues. The course explores the importance of harmonious relationships and how to achieve them.

12.101, 12.201 Radio Operations — An introduction to the equipment and techniques used in radio broadcasting. Starting with station organization, the student continues with a study of microphones, radio control boards, tape machines and 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.

12.105, 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 Technical Introduction — The students are given their first look at "what makes it work". This is an elementary technical introduction.

12.108, 12.208, 12.308, 12.408 TV News - This course will cover four terms and has been developed for the television option. The goal is to familiarize the students with the basics of news room operations, key positions and on-air presentation. A close liaison will develop between the journalism option and the television option in the combined daily presentation of the BCIT News.

12.111, 12.211 Announcing — An introduction to effective speaking for radio. The course combines classroom instruction with work sessions that employ class critiques. Regular auditions measure individual progress.

12.113 Introduction to Broadcast News — The student is given a "first look" at the field, including newsroom organization in radio and television stations, factors that determine newsworthiness, newsroom source material, and information functions.

12.114 Announcing - Introduction — The student is introduced to basic concepts of voice production, announcing skills, and news reading. Stress is placed on daily practice, and students receive coaching in groups and individually.

12.115 Broadcast News Writing — This is a practical course, designed to develop the student's ability to write concise, lively news copy, suitable to be read on air. The course includes consideration of copy formats and edit skills, but its stress is on practice and coaching.

12.116 Radio Basics (Jrn. Option) — Journalism students are introduced to radio station organization, programming concepts, radio broadcast equipment and production techniques. It is designed to give the student a basic appreciation and understanding of all aspects of radio broadcasting.

12.117 Television Basics (Jrn. Option) — Application of television equipment and production techniques to news and public affairs constitutes the major thrust

of this course. Appreciation of basic technical and production principles comes through lectures and "hands on" experience. The course provides the grounding that a student requires for later television newscasting work.

12.118 Film Basics (Jrn. Option) — As the title implies, students systematically are introduced to the fundamentals of picture taking, both 35mm stills and 16mm motion pictures.

12.131 Municipal Government for Reporters — This course follows a lecture format, with practical assignments, and covers the fundamental operations, structures and problems of local government in B.C. The focus is related directly to news reporting work.

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

12.205 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.

12.208 See 12.108

12.209 Introduction to Computers for Broadcast — To meet the ever increasing use of computer technology within the broadcast industry. From word processing to automatic logging and automation, the student will be familiarized with terminology and what computerisation means to a modern broadcaster.

12.213 Introduction to Broadcast News — Substantive news coverage areas, from B.C. geography to labour law, are examined from a broadcaster's standpoint. The course also deals with basic news situations and how to report them.

12.214 Announcing for Newspersons — See 12.114

12.215 Newsroom Operations I — In a lab situation, students will practice news writing, newscast makeup and presentation for both radio and television. Considerable time will be spent on substantive news stories and how to treat them. Regular reporting assignments, done outside of lab hours, round out the course.

12.217 E.N.G. Techniques (Term 2A only) — Electronic news gathering methods and portable video equipment, along with basic news set-ups, fundamental edit techniques and story-building provide a basis for further work in news labs and second-year assignments.

12.218 Television News Production (Term 2B only) - Journalism students receive instruction and coaching from a TV crew point of view in the studio and control room. The goal of the course is to acquaint news persons with the constraints and possibilities of television newscasting.

12.219 Newsroom Operations II - In the final three to four weeks of term, first-year students embark on a full-time "lab", operating according to regular shifts and doing a full day's run of radio and television news. Each shift concludes with a critique session.

12.220 Computer Systems for Broadcasting (Term 2B only) — The computer as an important servant of broadcast communication — traffic, programming and sales. Field trips to Vancouver stations supplement classroom instruction.

12.232 Government and Politics — This course in fundamental politics is directed toward news-related "literacy". Topics include fundamental concepts in political analysis, patterns of international politics, and government structure in B.C., Canada, the United States, Communist countries and single-party republics.

12.233 Current News Issues (Term 2A only) — Research, reading and class discussion on topical subjects are designed to deepen the student's understanding of news-related issues and methods of approaching them.

12.234 Field Trip - Interior, B.C. Industry - During the Spring term, students will take a one-week tour of interior British Columbia radio and television news operations. Students may also be assigned to visit some lower mainland stations and to compile a comparative report.

12.290 See 12.190

12.301, 12.401 Radio — 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.

12.304 Photography and Darkroom Techniques — This course is given to television students in their second year. It concentrates on 35mm photography, as the production of slides for news and commercial use is extensive in most stations. Prints made in the darkroom are an essential adjunct to the Graphics Department. Students learn how to take good pictures and how to develop and print them.

12.307 Radio News — This course is 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.

12.308 See 12.108

12.310 TV Production Planning — This course is 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.

12.313 Investigative Reporting — Uncovering concealed information and methods and sources of general news investigation form the basis of this advanced course in reporting. Topics such as confidentiality of sources, confirming information, and bias are also considered.

12.314 Announcing - Advanced I — Further practice and polishing of regular news announcing skills are mixed with specialized announce subjects, ad-lib skills, interview techniques, etc. Toward the Spring, emphasis shifts to final polishing in readiness for employment.

12.315, 12.415 Newsroom Operations - Advanced — Strategy of news coverage, file systems, newsroom operational techniques and development of news judgment, done through lectures and detailed critiques of assignments, provide the theoretical base to go with concurrent lab courses.

12.316, 12.416 Radio News Reporting (Lab) — Rotating between outside reporting and inside news desking positions, students will undertake daily news operations and contribute their part to the half-hourly radio news schedule through the broadcast day.

12.317, 12.417 Television News Reporting (Lab) — Rotating through the list of television newsroom functions during the course of the terms, students will undertake tasks directed toward the production of a daily local television newscast.

12.319, 12.419 News Practicums — Journalism students, during their second year of studies, spend a total of six weeks on practicum in working newsrooms, as assigned, around B.C. Normally, two weeks' work is done before Christmas, and the student returns to the same radio or television station in the Spring for the four final weeks of the term.

12.320 Computer Systems for TV — The computer as an important servant of television in traffic, programming and sales. Field trips supplement classroom instruction.

12.401 See 12.301

12.402 See 12.302

12.404 Film for TV — Much of the program material presented on air in television originates on film. News and commercial departments will shoot extensively on 16mm film. This course introduces the student to the equipment, techniques and procedures to enable the student to produce creditable films. The course includes basic animation and special effects.

12.406 See 12.206

12.407 Marketing, Sales and Promotion — The "unheard" broadcaster also enjoys a creative and rewarding career. An introduction to successful salesmanship.

12.408 See 12.108

12.413 Newsroom Management and Editorial Policy — This course introduces the student to basic management concepts applicable to newsroom operation, along with editorial and documentary policy development and related topics. Guest lecturers are utilized, where possible.

12.414 See 12.314

12.415 See 12.315

12.416 See 12.316

12.417 See 12.317

12.419 See 12.319

22.212 Introduction to Statistical Analysis and Research — A practical study of mathematics as applied to the broadcast industry.

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

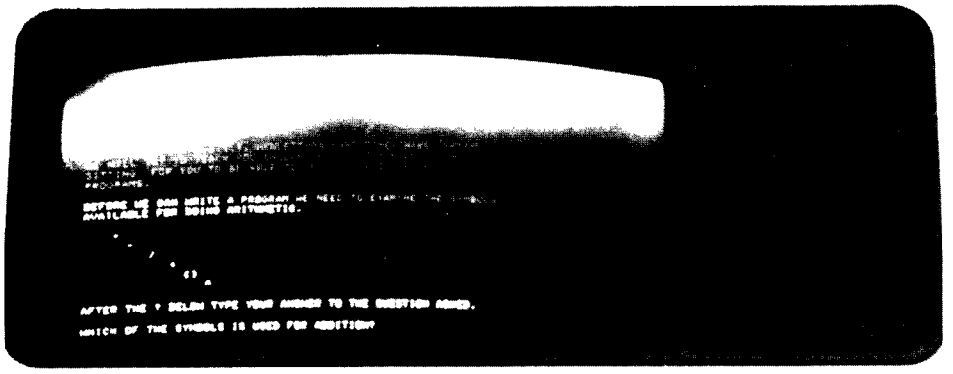
31.312, 31.412 Advanced Communication for Broadcasters — Emphasis in this course will be placed upon writing for the media. Sales messages, dramatic scripts, documentaries, news copy and original program proposals will be written by the student, who will also participate in voice exercises and play readings. 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.

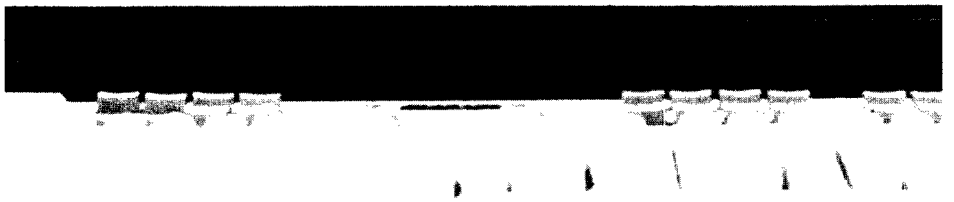
Note: As far as possible, materials and assignments used in this course will be geared to the individual elective; i.e., Radio, Television or Broadcast Journalism.

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.
T.J. Garner, B.A., Chief Instructor
K.W. Hughes, Dipl.Ed., Senior Instructor
J.J. Kemp
R. Liepert
B.G. McMaster, B.A., M.A.
K.J. Mitchell (on leave)
P. Munoz
R.H.B. Nason, B.A.
B. O'Neill
L.D. Rose, B.A., M.A. (on leave)
D.W. Short
Kathleen Smith
W.A. Smith
T. Stacey, B.A.





Computer 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 planning and 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, statistics and an introduction to programming and systems. In the second year, students specialize in either information systems or management systems (the applications of computer models to assist management in planning and control).

Prerequisites
Graduation from grade 12. The applicant should have at least a B- average in English, Mathematics, and at least five other grade 11 or 12 "academic" courses such as sciences, languages, and history. 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 Systems Option in the second year must have Algebra 12 or Math 12.

Course of Studies

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

		Infor. Syst	Mgt Syst
Year 2	**Term 3**		
10.322	Organizational Behavior	3	—
14.306	Management Decision Systems I	—	8
14.307	Introduction to Decision Systems	3	—
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
22.334	Management Engineering I	3	—
	Library and Research	4	5
		35	35
Year 2	**Term 4**		
10.402	Business and Administrative Practices	3	3
14.409	Management Decision Systems 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

10.102 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.

10.212 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. Microeconomic theory will be used to show its relevance in an analysis of the business firm, the price system and the market system.

10.322 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 organzation, 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.

10.402 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. Introduction to COBOL.

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

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

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

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 byproducts; 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.

22.334 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

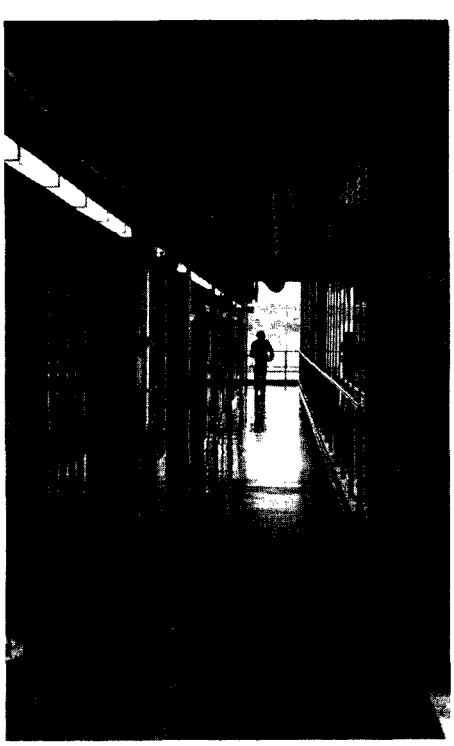
techniques used in business organizations. The projects require research and detailed analysis, plus the preparation and presentation of technical reports.

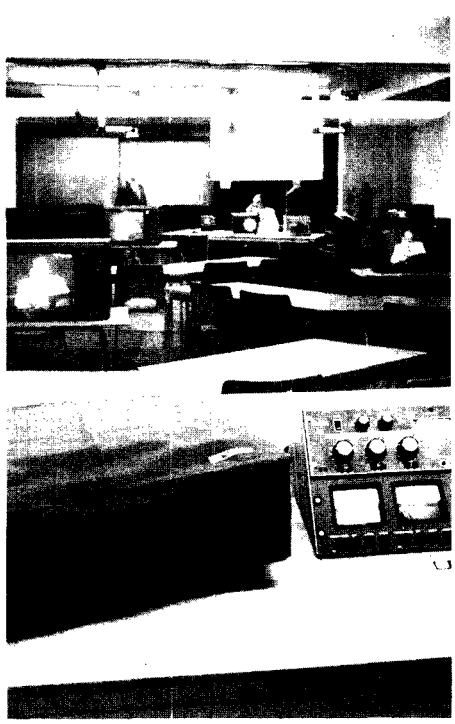
31.114, 31.214 Business Communication — The objective of this course is to develop students' written and oral communications skills. Students are taught to write the kinds of letters, memos and reports which they can expect to encounter in the computer industry. They will also be taught the skills of speaking to small and large groups.

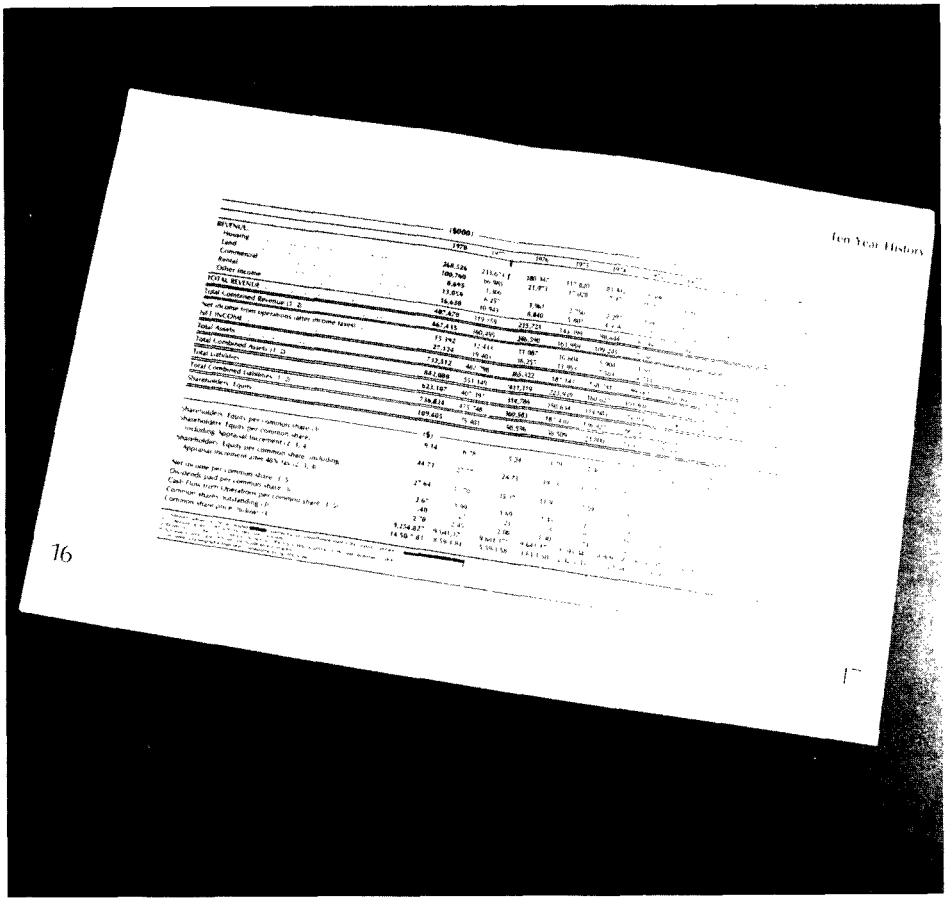
31.214 See 31.114

Faculty and Staff

M. Scriabin, M.B.A., *Department Head*
P. Abel, B.A.(Hons.), C.G.A., Senior Instructor, Information Systems
D. Breckner, B.A., M.A.
J.W. Cooke, C.G.A.
R. Coolidge, Dipl.T.
K.E. Holden, R.I.A.
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., Coordinator Continuing Education and Industry Services
B.A. MacLaren, B.A.
E.N. Newton, B.Voc.Ed.
M. Ramkay, B.Sc.
F. Senior, B.A.(Hons.), Chief Instructor
C.P. Simmons, C.G.A (on leave)
K. Takagaki, B.A. (Hons.), R.I.A.
M.E. Turner, M.B.A., P.Eng., Management Systems
G.N. Weir, C.D.P.
A.Y.W. Wong, B.A.Sc., M.Sc., P.Eng., Service Courses to Engineering and Health Divisions
H.E.W. Wuhrer, C.D.P., C.M.C., Senior Instructor, Service Courses to Business Division







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
10.104	Management I	3
10.114	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

Year 1	Term 2	
10.204	Management II	3
10.214	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
10.324	Organizational Behavior	3	3	3
10.384	Business Law	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	Claims, Losses and Adjustments	—	—	3
	Library and Research	4	4	4
		35	35	35

Year 2	Term 4			
10.484	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

Year 2	Term 4 cont.	Acctg	Fin	Ins
16.484	Estate and Insurance Planning	—	—	4
	Library and Research	4	6	5
		35	35	35

Subject Outlines

10.104 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.

10.114, 10.214 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, money and banking, international trade, employment, inflation and growth (macro-economics). An appreciation of the relation between economic theory and economic policy is provided.

10.204 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.

10.214 See 10.114

10.324 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.

10.384, 10.484 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.

10.484 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.

14.053 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 Claims, Losses 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 such 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. Woolley, B.A., M.A., C.A., *Department Head*
C.M. Briscall, B.Comm., M.B.A., R.I.A., Chief Instructor
R.C. Bell, B.A.(Econ.), C.G.A.
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
G.H. Farrell, Dipl.T., M.B.A., R.I.A., Senior Instructor
K.M. Hamm, B.Comm.
R.W. Jackson, M.C.I.
H.M.J. Lawson, B.Sc.(Econ.), M.B.A.
J.C. McAdam, B.A.Sc., M.B.A., P.Eng.
R.B.McCallum, B.Eng., M.B.A., R.I.A.
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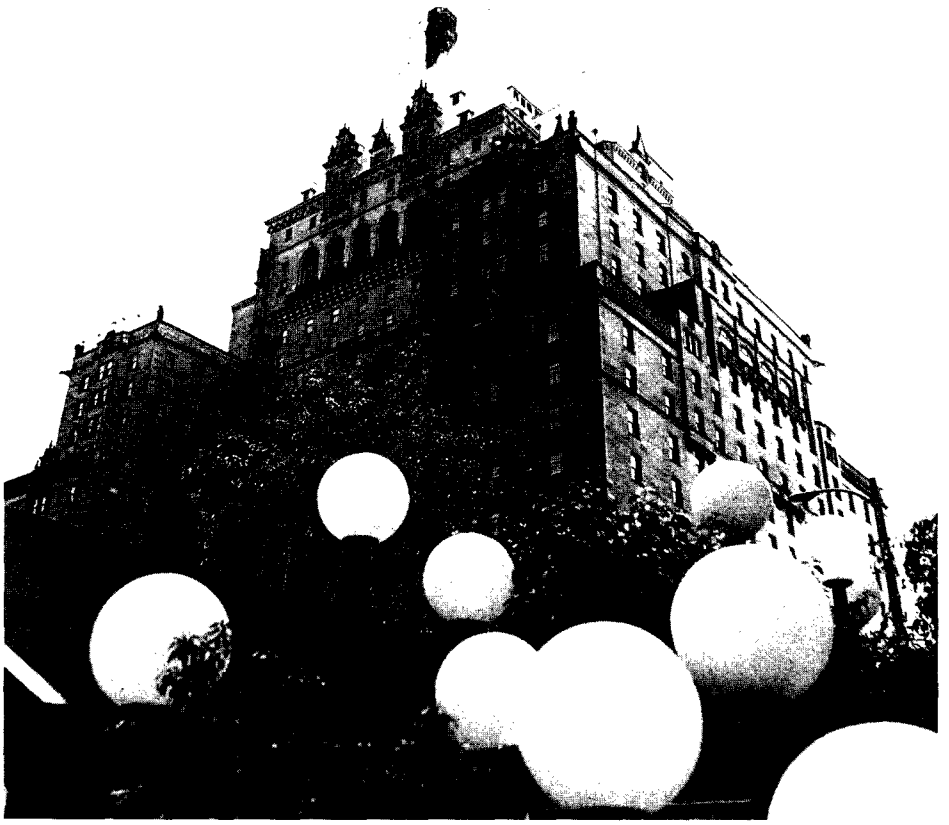
M.F. Thurgood, B.Comm., M.B.A., R.I.A.
C.J. Trunkfield, B.A., M.B.A., C.G.A.
H.B. Yackness, B.Comm., M.B.A., C.A.



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**	
10.116	Economics	3
16.140	Accounting	5
16.145	Credit and Collections	4
18.101	Food Service Procedures	3
18.102	Food Operations I	2
18.103	Front Office Procedure	3
18.111	Oral Communication Skills	2
22.118	Business Mathematics	4
31.118	Business Communication	4
	Library and Research	5
		35
Year 1	**Term 2**	
10.216	Economics	3
14.050	Introduction to Data Processing	3
16.240	Accounting	5
18.201	Food Preparation Procedures	3
18.202	Food Operations II	2
18.203	Front Office Machine Posting Practicum	1
18.204	Rooms and Lounge Operations	3
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 Management I	2
18.305	Food Production and Service I	7
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
Year 2	**Term 4**	
10.486	Hospitality Industry Law	3
18.402	Food and Beverage Management II	2
18.405	Food Production and Service II	7
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
10.116	Economics	3
16.140	Accounting	5
16.145	Credit and Collections	4
18.111	Oral Communication Skills	2
18.132	Tours and Hotels	3
18.331	Introduction to Tourism	3
22.118	Business Mathematics	4
31.118	Business Communication	4
	Library and Research	7
		35

Year 1	Term 2	Clrm hrs/wk
10.216	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	Destination: Canada	2
22.218	Basic Management Engineering	3
31.218	Business Communication	4
	Library and Research	7
		35

Year 2	Term 3	
18.300	Summer Work Practicum	—
18.316	Human Relations	2
18.326	Travel Marketing and Sales	3
18.333	Conversational French	3
18.334	Air Travel	6
18.340	Tourism Product Development	3
18.341	Recreational Geography	2
18.344	Agency Accounting and Controls	3
20.130	Transportation Economics and Regulation	3
22.318	Business Statistics	4
	Library and Research	6
		35

Year 2	Term 4	
18.416	Human Relations	2
18.426	Travel Marketing and Sales	4
18.433	Conversational French	3
18.434	Air Travel	6
18.435	Creative Promotion and Printing	2
18.443	Regional Economic Development	3
18.445	World Travel Destinations	3
18.450	Term Project	4
20.131	Transportation Economics and Regulation	3
	Library and Research	5
		35

Subject Outlines

10.116, 10.216 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.

10.216 See 10.116

10.486 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

18.101 Food Service Procedures — Skills-oriented course with emphasis on the knowledge, attitude and skills required to professionally serve food in restaurants and banquets. Includes industry practicum.

18.102, 18.202 Food Operations I and II — 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 Oral Communication Skills — Speech construction; types of speeches; speaking before groups; introducing and thanking speakers, chairing meetings and interviewing; practice in preparation and delivery of talks to groups.

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 Food Preparation Procedures — A practical course with emphasis on the development of basic skills, attitudes and knowledge required for the identification, handling and cooking of food items found on a restaurant menu. Care and handling of tools and restaurant equipment, preparation of stocks, soups, sauces, seafoods, meats, vegetables and specialty items. Includes industry practicum.

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.

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

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 Destination: 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 Management I and II — An exploration of the main facets of professional food and beverage operations through lectures, student projects and seminars. Functions of management, personnel and training,

purchasing, menu management, food service systems (specialty restaurants, fast-food, airline catering, hospitals, employee feeding and contract catering) convenience foods, current and future industry trends, wines. Includes industry practicum.

18.305, 18.405 Food Production and Service I and II — 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 problems in today's business organizations, including human needs and wants, motivation process, social systems, leadership, unions, management techniques, communication problems, staff hiring and appraisal, training and incentives. Lab discussions based on real-life cases help develop ability to make decisions upon critical analysis of 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 and Sales — 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 audiovisual 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 Conversational French — 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 Agency Accounting and Controls — 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.

20.130, 20.131 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.

20.131 See 20.130

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

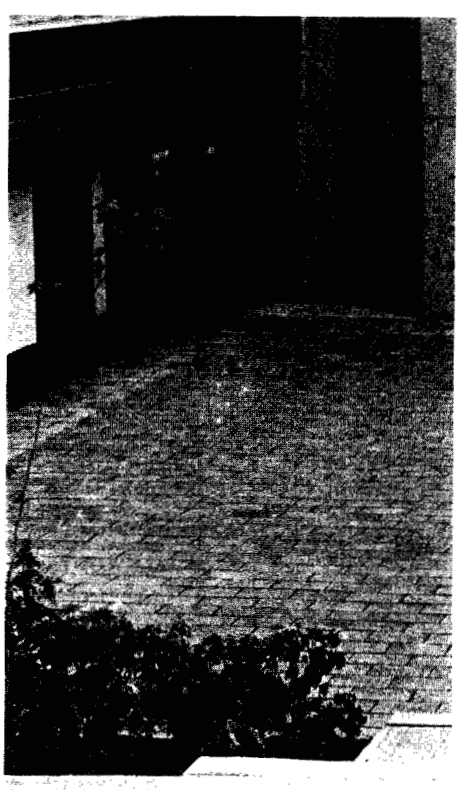
numerical and graphical presentation of data, measures of central tendency and dispersion, elementary probability, index numbers and time series. Introduction to inferential statistics through selected topics such as sampling, confidence limits of the mean, hypothesis testing and simple linear regression.

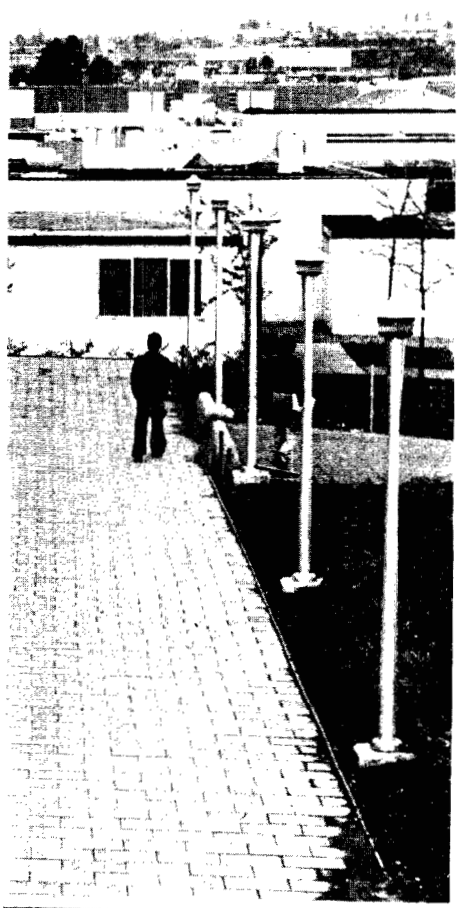
31.118, 31.218 Business Communication — This is an applied business communications course which concentrates on techniques and applications of written and spoken business communications. The discussion topics, explanations, illustrations and assignments are related as closely as possible to the hospitality 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
E.J. Cooke
F.N. Daniels
B.J. Fernandes
K.F. Krueger, Chief Instructor
J.G. Lindenlaub, Chief Instructor
L. Lous
P.F. Renner
R. Schlyecher
G.J. Wilson





Marketing Management

The marketing executive determines the needs of potential customers, explores the posibilities of developing products to meet those needs and then plans and coordinates the activities of specialist departments within the company in order to make the product available to the customer, at the right price.

The marketing manager today needs to understand the techniques of market research. An understanding of people is essential since success will depend on forecasting the trend of consumer needs more accurately, and satisfying them more precisely, than competitors. The marketing manager must also be aware of the potential and limitations of the production process so that modifications in the product required by the consumer may be discussed intelligently with wholesalers, retailers and consumers.

A real understanding of selling, in all its various forms is paramount, for the company's sales force is the instrument through which the marketer must work in getting the product to the customer. In addition, the principles of advertising, sales promotion and packaging design are important because of the part they play in accentuating the sales appeal of the basic product.

Job Opportunities
Marketing Management Option graduates may choose to enter either consumer marketing or industrial marketing. Past graduates have entered the field 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 Option graduates obtain positions in property management, appraisal, real estate management or real estate sales. While this option provides entry into many specialized real estate opportunities, graduates may also accept positions in the general area of marketing.

International Business Option graduates are expected to obtain positions in selling Canadian products or services abroad, or in related activities.

Transportation and Distribution Management Option graduates will find employment with a wide variety of transportation companies or with large companies providing their own services.

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 Technology 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 must choose one of the five options: Marketing Management, Transportation and Distribution, Real Estate or International Business or Advertising and Sales Promotion. 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.

Courses in International Business will emphasize the identification and development for foreign market opportunities. Students in the Advertising and Sales Promotion Option will develop creative communication skills.

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.

First-year applicants must indicate their second-year option choices.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
10.107	Management in Industry	3
10.117	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

Marketing

Year 1	Term 2	
10.217	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 Communication	4
	Library and Research	7
		35

Year 2	Term 3	
10.387	Business Law	3
16.342	Marketing Management Accounting I	5
20.310	Retailing	4
20.322	Marketing Management	4

Year 2	Term 3 cont.	Clrm hrs/wk
20.323	Sales Management	4
20.371	Advertising and Sales Promotion	4
20.372	Industrial Marketing	3
20.382	Marketing Research	4
	Library and Research	4
		35

Year 2	Term 4	
10.467	Personnel Administration	4
10.487	Business Law	3
16.442	Marketing Management Accounting II	5
20.411	Merchandising	3
20.422	Marketing Management	3
20.482	Marketing Research	3
20.484	Transportation and Distribution Management	3
20.490	Directed Studies	6
	Library and Research	5
		35

Real Estate

Year 2	Term 3	
10.387	Business Law	3
16.342	Marketing Management Accounting I	5
20.322	Marketing Management	4
20.323	Sales Management	4
20.350	Real Estate	3
20.351	Property Management	4
20.371	Advertising and Sales Promotion	4
20.382	Marketing Research	4
	Library and Research	4
		35

Year 2	Term 4	
10.467	Personnel Administration	4
10.487	Business Law	3
16.442	Marketing Management Accounting II	5
20.422	Marketing Management	3
20.450	Real Estate	3
20.451	Appraisal - Real Property	3
20.482	Marketing Research	3
20.490	Directed Studies	6
	Library and Research	5
		35

Transportation and Distribution

Year 2	Term 3	
10.387	Business Law	3
14.052	Computers in Transportation	4
20.323	Sales Management	4
20.331	Modes of Transportation	6
20.332	Transportation Economics	3
20.334	Transportation Regulations I	3
20.382	Marketing Research	4
22.320	Management Engineering	3
	Library and Research	5
		35

Year 2	Term 4	Clrm hrs/wk
10.467	Personnel Administration	4
10.487	Business Law	3
16.443	Management Accounting	4
20.433	International Trade	4
20.434	Transportation Regulations II	3
20.435	Distribution Management	4
20.436	Transportation Trends	6
20.482	Marketing Research	3
	Library and Research	4
		35

International Business

Year 2	Term 3	
10.387	Business Law	3
16.342	Marketing Management Accounting I	5
20.322	Marketing Management	4
20.323	Sales Management	4
20.360	Introduction to International Business	4
20.361	Transportation in International Trade	4
20.371	Advertising and Sales Promotion	4
20.382	Marketing Research	4
	Library and Research	3
		35

Year 2	Term 4	
10.467	Personnel Administration	4
10.487	Business Law	3
16.442	Marketing Management Accounting II	5
20.411	Merchandising	3
20.422	Marketing Management	3
20.482	Marketing Research	3
20.484	Transportation and Distribution Management	3
20.490	Directed Studies	6
	Library and Research	5
		35

Subject Outlines

10.107 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.

10.117, 10.217 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.

10.217 See 10.117

10.327, 10.467 Personnel Administration — 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.

10.387, 10.487 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.

10.467 See 10.327

10.487 See 10.387

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 Transportation — A cross-section of computer applications at various levels of management in the transportation field. The course is divided into three sections: review of basic information given in the initial course, Introduction to Data Processing; control systems which covers computer systems employed in the day-to-day operation of a transportation system and also assist in short-run decision making; and management decision systems that examine several computer models used by management as planning aids and to assist in long-run decision-making.

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 understanding 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 Transportation Economics —Provides the student with the understanding of the relationship of economic concepts and the applied economics of transportation, specifically the economic aspects of the costing of transportation. Students will gain an understanding of the various procedures used in costing transportation. Each mode of transportation will be analyzed to show the importance of economics in relation to the movement of goods and people. Outside factors must be considered by the transport operator and not just the costs that can be controlled by them. Points of interest to both public and private carriers will be included in the course.

20.334 Transportation Regulations I —Provides the student with an understanding of the regulations regarding Canadian transportation. The course will relate to transportation law and its application regarding British Columbia first; Canada second; the Pacific Rim trading community third; and world trade fourth. The students will study the various regulations and their application to the carriage of goods and people as a service and how it affects the user of the service.

20.350, 20.450 Real Estate — 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 pre-licensing course.

20.351 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.

20.360 Introduction to International Business — International environments, basic concepts in foreign trade, the direction and volume of Canadian exports, framework of international business, financing of foreign trade, foreign exchange, international banking. Importance of Pacific Rim countries to Canadian exports, role of provincial and federal government in export development, tourism.

20.361 Transportation in International Trade — The mechanism involved in transporting goods from the seller to buyer; documents required for international transactions; modes of transportation and comparisons; freight rates and structures; inland transportation problems; import requirements; tariff classifications; shipping terms and trade terminology; marine cargo insurance, clauses.

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 Industrial Marketing — 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

20.433 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.

20.434 Transportation Regulations II —Provides a continuation of the subject matter covered in Transportation Regulations I by covering material necessary for both the buyer and the seller of transportation involving factors required for a comprehensive practical knowledge of transportation. Students will be introduced to the various types of freight tariffs and will learn how to overcome freight claims. An introduction to marine insurance, the various agencies involved in transport regulations, and the trend to de-regulation in the U.S. and the applications to Canadian shippers and receivers will also be covered.

20.435 Distribution Management —Storage and warehousing includes diverse matters such as inventory control, packaging, purchasing, containerization, location analysis and general materials handling.

20.436 Transportation Trends — Seven hours of the transportation and distribution management student's timetable has been allocated to two major projects. These projects are chosen by the student and are to be in the area of transportation, distribution or international trade and may be either economic studies, problem-solving or feasibility studies. They are carried out under the guidance of assigned faculty members.

20.450 See 20.350

20.451 Appraisal - 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 course is modelled for students seeking credit in recognised programs of professional appraising societies.

20.462 International Marketing Strategies — Researching foreign markets and identifying opportunities, need for product modification; impact of culture and religion; pricing for profit, competition; distribution structure and types of foreign middlemen; trading companies; promotional techniques; brand protection; strategies used by various firms; the sales contract; the importance of personal selling.

20.482 See 20.382

20.484 Transportation and Distribution — 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, techniques of moving goods between shippers and receivers, materials handling, packaging, storage and other 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 such as sampling, confidence limits of the mean, hypothesis testing and simple linear regression.

22.320 Management Engineering — 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.

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 audiovisual 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.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., Senior Instructor
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., Chief Instructor
R.W. Vandermark, B.A., Chief Instructor
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

Year 1	Term 2	
10.218	Economics	2
10.228	Organizational Behavior	2
16.242	Introduction to Managerial Accounting	3
22.200	Applied Statistics	4
22.201	Method Study	4
22.202	Computer Programming — Applied FORTRAN IV	3
22.203	Systems	3
31.222	Technical Communication	3
33.217	Basic Science	3
49.209	Engineering Concepts II	3
	Library and Research	5
		35

Year 2	Term 3	
10.318	Economics	3
10.368	Personnel Administration	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	5
22.307	Performance Measurement	4
	Library and Research	5
		35

Year 2	Term 4	4A	4B
10.438	Industrial Relations	—	4
20.115	Market Research	2	2
22.400	Quantitative Methods	7	3
22.401	Industrial Engineering Concepts	—	17
22.404	Production Control Management II	5	2
22.405	Management Information Systems	3	—
22.406	Industrial Engineering	10	—
22.408	Supervision	2	2
	Library and Research	6	5
		35	35

Subject Outlines

10.218, 10.318 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 appre-

ciation of the relation between economic theory and economic policy is provided.

10.228 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.

10.318 See 10.218

10.368 Personnel Administration — 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.

10.438 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.

20.115 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.

22.100, 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 — The student studies the principles of systematic scientific problem-solving in business and industry. Selection of study areas, economic feasibility, recording techniques, assembly and analysis of data, critical examination and the development of alternative solutions for design and production problems. The emphasis is on productivity improvement.

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.

22.203 Systems — The course includes problem definition, systems of data collection, information analysis, problem analysis and solution through the use of quantitative techniques. Other areas include office procedure analysis and facility layout.

22.300, 22.400 Quantitative Methods for Management I and II — Applications of the scientific method and mathematical modelling to decision-making in business and industry. Topics include break-even analysis, additional probability and decision theory, inventory control, vectors, matrices, linear programming, simulation models and queuing theory.

22.304, 22.404 Production Control Management I and II — Introduction to the basic concepts of production control with a special emphasis on the design of control systems for operating environments. Practical experience in controlling a production system will be given through the operation of a simulated production shop. Topics include scheduling, planning, organization of production departments, dispatching and progress control, maintenance and quality control.

22.305, 22.405 Management Information Systems I and II — Introduction to computer systems design and the application of the computer in the operations management field. Topics include computer hardware, computer software, computer systems flow-charts, selected application packages, file organization techniques and computer resources in the community. At the conclusion of this course, the student will have a broad appreciation of the application, both current and potential, of the computer in the business world.

22.306, 22.406 Industrial Engineering — This course covers materials handling, facility layout and design and cost analysis. There will be an opportunity to apply these to a group of relevant case and real life problems.

22.307 Performance Measurement — This course gives the student an appreciation for physical work performed by both industrial and office workers. The student will learn two forms of work measurement, predetermined motion time systems and time study. He will also learn performance ratings and how to establish standard times.

22.400 See 22.300

22.401 Industrial Engineering Concepts — A comprehensive external study in a local firm requiring the application of material from various recordings and analysis of data from the field, terminating in a written report and an oral presentation of the project.

22.404 See 22.304

22.405 See 22.305

22.406 See 22.306

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 33.117

49.102 Interpretation of Engineering Drawings — This course introduces the student to engineering drawings as a method of communication. He/she 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.

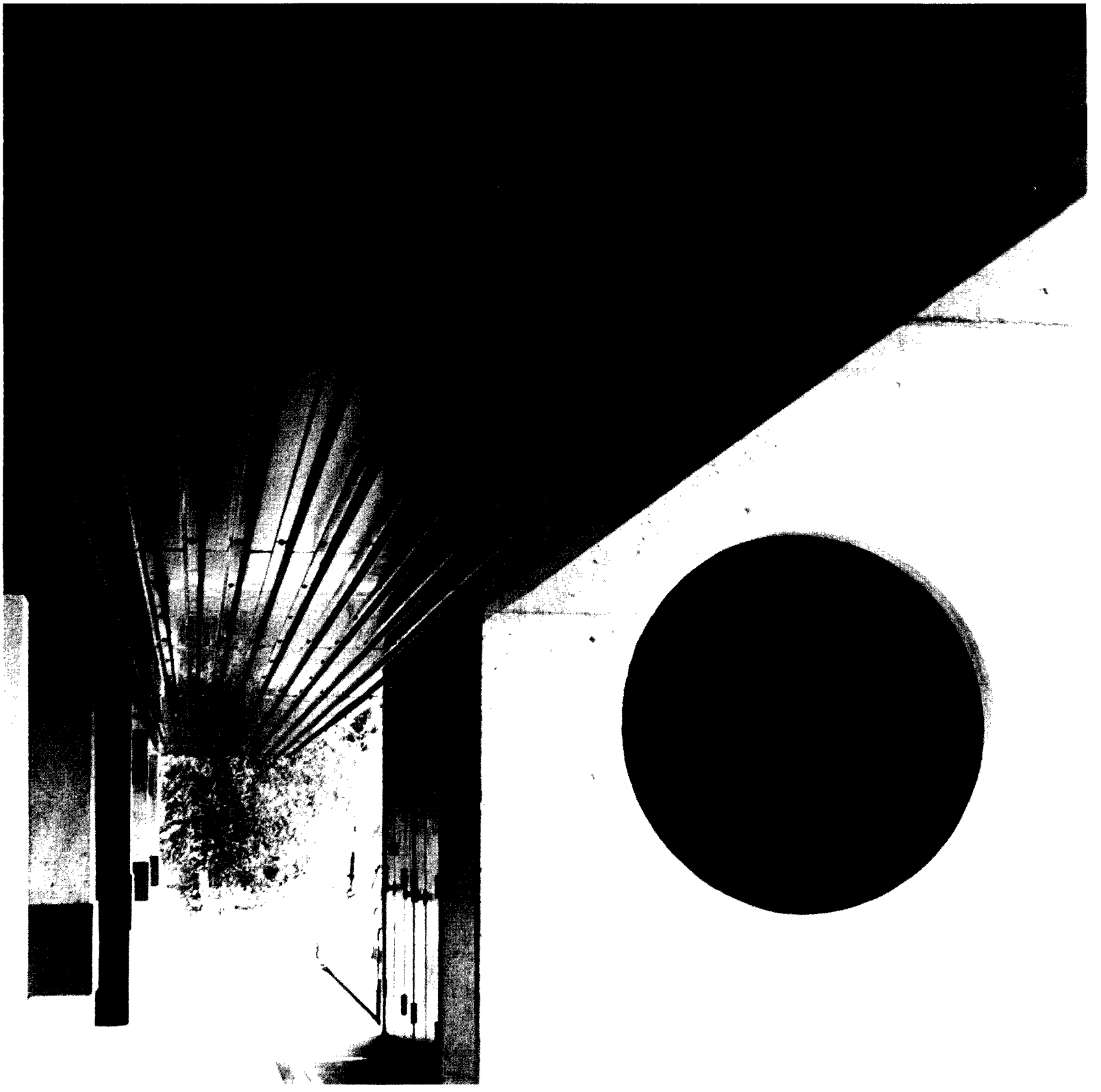
49.109 Engineering Concepts I — A study of applied mechanics and design concepts. Topics include some metallurgy, forces, moments, couples, frames, beams, centroids, friction and some elementary dynamics.

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*
C.K. Cha, B.Sc., M.B.A.
B. Curtis, M.B.A.
S.E. Dudra, B.Comm., M.B.A.
F.L. Gruen, B.Mgt.Eng., M.A.Sc., Chief Instructor
K.C. Hartley, B.A.Sc., P.Eng.
P.R. Harrison, P.Eng.
A.S. Lee, B.Eng., P.Eng.
J.E. Lloyd, M.Ed., P.Eng.
D.W. Malcolm, B.Sc.
D.J. Mallory, B.A.Sc., M.A., Ph.D.
E. Mason, B.A.Sc., P.Eng.
L. Mast, B.Sc., M.Sc.
N. MacKeown, B.A.Sc., P.Eng.
J.A.I. Millette, B.A.
B.R.M. Morrow, B.Comm., Chief Instructor
G.W. Murray, Dipl.T.
W.J. Sheriff, B.A., B.Sc.
L.A. Smith, Dipl.T., C.A.M.
C.V. Spong, Dipl.T.

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 Biological Sciences Program is accredited by the Society of Engineering Technologists.

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

Food Processing Option

Year 1	Term 2	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

Year 2	Term 3	
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

Year 2	Term 3 cont.	Clrm hrs/wk
44.312	Introductory Food Analysis	5
44.341	Mechanics of Machines	4
	Library and Research	5
		35

Year 2	Term 4	4A	4B
22.444	Basic Operations Management	2	2
32.444	Computing	4	—
44.401	Food Processing	5	5
44.402	Process Analysis	5	5
44.411	Quality Control	4	—
44.412	Food Analysis	5	5
44.415	Enzymatic Analysis	—	4
44.431	Sanitation	4	4
48.450	Instrumentation	—	6
	Library and Research	5	5
		34	36

Food Production Option

Year 1	Term 2	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
44.251	Food Production	6	6
	Library and Research	5	5
		35	35

Year 2	Term 3	
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

Year 2	Term 4	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

Landscape Horticulture Option

Year 1	Term 2	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	
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

Year 2	Term 4	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	
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

Year 1	Term 2	2A	2B
10.236	Economics	3	3
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
	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

Year 2	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 application 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 for Biological Sciences — 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 agri-

culture. 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.

44.251 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 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 rawmaterial 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. Physio-

chemical 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.

44.415 Enzymatic Analysis — The practical aspects of enzymology are stressed such as pH, buffers, classification, enzyme substrate reactions and the isozyme phenomenon. Laboratory procedures are chosen which measure native enzyme activities in various kinds of foods. The ultraviolet spectrophotometer and The Warburg apparatus are used to measure various enzyme activities.

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 See 44.391

44.495 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., P.Ag.
R.N.E. Hargreaves, Dipl.T., C.E.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
S.M. Murray, B.Sc. (Agr.)
B.E. Rothe
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 and 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 Systems 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, all with a mark of C+ or better. Related work experience or skills will strengthen an application.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
31.140	Technical Communication	4
32.140	Basic Technical Mathematics	5
40.101	Drafting	4
40.102	Building Construction	7
40.104	Materials and Methods	4
40.105	Construction Site Processes	2
49.140	Building Services (Heating & Vent.)	4
	Library and Research	5
		35

Year 1	Term 2	2A	2B
22.240	Basic 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 2	7	6
40.203	Construction Contracts	2	—
40.204	Building Services (Illumination)	—	3
40.406	Estimating	—	3
42.406	Building Structures	4	4
49.240	Building Services (Plumbing)	4	—
	Library and Research	4	4
		35	35

Year 2	Term 3	Arch	Econ	Clrm hrs/wk Sys
22.340	Operations Management	2	2	2
33.319	Applied Physics for Building Technology	4	4	4
40.301	Architectural Major	6	—	—
40.302	Building Construction 3	6	6	6
40.303	Electrical Systems	4	4	4
40.304	Estimating	5	5	5
40.305	Economics Major	—	6	—
42.407	Building Structures	4	4	4
49.340	Mechanical Systems Major	—	—	6
	Library and Research	4	4	4
		35	35	35

Architectural

Year 2	Term 4	4A	4B
22.440	Basic Operations Management	2	—
31.340	Advanced Technical Communication	2	—
40.401	Architectural Major	6	6
40.402	Building Construction 4	6	6
40.403	Construction Specifications	2	2
40.404	Estimating	3	5
40.407	Acoustics	—	4
40.408	Codes and Regulations	—	2
40.409	Construction Contracts	2	—
42.407	Building Structures	4	3
49.540	Space Conditioning	3	—
51.206	Introduction to Survey	—	3
	Library and Research	5	4
		35	35

Economics

Year 2	Term 4	4A	4B
10.731	Industrial Management	—	4
22.440	Basic Operations Management	2	—
31.340	Advanced Technical Communication	2	—
32.440	Mathematical Methods and Computing	4	—
40.402	Building Construction 4	6	6
40.403	Construction Specifications	2	2
40.404	Estimating	3	5
40.405	Economics Major	6	6
40.408	Codes and Regulations	—	2
40.409	Construction Contracts	2	—
42.407	Building Structures	4	3
51.206	Introduction to Survey	—	3
	Library and Research	4	4
		35	35

Mechanical Systems

Year 2	Term 4	4A	Clrm hrs/wk 4B
10.731	Industrial Management	—	4
22.440	Basic Operations Management	2	—
31.340	Advanced Technical Communication	2	—
40.402	Building Construction 4	6	6
40.403	Construction Specifications	2	2
40.406	Estimating (Mech.)	3	4
40.408	Codes and Regulations	—	2
40.409	Construction Contracts	2	—
40.410	Mech. Systems Vibration	—	4
42.407	Building Structures	4	3
49.440	Mechanical Systems Major	6	6
49.540	Space Conditioning	3	—
	Library and Research	5	4
		35	35

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 — 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, bylaws. Application of the above to the preparation of working drawings, in coordination with courses in building structures and building services.

40.104 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.

40.105 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.

40.201 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 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.

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

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; model-making. 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, 40.404 Estimating — Basic theories and principles of estimating and construction costs, including methods of measurement of works and pricing of construction on unit systems. Course concludes with an introduction to elemental analysis method of forecasting project costs.

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.

40.401 See 40.301

40.402 See 40.302

40.403 Construction Specifications — Techniques of specifying construction work for estimating and bidding; practical applications in specifying costs of various kinds of construction work, particularly wood-frame and reinforced-concrete systems.

40.404 See 40.304

40.405 See 40.305

40.407 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 Construction Contracts — Introduction to the fundamentals of contracts; the basic forms of construction contracts (stipulated price and cost plus fee) and their relationship to information and risk; other forms of construction contracts (max. cost plus fee and unit price); contracts agreements; and an initial examination of some of the primary general conditions of contract. These are continued and extended in second year.

40.410 Mech. Systems 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.

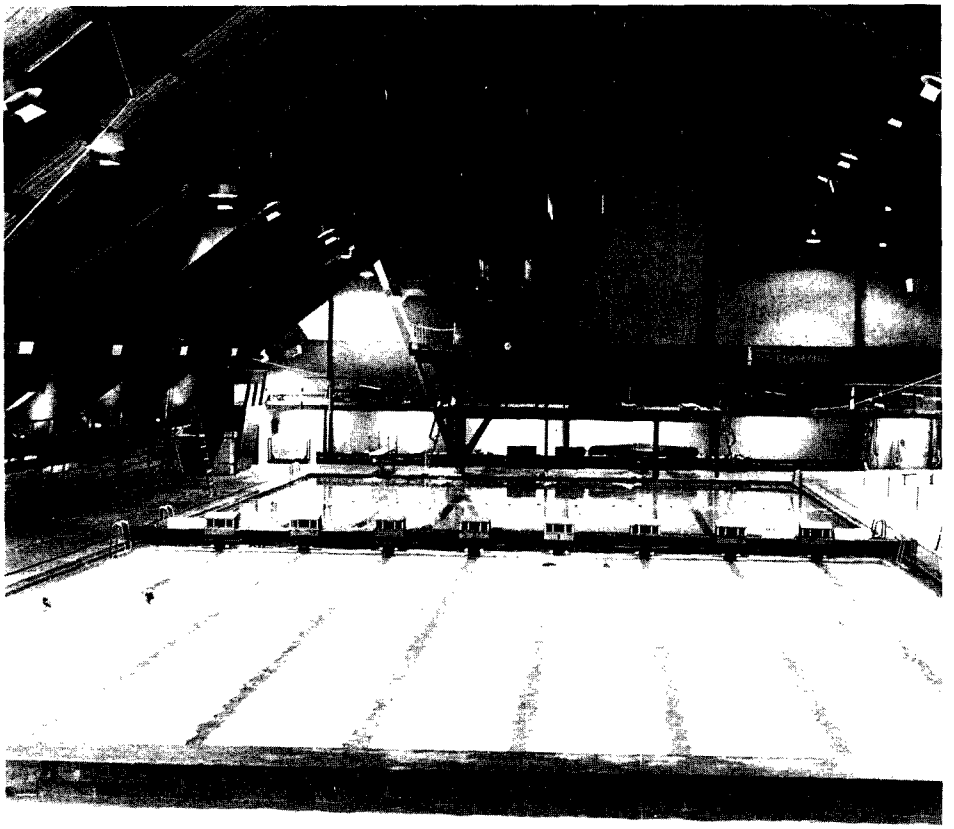
49.440 See 49.340

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
R. Guerin
D.C. Hale, Dipl.T.
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
H.E. Kuckein, M.R.A.I.C.
J. Lancaster, B.Comm., M.C.I.Q.S.
A. Maharajh, Dipl. T.
J.P. Sullivan, B.Sc., P.Eng.
T. Thonig, Dipl. T.
D. Workman



Recreation Facilities Management

This program should appeal to students who have a predominate interest in the management of recreation facilities. An aptitude for sports and leisure activities is desirable and an appreciation is necessary; but a keen interest to effectively manage people, programs, budgets and physical plant operations is essential. The potential manager will learn skills to enable participants efficient and enjoyable access in the framework of maximum utilization of the recreation facilities. The graduate will be responsive to today's energy and budget conscious environment and will bring to the field skills in human relations, organization theory, personnel, accounting, food and beverage management and physical plant operation and maintenance.

Job Opportunities

The program has been developed to answer a need for qualified people able to work effectively in the public and private sector in a wide range of facilities such as private family clubs, golf facilities, private and municipal, health spas, municipal recreation complexes, joint private and government complexes, aquatic centres, indoor winter sport centres, and ski resorts.

Graduates of the program should be able to enter employment at different levels dependent upon any past experience or part-time job experience gained during the two year program. It is expected that most will join organizations at the supervisory level in capacities such as assistant managers, facilities coordinator or managers of single purpose facilities such as squash courts, arenas or pools.

In general, initial placement would be in positions between the direct program orientated person and the senior administrators of recreation facilities. With experience graduates can become managers, superintendents, supervisors, coordinators or directors of any one of a variety of recreational facilities, public or private, dependent upon acquired "hands on" expertise and to some degree, program aptitude and interest.

The Program

Facilities recreation management people must be equipped with an understanding of the accounting process and theories; plant maintenance and operations; food and beverage management; marketing; basic management practices including human relations, personnel and standard engineering and architectural practices related to facilities development. Ability to effectively communicate ideas and concepts, verbally and in writing, will also be addressed. Most important the program will include current thoughts and concepts in the fields of philosophy and programming for leisure and recreation, complemented with the ability to effectively administer funds for the operation of leisure services.

The program will include some field work projects and career guidance.

Prerequisites

Graduation from the Selected or Combined Studies Program with Algebra 12 or Math 12 and Physics 11. Related work experience or skills will strengthen an application. 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**	
16.144	Introduction to Accounting	3
22.135	Introduction to Operations Management	5
22.154	Mathematics of Finance	5
31.122	Technical Communication	3
33.122	Physics for Recreation Facilities Management	3
49.154	Physical Plant Equipment and Maintenance	5
54.101	Recreation Facilities Management	7
	Library and Research	4
		35
Year 1	**Term 2**	
22.235	Basic Management Engineering	3
22.254	Applied Statistics	4
31.222	Technical Communication	3
33.222	Physics for Recreation Facilities Management	3
40.205	Building Services (Illumination)	3
49.254	Physical Plant Equipment and Maintenance	5
54.201	Recreation Facilities Management	7
82.204	Drafting and Blueprint Reading	2
	Library and Research	5
		35
Year 2	**Term 3**	
10.325	Industrial Relations	4
10.371	Management of Human Resources	2
14.050	Introduction to Data Processing	4
18.102	Food and Beverage Management	5
20.382	Marketing Research	4
49.140	Building Services (Heating and Ventilating)	5
54.301	Recreation Facilities Management	7
	Library and Research	4
		35
Year 2	**Term 4**	
10.425	Industrial Relations	3
18.202	Food and Beverage Management	5
20.482	Marketing Research	4
22.454	Supervision	3
40.209	Landscape Drafting	3
49.240	Building Services (Plumbing)	3
54.401	Recreation Facilities Management	9
	Library and Research	5
		35

Subject Outlines

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.

10.371 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.

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

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.

16.144 Introduction to 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, owner's equity and payroll accounting.

18.102, 18.202 Food and Beverage Management — Background of industry; sanitation; meal planning, costing and menu preparation; selection of foods; purchasing methods; principles of food preparation; equipment layout and specifications; service of foods; administrative requirements; organization of internal and external catering services.

18.202 See 18.102

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 application of marketing research and simulated real-life situations will be examined.

20.482 See 20.382

22.135 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.

22.154 Mathematics of Finance — Review of basic algebra, trigonometry and graphing techniques. Other topics to be covered include basic mathematics of finance, note discounting, simple and compound interest, the concept of present value and cash flow, loan payment plans, annuities, mortgages, sinking funds, depreciation methods, techniques of evaluating investment alternatives, and basic inventory management mathematical techniques.

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

22.254 Applied Statistics - Introduction to the use of statistics in business; descriptive statistical techniques involving the collection and treatment of data and elementary probability. The course also covers an introduction to inferential statistics through selected topics such as sampling, confidence limits, hypothesis testing, and linear regression. A statistical research project, applied to recreation facilities management, is a requirement of the course.

22.454 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, audiovisual techniques, oral presentations and reports. The lab hours will be used to practice these skills. There will be approximately ten 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

33.122, 33.222 Physics for Recreation Facilities Management — A general physics course designed to meet the needs of the Recreation Facilities Management Technology. No formal laboratory program. Subjects covered include: kinematics, dynamics, statics, energy, simple machines; basic electrical circuits, magnetic and electromagnetic effects; mechanical and thermal properties of solids, liquids and gases; change of state, heat transfer, heat engines and refrigeration; light and illumination; sound and sound insulation.

33.222 See 33.122

40.205, 49.140, 49.240 Building Services — Introduction to building service systems in regard to water supply, drainage, heating, ventilating and electrical illumination.

40.209 Landscape Drafting — A basic study of the elements of landscape as applied to recreation facilities relative to working drawings. The graphic representation of turf, plantings, parking, drainage, sprinklers, and fixtures will be examined with an overview to maintenance.

49.140 See 40.205

49.154, 49.254 Physical Plant Equipment and Maintenance — The course is highly descriptive and qualitative, treating the various mechanical systems and equipment items commonly required in recreational facilities, in terms of performance, operating principles, and application. The course covers air-conditioning systems; refrigeration and artificial ice installations; swimming pools; fire protection systems; elevators and escalators; boilers, pumps and fans. In addition, a brief treatment of electric motors and switchgear is included. The laboratory periods are comprised of problem-working sessions, demonstrations, and field trips.

49.240 See 40.205

49.254 See 49.154

54.101, 54.201, 54.301, 54.401 Recreation Facilities Management — Each term will emphasize a different aspect of current thoughts in the recreation and leisure services industry. Theories, trends, and applications of recreation and leisure services management will be discussed. Four major subjects will be covered; management of recreation services, maintenance of recreation facilities, programming of recreation facilities and philosophy of leisure and recreation. One term will be devoted to each major topic. Visits to local facilities will complement lecture and lab material when appropriate and the fourth term will include directed field work.

54.201 See 54.101

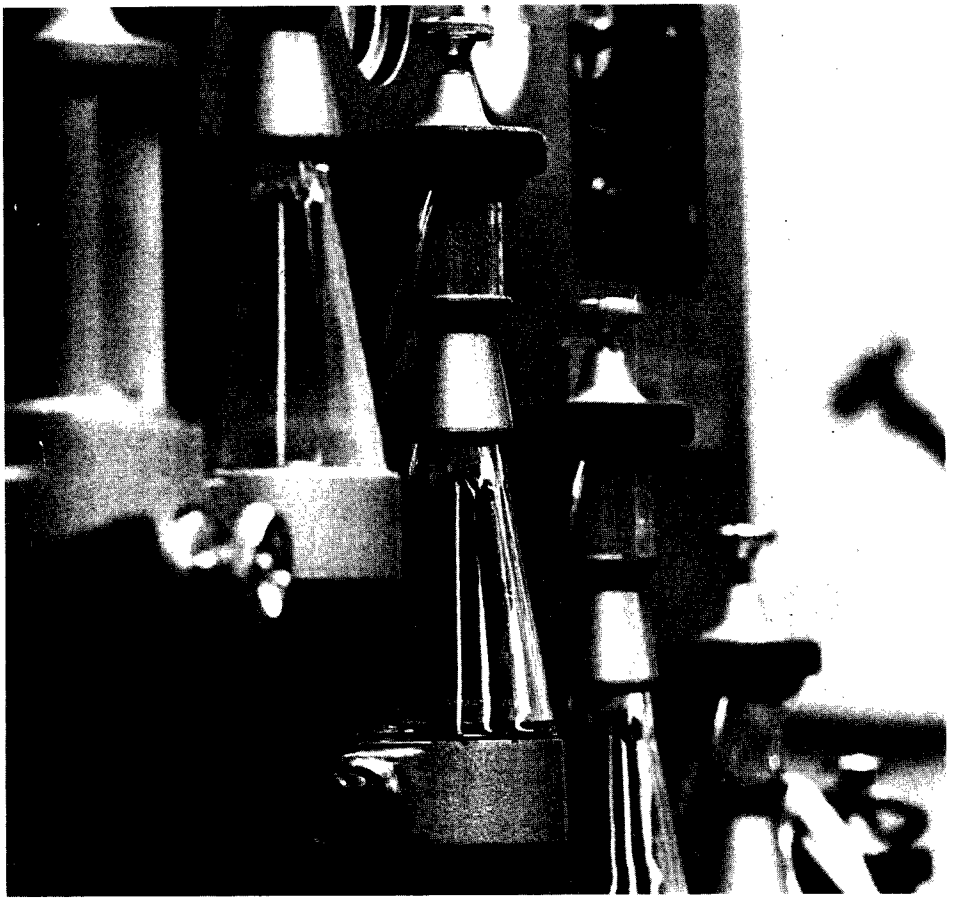
54.301 See 54.101

54.401 See 54.101

82.204 Drafting and Blueprint Reading — Fundamental introduction to drafting: lettering, oblique, isometric and perspective presentation techniques, charts and graphs, topographic maps, subdivisions and plans 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.

Faculty and Staff

D.A.D. Hickman, F.R.A.I.C., *Department Head*
M.D. Powley, B.Ed., M.B.A.



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.

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 are 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
41.119	Environmental Science	4½
49.101	Drafting	2
	Library and Research	5
		35

Year 1	Term 2	2A	2B
30.201	Applied Chemical Principles	6	6
30.204	Chemical Laboratory Techniques	3	3
31.241	Communication	3	—
32.241	Mathematics	5	5
33.214	Physics	6	6
41.202	Laboratory Workshop	1½	1½
41.203	Engineering Materials	3½	3½
41.210	Industrial Chemical Processes	—	3
49.201	Drafting	2	2
	Library and Research	5	5
		35	35

Students must take all the common courses listed for Term 3 plus one course in Specialty 1.

Year 2	Term 3	Clrm hrs/wk
	Common	
30.310	Physical Chemistry	5
30.314	Analytical Chemistry	6
31.341	Report Writing	2
32.341	Mathematics	5
41.341	Unit Operations	6
	Library and Research	5
	Specialty 1	
30.309	Organic Chemistry	6
41.304	Physical Metallurgy	6
41.307	Extractive Metallurgy	6
41.311	Pollution Science	6
		35

Year 2 Term 4

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

	Common	4A	4B
30.414	Analytical Chemistry	6	6
41.441	Unit Operations	6	6
	Library and Research	5	5
	Specialty 1		
30.409	Organic Chemistry	6	6
41.404	Physical Metallurgy	6	6
41.407	Extractive Metallurgy	6	6
41.411	Pollution Science and Microbiology	6	6
	Specialty 2		
41.408	Ore Analysis	3	3
41.412	Waste Management	3	3
	Specialty 3		
41.413	Environmental Analytical Methods	3	3
47.409	Process Dynamics	3	3
	Specialty 4		
32.441	Calculus II & III	3	3
41.320	Project	3	3
	Specialty 5		
30.416	Analytical Instrumentation	—	3
43.457	Process Instrumentation	3	—
	Specialty 6		
41.448	Pollution Control In Industrial Chemistry	3	—
41.438	Coal Chemistry	—	3
		35	35

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 tech-

niques 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 chemtry 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, 30.424 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.

31.241 See 31.141

31.341 Report Writing — Emphasis is on preparation of a major term report which is based on library research.

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 and Fortran — 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 II, Calculus III 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; 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 —A survey of analytical methods to determine the elemental constituents of ores, concentrates, alloys and metal products. Laboratory work includes principles and practice of gravimetric, volumetric, complexometric and spectrophotometric methods of analysis.

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 Waste Management — Physical, biological and chemical methods used in treating municipal and industrial wastewaters.

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.

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 Pollution Control in Industrial Chemistry — This course deals with the engineering methods currently used for the control and/or treatment of the major air and/or water pollutants. Topics to be covered will be selected among the following; electrostatic precipitators, scrubbers, cyclone collectors, fabric filters, industrial wastewater treatment, oil spill recovery, solid waste disposal methods, treatment of radioactive wastes and others.

43.457 Process 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.

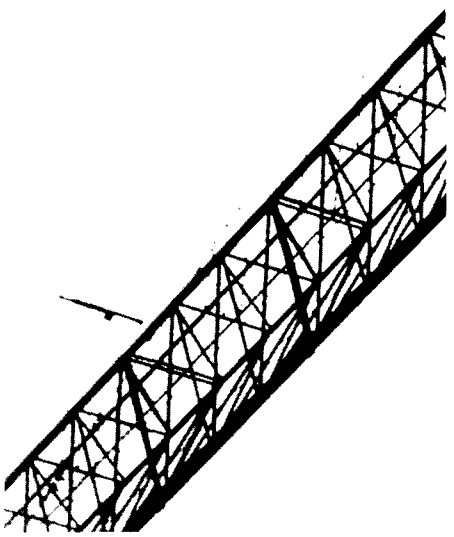
47.409 Process Dynamics — Measurement transducers, interface devices, indicators and recorders. Controllers and control functions. Dynamics of process systems, lumped parametric solutions. Upset solutions. Computer applications of system modelling.

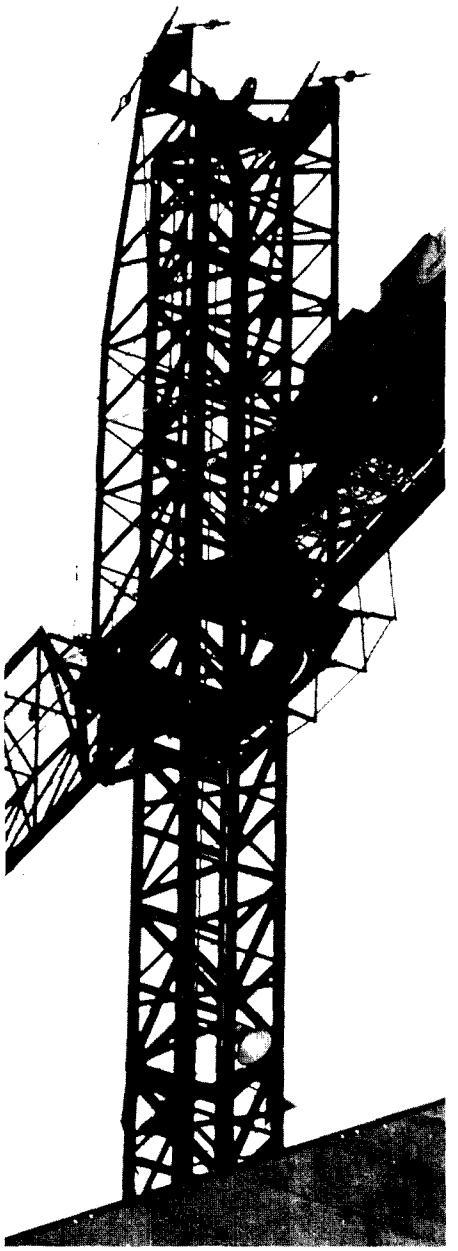
49.101, 49.201 Drafting — Techniques of reading and producing orthographic drawings using standard format and the development of basic skills in applying these techniques. Use of instruments, line work, geometric constructions, orthographic projection, isometric drawing and sketching, sections and dimensioning.

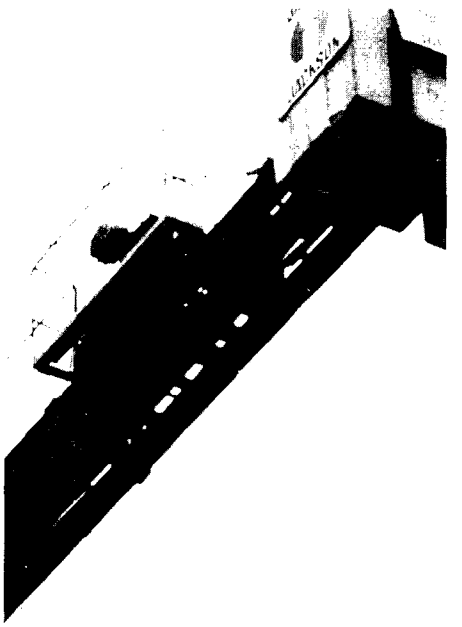
49.201 See 49.101

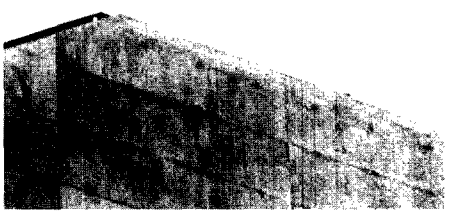
Faculty and Staff

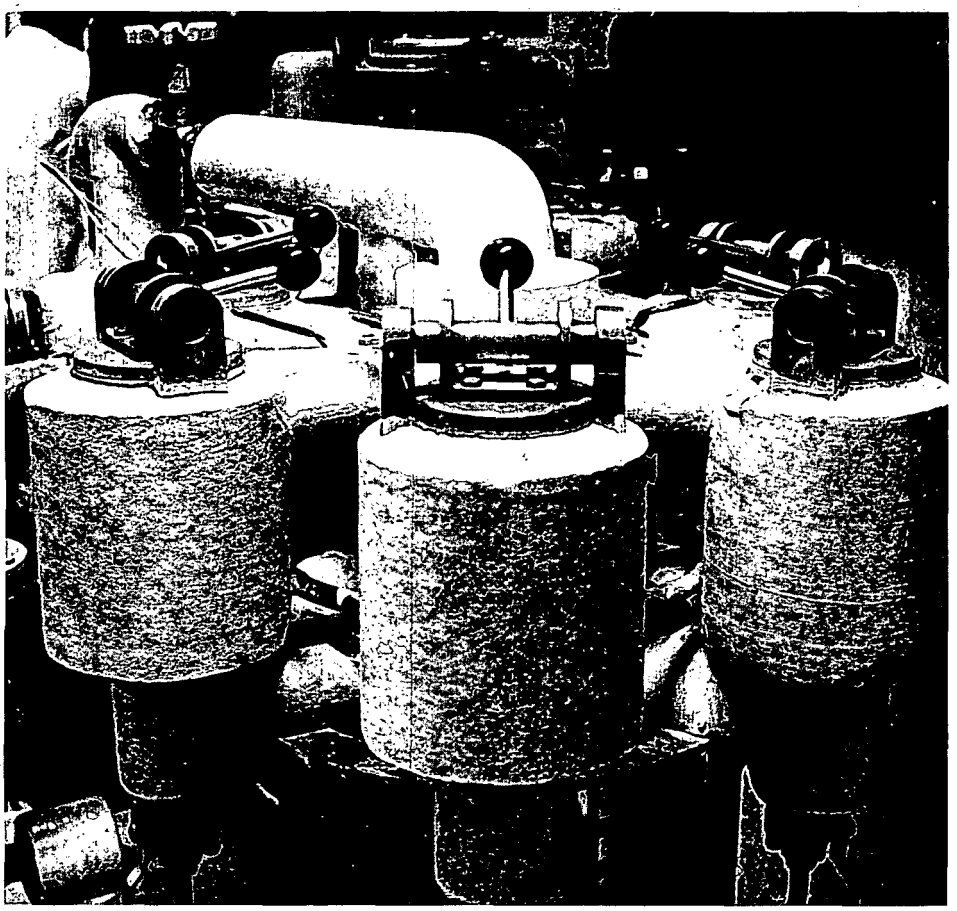
I.M Anderson, M.I., Gas.E., C.Eng., *Acting Department Head*
J. Berry, B.Sc., M.Sc., Ph.D.
W.J. Boygo, B.C.L.Ass.
J.T. Denley, B.Sc., P.Eng. (Alta.)
R. Drouin, Dipl.T.
W.R. Irvine, B.A., M.Sc., P.Eng., Chief Instructor
D.J. McLeod, A.R.M.T.C., A.I.M.
W.F. Roberts, B.A., B.A.Sc., P.Eng., Senior Instructor
T. Voksepp, B.A.Sc., P.Eng.











Forest Products

The forest products industry in B.C. continues to grow yearly with the adoption of new technology in the manufacture and marketing of pulp, newsprint, plywood and lumber products.

Job Opportunities
Both men and women with a sound knowledge of technological advances in forest products and their application are needed in plant process operations, plant managment, research and development, technical services and sales.

Graduates in the Lumber and Plywood Program are employed in the sawmilling and plywood industries as management trainees in production, production control, quality control or sales.

Graduates from the Pulp and Paper Program are in demand in pulp production, process control, pulp and paper quality control, pollution abatement and control, and research.

The Program
Students enrolling in the Forest Products Technology choose one of two programs of study — lumber and plywood or pulp and paper. In addition to the basic sciences, the first-term curriculum includes an introduction to forest utilization, wood technology, sawmilling, plywood and pulp and paper manufacture. In the succeeding terms, there is increased emphasis on specialization within the chosen program.

The Lumber and Plywood Program includes the study of the techniques and economics involved in converting wood to products such as lumber, plywood and particleboard.

The Pulp and Paper Program curriculum includes the theory and application of technology in pulping processes, and the conversion of pulp to finished products such as newsprint, paper and paperboard. Quality control and pollution abatement are an integral part of the program. A pilot plant, which is recognized by the Technical Section of the Canadian Pulp and Paper Association as a member mill, is used to provide hands-on experience.

In both programs, classroom and lab instruction are augmented by field trips.

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

Pulp and Paper: Algebra 12 or Math 12 and Chemistry 11

Lumber and Plywood: 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.

Scholarships
Industry-sponsored, two-year combined scholarship-mill employment awards are now available to selected students entering both the Pulp and Paper and Lumber and Plywood Programs.

These awards vary in amounts up to $1,200 per student. Information may be obtained from your high school counsellor, or by contacting the Forest Products Technology staff at BCIT.

Course of Studies

		Clrm hrs/wk	
		Pulp & Paper	Lumber & Plywood
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	
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
Year 1	**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
Year 1	**Term 2B**		
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
46.399	A summer technical report will be required for students continuing into second year.		

		Clrm hrs/wk	
		Pulp & Paper	Lumber & Plywood
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	—
43.354	Electrical Equipment Applications	—	4
46.301	Pulp and Paper Technology II	7	—
46.305	Pulp and Paper Testing I	8	—
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
Year 2	**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
Year 2	**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.*

Subject Outlines

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.

31.146, 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.

31.246 See 31.146

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 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.

31.446 See 31.346

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

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

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 lab 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

I.M. Anderson, M.I.GasE., C.Eng.
Acting Department Head
S. Berghold
G.R. Harris, B.A., M.A., Chief Instructor
H. Kettner
B.R. Leslie, B.A.
J.T. Neilson, B.A.Sc., P.Eng.
G.A. Smook, B.S., P.Eng.

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. The B.C. coal industry is expanding and local mining activity generally has brightened in the last year. 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. This program is accredited by the Society of Engineering Technologists.

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

Year 1	Term 1	Clrm hrs/wk
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

Year 1	Term 2	
30.201	Applied Chemical Principles	6
31.250	Technical Communication	3
32.250	Calculus I	5
33.201	General Physics	3
49.201	Drafting	2
50.201	Geology	3
50.202	Mining	2
51.210	Surveying	3
	Library and Research	5
		32

Year 2	Term 3	Clrm hrs/wk
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

Year 2	Term 4	
31.450	Advanced Technical Communication	2
32.450	Numerical Methods I	5
41.405	Assaying	4
41.414	Mineral Processing	3½
42.202	Hydraulics	3
42.502	Statics and 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, queuing 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 covering mechanics, dynamics, and the properties of solids and fluids.

33.201 General Physics — A general level course of lectures only covering thermal properties of matter, waves, electricity, magnetism, electromagnetism and atomic and nuclear physics.

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 Statics and Strength of Materials — Starting with vector representation of force systems, the student learns to analyse a large variety of equilibrium problems by both graphical and analytical methods. After thorough grounding in force analysis the student examines the stresses produced by these forces in various materials and under typical engineering conditions

42.502 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 matamorphic 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

I.M. Anderson, M.I.GasE., C.Eng.
Acting 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 work 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. This program is accredited by the Society of Engineering Technologists.

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
Year 1	**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	3
33.204	Introductory Geophysics	3
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
Year 2	**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 Petroleum 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.

31.247 See 31.147

32.147 Basic Technical 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 General Physics — A general level course covering mechanics, dynamics and the properties of solids and fluids.

33.201 General Physics — A general level course of lectures only covering thermal properties of matter, waves, electricity, magnetism, electromagnetism and atomic and nuclear physics.

33.204 Introductory Geophysics — A combined lecture and laboratory course covering the elements of gravity, resistivity, seismic and magnetic methods of geophysical surveying as prerequisite for 33.406 Petroleum Geophysics.

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.

41.106 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.

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

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 Gas Distribution and Utilization — 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.

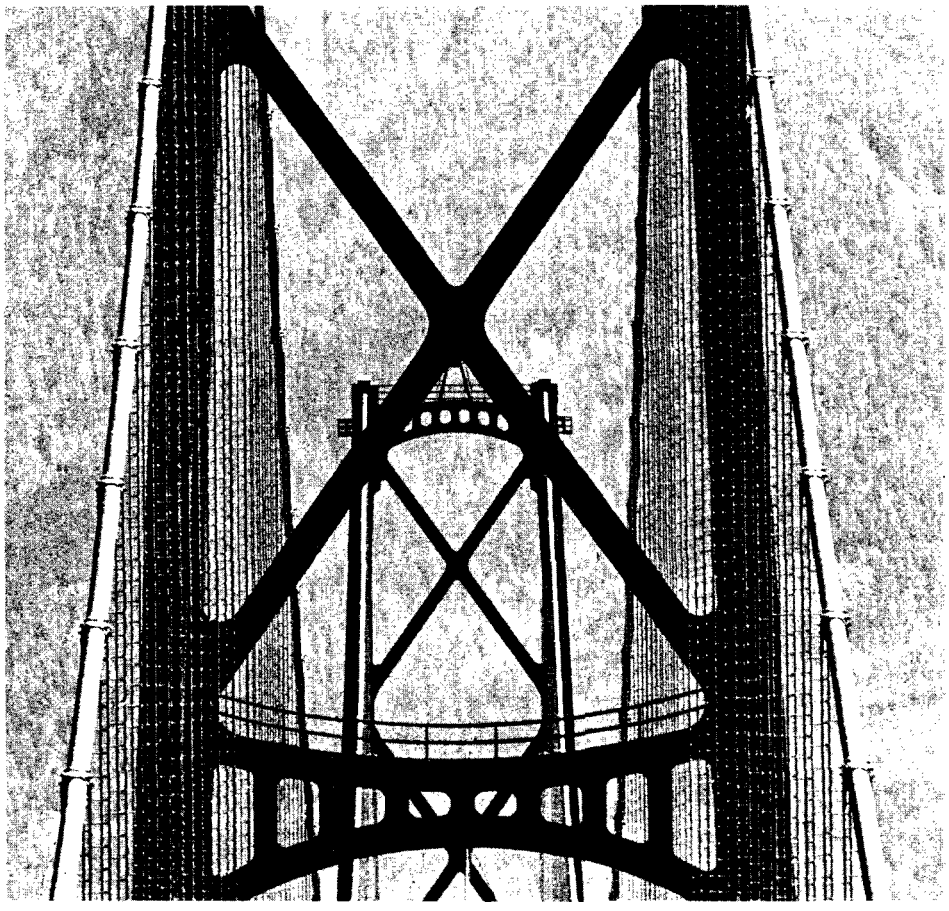
49.266 Introduction to Machine Tools — A basic course designed to familiarize the student with shop tools and equipment and with shop terminology and established standards of workmanship. Demonstrations are carried out to provide a practical understanding of the subject.

50.101 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 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.

Faculty and Staff

I.M. Anderson, M.I.GasE., C.Eng., *Acting Department Head*
J.F. Fairley, B.A.Sc., P.Eng.
D.J. Hardie, H.N.C.



Civil and Structural

Civil and structural technologists are involved in the design and construction of highways, bridges, airports, railways, municipal works, power developments, dams, canals, docks and harbors. The field has enormous creative potential and 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.

This program has been accredited at the technologist level by the Society of Engineering Technologists of B.C. and, upon completion of the BCIT diploma program, graduates are eligible for membership in the Society.

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	Term 1, 2a, 2b		Clrm hrs/wk
31.142, 31.242	Technical Communication		3
32.142, 32.242	Basic Technical Mathematics, Calculus		5
33.107, 33.207	Physics		5
		hrs/wk any term	
42.002	Hydrology[2]	(6)	
42.003	Hydraulics[2]	(3)	
42.004	Transportation[2]	(6)	
42.005	Elementary Structural Design[2]	(6)	12
42.101	Statics[2]	(6)	
42.201	Materials Behavior[2]	(9)	
	Library and Research		5
49.101, 49.202	Drafting		2
51.109, 51.209	Surveying		3
			35

[2]Order of courses shown will vary from term to term depending on student timetable.

Civil Sets

Year 2	Term 3	Clrm hrs/wk
22.342	Operations Management	3
31.342	Communications	2
32.342	Matrix Mathematics	4
42.020	Hydraulics	(6)
42.041	Structures I	(6)
42.321	Soil Mechanics I[2]	(6)
51.309	Surveying	3
	Library, Research and Electives	5
		35

Year 2	Term 4	4A	4B
31.442	Communications	2	2
32.442	Statistics and Numerical Methods	4	4
42.028	Highways and Asphalt[2]	—	(9)
42.030	Construction	—	6
42.325	Municipal Services I[2]	(6)	—
42.421	Soil Mechanics II[2]	(6)	—
42.425	Municipal Services II[2]	—	(6)
51.409	Surveying	3	—
	Electives[2]	9	—
	Library, Research and Electives	5	5
		35	32

Structures Set

Year 2	Term 3	
22.342	Operations Management	3
31.342	Communications	2
32.342	Matrix Mathematics	4
42.020	Hydraulics	(6)
42.027	Highways[2]	(6)
42.041	Structures I	(6)
51.309	Surveying	3
	Library, Research and Electives	5
		35

Year 2	Term 4	4A	4B
31.442	Communications	2	2
32.442	Statistics and Numerical Methods	4	4
42.030	Construction	—	(6)
42.042	Structures II	(6)	—
42.043	Structures III	—	(6)
42.045	Municipal Services B[2]	(6)	—
42.047	Structural Detailing	(3)	(3)
42.321	Soil Mechanics I[2]	(6)	—
42.421	Soil Mechanics II[2]	—	(6)
51.409	Surveying	3	3
	Library, Research and Electives	5	5
		35	35

All students must complete a minimum of 63 hours as shown in parentheses. Elective hours can be chosen from the list below or approved continuing education courses.

Elective List
14.424 Computer Applications (3)
22.442 Operations Management II (6)
42.060 Waste Treatment and Disposal (3)
42.999 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 Communications — 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

42.002 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.

42.005 Elementary Structural Design — Having previously studied forces and material properties, the student learns to apply these to analysis of real structures. In addition, he or she studies the effects of wind, snow and earthquake loads as determined from national standards. Design and analysis of steel and timber beams, columns and trusses and their connections are used as examples.

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.

42.027 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.

42.028 Highways & Asphalt — This course simulates the role of a design technologist as part of a highway design team. The instructor, as the project engineer, will present the principles of highway design which will then be used by the student to design an actual highway. Topics will include conceptual design, preliminary investigation, alignment, surface geometry, rural intersection design, earthworks, drainage and safety. The student will also be instructed in the principles of asphalt technology through lectures and laboratory work, culminating in a detailed pavement design.

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 specifi-

cations, 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.

42.047 Structural Detailing — Students will be required to design and detail connections and draw solutions to detailing problems taken from structures used in other related courses. This includes timber, steel and reinforced concrete including bill of materials and reinforcing bar lists.

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., reaeration, pretreatment, sedimentation, theory of biological treatment, activated sludge,trickling filters, sludge digestion, sludge disposal, wastewater lagoons and refuse disposal.

42.101 Statics — Vectors, force systems, graphical analysis, resultants, components, moments, equilibrium laws, force polygons, funicular polygons, frames and trusses, stress diagrams, Bowes' notation, flexible tension members, load shear and bending moment curves. Closely-supervised problem sessions are used to provide the student with practice in common analytical and graphical solutions to problems of static load on statically determinate structures.

42.201 Materials Behavior — Simple stresses; stress, stain elasticity; compound bars and columns; temperature stress; elastic limit; limit of proportionality; yield; ultimate; factor of safety; load factor; ductility; resilience; fatigue; shock. Properties of sections; bending moments; shear forces; theory of flexure; slopes and deflection of beams; restrained and continuous beams. Strut theories; eccentric loading, lateral loading. Testing techniques; machines; extensometers; strain gauges; brittle lacquers; photo elasticity; evaluation of results.

42.321, 42.421 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.

42.325, 42.425 Municipal Services — Students plan a residential subdivision for a piece of accessible raw land and design an arterial street bordering the subdivision and specific minor streets and intersections within the subdivision. The instructor acts as supervisor and consultant to 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.

42.421 Soil Mechanics II See 42.321

42.425 Municipal Services See 42.325

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.

49.202 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.

51.109, 51.209 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.

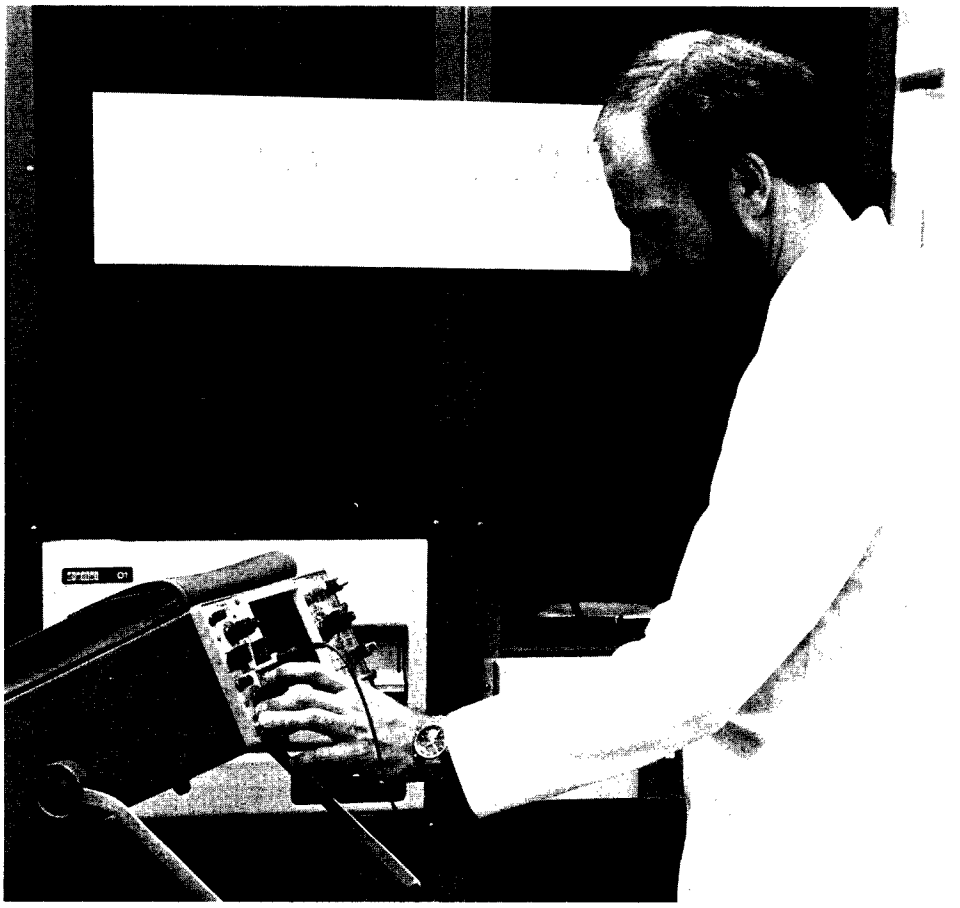
51.209 See 51.109

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

A.J. Elston, B.E., P.Eng., *Department Head*
A.R. Barren, B.Sc., Ph.D., P.Eng.
K.B. Brown, Dipl.T.
R. Butler, C.Eng., P.Eng., M.I.C.E., M.I.Struct.E.
C.L. Doylend
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.
C.A. Payne, B.A.Sc., M.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.
R.C. Starr, B.Eng., M.A.Sc., P.Eng., Chief Instructor



Electrical

Electrical energy, electronic controls, industrial instrumentation and control, together with electronic communications, form the base of modern technology. These disciplines and the related systems 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.

This program is accredited by the Society of Engineering Technologists.

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.

Graduates in the rapidly-expanding field of Instrumentation are sought after in a diverse range of industries such as consulting, engineering sales and support, marine systems, environmental control, mining and pulp and paper.

Employment may vary from the maintenance of process instrumentation and control systems with large companies such as B.C. Hydro, Noranda and MacMillan Bloedel, to system design and application work with companies like H.A. Simons International, Foxboro Controls and Wright Engineering. Work is also found in other areas such as B.C. Research, Department of the Environment, and smaller firms specializing in custom design and manufacturing of automated measurement and control systems.

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

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.

Students in the Instrumentation Option will be concerned with the applications of automation and control systems in one of the most rapidly expanding phases of technology today.They will be taught the fundamentals of automatic control systems which measure, compute and regulate process conditions such as level, pressure, flow, temperature and chemical composition. The graduate will be competent in subject areas such as hydraulics, pneumatics, thermodynamics, chemistry, electronics, mini and microprocessors and software as they apply to measurement and control of real processes.

The program will be applications orientated with hands-on equipment labs, industrial tours, guest lecturers, design projects and a two-week industrial practicum.

The Power Option is concerned primarily with the generation, distribution, transmission, utilization and control of electrical energy. The concept of electrical power systems requires the study of digital techniques and microprocessors, which monitor and control these systems. Approximately 25 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. Physics 11 and 12 and Chemistry 11 and 12 — all with a C standing — are acceptable.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
31.143	Technical Writing	4

Year 1	Term 1 cont.	Clrm hrs/wk
32.143	Basic Mathematics	7
33.106	Physics	5
41.109	Materials	3
43.102	Circuit Analysis	6
43.103	Shop Practice	4
	Library and Research	6
		35

Year 1	Term 2	
31.243	Technical Writing	3
32.243	Calculus	7
33.206	Physics	5
43.201	Electronic Circuits I	6
43.202	Circuit Analysis 2	5
43.203	Shop Practice 2	2
43.204	Measurements	3
	Library and Research	4
		35

Control Electronics

Year 2	Term 3	
10.732	Industrial Management	2½
32.343	Numerical Methods and Computing	3½
43.311	Electronic Circuits 2	7
43.312	Digital Techniques	6
43.313	Pulse Circuits	6
43.314	Telecommunications Circuits	6
	Library and Research	4
		35

Year 2	Term 4	4A	4B
31.443	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)	—	—
	Library and Research	4	3
		35	35

Instrumentation

Year 2	Term 3	
30.302	Chemical Instrumentation	6
41.341	Unit Operations	4
43.341	Measurement Electronics	5
43.342	Digital Components	5
43.343	Transducer Principles	6
43.344	Control Devices and Techniques	6
	Library and Research	3
		35

Year 2	Term 4	4A	4B
41.441	Unit Operations	4	4
43.441	Electronic Signal Conditioning	5	—
43.442	Interface Techniques	5	—
43.443	Analytical Process Measurements	6	—
43.444	Process Control Systems	6	6
43.445	Instrument Engineering Practices	4	4

Year 2	Term 4 cont.	Clrm hrs/wk	
43.446	Electronic Controllers	—	5
43.447	Process Computers	—	5
43.448	Advanced Process Analyzers	—	6
43.449	Instrumentation Practicum (2 wks)	—	—
	Library and Research	5	5
		35	35

Power

Year 2	Term 3	
10.732	Industrial Management	2½
32.343	Numerical Methods and Computing	3½
43.321	Industrial Electronics	6
43.322	Digital Control	6
43.323	Three-Phase Power Circuits	6
43.324	Electrical Equipment I	6
	Library and Research	5
		35

Year 2	Term 4	4A	4B
31.443	Advanced Technical Writing	1	—
43.421	Control Systems	6	7
43.422	Electrical Drafting	2	2
43.423	Power System Analysis	5	6
43.424	Electrical Equipment 2	6	—
43.425	Protective Systems	6	—
43.426	Lighting Systems	5	—
43.427	Utility Systems	—	7
43.428	Industrial Systems	—	7
	Library and Research	4	6
		35	35

Telecommunications

Year 2	Term 3	
32.343	Numerical Methods and Computing	3½
43.331	Electronic Circuits 2	6
43.332	Digital Techniques	6
43.333	Non-linear Circuits	6
43.334	Telecommunication Principles I	6
43.335	Electronic Fabrication	3½
	Library and Research	4
		35

Year 2	Term 4	4A	4B
10.732	Industrial Management	—	3
43.431	Voice and Data Networks	6	6
43.432	Digital Applications	6	7
43.433	Antennas and Transmission Lines	6	—
43.434	Telecommunications Principles II	6	7
43.435	Radio Systems and Propagation	—	7
43.436	Microwave Techniques	6	—
	Library and Research	5	5
		35	35

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 problems.

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

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.

31.243 See 31.143

31.443 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 Methods 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 — Before suitable measurement and automatic control strategies can be designed and implemented for a process, a detailed knowledge of the behavior of that process is required. Unit operations fills that requirement by introducing the student to the static and dynamic properties of common industrial processes. Topics will include transportation of fluids, fluid dynamics, Bernouli's equation and flow measurements, thermodynamics, heat transfer, heat balance equations, mass and energy balance, evaporation and distillation. Lab exercises will involve hands on interaction with absorption columns, heat exchangers, flow measuring devices, flue gas analyzers, batch and binary distillation columns, energy balance and energy management.

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; lowfrequency 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 — This course introduces pulse signal circuits such as clippers and clamps; transistor switches; astable and monostable multivibrators; flip flops; Schmitt triggers and ramp generators; dc to dc converters; video circuits; CRT deflection circuits. CMOS integrated circuits along with transistor arrays and 555 timers are used throughout this course. Each circuit is analyzed in detail and its industrial applications are considered.

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.

43.331 Electronic Circuits 2 — 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 Measurement Electronics — This course familiarizes the student with the circuitry of electronic transducers and measurement amplifiers used for the measurement of process signals such as temperature, flow, pressure, level, conductivity and strain. Topics will include the use of the Wheatstone bridge with resistive sensors such as strain gauges, thermistors, and R.T.D.'s. Non-resistive sensors such as variable inductance and variable capacitance transducers, sonic transducers and pulse output devises will be investigated. Operational amplifiers will also be studied with emphasis on d.c. characteristics important in such applications as differential and instrumentation amplifiers. Lab work will consist of construction and testing of basic circuits applicable to the measurements mentioned above, as well as analysis of characteristic industrial measurement systems.

43.342 Digital Components — This course introduces students to the field of digital electronics, teaching the design and implementation of logic systems, counter circuits and arithmetic functions. Topics will include logic gating networks, Boolean algebra, minimization techniques, code converters, flip flops, latches, registers, oscillators and arithmentic circuitry. Electronic properties of various gating families will be analyzed along with interface techniques between families and to the outside world. Lab exercises will consist of design, construction and analysis of digital circuitry for typical measurement and control applications.

43.343 Transducer Principles — This course teaches students the principles and techniques used for the measurement of pressure, flow and level in various process. Topics studied will include manometers, pressure gauges, differential pressure (D.P.), transmitters and level and density measurements. Flow measurement devices such as differential pressure transmitters, variable area flowmeters, turbine flowmeters and magnetic flowmeters will also be analyzed. Lab exercises will consist of configuration, calibration and testing of various industrial devices.

43.344 Control Devices and Techniques — This course introduces the student to the basic principles and practices common to many types of industrial automatic process control systems. Topics will include automatic control principles; feedback circuit design principles and devices and systems; block diagrams and transfer functions; pneumatic and hydraulic amplifier circuits applied to transmitters, signal converters, power amplifiers, computing circuits and position servo-mechanisms; control valve characteristics, specification and sizing: process static and dynamic characteristics influencing automatic control. Lab exercises will be done with commercial control equipment on several types of processes.

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, and absorption 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 plant 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 of feedback and its effect on continuous and discrete time linear systems. Topics include signal-flow graph analytic techniques, the transfer function concept and stability criteria for feedback systems. These topics are applied to the analysis and design of oscillators, wide-bond amplifiers and modern analog filters. The sampling concept (discrete time system) and the complex z-plane are introduced. Several approaches to the realization of a sampled data system are reviewed and worked examples in the design of digital filters are given.

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 Communications — Introduces the systems and techniques used to link computer-based systems together. Topics include data links via telegraph, telephone and microwave radio channels; transmission methods including frequency and time division multiplexing; FSK, PSK, PCM; introductory transmission line theory; channel capacity; noise and distortion; line conditioning, error rates; codes and coding systems; data modems and subscriber interfaces; RS232 and RS422 interfaces; computer communications protocol; video systems and standards; video equipment, including cameras, monitoring and VTR's; transmission and distribution of video data.

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 — Applies electronics to the control of electrical equipment. Topics include steady state and transient behavior of feedback systems; application of feedback principles to the design, analysis and testing of electronic systems for controlling electrical machinery; microprocessors — organization, terminology, introduction to Assembler language programming, interfacing and application to industrial control.

43.422 Electrical Drafting — Gives an appreciation of the preparation and interpretation of electrical drawings. Topics include standard symbology; schematic, connection and block 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.

43.424 See 43.324

43.425 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.

43.426 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.

43.427 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 systems; substations; protective relaying and rate structures.

43.428 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.

43.431 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, analogdigital multiplexing, tri-state bus structures, large scale binary storage devices (RAM-ROM-DIODE MATRIX), introduction to mini and microcomputers (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 spacewave 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 Electronic Signal Conditioning —In this course, the student will study the means by which process signals are transmitted and conditioned in the process control loop. Topics will include current transmitters and receivers, the 4-20 ma loop, two wire transmitters and associated circuitry. Analog signal conditioning circuits such as limiters, comparators, diode function generators, square and square root functions and multipliers will also be studied. Lab practice will include construction of typical circuits using op-amps; analysis of commercially available devices, and the application of these devices for interfacing of process signals to a computer-based analog input system.

43.442 Interface Techniques — This course introduces the student to the digital circuitry and techniques used for the computer-operator and computer-processor interfaces. Topics will include U.A.R.T.S. and serial data transmission, parallel data transmission, input/output devices such as terminals and disks, analog to digital and digital to analog conversion techniques, analog and digital signal multiplexers, and bus structures. Practical design considerations such as speed, accuracy, shielding, and isolation will be considered. Lab exercises will consist of construction of characteristic circuits and connection of these to input/output devices, minicomputers and microprocessing.

43.443 Analytical Process Measurements — Continuing on from "Transducer Principles" this course covers industrial measurement techniques for strain, temperature, humidity and dewpoint. Topics will include expansion thermometers, thermocouples, resistance thermometers, thermistors, mechanical and optical strain gauges, resistive strain gauges, load cells, psychrometry, hygrometry and vapour equilibrium systems. Lab exercises will consist of design and construction, and analysis of typical transducers.

43.444 Process Control Systems — This course is a continuation of 43.344 Control Devices and Techniques. It deals with process control strategies and hardware commonly used for single variable, multivariable and feedforward control systems. Topics include closed loop system stability and damping; gain and phase shift of system components; controller circuits for proportional, integral and derivative modes; control system objectives and strategies including ratio, cascade, feedforward plus feedback and total feedforward control. System tuning, adaptive methods; computer control algorithms and supervisory control will also be included. Lab exercises will include the use of characteristic industrial controllers for testing and comparison of various strategies on standard processes such as level loops, flow loops and vapor/liquid heat exchanger systems.

43.445 Instrument Engineering Practices — This course introduces the student to the accepted standards and practices used for project engineering and project implementation within the instrumentation industry. Topics include standard symbology, instrumentation and process flow diagrams, specification documents, safety codes, safety circuits and design standards. The practical side of this course will be the preparation of an instrumentation and process control project proposal, complete with drawings, specifications, instrument schedules and costs.

43.446 Electronic Controllers — This course introduces the student to electronic and micro-processor based multi-mode controllers used in instrumentation. Topics will include electronic and software configuration of standard controller strategies using modules such as integrators, differentiators and summers with attention paid to problems such as integrator wind up, bumpless transfer and interaction between modes. A comparison of various controller configurations will be studied as well as the trade-offs between

electronic and micro-processor based systems. Analysis of industrial 3-Mode controller circuitry will be included as well as interface requirements from typical computer-manual and computer-auto-manual stations to computer-based control systems. Lab practices will include construction of hardware and software controller circuits and testing of their operation on real and simulated processes.

43.447 Process Computers — This course deals with the applications of mini- and micro-computer systems to real time monitoring and control of industrial processes. Topics will include Assembler and high level language programming techniques, configuration of typical process interfaces and implementation of appropriate software drivers. Programming considerations will include accuracy, input scan rates, digital filtering and real time display updating. Other topics discussed will be analog back-up, distributed processing, direct digital control and supervisory control. Lab work will include hands-on operation in an actual process environment.

43.448 Advanced Process Analyzers — This course continues from Analytical Process Measurements, developing skills in the areas of gas analysis, spectrometry and industrial pH measurement and control. Gas analysis techniques such as absorption, direct and indirect thermal conductivity and paramagnetic heat of combustion will be studied. The laws of spectrometry will be investigated as well as ultra violet, visible and infra-red spectrometers, dispersion and diffraction methods and non-dispersive analyzers. The student will also learn the industrial applications of pH measurement and typical methods by which it is controlled. Lab exercises will include the operation, calibration and analysis of various measurement systems including gas analyzers, spectrometric analyzers and pH measuring systems.

43.449 Instrumentation Practicum — Each student is sent to a local industrial, commercial or scientific firm for a two-week period. This provides the student with on-the-job experience in an activity directly related to the field of automatic measurement and control systems.

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

British Columbia's greatest renewable natural resource is its forest land. The benefits that derive from the intelligently planned use of this forest land are certainly many, varied and extremely valuable to the people of this province.

The wise use of the land and related resources is essential for the continued survival of many industries, as well as for the perpetuation of the resources themselves.

The Forest Resource Technology has been established in an endeavor to meet the above needs and offers training in two options: Forestry; and Fish, Wildlife and Recreation.

Job Opportunitites
Graduates in the Forestry Option find employment in a variety of industrial and government positions.

The job opportunities for graduates in Fish, Wildlife and Recreation are principally in government agencies, and because of the limited nature of jobs, the number of students is restricted.

The Program
Forestry covers forest engineering, logging systems and production, fire control, forest management, forest measurements, silviculture, photo interpretation and mapping, botany and soils, forest utilization and ecology.

Fish and Wildlife and Recreation Option treats the management of fish, wildlife, and recreation land and includes habitat ecology, environmental inventory techniques and law enforcement with respect to the above-mentioned resources.

Prerequisites
Graduation from the secondary school Combined or Selected Studies Program is a general prerequisite. It is strongly recommended that applicants write a diagnostic math examination which will indicate whether or not a mathematics course should be taken. Industrial experience strengthens an application for either of the options. Skill in report writing is highly desirable. Initiative, efficiency and leadership ability are important qualities.

The following special prerequisites are required for individual options:

Forestry: Algebra 12 or Math 12 and a Science 11 (Biology is preferred). A "C" or better standing in Algebra 12 or Math 12 is required.

Fish, Wildlife and Recreation: Algebra 12 or Math 12, and Biology 11.

Expenses
In addition to tuition fees, books, supplies and equipment, students will incur expenses for field trips and a first aid course. These expenses may be as much as $200 for first year and $300 for second year.

Course of Studies

		Clrm hrs/wk	
		Forestry	F.W.R.
Year 1	**Term 1**		
31.145	Technical Communication	3	—
31.148	Technical Communication	—	5
32.145	Mathematics for Forestry I	5	
32.154	Mathematics for F.W.R. I	—	5
45.102	Forest Measurements I	6	6
45.103	Wood Utilization	3	—
45.106	Photo Interpretation and Mapping	4	4
45.110	Fire Control I	3	—
45.120	Plants and Soils	6	6
45.130	Fish, Wildlife and Recreation Introduction	—	3
45.199	Special Computer Applications	—	1
	Library and Research	5	5
		35	35
Year 1	**Term 2**		
10.241	Public Administration in Canada	—	3
31.245	Technical Communication	3	—
31.248	Technical Communication	—	3
32.245	Mathematics for Forestry II	6	—
32.254	Mathematics for F.W.R. II	—	6
44.224	Zoology	—	5
45.201	Introduction to 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	3	3
45.228	Field Skills	2	2
	Library and Research	3	3
		35	35

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

Year 2	**Term 3**		
10.381	Organizational Behavior	3	3
31.348	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 Silviculture	4	—
45.321	Recreational Land Management I	—	5
45.322	Wildlife Management I	—	5
45.323	Fish Management I	—	6
45.326	Environmental Inventory Techniques I	—	5
45.327	Projects	—	6
45.328	Summer Technical Report	1	2
	Library and Research	4	1
		35	35

Year 2	Term 4	Clrm hrs/wk Forestry	F.W.R.
31.448	Information Techniques	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	Silviculture	3½	—
45.417	Forest Management	4	—
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	—	2
	Library and Research	4	4
		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.

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.

31.148 Technical Communication — Basic business and technical communication skills; introduction to letters, memos and short reports; basic listening and reading skills. One lecture and four labs per week.

31.245 See 31.145

31.248 Technical Communication — Continuation of 31.148. Job finding techniques; letters and memos; longer and formal reports. One lecture and two labs per week.

31.348 Advanced Technical Communication — Reports, proposals, briefs, funding requests and other more complicated or sophisticated communication skills required on the job. Two hours of lab each week.

31.448 Information Techniques — Public speaking: oral communication techniques, graphics and audio/visual techniques, answering questions. Media communication: interview techniques, press releases, using radios and telephones. Information packages: organizing tours and training sessions, designing brochures and public announcements. Two labs per week.

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

32.154 See 32.145

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.

32.254 See 32.245

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.

45.102 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 preorganization of industrial and government agencies. "Forest Act", Part XI. Fire suppression techniques through firesimulation 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.

45.130 Fish, Wildlife and Recreation Introduction — A general survey course in Fisheries, Wildlife, and Recreation concerned with the identification and biology of important sport and commercial fishes and important wildlife species in this province. The course will also deal with the identification, use, and classification of Provincial and Federal Parks.

45.199 Special Computer Applications - Introduction to the use of computers and their application to various Fish, Wildlife and Recreation requirements.

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 Measurements 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 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.

45.302, 45.402 Forest Measurements 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 logspan 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 Forest Management - Silviculture — Foundations of forest management; site, stocking, spacing, forest yield, forest growth and regulation; introduction to silviculture, forest regeneration, seed and stock procurement, principles of seed production and cone collection.

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, physiology, 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 Environmental Inventory Techniques I — 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, and forest inventory and pollution sampling techniques.

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 Log 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 Silviculture — Site examination, analysis and prescriptions; site preparation, planning, methods and evaluating artificial regeneration, methods application, contract, planting, costing and inspection; brush control, methods and application; spacing, methods and evaluation; conifer release, application; fertilization, methods and application.

45.417 Forest Management — Principles of integrated resource management; planning and administration: relationship of timber production to other forest land uses; structure and organization of a forest business and enterprise, sustained yield management planning and operations, determination of cut, stumpage appraisal.

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 II — A continuation of Environmental Inventory Techniques I.

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".

Faculty and Staff

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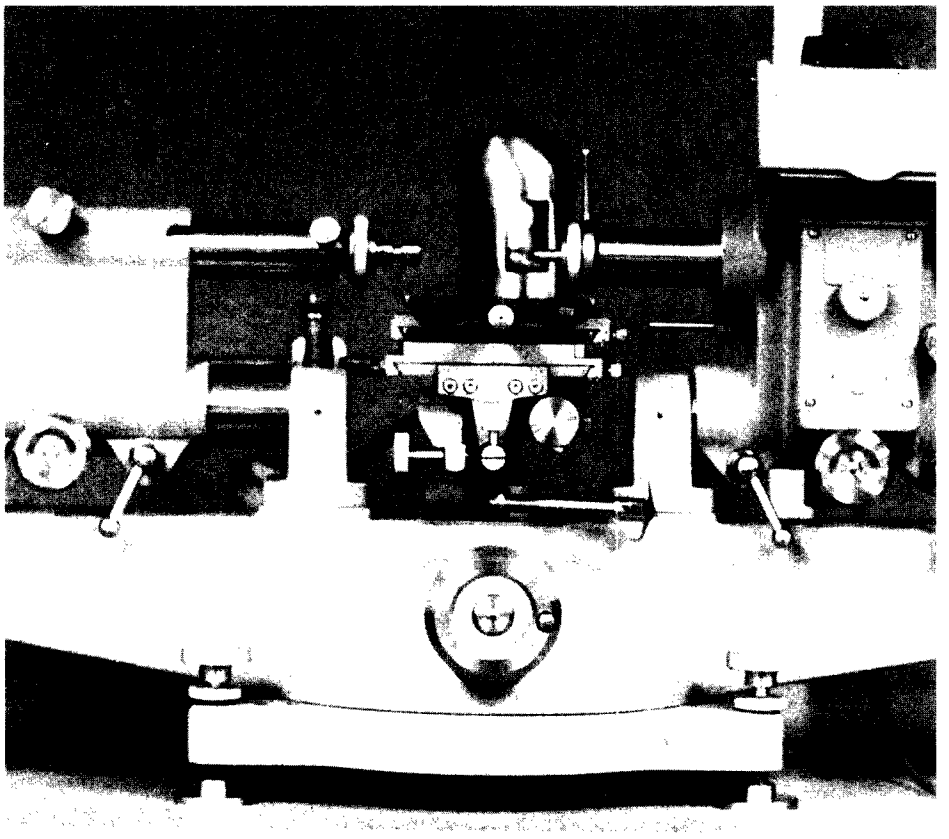

Mechanical

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 three options: Design, Production or Mechanical Systems.

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

This program is accredited by the Society of Engineering Technologists.

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

Year 1	Term 1	Clrm hrs/wk
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	7
49.145	Manufacturing Processes I	6
	Library and Research	5
		35

Year 1	Term 2	
31.249	Technical Communication	4
32.249	Calculus	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
43.353	Electrical Equipment Applications	4
49.312	Machine Design I	4
49.325	Thermal Engineering I	4
49.335	Fluid Engineering I	6
49.345	Manufacturing Processes III	4
49.360	Engineering Economics	4
	Library, Research and Field Trips	5
		35

Production

Year 2	Term 4	
22.449	Operations Management	4
32.449	Statistics and Quality Control	4
49.435	Fluid Engineering II	6
49.445	Manufacturing Processes IV	4
49.450	Production Engineering Management	4
49.455	Tool Design	3
49.460	Metrology	4
	Library, Research and Field Trips	6
		35

Design

Year 2	Term 4	
43.455	Instrumentation	4
49.412	Machine Design II	5
49.413	Theory of Mechanisms	4
49.414	Design Projects	3
49.425	Thermal Engineering II	4
49.435	Fluid Engineering II	6
49.455	Tool Design	3
	Library, Research and Field Trips	6
		35

Mechanical Systems and Services

Year 2	Term 4	
22.439	Plant Engineering	4
43.455	Instrumentation	4
49.425	Thermal Engineering II	4
49.430	Heating Ventilation and Air Conditioning	4
49.435	Fluid Engineering II	6
49.470	Mechanical Equipment	4
49.475	Maintenance	4
	Library and Research	5
		35

Subject Outlines

22.439 Plant Engineering — A course designed to relate materials handling and plant layout through detailed analysis of alternative handling systems normally encountered in manufacturing plants.

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 Technical Communication — The objective of this course is to teach students the skills necessary to make them effective writers and speakers in the engineering industries. The lectures will introduce students to communication theory and to the style, content, and graphics of technical writing. The labs will review writing and speaking skills and then apply these to oral reporting and to writing lab reports, technical letters and memos, and informal reports.

31.249 Technical Communication — This course has three objectives: (1) to teach students job application procedures and techniques; (2) to show students how to become effective researchers of engineering information; and (3) to provide students with practical training in the technical reporting used in the engineering industries. Students will learn how to write proposals, specifications, progress reports and feasibility studies, and they will submit a formal technical report.

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

43.353 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.

43.455 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.

49.208 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.

49.345 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.

49.360 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.

49.412 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 Projects — 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 IV — 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.

49.450 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.

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

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

Faculty and Staff

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D.C. Gerlitz, B.Sc., M.S., P.Eng.
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R.G. Graham, B.Sc., M.A.S.H.R.A.E., P.Eng.
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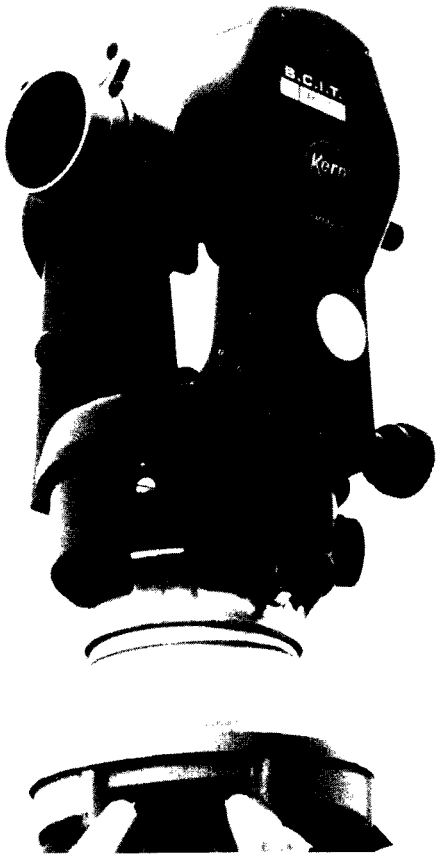
V.M. Strijack, B.Sc., P.Eng.
J.P. Sullivan, B.Sc., P.Eng., M.A.S.H.R.A.E.



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

		Clrm hrs/wk
Year 1	**Term 1**	
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
Year 1	**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

		Clrm hrs/wk
Year 2	**Term 3**	
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
Year 2	**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

		Clrm hrs/wk
Year 2	**Term 3**	
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
Year 2	**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
51.411	Surveying	2
51.415	Cartography	3
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; reverse curves; vertical curves; transition curves; eccentric angular and linear observations; resection; intersection; inaccessible 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; Tissot'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 solar 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; stereo-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

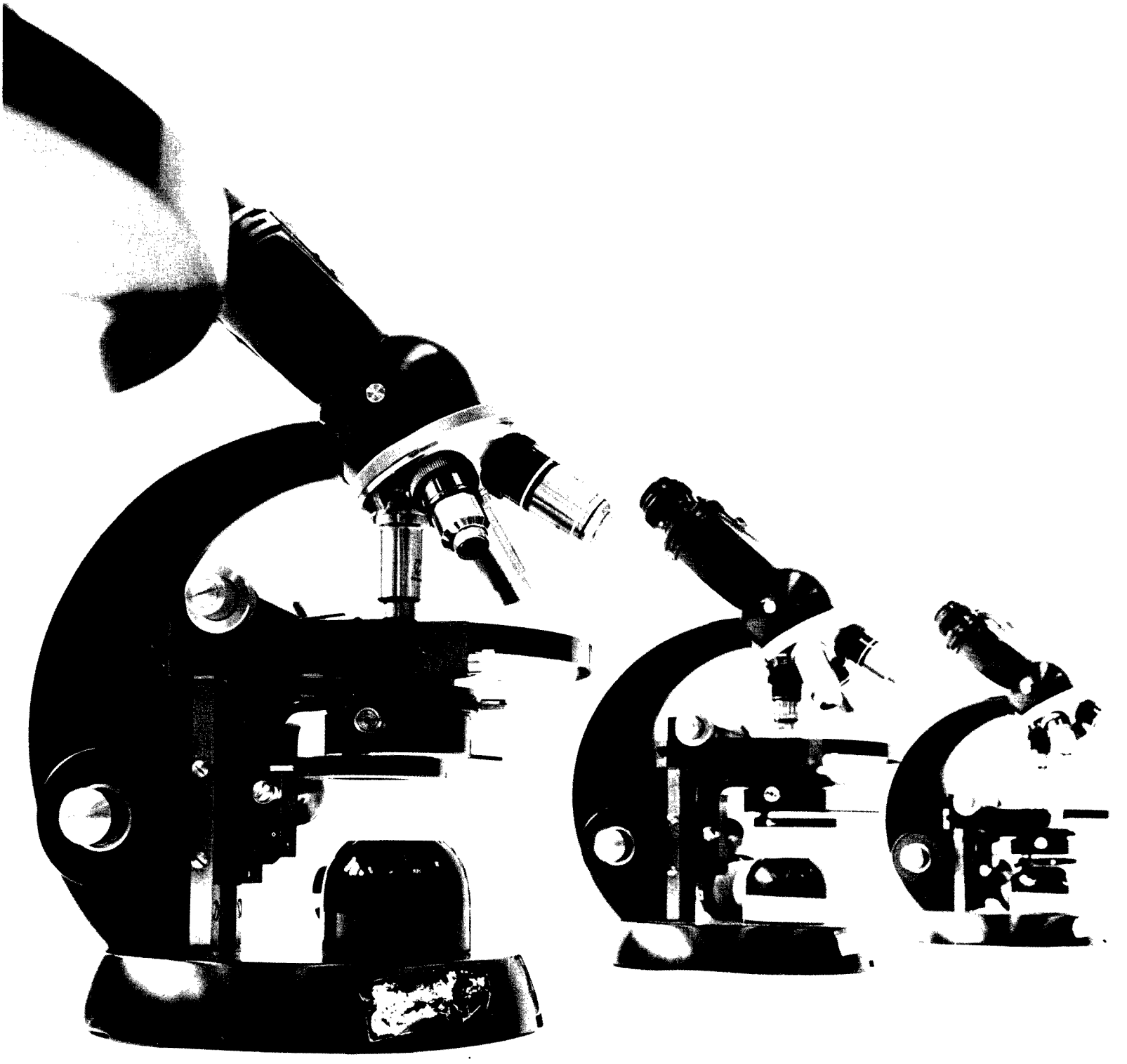
51.420 Planning and Land Utilization — The planning process as it applies to physical planning. Planning authorities and their powers. Government legislation in the planning field. Zoning and its implications in land use and development. Land use and land use studies. Subdivision design and economics.

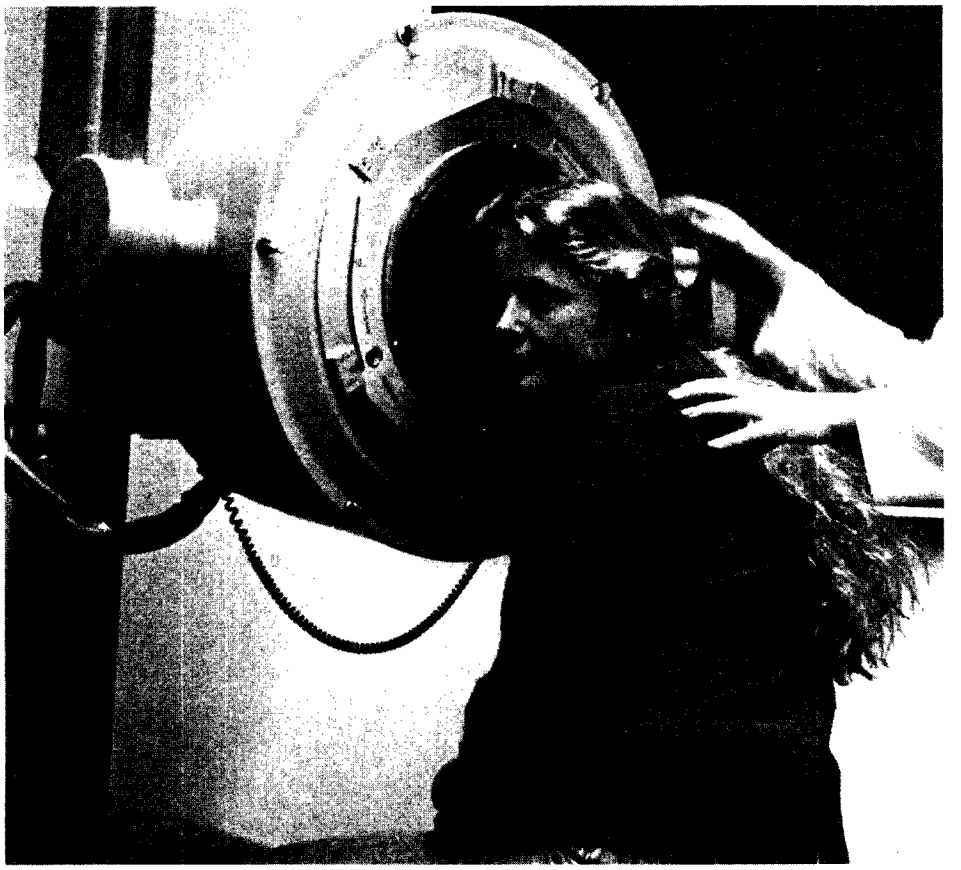
51.421 Natural Sciences — Study of the forest flora of British Columbia; the characteristics of native trees, identifying features and common uses. Elementary geology, including the study of rocks and minerals; geologic structures, general location and uses of common ores, soil classification and location.

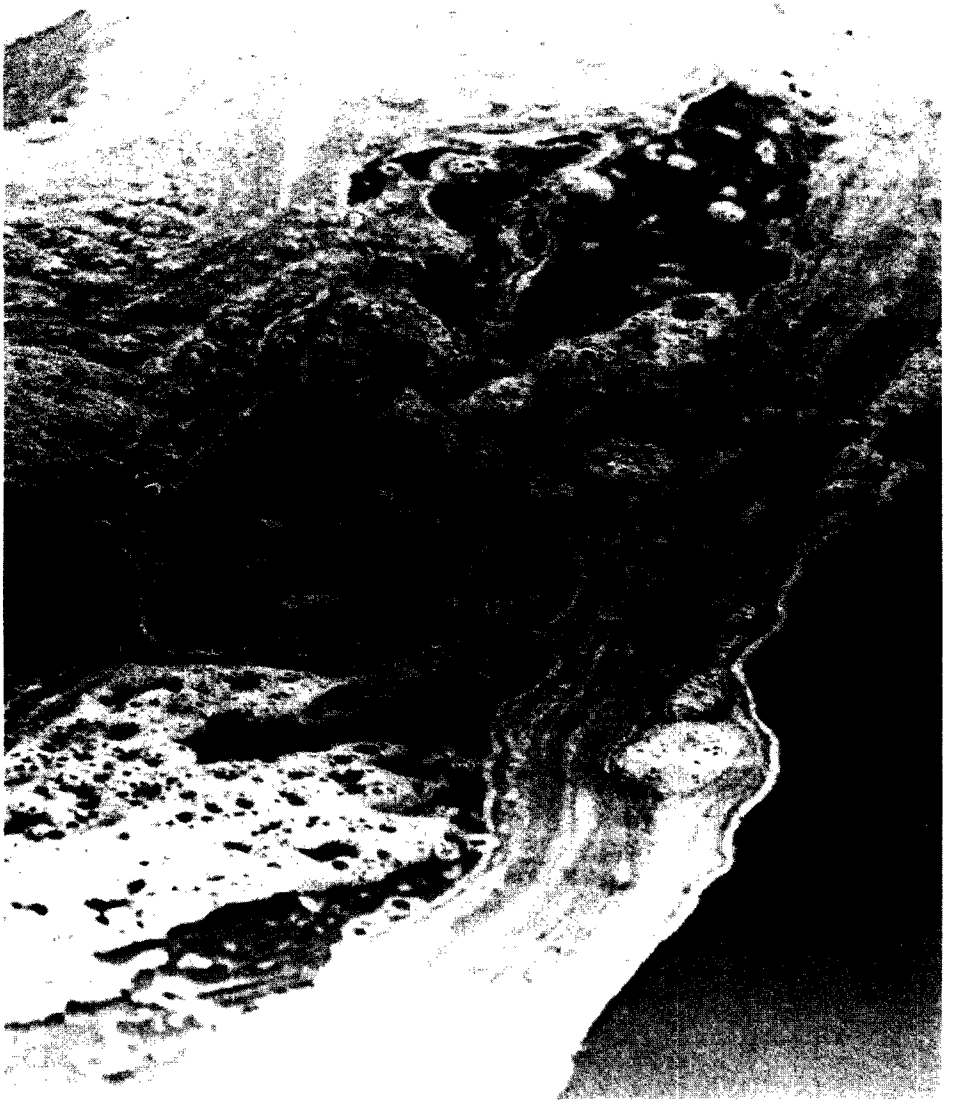
Faculty and Staff

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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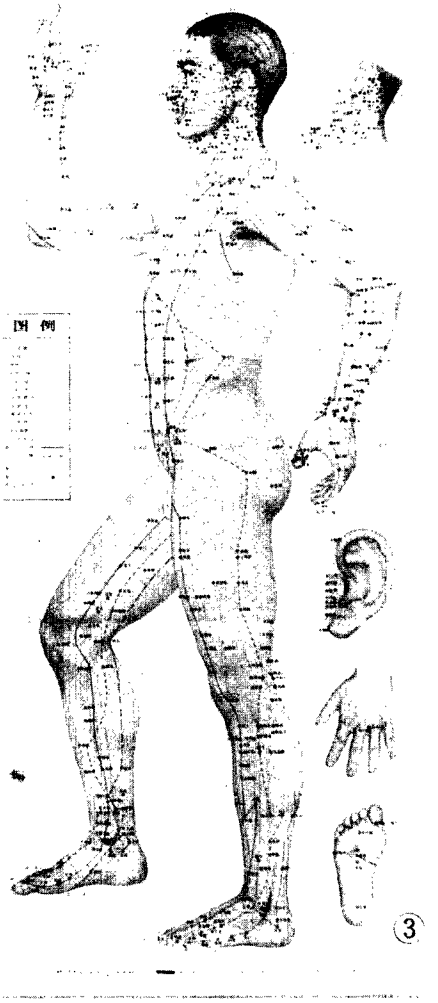
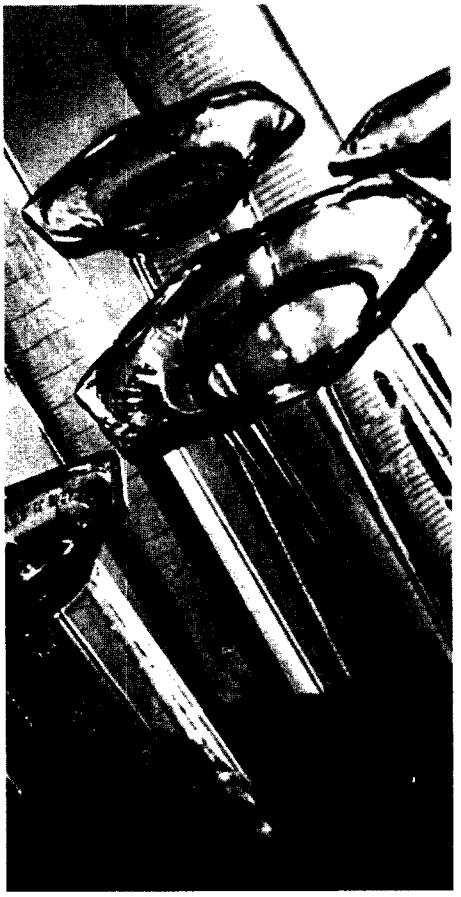




Basic Health Sciences

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. 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., M.A.
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 Institute of Public Health Inspectors.

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	5
82.102	Food Sanitation	4
82.103	Public Health Inspection I	4
98.123	Public Health and Pollution Control Microbiology	3
	Library and Research	9
		35
Year 1	**Term 2**	
30.208	General Chemistry for Environmental Health	6
31.282	Communication for Health Technologists	2
32.282	Statistics	4
33.212	Environmental Physics	3½
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	4½
		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	3½
82.310	Technical Research Methods	7
82.311	Environmental Health Relations	5
82.312	Environmental Noise	3½
	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
82.416	Public Health Law	3
82.417	Municipal Water and Sewage Treatment Systems	3

Year 2	Term 4 cont.	Clrm hrs/wk
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 in 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 degration. 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.

82.311 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.

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.

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 — This is an introductory course in the sanitary practices and inspection techniques associated with the production, processing and distribution of food. Given lectures and field situations, the student will be able to explain the danger of food-borne illness in Canada, identify potential places where food may become contaminated in food service outlets and investigate and analyze how food-borne disease outbreaks occur.

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 — 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.

82.310, 82.419 Technical Research Methods — This course provides for the development of research methods and communication skills necessary in designing 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.

82.312 Environmental Noise — This course will cover noise topics relevant to the field of environmental health with emphasis on occupational and community noise assessment and control. The lab course will emphasize audiometry, noise measurement and analysis and calibra-

tion techniques. utilizing state-of-the-art instrumentation.

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 industies.

82.413 Food Hygiene — This course reviews food preservation techniques and sanitary practices in the food processing industry. Given lectures and field situations, the student will be able to assess and analyze public health related problems in primary food production and processing outlets; e.g. dairies, abattoirs, fish canneries. He or she will also be able to investigate and analyze common food-borne illness outbreaks related to the above industries.

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 — This is a survey course in occupational health. Given lectures, laboratory exercises and field situations, the student will be able to recognize common occupational health hazards, demonstrate how to use appropriate environmental sampling equipment and recommend control measures which would alleviate potential health hazards.

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.

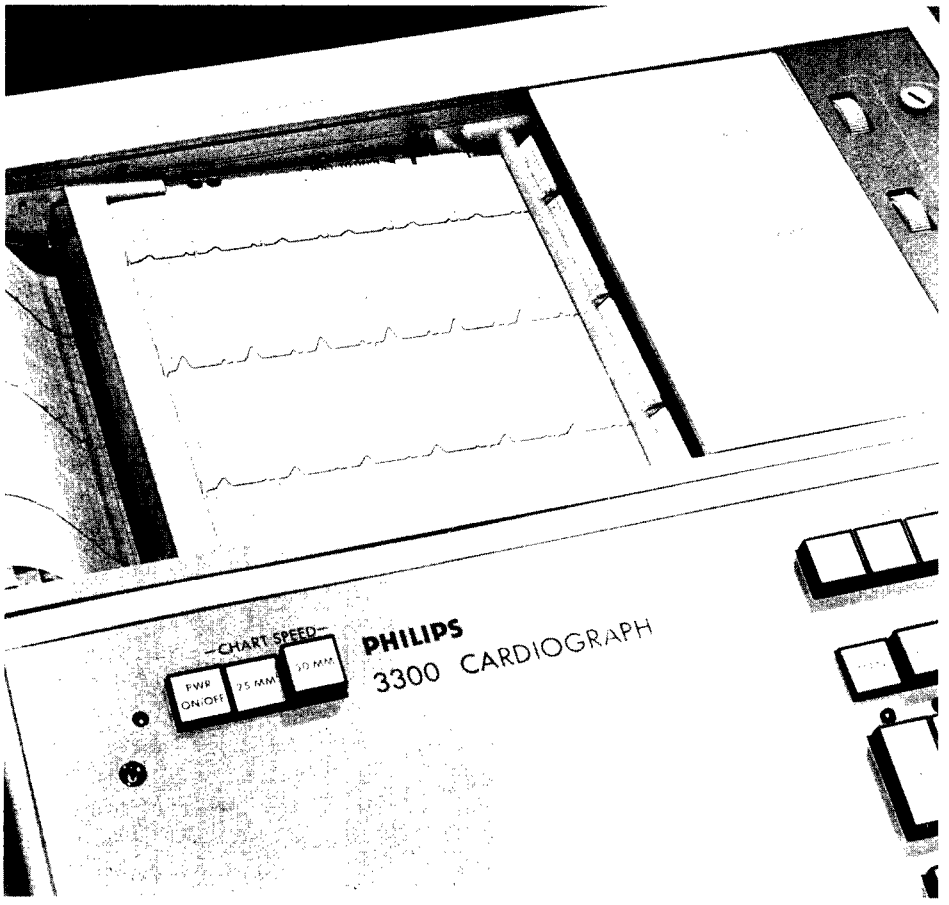
98.204 Basic Anatomy and Physiology — This course is designed to provide a basic knowledge of human anatomy and physiology. Emphasis is placed on the physiology of the human body systems and how environmental factors can affect these systems.

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)
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

		Clrm hrs/wk
Year 1	**Term 1**	
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
Year 1	**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
Year 1	**Term 2B**	
30.307	General Chemistry	6
31.278	Technical Writing	3
32.278	Calculus	5
43.351	Methods of Electrical Measurement	5
78.102	Electronics Principles and Practice	10
	Library and Research	5
		34
Year 2	**Term 3**	
32.X78	Numerical Methods and Boolean Algebra	3
32.378	Statistics	3
33.330	Biophysics	3
41.391	Materials	4
43.352	Medical Instrumentation	4
78.103	Biomedical Electronics	6
78.104	Electronics Principles and Practice	7
	Library and Research	5
		35
Year 2	**Term 4A**	
30.411	Instrumental Analysis Methods for Biomedical Electronics	3
41.491	Laboratory Workshop	4
43.451	Electronics Principles and Practice	4
78.105	Biomedical Electronics	9
78.106	Digital Principles and Techniques I	7
98.402	Physiology	3
	Library and Research	5
		35
Year 2	**Term 4B**	
30.421	Instrumental Analysis Methods for Biomedical Electronics	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

30.411, 30.421 Instrumental Analysis Methods for Biomedical Electronics — This course introduces basic theoretical concepts, instrument components and operation and general application of the following methods: potentiomatric absorption, flame absorption and emission, fluorescence, gas and liquid chromatography and automated analysis.

30.421 See 30.411

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.X79 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 Statistics — This course provides students with a basic knowledge of statistics. Topics include random sampling, measurement and rounding, frequency distributions, measures of central tendency, measures of dispersion, normal distribution, ranks and percentiles. Estimation, central limit theorem, standard errors, confidence intervals, hypothesis testing, null and alternate hypothesis, large sample hypothesis testing, t-distribution, small sample hypothesis testing and non-parametric testing will also be covered.

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.

41.391 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.

41.491 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 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 infrared 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.

43.454 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 microprocessor/microcomputer as an example. Topics to be discussed include microprocessor fundamentals; microcomputer system organization; microprocessor instruction set; assembler level programming; I/O; subroutines; interrupt processing and realtime concepts.

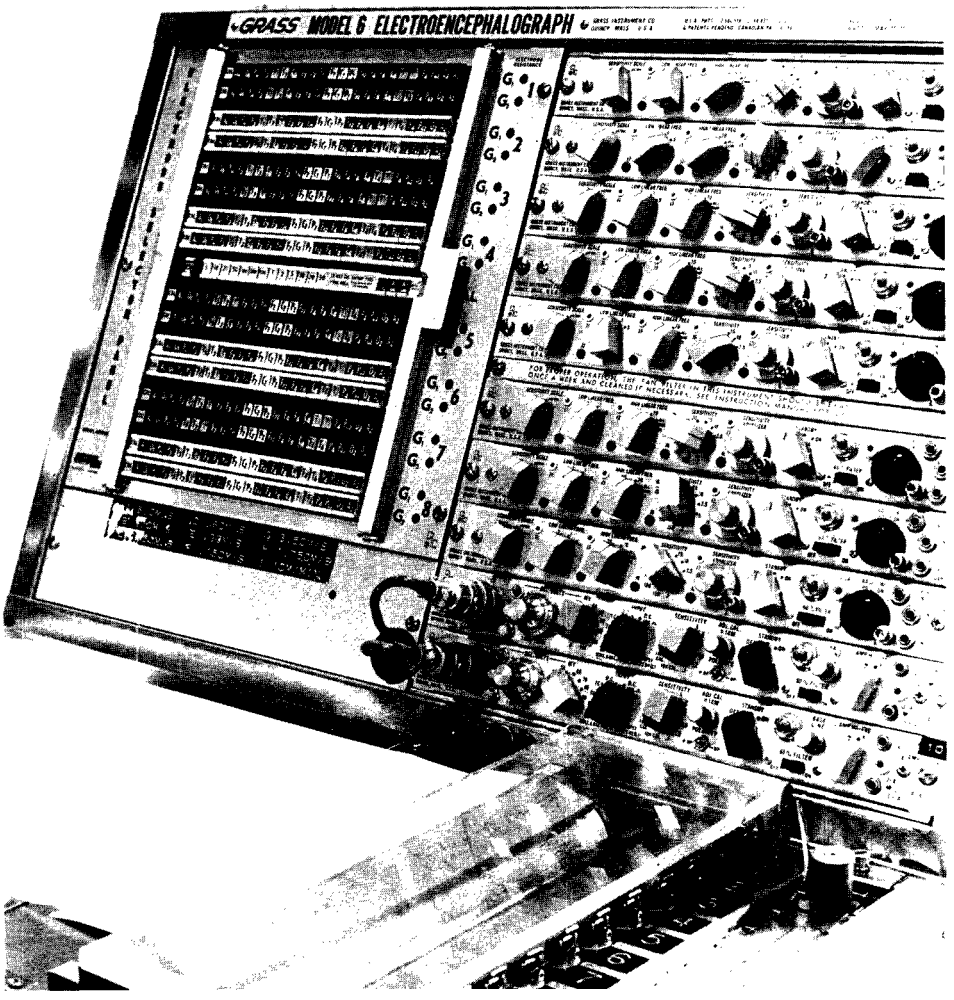
98.102, 98.202 Human Anatomy and Physiology — A study of human anatomy and physiology carried out by a consideration of the body systems. During the first term attention is given to the structure and function of cells, tissues, and the skeletal, muscular and nervous systems. The remaining body systems are considered during the following term.

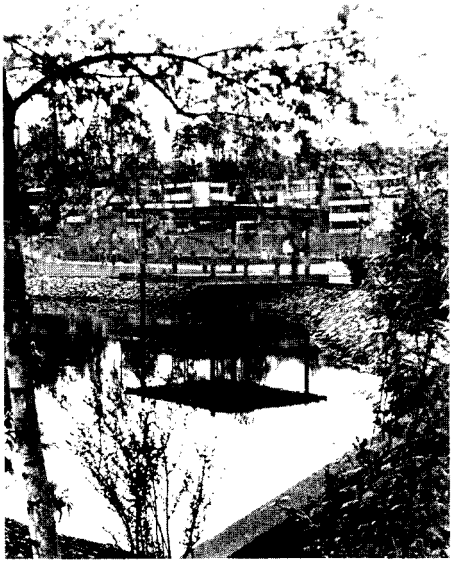
98.202 See 98.102

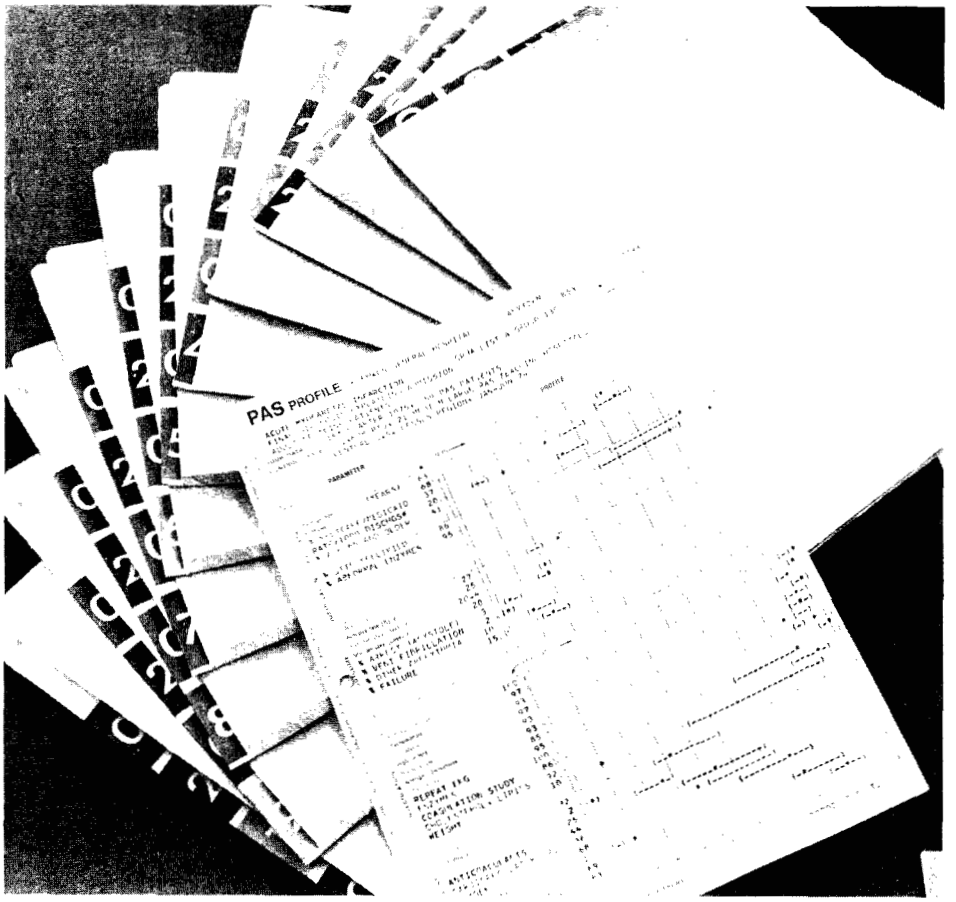
98.402 Physiology — A review of human physiology for Biomedical Electronics students with emphasis on the cardiovascular, nervous, respiratory, muscular and urinary systems.

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., P.Eng., 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

		Clrm hrs/wk
Year 1	**Term 1**	
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
Year 1	**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
Year 1	**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	
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

Year 2	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

Year 2	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.

80.107, 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.

80.108 See 80.105

80.109 See 80.106

80.110 See 80.107

80.111 See 80.105

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

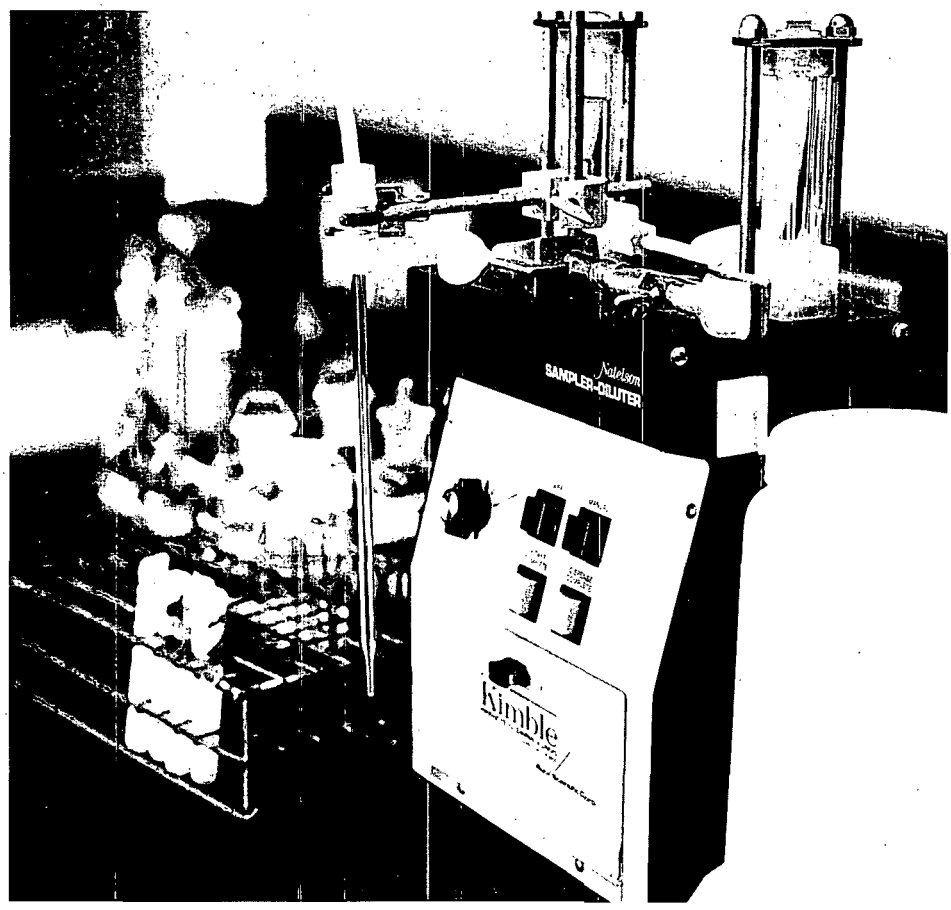
98.337, 98.437 Organizational Psychology — A study of organizational psychology as it pertains to health care organizations. Emphasis is placed on acquiring knowledge and skills to enable the health data technologist to communicate, supervise and evaluate in the medical records work situation.

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. Laboratory 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 and new 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 laboratory. These fields include histotechnology, clinical chemistry, hematology, microbiology and immuno hematology. 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 conjointly 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**	
30.105	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 Science	3
	Library and Research	4
		35
Year 1	**Term 2**	
14.211	Introduction to Data Processing	3
30.205	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	Introductory Principles of 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
Year 2	**Term 4**	
70.402	Clinical Chemistry	10
70.403	Hematology	5
70.405	Microbiology	9
70.406	Immunohematology	8
	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.

30.105, 30.205 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. 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.

30.205 See 30.105

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 Technologists — 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.

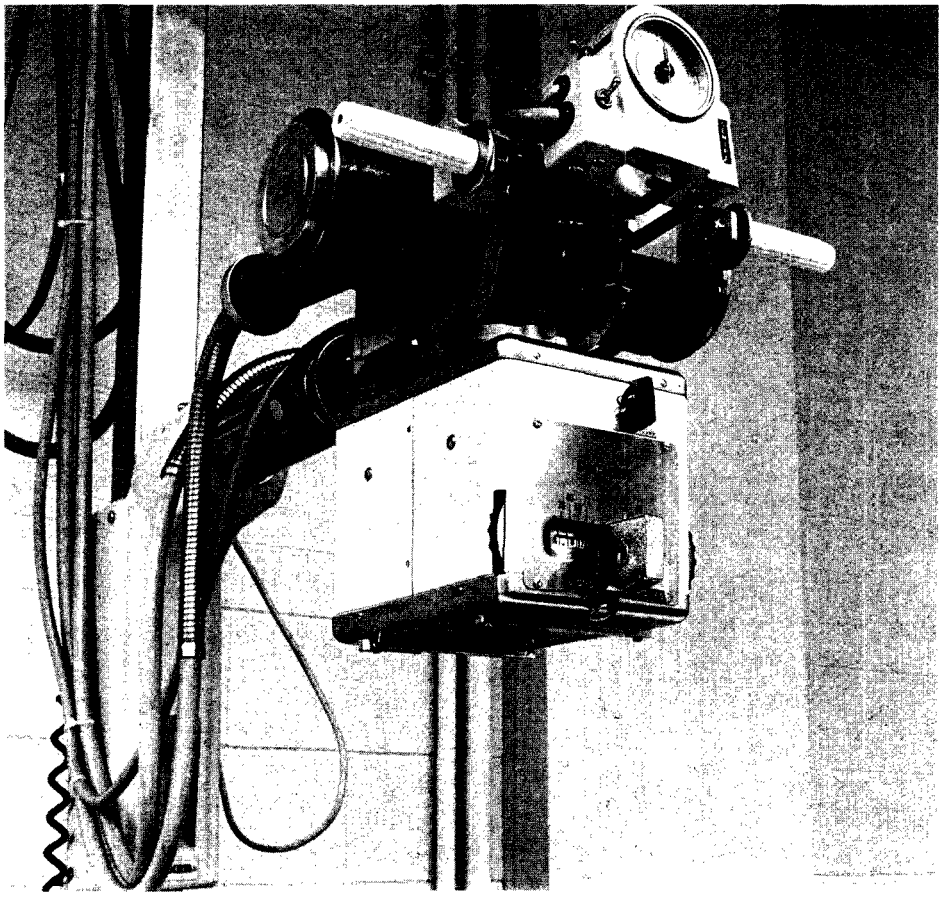
98.136 Behavioral Science — This course presents basic psychological and sociological concepts of health and illness behavior. Emphasis is placed on analytical examination of these concepts.

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*
Mrs. W. Basford, R.T.
Paul Bradbury, F.I.M.L.S.
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. Nicolson, B.Sc., R.T.
Mrs. J.M. Scriabin, B.Sc. (Hons.), A.R.T., Senior Instructor
Mrs. A.J. Striha, A.R.T.
Miss E.A. Whiteside, B.A., R.T., Senior Instructor
Mrs. P. Wooldridge, R.T.
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. Medical Radiography is a field suited to both men and women.

Prior to enrolment at BCIT, a two-week orientation period in a hospital x-ray department is required. Arrangements for this orientation will be made by the Institute.

During training, medical radiography students receive intensive theoretical and practical instruction in lectures, labs and tutorials in the Institute, as well as practical experience in hospitals. In the second year, students spend alternate weeks at BCIT and at a hospital. A third year of in-service training must be completed at one of seven participating hospitals (four in the Lower Mainland; two in the Interior; one on Vancouver Island). This additional training, which commences in July and concludes the following June, is a prerequisite for writing the registration examination set by the Canadian Association of Medical Radiation Technologists.

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 Association of Medical Radiation Technologists 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.

**Experience has shown that Physics II is an advantage.*

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
31.172	Communication for Health Technologists	4
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
	Tutorial	1
		28
Year 1	**Term 2A**	
31.272	Communication for Health Technologists	4
33.209	Physics of Medical Radiography	5
72.201	Basic Medical Radiography	6
72.203	Radiographic Anatomy and Physiology	6
72.204	First Aid	1
76.106	Patient Care	2
	Tutorial	1
		25
Year 1	**Term 2B**	
33.209	Physics of Medical Radiography	5
72.201	Basic Medical Radiography and Clinical Orientation	9
72.202	Apparatus and Image Recording	5
72.203	Radiographic Anatomy and Physiology	6
98.240	Behavioral Sciences	4
	Tutorial	1
		30
Year 2	**Term 3**	
72.301	Radiographic Technique	8
72.302	Imaging Equipment	7
72.307	Pathology for Medical Radiographers	4
76.306	Patient Care	6
	Tutorial	1
		26
72.306	Clinical Experience in Radiography (Hospital)	35*
Year 2	**Term 4A**	
72.401	Radiographic Technique	8
72.402	Imaging Equipment	6
72.405	Radiobiology and Protection	5
72.407	Pathology	4
98.427	Microbiology and Epidemiology	3
	Tutorial	1
		27
72.406	Clinical Experience in Radiography (Hospital)	35*
Year 2	**Term 4B**	
72.401	Radiographic Technique	13
72.405	Radiobiology and Protection	5
72.408	Film Critique	2
		85

Year 2	Term 4B cont.	Clrm hrs/wk
98.427	Microbiology and Epidemiology	4
	Tutorial	1
		25
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 of Radiography — Plane geometry. Functions and graphs. Exponents, common and natural logarithms, exponential growth and decay, log-log and semi-log graphs. Trigonometry and sinusoidal 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.

72.306 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 — A study is made of ionizing radiation and its interaction with matter. Radiation units and their measurement are studied. Permissible exposures and their rationale are considered. Term 4A.

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. Term 4B.

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.

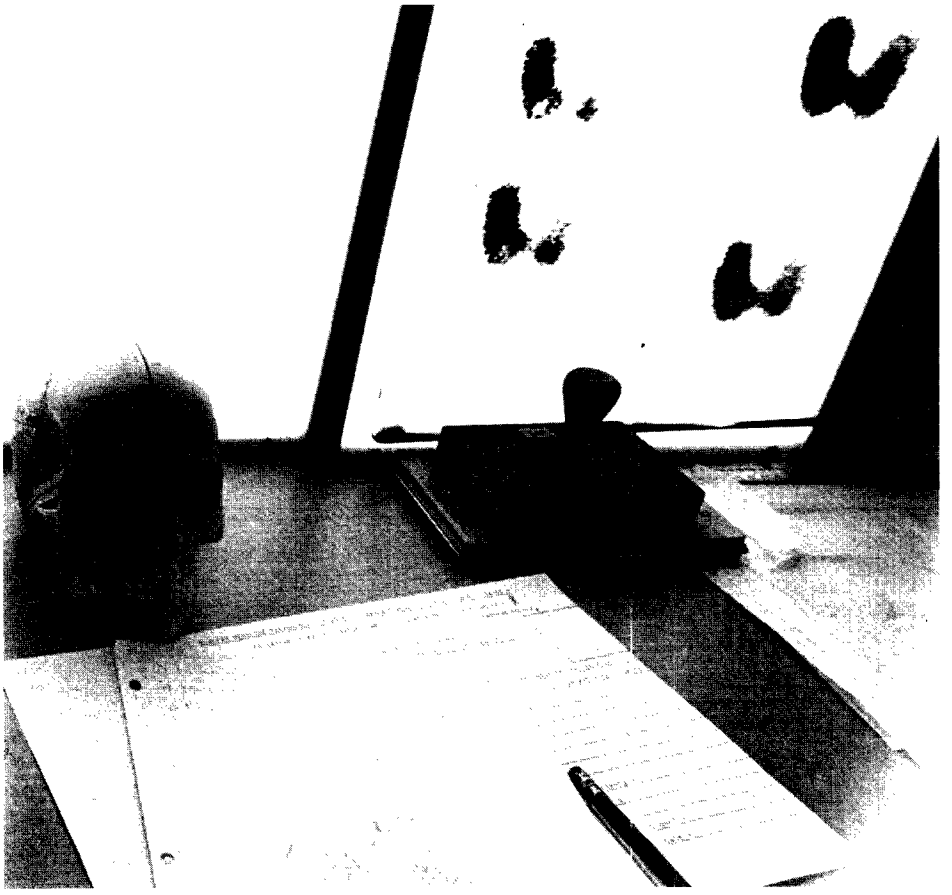
98.107 Basic Anatomy and Physiology — This course is a systemic study of the basics of human anatomy and physiology to prepare the student for the course 72.203. Included are basic physiological chemistry, cytology and histology.

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 Association of Medical Radiation Technologists. 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

		Clrm hrs/wk
Year 1	**Term 1**	
30.106	General Chemistry for Nuclear Medicine Technology	6
32.174	Basic Technical Mathematics	5
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
		29
Year 1	**Term 2**	
30.206	General Chemistry for Nuclear Medicine Technology	6
32.274	Statistics and Calculus	5
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	3
98.206	Physiology and Pathophysiology	4
		32
Year 1	**Summer Term**	
74.209	Clinical Experience in Diagnostic Procedures	35
Year 2	**Term 3**	
31.374	Communication for Health Technologists	2
33.305	Measurement of Radioactivity	6

		Clrm hrs/wk
Year 2	**Term 3 cont.**	
74.304	Applied Physiology	14
74.308	Imaging	5
98.306	Physiology and Pathophysiology	4
		31*
74.305	Clinical Experience in Diagnostic Procedures	35*
Year 2	**Term 4**	
14.412	Computer Applications	3
31.474	Communication for Health Technologists	3
74.404	Applied Physiology	17
98.439	Human Behavior	4
		27
74.405	Clinical Experience in Diagnostic Procedures	35*
Year 2	**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

31.374, 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.

31.474 See 31.374

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.

74.204, 74.304, 74.404 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.

74.207 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.

74.304 See 74.204

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.

74.404 See 74.204

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.

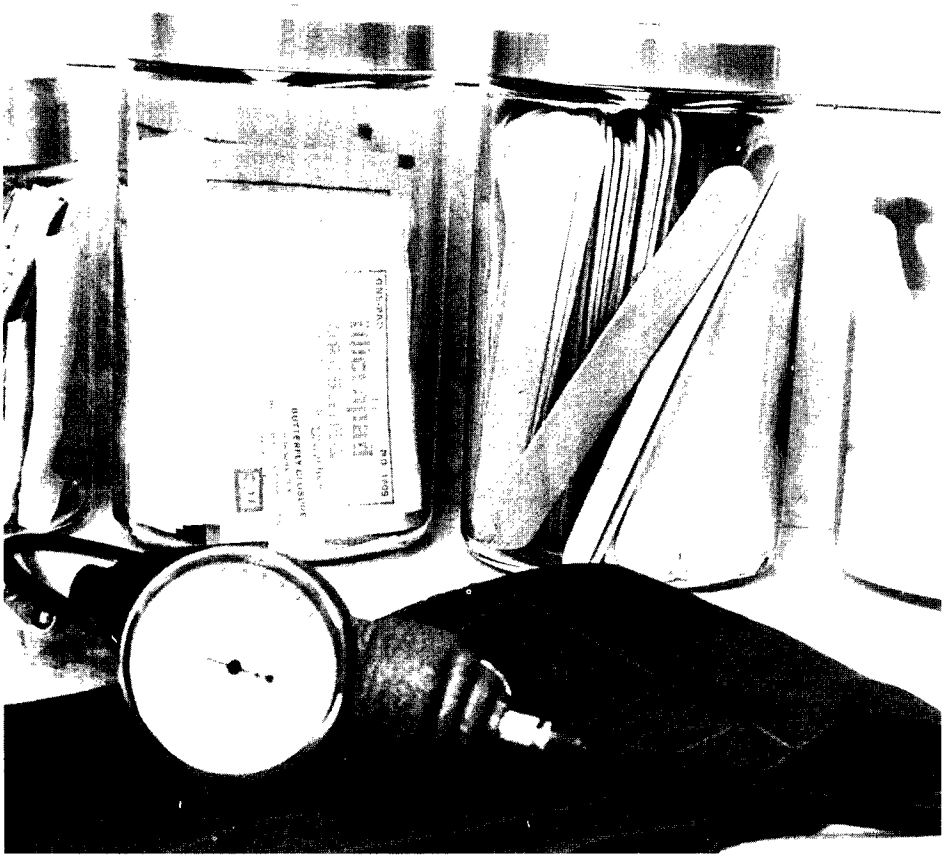
98.206, 98.306 Physiology and Pathophysiology — A systematic examination of the normal physiology of the human body and its derangement in disease states. General concepts of the disease process are included, as well as disturbance in function of specific body systems. Pathological examples are chosen 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 J. Miki, R.T. (N.M.), R.T. C.S.L.T.
R.A. Singer, R.T. (N.M.)
R.J. Smith, M.S.R., R.T.



General Nursing

Department of General Nursing

Today's nurse works 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 and the Worker's Compensation Board.

Students 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. Applicants must have a physical examination, by a physician of their choice, to determine whether their physical and emotional status are compatible with carrying out nursing functions. Students must also complete an immunization program. A pre-admission interview with a member of the nursing faculty is conducted to assess the applicant's suitability and motivation towards nursing. Possible topics for discussion would be knowledge of nursing and nursing responsibilities, reasons for career choice, long-term career goals and knowledge of the BCIT program. Students are expected to be competent in written and oral English. Students are also required 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

BCIT has a comprehensive financial assistance program — scholarships, loans and bursaries. Details are available from the Financial Assistance Office.

Special Note on Applications

Applications are accepted for review by the Student Selections Committee between January 2 and May 31 for the August class and June 1 and 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

		Clrm
Year 1	**Term 1**	hrs/wk
76.100	Nursing I Theory	8
	Clinical	12

		Clrm hrs/wk
Year 1	**Term 1 cont.**	
98.105	Anatomy and Physiology	3
98.118	Personal Fitness Management	2
98.138	Human Behavior	3
	Library and Research	7
		35
Year 1	**Term 2**	
31.276	English for General Nursing	3
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
		35
Year 2	**Term 3**	
31.376	English for General Nursing	3
76.200	Nursing III Theory	9
	Clinical	18
	Library and Research	5
		35
Year 2	**Term 4**	
76.250	Nursing IV Theory	7
	Clinical	24
	Library and Research	4
		35
Year 2	**Term 5**	
76.300	Nursing V Theory (for 3 weeks of term)	28
	Clinical (for 15 weeks of term)	35

Subject Outlines

31.276, 31.376 English for Nursing Students — 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)

76.200 Nursing III — 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 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 and general medical-surgical 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 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).

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 Personal Fitness Management — 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.

98.138 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. C.A. Orchard, B.S.N., R.N., *Acting Department Head*
Ms. L. Barratt, R.N.
Ms. M.J. Belfry, B.N., R.N.
Ms. D.M. Belyk, B.S.N., R.N.
Ms. E. Carr, B.S.N., R.N.
Ms. V. Cartmel, B.S.N., R.N.
Ms. A.J. Collins, M.S.N., B.N., R.N.
Ms. J. Delesalle, M.S.N., B.S.N., R.N.
Ms. K. Doyle, B.S.N., R.N.
Ms. H.M. Evans, S.R.N., S.C.M., Dip. P.H. Nsg., R.N.
Ms. E.M. Fraser, B.S.N., R.N. Chief Instructor - Year 1
Ms. B.A. Greenlaw, B.N., R.N.
Ms. H.D. Hintz, B.S.N., R.N.
Ms. G.M. Kammermayer, B.Sc.N., R.N.
Ms. B.A. Lawes, B.Sc.N., R.N.
Ms. L.P. Meredith, M.Adult Ed., B.S.N., R.N. LTD.
Ms. Jean-Monica Mogg, B.A., Dipl. Nsg.Ed., S.C.M., Dipl.E.N.T.Nsg., R.N.
Ms. M.H. Mysak, B.Sc.N., R.N.
Ms. K.C. Peters, B.S.N., R.N.
Ms. M.N. Renwick, B.S.N., Dipl.T.S., R.N.
Ms. A. Russell, R.N., B.S.C.
Ms. L.M. Shaw, B.Sc.N., R.N.
Ms. S.W. Stephens, B.Sc.N., R.N.
Ms. M.W. Whitehead, B.S.N., Dipl.Obs. Nsg., R.N., M.A. (Educ.)
Ms. M. Wiens, B.S.N., Dipl.T.S., R.N.
Ms. P.V. Zabawski, B.Sc.N., R.N.

Part-Time Faculty

Ms. B. Collingwood, R.N., Dipl.Nsg.Ed.
Ms. E. Jackson, B.S.N., R.N.
Ms. N.J. Lawson, B.S.N., R.N.
Ms. K. Negoro, Dipl.Nsg.Ed., R.N.
Ms. A.L. Novada, B.S.N., Dipl.T.S., R.N.
Ms. E. Martin, B.S.N., R.N.
Ms. M. Olson, B.S.N., R.N.
Ms. K. Quee, R.N., B.S.N.
Ms. J. Verner, B.S.N., R.N.
Ms. J Zimka, B.Sc.N., R.N.

Support Staff

Ms. F. Nordstrand, R.N.
Ms. G.S. Malm, Records Assistant
Ms. D.A. Martin, Clerk Typist
Ms. B.V. Tearse, Clerk Typist

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; 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. Beginning salary is currently $1,361 per month. (1979 schedule).

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 2-1/3 year interval. Throughout the program, theoretical, laboratory and clinical settings are given concurrently supported by courses in 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 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. Mature students are required to have standing in English 12 as well as the course prerequisites. A C+ standing or better in these subjects is preferred for all applicants. Applicants may be required to write and achieve satisfactory scores in arithmetic and English pre-tests. Remedial instruction will be recommended for individuals with unsatisfactory scores.

All students are required to have a current St. John Safety-Oriented First Aid Certificate 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. Applicants are required to complete a specified immunization program as condition of acceptance into the program. The immunization program includes: 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, $250 per year for books, $20 for the St. John Safety Oriented First Aid Course and $15 for the St. John Cardio Pulmonary Resuscitation Course.

The student is also responsible for transportation to community agencies and hospitals. Use of a car for 2 days per week terms 1 to 4, and 5 days per week for term 5 is highly desirable. Monthly cost of transportation is estimated at $100. Most

graduates purchase a school pin which costs approximately $60. These estimates are subject to change. Additional costs for accommodation and travel may be incurred during the fifth term.

Financial Assistance
The Ministry of Health provides a stipend of up to $150 per month for students who need financial assistance. For other sources of such assistance please refer to the General Information section of the calendar. Applicants who need financial support are urged to consult a counsellor in Student Financial Services when on campus for required interview.

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

Applicants who have had a criminal conviction for any charge other than a minor vehicle infraction, should confer with the Association prior to admission to the program.

Students are advised to apply for registration at least by the completion of the fourth term in order to ensure that documentation is complete, so that they are eligible to write the registration examinations following graduation from BCIT.

Educational Opportunities for Graduates
Graduates are eligible to enter the general nursing diploma programs at Douglas and Okanagan Colleges with one year's advance credit. Transfer of credit between the two nursing programs at BCIT will be reviewed when both programs are fully developed in 1980-81. Graduates interested in administration are eligible to enter the One Year Management Program in Health Services available in the evenings.

How to Apply
The program welcomes applications from men and women and from mature students 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. Application forms are available from the Admissions Centre.

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.

If you wish to obtain more information on the program, contact the Department of Psychiatric Nursing to arrange an interview.

Dates of Terms: 1980-81
August 11 - December 12 (inclusive)
January 5 - May 15 (inclusive)

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
77.100	Psychiatric Nursing I	6
77.105	Psychiatric Nursing Practicum I	9
77.110	Interpersonal Relationship Laboratory I	2
77.120	Psychomotor Laboratory I	3
98.105	Anatomy and Physiology	3
98.118	Personal Fitness Management	2
98.141	Human Behavior I	4
		29
Year 1	**Term 2**	
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	3
98.208	Physiology and Pathophysiology	3
98.225	Microbiology and Immunology	2
98.241	Human Development	4
		30
Year 2	**Term 3**	
31.377	English for Psychiatric Nursing Students	3
77.200	Psychiatric Nursing III	6
77.205	Psychiatric Nursing Practicum III	15
77.210	Interpersonal Relationship Laboratory III	2
77.220	Psychomotor Laboratory III	2
98.308	Physiology and Pathophysiology	2
		30
Year 2	**Term 4**	
31.477	English for Psychiatric Nursing Students	3
77.250	Psychiatric Nursing IV	6
77.255	Psychiatric Nursing Practicum IV	15
77.260	Interpersonal Relationship Laboratory IV	2
77.270	Issues in Psychiatric Nursing	2
		28
Year 3	**Term 5**	Clrm hrs/wk
77.300	Psychiatric Nursing V	25 for 3 wks.
77.305	Psychiatric Nursing Preceptorship	30 for 15 wks

Subject Outlines

31.377 English for Psychiatric Nursing Students — This course consists of (a) a study of the general principles of writing and their application to professional writing tasks, and (b) a study of modern literature.

31.477 English for Psychiatric Nursing Students — This course consists of (a) a study of the general principles of writing and their application to professional writing tasks, and (b) a study of modern literature. Continued from 31.377.

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 community settings and general and psychiatric hospitals. Emphasis is placed on developing an awareness of a variety of lifestyles, available mental health services, skills related to assessment, activities of daily living and interpersonal relations. A one hour seminar is included in this course.

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. Professional responsibilities are continued from 77.100 and organizational skills are introduced. Prerequisites: all first-term courses.

77.155 Psychiatric Nursing Practicum II —A clinical practice course offered concurrently with 77.150, 77.160 and 77.170. Experiences are provided in pediatric areas of general hospitals and mental retardation settings. Emphasis is placed on initiating therapeutic relationships, assessing levels of development, applying principles of teaching and learning, applying the problem-solving process and performing basic nursing skills for

specified stressors of the respiratory, digestive, reproductive and urinary systems. A one hour seminar is included in this course. Prerequisites: all first term courses.

77.160 Interpersonal Relationship Laboratory II — A lab practice 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 practice course offered concurrently with Psychiatric Nursing II. Emphasis is placed on the development of selected nursing skills. Prerequisites: all first-term courses.

77.200 Psychiatric Nursing III — The study of individuals with specified maturational and/or situational stressors. Emphasis is placed on the care of adults with acute physical and emotional problems. Professional responsibilities and organizational skills are continued from 77.150. Prerequisites: all second-term courses.

77.205 Psychiatric Nursing Practicum III — A clinical practice course offered concurrently with Psychiatric Nursing III. Experiences are provided in general surgical units of general hospitals and acute psychiatric in-patient units. Emphasis is placed on maintaining and terminating therapeutic relationships and developing nursing and organizational skills. A one hour seminar is included in this course. Prerequisites: all second-term courses.

77.210 Interpersonal Relationship Laboratory III — A lab practice course offered concurrently with Psychiatric Nursing III. Emphasis is placed on the maintainance and termination of therapeutic relationships with adults. Prerequisites: all second-term courses.

77.220 Psychomotor Laboratory III — A lab practice course offered concurrently with Psychiatric Nursing III. Emphasis is placed on the development of selected nursing skills related to specified body systems and the care of the surgical patient. As part of this course, students are required to take the St. John Cardio Pulmonary Resuscitation Course at a cost of $15. Prerequisites: all second-term courses.

77.250 Psychiatric Nursing IV — The study of individuals with multiple stressors. Emphasis is placed on nursing interventions for multi-system problems. Professional responsibilities and organizational skills are continued from 77.200. Prerequisites: all third-term courses.

77.255 Psychiatric Nursing Practicum IV — A clinical practice course offered concurrently with Psychiatric Nursing IV. Experiences are provided in long-term psychiatric, psychogeratic and general medical-surgical settings. Emphasis is placed on initiating, maintaining and terminating therapeutic relationships with groups of clients and developing selected nursing and organizational skills. A one hour seminar is included in this course. Prerequisites: all third-term courses.

77.260 Interpersonal Relationship Laboratory IV — A lab practice course offered concurrently with Psychiatric Nursing IV. Emphasis is placed on maintenance and termination of therapeutic relationships with groups of clients. Prerequisites: all third-term courses.

77.270 Issues in Psychiatric Nursing — Some particular sociological issues will be discussed. Emphasis will be placed on their influence and relevance to the practice of psychiatric nursing.

77.300 Psychiatric Nursing V — A review of psychiatric nursing practice with emphasis on developing the responsibilities of a psychiatric nurse and working with health team members. Psychiatric Nursing Preceptorship 77.305 follows this course. Prerequisites: all fourth-term courses.

77.305 Psychiatric Nursing Preceptorship — A clinical practice course offered after Psychiatric Nursing V: 77.300. Experiences are provided in a variety of mental health facilities throughout British Columbia. Emphasis is placed on integrating knowledge and skills learned in Terms 1 to 4, on assuming responsibility and on working effectively with team members. Prerequisites: all fourth-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 Personal Fitness Management — 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 1 — 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 and Pathophysiology — 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: Anatomy and Physiology 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 microbiology concepts, including the distinguishing characteristics of microorganisms, 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: Anatomy and Physiology 98.105.

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. Prerequisites: Human Behavior 1 98.141.

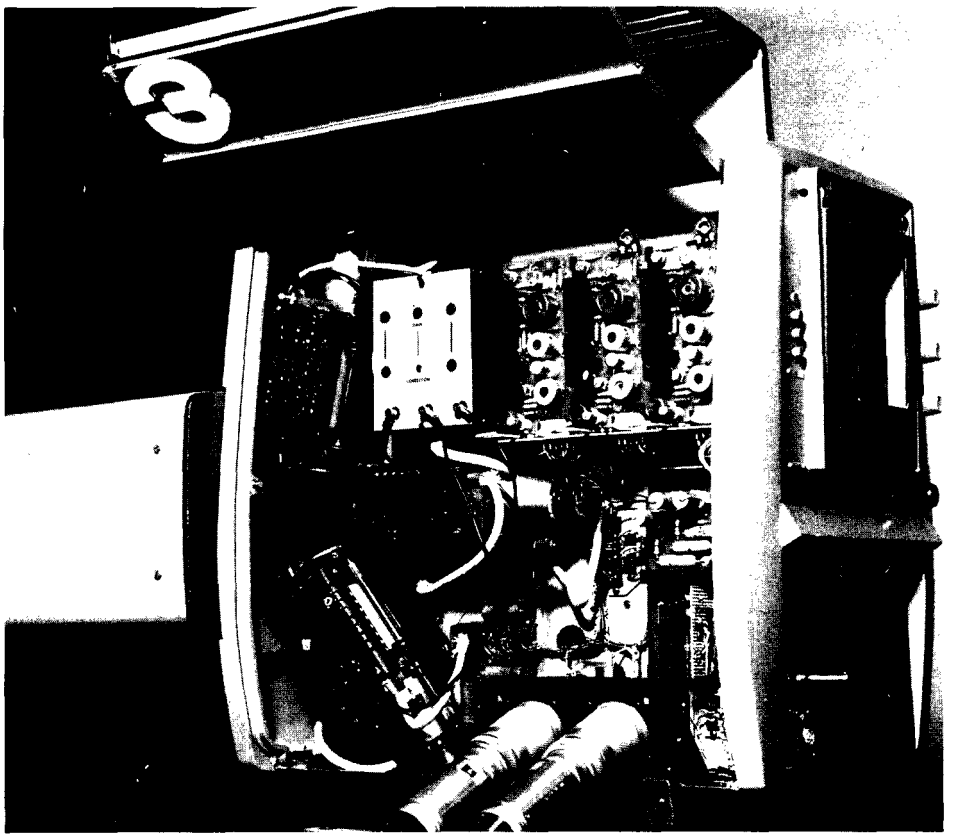
98.308 Physiology and Pathophysiology — Normal homeostatic regulation as well as fundamental pathophysiological mechanisms in specific body systems are continued from 98.208. An introduction to the concept of neoplasia is included. Wherever possible, the course content corresponds with conditions encountered in the clinical experience of the psychiatric nursing student. Prerequisite: Physiology and Pathophysiology 98.208.

Faculty and Staff

Margaret S. Neylan, R.N., B.S.N., M.A., *Department Head*
Joan Anderson, R.N., B.Sc.N.
Linda Brazier, B.S.N., R.N.
Mrs. S.K. Lee Chan, B.Sc.N., R.N.
John Crawford, R.P.N., Cert.in Adv.Nsg., B.A., Chief Instructor
Ms. K. Duncan, B.S.N., R.N. Chief Instructor
Shiron Erickson, R.N., Dipl.Psych.Nsg., B.N.
Ms. M.L. Evans, B.Sc.N., R.N.
Lynn Field, R.N., B.Sc.N. Chief Instructor
Phyllis Gilchrist, R.N., B.Sc.N.
Stephany Grasset, B.Sc., R.N., P.H.N.
Yvonne Greene, B.Sc.N., R.N., R.M.N.
Jean Gunderson, R.P.N. R.N.
Wilda Haydamack, R.N., Dipl.P.H.Nsg., Dipl.Psych.Nsg., B.Ed., M.Ed.
Joyce Heaton, B.Sc.N., R.N.
Anne Houseman, B.Sc.N., R.N.
Ms. M. Ireton, B.Sc.N., R.N.
Beverley Miller, R.N., B.Sc.N.
Ms. J. Mossing, R.N., B.N.
Ms. C. Niven, B.Sc.N.Ed., R.N.
Marie Riediger, R.N., B.N.
Ross Stewart, R.P.N., R.M.N., R.N.
Ms. M. Sutherland, B.N., C.M.B., Dipl.T.S. Psych.Nsg., Dipl.Adult Ed., M.A.
Norma Vallentgoed, R.P.N., B.A.

Support Staff
Helen Moore
Pat Ord

Third Year Programs



Broadcast Engineering
(Broadcast Communications Technology)

This program is designed to meet the increasing need for highly skilled maintenance engineers in the broadcast and cable industries.

The Program
Three main course areas are supplemented with a co-operative education component.

Television studio systems and equipment provides the student with detailed experience in the maintenance of highly specialized equipment used in the modern television station. Particular emphasis will be placed upon the servicing of video tape equipment, and will include studio, portable and remote equipment. Time will also be devoted to preventative maintenance schedules and systems design.

Radio studio systems and equipment will give students extensive practice in applying electronic skills to modern radio, monaural and stereo broadcast equipment. Special emphasis will be placed on new technology in radio broadcasting, keeping in mind the complexity of older equipment presently in use.

Radio, television and F.M. transmission systems and equipment maintenance will comprise the third course area.

Those from outside greater Vancouver will be given preference in their home locations with respect to co-op education assignments.

Prerequisites
Graduation with a Diploma of Technology in Electronics, or equivalent experience in the work force.

Applications
Applications will be accepted at any time for classes beginning in June. For 1979, applicants should submit all documentation as soon as possible.

Calendar of Events

June 9/80	— Registration
June 10	— First day of classes
Sept. 15-19	— Term 1 assessment
Sept. 22-26	— Break
Dec. 8-12	— Term 2 assessment
Dec. 15-Jan. 5/81	— Break
Jan. 5	— Final term begins
March 6	— Program ends

Course of Studies

		Clrm hrs/wk
12.531	Color, Cameras and Television systems (2-6 hour blocks)	12
12.532	Video Tape	6
12.533	Radio and Television Production	3
12.534	Transmission	6
12.535	Radio Studio Equipment	3
	Library and Research	5
		35

Courses will include 10 weeks industry observation.

Business Administration

(Administration Management Technology)

Following some experience in the work force, engineering and health technologists may assume supervisory and managerial responsibilities. Although they are well-versed in the technical aspects of their field, they could, in most cases, benefit from further training in business management to be effective administrators. To fulfill this training need, BCIT has developed a full-time diploma program in business management.

The Program

The nine-month program includes basic business subjects such as accounting, economics, personnel administration, data processing and marketing to give students a thorough understanding of current business practices, which will enable them to apply a disciplined and professional approach to management. Lectures are supplemented by case studies and group discussions throughout the program.

Prerequisites

Graduation from a BCIT diploma program or a two-year college program in an engineering or health technology, or equivalent. Applicants should be interested in supervisory or managerial positions. Previous business experience is preferable, but not mandatory.

Post-graduation

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

Course of Studies

		Clrm
Year 1	**Term 1**	hrs/wk
10.110	Economics	3
10.300	Management IV	3
10.360	Personnel Administration	3
10.380	Business Law	3
14.050	Introduction to Data Processing	4
16.140	Accounting	5
20.191	Marketing	3
22.110	Business Mathematics	4
	Library and Research	7
		35

Year 1	**Term 2**	
10.220	Organizational Behavior I	3
10.210	Economics	3
10.400	Management IV	3
10.480	Business Law	3
14.052	Computers in Business	4
16.240	Accounting	5
20.291	Marketing	3
22.408	Supervision	3
	Library and Research	6
		35

Subject Outlines

10.110, 10.210 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.

10.210 See 10.110

10.220 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.

10.300 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.

10.360 Personnel Administration — An introduction to the fundamentals of personnel management, including organization of the personnel function: recruiting, testing, interviewing, selection; job descriptions and evaluation; salary administration, fringe benefits; training, management development and performance appraisal; constructive discipline, grievances and morale.

10.380, 10.480 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.

10.400 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 discussion. 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.

10.480 See 10.380

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.

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.

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.

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.

Faculty and Staff

R.A. Cradock, B.Comm., M.B.A., R.I.A., *Department Head*
G. Bell, B.Comm., M.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.
R.A. Yates, LLB., M.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 pre-entry 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 Dean of the Core Division. For information on the BCIT preparatory program consult this calendar, the continuing education calendar, the appropriate department head or the Dean of the Core Division.

Faculty and Staff

B. Gillespie, B.Sc., M.Sc., *Dean*

Department of Chemistry

C. Barnetson, B.Sc., *Department Head*
N. Abdurahman, B.Sc., M.Sc., Ph.D.
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C. Heady, Dipl. Tech.
T. Mepham, A.R.I.C., M.Sc.
C.J.C. Nichol, B.A., M.Sc., Ph.D.
M. Pickering
S.M. Reynolds, B.A., M.Sc.
R. Tam
E.E. Tang, B.Sc.
L.V. Tolani, B.Sc., M.Sc.
P.W. Van Ameyde, H.L.S. (Neth.), Ir.N.I.R.I.A.

Department of English

H. Arthur, B.A.(Hons.), M.A., *Department Chairperson*
R. Allin
K. Brambleby
P.J. Burns, B.A., M.A.
F.C.H. Challans, B.A.
H.M. Clarke, Ph.M.B., M.A.
Wm. Rider Cooey, B.A.(Hons.)
J. Davison, Ph.D.
R.G. Douglas, B.Ed.
T. Easton, B.A., M.A.
O.D. Erickson, B.A.
S. Fahey, B.A.
D. Hamilton, B.Sc.
T. Harding
D. Helgesen, B.A., M.B.A.
D. Horan, B.Journ., B.A. (Hons.)
V. Johnson, B.A. B.Ed.
R.W. Kean, B.A., M.A.
R. Knott, B.A.(Hons.), M.Ed.
G. Layton, B.A.
R. Lund
D.S. McNeal, B.A., M.A., Ph.D.
M. Moore, B.A., M.A.
W.W. Oaksford, B.A., M.A.
M. Otte, B.A.(Hons.), M.A.
G.M. Ramsay, B.A.
B. Schillinger, B.A., M.A.
J. Segal, B.A.(Hons.), M.A.
R. Spence, B.Comm., B.A.
E. Stephens, B.A., M.A.
E. Stronach, B.A., B.Ed., M.A.
C. Swan
P.H. Thomas, B.A., B.Ed., M.A.
D.R. Vale, B.A., B.Ed., M.Ed.
L. Walker, Ph.D.
A. Willson, B.A., M.A.
M.Archer Young, B.A.(Hons.), M.A.

Department of Mathematics

R.A. Sterne, B.A.Sc., P.Eng., Department Head
M.C. Bojadziev, Dip.Ing.
J.W. Brown, B.Sc.(Hons.), M.A.
A.K. Chu, B.A.Sc., P.Eng.
G. Cocksedge, B.Sc.For., M.Eng.
C.A. Copping, B.Sc.
M. Dekker, B.Sc.(Hons.)
A. Ellingsen, B.Sc.
P.M. Hobbins, B.Sc.
C.C. Lawrence, B.Sc.(Hons.)

R.D. Lynn, B.Sc.(Hons.), M.S.B.A.
A.F.I.M.A.
E.R. Martin, B.Sc., M.Ed.
J. Meisen, B.Sc., M.S., Ph.D.
A.P. Paris, B.A.Sc., M.A.Sc., P.Eng.
V. Sawadsky, B.S., B.Sc.(Hons.)
W.S. Sims, B.Sc.
E.L. Toth, B.Sc.,
B.L. Turner, B.Sc.
H.E. Walker, B.A., D.L.S., M.R.I.N.
J.H. Wardroper, B.Sc.(Eng.), M.Sc.,
M.I.C.E., P.Eng.

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F. Reader, B.A.Sc., P.Eng.,
Department Head
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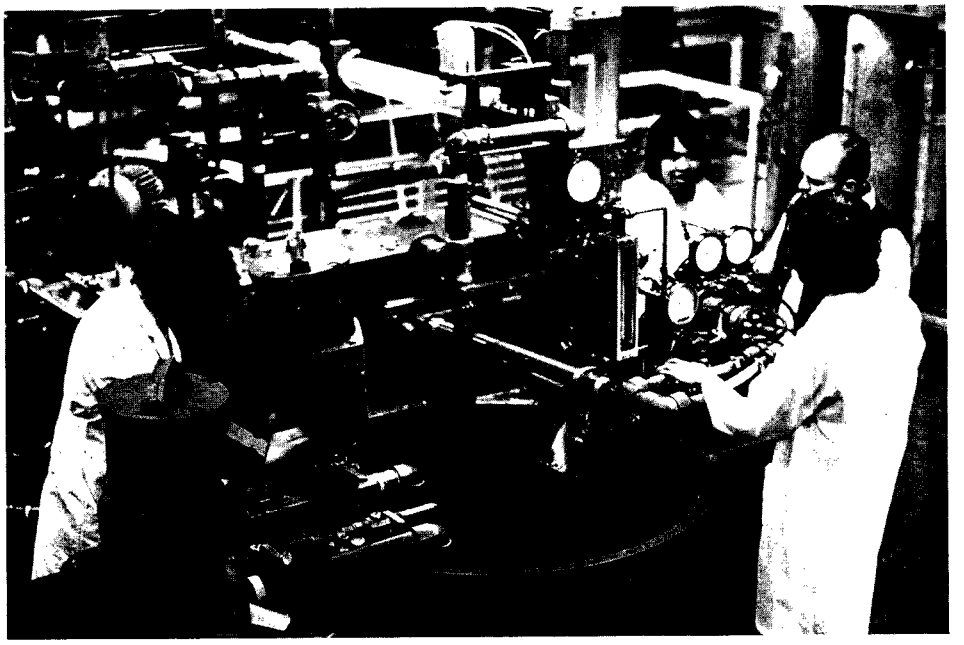
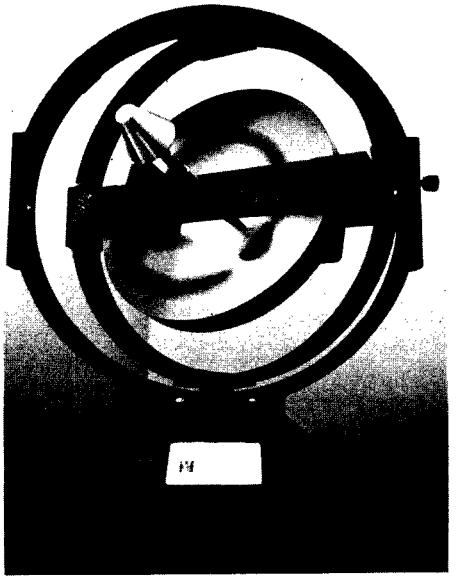
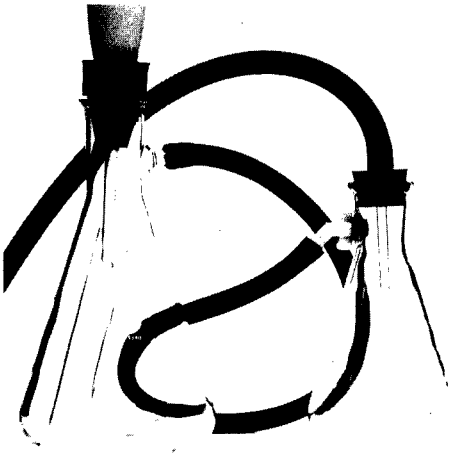
C. Bitsakis, B.Sc.
G. Bodnar
R. Englund, B.Sc.
L. Greenwood, B.Sc., B.A.
J. Griffiths, B.A.Sc., M.A.
H.D. Hecker
D.E.A. Kenyon, B.Sc.
A. Kshatriya, B.Sc., M.Sc.
W. Malakoff, B.Ed., M.Sc.
J. McGill, B.Sc., M.Sc.
M. Muir, Dipl.Tech.
G. Olive, B.Sc.(Hons.), M.A.Sc., Ph.D.
W.V. Olson, B.Sc.
G.R. Paulson
J.R. Saunders, B.Sc., M.Sc.
W. Swetlishoff, B.Ed.
D.E. Thom, B.Sc.
C. VanDeurzen, B.Sc., M.A., Ph.D.
L. Warren, B.A., M.A.
W.T. Withers
K.A. Yakel, B.Sc.(Hons.), M.Sc.



$$MSE = \frac{1}{N}\sum_{i=1}^{N} (y_i - a_1 - a_2 e^{-x_i/\tau})^2$$





Pre-Technology Programs and Pre-Entry Courses

Through the Division of Continuing Education, BCIT offers individuals seeking entrance to full-time or part-time technology programs, pre-entry courses and pre-technology programs. This academic upgrading program provides students the opportunity to meet BCIT entrance requirements. By taking one or more courses students are eligible to submit their admission application for consideration. The program is for mature students, students who are missing specific prerequisites and students who have weak backgrounds or have had marginal success in chemistry, English, mathematics and physics.

Courses are usually offered during three time periods: September to May, February to June, evenings; May to August, evenings and June to August, days and evenings.

Courses may be taken individually or as a package. Since all courses may not be available in each time period, students should consult the Continuing Education course offerings for exact dates and times.

When applying for admission to day school programs students should indicate which preparatory courses they plan to complete.

Advice on course selection is available through Continuing Education.

The following courses are designed as prerequisites to BCIT level technological courses and satisfy specific course entrance requirements as outlined in this calendar.

22.900 Preparatory Business Mathematics — An upgrading and refresher course for students entering Business programs. 48 hours. This course satisfies Math 11 or Algebra 11 entrance requirements.

30.909 Pre-Entry Chemistry — An upgrading course for individuals whose background in chemistry is weak and a refresher for those who have not studied chemistry for several years. 78 hours.

31.996 Comprehensive Reading, Writing and Study Skills — An integrated course which provides extensive coverage of all reading, writing and study skills necessary for successful completion of technology programs. 80 hours.

31.997 Effective Writing — This course develops the basic skills of effective writing and uses them in a variety of paragraph forms related to technical writing. 24 hours.

31.998 Textbook Reading and Study Skills - This course deals with the skills a student needs to be successful in learning situations. 24 hours.

31.999 English as a Second Language — Preparatory course for students with English as a second language. Enables them to deal more effectively with post-secondary demands. Equivalent to 098-099 at Vancouver Community College Special Programs Division. Satisfies TOEFL entrance requirement. 14 weeks, 20-25 hours per week.

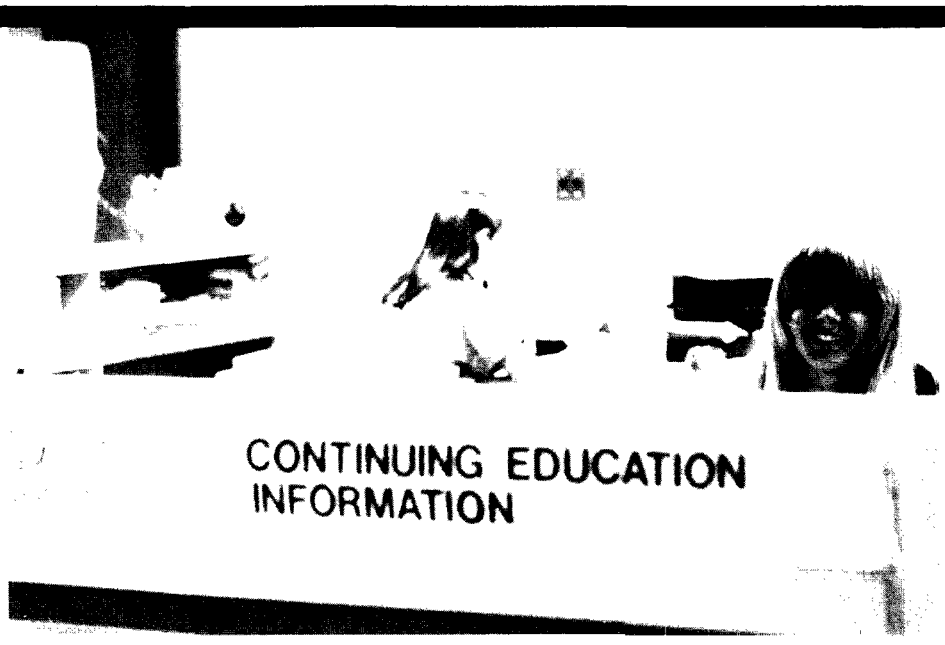
32.950 Pre-Entry Mathematics — An upgrading course for students who have not completed high school mathematics. 90 hours. This course satisfies Math 12 or Algebra 12 entrance requirements. Prerequisite: Math 11 or Algebra 11 or equivalent.

32.951 Refresher Mathematics — A refresher course for mature students and for students with weak backgrounds in mathematics. 80 hours. This course satisfies Algebra 12 or Math 12 entrance requirements. Prerequisite: Math 12 or Algebra 12 or equivalent.

32.995 Remedial Mathematics — An at-home, self-study course for students whose background in mathematics is weak or who have not studied mathematics for several years. This course satisfies Algebra 12 or Math 12 entrance requirements. Prerequisite: Math 11 or Algebra 11 or equivalent.

33.909 Pre-Entry Physics — An upgrading course for individuals whose background in physics is weak and a refresher for those who have not studied physics for several years. 87 hours. This course satisfies Physics 11 entrance requirements.

Continuing Education and Industry Services



A diverse and exciting selection of credit and non-credit courses are available through the Division of Continuing Education and Industry Services at BCIT.

The division directs its offerings to a variety of people through many formats and in different locations through one or more of its departments.

Students interested in earning a BCIT certificate may want to take advantage of evening and weekend courses presented by the **Business Continuing Education Department.** The department offers all BCIT day-school business technology programs and programs such as Building Services Management.

A growing "downtown campus" also provides a variety of after work classes for people working downtown.

Engineering-oriented courses which reflect all BCIT day-school engineering technologies are offered by **Engineering and Core Continuing Education.** The department also provides the P.Eng. Tutorials series for students preparing for P.Eng. Fundamental Examinations. Pre-entry and remedial courses in core programs such as English, mathematics, physics and chemistry are also available.

Health Continuing Education provides a service to workers in the health care delivery system. Courses in health care management, operating room nursing skills, and refresher programs for graduate nurses are available. Another offering of the department is Nursing Update. The program provides short courses on nursing education topics at BCIT and throughout the province.

Correspondence courses are available for people who wish to study on an unscheduled basis. The **Directed Study Centre** provides credit and non-credit, preparatory and advanced, structured and non-structured, general interest and career-oriented courses. Topics include forestry, highway technology, business administration, mathematics, physics and medical laboratory technology. Additional day-school correspondence courses and courses for industry, government and business are designed and produced by the **Program Development Group.**

Industry Services, a training resource for industry, presents programs to meet the specific needs of government agencies, corporations and professional organizations.

Seminars in the fields of technology, business management, instructor training and health education are presented by the **Training and Development Centre.** The seminars are non-credit and are available to business and educational institutions as well as individuals.

If you are interested in exploring alternatives, professional development or adding new dimensions to your career, write to The Division of Continuing Education and Industry Services, British Columbia Institute of Technology, 3700 Willingdon Avenue, Burnaby, B.C., V5G 3H2 or telephone 434-5734, local 204/205.

Dean and Departments

D.M. Brousson, B.A.Sc., P.Eng., Dean, The Division of Continuing Education and Industry Services

L.S. McGill, Department Head, Business Continuing Education, local 583

J.A. Willcox, B.A.Sc., P.Eng., Department Head, Engineering and Core Continuing Education, local 582

R.C. Morris, B.A., D.H.A., Department Head, Health Continuing Education, local 376

W.E. Robertson, B.Ed., Department Head, Program Development and Directed Study Centre, local 406

R.C. MacGregor, A.M.S.L.A.E.T., T. Eng., Department Head, Industry Services, local 636

Library and Audiovisual

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 best way to begin making productive use of the Library resources is to take a self-guided audio 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.

As the major technological information center in the province, the BCIT Library contains the latest books, journals, indexes and maps to support all technologies. In addition there are over 1800 films, 400 learning kits and 2200 audio tapes. The listening and viewing area provides preview booths, slide tape units, video monitors and microfiche readers to make use of the media resources. As an added feature, there are four computer assisted instruction terminals in the area.

Audiovisual 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 audiovisual packages and operating equipment.

The Audiovisual 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 audiovisual 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 operations of such equipment can arrange for individual or group training.

Quick Facts

about the Library and Audiovisual Services Division

Hours: Sept. - May (subject to change)

Library

Mon.-Thurs	8 a.m. - 11 p.m.
Fri.	8 a.m. - 5 p.m.
Sat.	9 a.m. - 5 p.m.
Sun.	noon - 6 p.m.

AV Equipment

Mon.-Fri.	8 a.m. - 5 p.m.

AV Production

Mon.-Fri.	8:30 a.m. - 4:30 p.m.

Holidays: The Library will be open on the following statutory holidays (AV will be closed).

Remembrance Day	9 a.m. - 5 p.m.
Victoria Day	8 a.m. - 11 p.m.

Borrowers: Cards are issued free to day and night school students, staff and faculty. There is a $5 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.
Film Bookings
434-5734, local 367/740

Loans:

Circulating books — two weeks
Journals, reference books — Library use only
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. No statement of marks, diploma or certificate will be issued until the student clears up all financial obligations for overdue material.

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.

Faculty and Staff

Jos E. Carver, C.D., B.L.S., *Dean*
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, Audio Maintenance and Distribution Supervisor
Maureen Brooks, Equipment Circulation
Leslie Chan, Dipl.T., Video Maintenance and Distribution Systems
Jim Crozier, Equipment Circulation
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, Production Specialist, Health and CEIS
Tony Kelly, B.A., M.L.S., Reference Librarian, Business
Frank Knor, Dipl.T., B.Ed., B.L.S., Systems Librarian
Trish Labonté, B.Sc., M.L.S., Reference Librarian, Facilities Planning
Merilee MacKinnon, B.A., M.L.S., Cataloguer
Marj McLeod, B.L.S., Reference Librarian, Health
Paula Pick, B.A., M.L.S., Head Cataloguer
Larry Porter, Equipment Circulation
Jo Rix, Media Preparation
Robert Roy, B.A., M.A., B.L.S., Technical Services Coordinator
Charles Saunders, Dipl.T., AV Services Coordinator, Production Specialist, Business and Administration
Egon Steinebach, Photographic Production
Gerry Weeks, B.A., M.L.S., Reference Services Coordinator
Christopher Wilson, Dipl.T., B.A., Video Production and Scripting, Production Specialist, Core and Engineering
Ray Young, Media Graphic Production
Robert Young, B.Sc., B.L.S., Reference Librarian, Core and Administration

Admissions

Admissions Policy

BCIT was built to serve the residents of British Columbia. The selection of applicants is on a "first-come, first-served" basis.

British Columbia residents who are Canadian citizens and landed immigrants who have resided in B.C. for at least one year prior to enrolment have first priority; out-of-province Canadian citizens and landed immigrants who have resided in Canada for at least one year prior to enrolment, have second priority. Out-of-country applicants on a student visa, which is designated BCIT, have third priority. Out-of-country candidates are only selected when there is a lack of applications from the first two priorities. Due to limited enrolment, out-of-country applicants on a student visa are only considered for admision to Biological Sciences, Chemical and Metallurgical, Civil and Structural, Forest Products, Mechanical, Mining, Natural Gas and Petroleum and Surveying. *This policy is currently under review.*

BCIT does not accept applications from persons who are on a visitor's visa. All prospective students must be at least 16 years of age, however, there is no upper age limit.

Academic Requirements for Admission

Graduation from a senior secondary school in a Selected or Combined Studies Program or equivalent, with satisfactory grades, as prescribed by the British Columbia Ministry of Education, is required. In addition, candidates must meet certain special technology prerequisites. *See Technology Prerequisites.*

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 of the English department.

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.

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. Any questions should be directed to the department head of the technology.

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 Registrar's Office at BCIT.

Direct Entry

Those persons who have successfully completed one or more years of study at a level equal to, or higher than, that of a BCIT 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.

Technology Prerequisites

Business Management Division

Administrative Management — Algebra 11 or Math 11 or Business and Consumer Math 11

Broadcast Communications — Nil

Computer Systems
- Information Systems— Algebra 11 or Math 11
- Management Systems — 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 — Business and Consumer Math 11

Marketing Management — Algebra 11 or Math 11 or Business and Consumer Math 11

Operations Management — Algebra 11 or Math 11 or Business and Consumer Math 11

Business Administration — Diploma of Technology in Health or Engineering

Broadcast Engineering — Diploma of Technology in Electronics or equivalent

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 (all with a C+ standing or better)

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).
Forest Resource
Forestry Program — Algebra 12 or Math 12 and science 11 (Biology preferred)
Fish, Wildlife and Recreation — Algebra 12 or Math 12 and Biology 11
Forest Products
Pulp and Paper — Algebra 12 or Math 12 and Chemistry 11
Lumber and Plywood Manufacturing — 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
Recreation Facilities Management — Algebra 12 or Math 12 and Physics 11
Surveying — Algebra 12 or Math 12 and Physics 11
For some selected Engineering Technologies, work experience may be used as a criteria.

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.

How to Apply

Applications for admission to various technologies should be submitted as early as possible as some programs at BCIT have a limited number of seats available. Application forms and additional information may be obtained from the Admissions Department, BCIT, 3700 Willingdon Ave., Burnaby, B.C. V5G 3H2 - phone 434-5734, local 216. These forms should be completed and returned with the necessary documents attached. *See Document Requirements.*

When to Apply
Applications for classes commencing in September will be accepted by the Admissions Department from January 1 to the second week of September.

Applications for Psychiatric Nursing will be accepted from January 1 to July for the August classes and from the first week of May to September 30 for the January classes.

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

Accepted — The applicant who meets the requirements of the institute and the technology may be fully accepted.

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

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

Final acceptance or non-acceptance to BCIT, 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.

Acceptance to a program is non-transferable from year to year. Applications are considered for the current school year only. An accepted applicant who is unable to enrol may re-apply for admission. However, the new application will be reviewed again for the new academic school year.

Document Requirements
The following documents must accompany the completed application form:

1. A senior secondary school transcript of marks or, if this is unavailable, 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 upon the completion of grade 12 on the Selected or Combined Studies Program. This interim statement of marks must be substantiated by a final secondary school transcript of marks when it becomes available.
2. If applicable, all post-secondary school statement of marks indicating credits and grades achieved.
3. Out-of-country applicants must submit official government documents indicating Landed Immigrant Status or Student Visa designated for BCIT.
4. Health Division applicants are required to complete a medical questionnaire and return it to the Medical Services Department 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 the time, students will be required to complete the necessary procedure at Medical Services.
5. Students who have been selected for admission must have medical insurance coverage prior to registration.

   Out-of-country students who have been selected for admission must apply in person to the Health Services Department 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.

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

Course Credit and Advanced Standing
Course credit may be granted for individual subjects taken at BCIT or at other recognized post secondary institutions when the courses are equivalent in content to a selected program of studies at BCIT.

Students should apply for course credit through the "direct" method or the "mail-in" method.

Mail-In
Course credit application is completed by the student and forwarded to the Registrar's Office for processing. This method is only operative up to 10 days prior to the commencement of classes. Applications made after this date must be routed by the student, through the "direct" application method.

Direct
The student takes the completed course credit application form to the Registrar's Office where it is "logged in" and returned directly to the student. It is the student's responsibility to obtain the necessary approvals and return the form to the Registrar's Office.

Application for course credit must be submitted to BCIT no later than 14 calendar days after the commencement of classes. Applications will only be accepted after this time if prior written authorization has been received by the Registrar from the technology department head.

a) First year students may only make application for course credit after they have been fully accepted and have paid their commitment fee.
b) Second and third year students, who are direct entries to BCIT, may make application for course credit upon receiving full acceptance.
c) Students who are presently enrolled at BCIT may make application for course credit at any time within the specified schedule.

Course credit may be applied for each term or on an academic year basis.

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

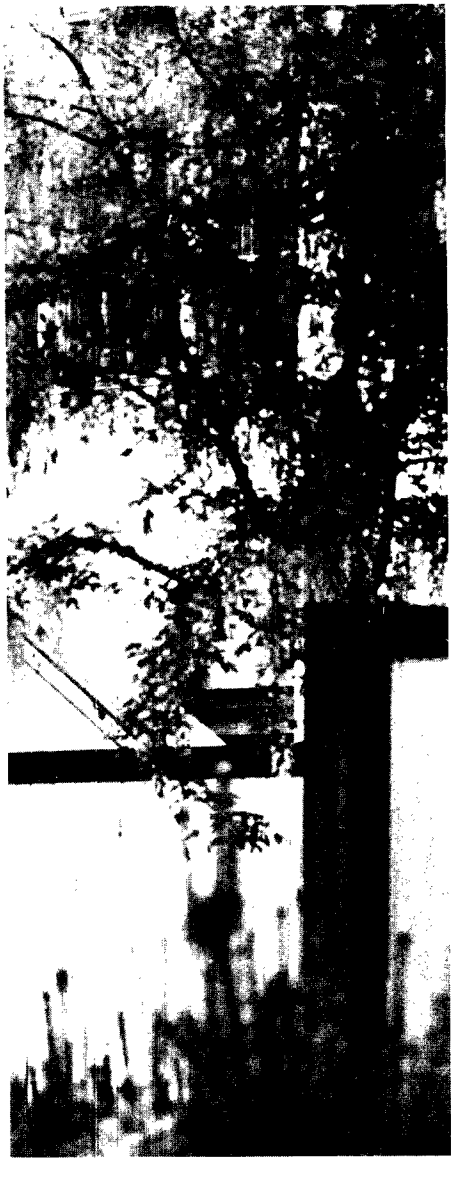
If course credit is granted, students will not be eligible for BCIT scholarships, however, BCIT bursaries and government grants are available to the student if he/she is carrying at least a 75% class workload. Students must carry a 75% class workload in order to be registered as a full time day school student. If a second year student receives course credit in one or more subjects in second year, they will not be eligible to receive an honors diploma.

Readmissions
Students may interrupt their studies after the completion of any term. However, an application form must be completed and submitted to the Admissions Department one month prior to the date of the commencement of the term.

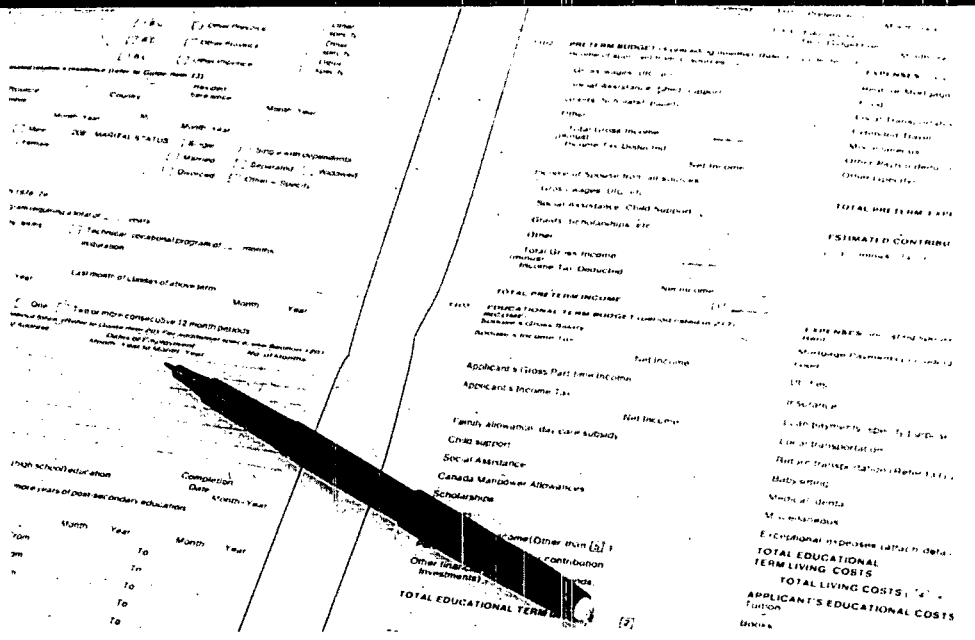
Change of Program
After a student has been enrolled in a technology a request for technology transfer requires the completion of a Request for Transfer form by the student. It is the responsibility of the student to obtain the approval and signatures of the appropriate department head, Dean and Registrar. 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 estimating your resources and expenses. The example below has been worked out to cover a nine-month educational year and is intended to be used only as a guide.

Average Budget

Possible Resources	
Savings from summer job	$1000
Other savings	1000
Parental contribution	500
Part-time earnings during the school year	1000
Total resources	$3500
Estimated Expenses	
Tuition	$510
Student activity fee	40
Books and supplies	200
Room and board	2400
Local transportation by bus	250
Miscellaneous (clothing, laundry, Christmas, entertainment)	700
Total expenses	$4100
Minus total resources	3500
Shortfall	600*

*If your 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. For further information contact Student Financial Services by writing to BCIT, 3700 Willingdon Avenue, Burnaby, B.C. V5G 3H2, or by phoning 434-5734, local 890 or 886.

Fees for 1980-81 academic year

Annual Fees

General tuition	$510
Student activity fee	40
Total payment	550

First-year students
All first-year students must pay their fees according to the following schedule.

First-term fees (due 60 days before commencement of classes)

General tuition (includes $75 commitment fee)	$255
Student activity fee	40
	$295

Second-term fees (due first week of the term)

General tuition	$255
Total payment	$550

Second-year students
All second-year student fees are due 30 days before commencement of classes.

First-term fees

General tuition	$255
Student activity fee	40
	$295

Second-term fees (due first week of the term)

General tuition	$255
Total payment	$550

Third-year fees
Third-year fees (one term only) are due 30 days prior to commencement of classes.

General tuition	$255
Student activity fee	25
Total payment	$280

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 a two-year program is required to pay full term fees 30 days before the commencement of classes.

Payment of tuition fees for subsequent terms
Both first and second-year students returning for a subsequent term; e.g., term 2, are required to pay full fees during the first week of the term.

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.

Payment
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. Payments may also be made by Chargex (Visa) or Mastercharge credit cards.

Refunds of fees for students who withdraw
Up to 14 calendar days after the commencement of classes.

General tuition: complete refund, less $75 commitment fee.
Student activity fee: complete refund.

From the day following the last day specified above until the end of term.

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.)

No refunds of student activity fees will be made after the last day of February. 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
Reread or appeal of examination (per subject) $10
Transcript of marks (per copy) .....$ 3
Duplicate of diploma (per copy) ....$ 6
(A duplicate diploma will be issued only when written confirmation of loss of the original diploma has been submitted to the Registrar.

Application should be made through the Admissions Department.

Student Financial Services

There are several types of financial assistance available to BCIT students, including bursaries, government loans/grants and emergency loans. Students wishing more information on these programs should obtain a copy of "The Guide to (Almost) Everything You've Wanted to Know About Student Financial Services at BCIT". Information, application forms and financial counselling are available at the Student Financial Services Office, Trailer 2V, telephone 434-5734, local 886 or 890. Office hours are Monday, 8 a.m. to 9 p.m., Tuesday to Friday, 8 a.m. to 4:30 p.m. from September to April. In May the office is open from 8 a.m. to 4:30 p.m., Monday to Friday. Summer hours are 8 a.m. to 4 p.m., Monday to Friday.

BCIT Scholarship and Bursary Fund

The British Columbia Institute of Technology Scholarship and Bursary Fund has been established through private means to provide annual awards to deserving and needy students of the Institute.

Scholarships are presented on the basis of academic standing. Bursaries are mainly awarded for financial need, although academic standing as well as school and community involvement may also be considered. Companies, organizations or individuals interested in donating to the Scholarship and Bursary Fund should obtain the pamphlet "Information for Donors" available from the Office of Administration and Bursar or Student Financial Services.

1978 Contributors

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.

Advanced Systems Development Limited has contributed $2,465 to establish a bursary fund for students in the Computer Systems Technology.

Akhurst Machinery Limited contributed a $175 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.

American Can of Canada Limited contributed $445 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

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 in the Natural Gas and Petroleum Technology, to be awarded at the discretion of the Financial Awards Committee.

Argus Installations Limited contributed $50 to be awarded to a deserving student in the Services Option of the Building Technology.

Associated Engineering Services Limited contributed $445 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.

BC/3 (users of IBM Systems 3) Organization Fund was established by various donors, the annual interest of which is to be awarded to a deserving student in the Computer Systems Technology.

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 General 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.

The British Columbia Association of Medical Radiation Technologists contributed a $100 scholarship to be awarded to a deserving student in the first year of the Medical Radiography 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 $275 scholarship to be awarded to a deserving student in the Biological Sciences Technology, Landscape Horticulture Option.

B.C. Dairy Foundation (previously known as the Vancouver Milk Foundation and the Victoria Milk Foundation) established a trust fund in 1972 by an initial contribution of $10,000 each, the annual interest to be awarded as four $500 bur-

saries to deserving students in the Biological Sciences Technology.

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 $2,000 for ten $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: Administrative Management — Administration Option and the Personnel and Industrial Relations Administration Option; Financial Management — Accounting Option and the Finance Option; Marketing Management — Marketing Option and the Transportation and Distribution Option; Operations Management. B.C. Forest Products Limited also contributed four entrance scholarships of $700 each to students entering the first year of the Instrumentation Option of the Electrical Technology; the Forestry Program of the Forest Resource Technology; the Pulp and Paper Program of the Forest Products Technology; and the Lumber and Plywood Program of the Forest Products Technology.

The British 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 to students in other engineering programs having a direct interest in a public utility.

The British Columbia Institute of Technology Staff Society contributed $600 for six $100 bursaries to be awarded to single parents at the discretion of the Financial Awards Committee. The Staff Society also contributed four prizes of $100 each to be awarded to the top first year students in Chemistry, English, Mathematics and Physics.

The British Columbia Institute of Technology Student Association sponsored three prizes of $250 each to be awarded to students who worked on behalf of BCIT students during their first year. These prizes are made available through donations made to the Laurie Jack Memorial Fund as well as contributions of the Student Association.

The British Columbia Lung Association contributed a $500 bursary to be awarded to a deserving student in the General Nursing Technology. The bursary is to be referred to as the Helen Findlay Memorial Bursary.

British Columbia Packers Limited contributed $500 for two scholarships in the Administrative Management Technology, one at $300 and a second at $200.

British Columbia School Trustees Association contributed $475 for a deserving student in the Television Option of the Broadcast Communications Technology, to be awarded at the discretion of the Financial Awards Committee.

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.

British Columbia Telephone Company contributed two bursaries of $500 each, for two deserving students at the Institute of Technology to be awarded at the discretion of the Financial Awards Committee.

British Columbia Television Broadcasting Systems Limited contributed $300 for a deserving student at the Institute of Technology in Broadcast Communications.

The Charles Calder B.C. Hydro Scholarship was established by various donors, the annual interest of which is to be awarded to deserving students in the Mechanical Technology.

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 $300 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 Technology. Canadian Cellulose also contributed three entrance scholarships of $1,200 each to students entering the first year of the Pulp and Paper Program and the Lumber and Plywood Program of the Forest Products Technology.

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. Canadian Forest Products also contributed two entrance scholarships at $1,000 each to students entering the first year of the Pulp and Paper Program of the Forest Products Technology.

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 $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 D.D. McNab Bursary.

The Canadian Institute of Public Health Inspectors, B.C. Branch, contributed $3,000, 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.

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 Program of the Forest Products Technology.

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 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.

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 Construction Limited contributed a $300 bursary for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

The Council of Forest Industries of British Columbia contributed a first year prize to be awarded to the BCIT student in the Lumber and Plywood Program of the Forest Products Technology who

received the highest marks in the lumber grading examination.

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.

Crossman Machinery Company Limited contributed a $500 bursary for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

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.

Daon Development Corporation contributed a $500 scholarship to be awarded to a deserving student in the first year of Administrative Management.

Data Processing Management Association contributed a $150 scholarship to be awarded to a deserving student in the Computer 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 Arthur Bell and Sons, Perth, Scotland (Bells Scotch), Marnier Lapostolle, Paris, France (Grand Marnier), Heineken Breweries, Amsterdam, Holland.

The Durand Machine Company Limited contributed a $300 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 $500 for two $250 bursaries for students who are active members, or a son or daughter of an active member of the Edelweiss Credit Union.

Empire Stevedoring Company Ltd. contributed a $100 bursary for a deserving student in the Marketing Transportation and Distribution Technology.

Endako Mines, Division of Canex Paper Limited, contributed $700 for two $350 scholarships to be awarded to students in any of the following technologies: Chemical and Metallurgical, Mining or Surveying.

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 $1,000 for two $500 bursaries for a deserving student in the Mechanical Technology and for a deserving student in the Electrical Technology.

Food Executives Club of Vancouver contributed $420 to be awarded to a deserving student at the Institute, in the Food Processing Option of the Biological Sciences Technology.

Ford Motor Company of Canada Limited (Pacific Region) contributed a $500 scholarship to be awarded to a deserving first year student in the Transportation and Distribution Option of the Marketing Management 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.

Garland Commercial Ranges Limited contributed a $100 scholarship for a deserving student in the Hotel, Motel and Food Services Administration Option of the Hospitality and Tourism Technology.

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.

Giroday Sawmills Limited contributed a $200 bursary for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

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.

Good Host Foods Limited contributed a $300 first year prize for a deserving student at the Institute in the Hospitality and Tourism Technology (Hotel, Motel & Food Service Option).

Gray Beverage Company Limited contributed a $300 bursary fund to be awarded to deserving students in the Marketing Management Technology.

Guildford Motors Limited contributed a $50 bursary to be awarded to a deserving student at the discretion of the Financial Awards Committee.

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 $420 scholarship to be awarded to a student in the Hospitality and Tourism Administration Technology.

Health Record Association of British Columbia contributed a $25 scholarship to be awarded to a student in the Health Data Technology.

Hewlett Packard (Canada) Limited contributed a $150 bursary to a deserving student in the Computer Systems Technology.

The M.C.D. Hobbs Bursary Fund was established by Mr. M.C.D. Hobbs, a member of the Board of Governors. The interest from the donation which totals $3,000 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.

Hyatt Regency Vancouver contributed a $445 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Imperial Oil Limited contributed $600 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 Systems Technology, and one to be awarded to a student in the Electrical Technology.

The Laurie Jack Memorial Fund 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 as three prizes to students who worked on behalf of their fellow students during their first year. The Laurie Jack prizes are co-sponsored by the BCIT Student Association.

Johns-Manville Canada Inc. contributed

a $300 bursary for a deserving student at the Institute in the Civil and Structural Technology.

Johnston Terminals Limited contributed a $250 scholarship for a deserving first year student in the Transportation and Distribution Option of the Marketing Management Technology.

Kauwinch River Logging contributed a $500 scholarship for a deserving student in the Forestry Option of the Forest Resource Technology.

Keen Engineering Company Limited contributed a $100 bursary for a deserving student at the Institute, 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 Administrative Management Technology.

Kennco Explorations, (Western) Limited, contributed $250 for a scholarship to be awarded to a student in the Mining Technology.

The Kiwanis Club of Vancouver has established a memorial fund to the late Honorable H. Stevens to provide bursaries to part-time students. Interested businesses, individuals and organizations are encouraged to contribute to this worthwhile fund.

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.

L & K Lumber (North Shore) Limited contributed $250 for a bursary to be awarded to a student in the Forestry Program, Forest Resource Technology, or the Lumber and Plywood Program of the Forest Products Technology.

The Lapidary Rock & Mineral Society of British Columbia contributed $300 for two $150 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.

Lecky Paper Limited contributed $250 for a bursary to be awarded to 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 of Technology, 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. MacMillan Bloedel also contributed two entrance scholarships of $700 each to students entering the first year of the Forest Products 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.

Manufacturers Life Insurance Company contributed $250 for a scholarship to be awarded to a first year student in the Marketing Management Technology.

Medtronic of Canada Limited contributed a $200 bursary for a deserving student in the Biomedical Electronics Technology to be awarded at the discretion of the Financial Awards Committee.

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 bursaries; 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 $150 bursary to a deserving student in the Marketing Management Technology; one $150 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.

Northwood Pulp and Timber Limited awarded two entrance scholarships of $750 each to students entering the first year of the Pulp and Paper Program and the Lumber and Plywood Program of the Forest Products Technology.

The Nuclear Medicine Advisory Committee contributed a $100 scholarship to be awarded to a deserving student in the first year of the Nuclear Medicine Technology.

Okanagan Helicopters 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.

Overseas Monitor Corporation Limited contributed a $100 scholarship for a deserving student in the Biomedical Electronics Technology.

Pacific G.M.C. Limited contributed a $500 scholarship for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Pacific Logging Company Limited contributed $1,000 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 first year prize to be awarded to a deserving student in the Hospitality and Tourism Administration Technology.

E.B. Peerless Limited contributed $100 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Philips Cables Limited contributed $275 for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Phillips Electronics Limited contributed a $50 bursary to be awarded at the discretion of the Financial Awards Committee.

Pioneer Envelopes Limited contributed a $100 scholarship for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Pitney Bowes of Canada Limited contributed $30 for a bursary 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.

Prince George Pulp and Paper Limited (Joint Ventures Companies) awarded two entrance scholarships of $750 each to students entering the first year of the Pulp and Paper Program of the Forest Products Technology.

Quantity Surveyors Society of British Columbia contributed a $100 scholarship for a deserving student at the Institute in the Economics Option of the Building Technology.

Rayonier Canada (B.C.) Limited contributed $1,050 for three $350 scholarships; one to be awarded to a student in the Lumber and Plywood program, one in the Pulp and Paper Program of the Forest Products Technology and the third to be awarded to a student in the Forestry Program of 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 contri-

buted 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.

Scott Paper Limited contributed a $250 scholarship for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Seaspan International Limited contributed a $500 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 to be awarded as five $250 bursaries to students in the Civil and Structural Engineering Technology, the Electrical Technology, the Instrumentation Option of the Electrical Technology, the Mechanical Technology and the Forest Products Technology.

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 Engineering Division. 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.

Suburban Developments contributed a $200 bursary for a deserving student at the Institute of Technology, to be awarded at the discretion of the Financial Awards Committee.

Sun-Rype Products Limited contributed $250 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 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 $500 scholarship for a deserving student in the Television Option of the Broadcast Communications Technology.

Vancouver City Savings Credit Union contributed $900 for two $450 bursaries to deserving students at the Institute of Technology to be awarded at the discretion of the Financial Awards Committee.

Vancouver Foundation contributed a $750 bursary fund for deserving students at the Institute, to be awarded at the discretion of the Financial Awards Committee.

The Vancouver Women's Transportation Club contributed $200 for deserving students in second year in the Transportation and Distribution Option of the Marketing Management Technology.

Van Waters & Rogers Limited contributed a $445 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

L.A. Varah Limited contributed $100 for a bursary to a deserving student in the Electrical Technology.

Wesfrob Mines Limited contributed a $300 scholarship for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Westcoast Transmission Co. Ltd. contributed a $500 bursary for a deserving student at the Institute in the Natural Gas and Petroleum Technology.

Western Canada Steel Limited contributed $400 for a deserving student in a steel manufacturing related technology.

Westinghouse Canada Ltd. contributed a $200 scholarship for a deserving student in Administrative Management.

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.

Woodwards Stores contributed two $200 bursaries for deserving students at the Institute in the Biological Sciences and Marketing Management technologies.

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.

Staff

A.S. McLean, B.A., B.S.W., M.S.W., Director
J.L. Orum, B.Ed., M.A., Counsellor/Coordinator
L. Jenkins, Dipl. T., Advisor
L. Krahn, B.A., Advisor

Examinations and Marks

Examinations
Formal examinations are written at the conclusion of each term.

Return of Examinations
Mid-term and Christmas examination papers may be returned to students 10 school days after the official institute distribution schedule for the statement of marks. Only those examinations designated as "restricted exams" by the Dean shall not be returned.

Determination of Standing
Final standing is determined on the basis of term progress and examination results. Students' subject standing are reviewed by a Divisional Marks Review Committee where final standing is determined. Subject standing is as follows:

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

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

C - Credit Granted
Recognition of an acceptable level of studies taken in a specific subject area.

PP - Provisional Pass
Standing granted on the basis that the student will reach pass standing in the continuing subject.

P - Provisional Pass Fulfilled
Standing granted on the basis that the student has fulfilled the requirements of the provisional pass.

AP - Adjudicated Pass
Subject standing raised to a pass level permitting the student to continue in the program based upon overall performance.

N - Not Complete
Student did not complete subject requirements.

X -
No examination or grade given for this subject.

S - Satisfactory
Subject requirements fulfilled, no mark assigned.

U - Unsatisfactory
Subject requirements not fulfilled, no mark assigned.

AU - Audit
Student attended subject, no credit given.

W - Withdrawal
Approved withdrawal from a subject or program.

Withdrawal from Subjects or Program
A full-time student withdrawing from one or two courses without permission will receive an "F" on his/her transcript. Withdrawal **with** permission from his/her department head or Dean will show a blank on the transcript. Appeals to the Registrar will be adjudicated by the Registrar and the Division Dean.

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

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

Distribution of Transcripts
Students will not be provided with marks prior to the issuance of an official transcript by the Registrar's Office.

First and third term transcripts will be distributed to students as follows: Engineering and Health Division will issue transcripts to students upon their return to class; Business Management Division students will have their transcripts mailed to them by the Registrar's Office.

NOTE: A student who has failed a first or third term will be advised by telegram prior to the commencement of the next term. A letter together with the student transcript follows the telegram.

Second and fourth term transcripts for all divisions are mailed to students by the Registrar's Office.

Additional Transcripts
A fee of $3 is charged for each additional transcript of an undergraduate's or graduate's statement of marks.

Withholding Statement of Marks
No statement of marks, transcript, diploma or certificate will be issued until

the student has cleared up all financial and other obligations to the institute 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.

Rereads or Appeals

Requests for rereads or appeals of a subject standing should be submitted in writing to the Registrar's Office within ten school days after the official institute transcript distribution date. There is a fee of $10 for each subject reread. If the original mark is favorably adjusted, the fee will be refunded. Rereads and appeals are adjudicated by the Registrar and the Division Dean. The student is notified of the reread result by formal letter from the Registrar and the mark is adjusted accordingly.

The institute rereads and appeals policy and procedure is currently under review.

Failure and Repetition

A student who fails a term may be permitted to repeat the term only at the discretion of the Dean of the Division 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. Graduates unable to attend the convocation exercises will have their diplomas sent by registered mail to the student's current address on file with the institute. An Honors Diploma is awarded to a graduating student who has taken a full second-year program load and whose average of all courses, that constitute a second year program of studies, is 80 percent or greater. Students who have been granted course credit or advanced standing while in attendance at BCIT will not be eligible for honors diploma status.

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. 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 Dean of the technology concerned and the Registrar.

Only one diploma will be issued to each student. It will not be replaced. Should a student request a copy because of loss, a "Request for a Replacement Diploma" form must be completed and returned to the Registrar's office. Upon review of the reason for the loss, the Registrar may issue a replacement diploma. There is a $6 charge for issuing a replacement diploma.

Academic Awards

Academic Awards

Academic awards are presented on three occasions during the school year; diplomas and honor awards at convocation; graduating awards and prizes at the June awards ceremony held in conjunction with the convocation exercises; entrance scholarships, first-year scholarships and prizes at the October scholarship ceremony. See page 113 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.

Graduating Awards

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 1979 Graduation Awards Ceremony.

Business Management Division

Administrative Management
The Bank of British Columbia Award in Administration ($100)
The Finning Tractor & Equipment Co. Ltd. Award in Personnel and Industrial Relations ($250)
The Municipal Officers' Association of British Columbia Award in Public Administration ($100)

Broadcast Communications
The British Columbia Association of Broadcasters' Award

Financial Management
The Society of Management Accountants of British Columbia Awards in Accounting ($200)
BCIT Alumni Association Award in Finance ($100)

Hospitality and Tourism Administration
The British Columbia Hotels' Association Award in Hotel, Motel and Food Services ($100)

Marketing Management
The Vancouver Sun Award in Marketing ($100)
The Dow Chemical of Canada Ltd. Award in Transportation and Distribution Management
The Real Estate Council of British Columbia Awards in Real Estate Management

Engineering Division

Biological Sciences
B.C. Federation of Agriculture Award in Agri-Management ($100)
Agricultural-Chemical Industry of the Lower Mainland Award in Food Production ($100)
The British Columbia Nursery Trades Association Award in Landscape Horticulture ($100)
The Fisheries Association of British Columbia Award in Food Processing ($200)

Building
The Architectural Institute of British Columbia Award in Architecture ($200)

Chemical and Metallurgical
The Chemical Institute of Canada Award in Organic Chemistry
The Wire Rope Industries Limited Award in Pollution Sciences ($100)
The Canadian Institute of Mining and Metallurgy, District Six, Award in Extractive Metallurgy ($100)
The Pressed Metal Products Limited Award in Pollution Science ($50)

Civil and Structural
The Swan Wooster Engineering Company Limited, Col. W.G. Swan Award ($100)

Electrical
The Federal Pioneer Ltd. Award in Power ($200)
The Lenkurt Electric (Canada) Ltd. Award in Telecommunications ($200)
The Electro-Tec Marketers Limited Award in Control Electronics ($100)

Forest Resource
The Council of Forest Industries of British Columbia Award in Forestry ($100)
The Council of Forest Industries of British Columbia Award in Lumber and Plywood ($100)
The Canadian Pulp and Paper Association, Technical Section, Pacific Coast and Western Branches Award in Pulp and Paper ($200)

Mechanical
The Canadian Manufacturers' Association Award in Production ($100)
The Canadian Society of Mechanical Engineering Award in Design

Mining
The Canadian Institute of Mining and Metallurgy, District Six, Award ($100)

Health Division

Biomedical Electronics
The Biomedical Electronics Graduating Award ($100)

Health Data
The Health Record Association of British Columbia Award

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, Ralph Jamieson Award ($100)

Psychiatric Nursing
The Registered Psychiatric Nurse Association of British Columbia, Richard Strong Memorial Awards ($250)

General Nursing
The W.B. Saunders Company Canada Limited Awards

Graduating Prizes

The following prizes were awarded at the 1979 graduating awards ceremony. Prizes are awarded for outstanding achievement in specific courses, high overall achievement or a combination of academic ability and leadership.

Business Management Division

Administrative Management
The Administrative Management Students' Prize ($100)
The Andre Gutfreund Memorial Prize ($150)
Block Bros. Realty Ltd. Prize in Real Estate Management
The West Coast Transmission Company Limited Prize in Management ($100)

Broadcast Communications
The British Columbia Film Industry Association, Jack Gettles Memorial Fund Prize for Creativity in Television ($100)

Computer Systems
The Canadian Information Processing Society, Vancouver Section Prize ($50)

Financial Management
The Certified General Accountants Association of British Columbia Prizes in Accounting
The Dow Jones and Company Inc., Wall Street Journal Prize in Finance
The Financial Executives Institute, Vancouver Chapter Prize ($200)

Hospitality and Tourism Administration
The Bayshore Inn Prize ($150)
The Restaurant & Food Services Association of British Columbia Prize ($100)
The International Food Service Executives Association Prizes ($200)
The Hotel Georgia Prize ($125)
The Hotel Vancouver Prize ($300)
The Renard Hospitality Consultants Limited Prize for hospitality and goodwill ($100)
The White Spot Limited Prizes ($500)

Marketing Management
The Vancouver Transportation Club Prize in Transportation and Distribution Management ($300)
The Block Bros. Realty Limited Prize in Real Estate Management

Operations Management
The Margery A. Smylie Memorial Prize ($100)

Engineering Division

Building
The Clay Brick Association of Canada Prize ($100)
The Royal Institution of Chartered Surveyors, British Columbia Group, Prize in Specifications and Estimating ($50)
P.B. Ford and Company Prize ($100)

Civil and Structural
The Jackson Scaffolding Limited Prizes ($900)
The MacDonald, Dettwiler and Associates Limited Prize in Control Electronics ($100)
The Society of Engineering Technologists of the Province of British Columbia, President's Award of Excellence
The British Columbia Institute of Technology, Mathematics Department, Book Prize

Forest Resource
The Canadian Institute of Forestry, Vancouver Section, Prize in Forestry.

Forest Products
The Canadian Pulp and Paper Association, Technical Section, Pacific Coast and Western Branches Prize in Pulp and Paper ($200)

Mechanical
The Institution of Mechanical Engineers, Western Canada Branch, Commander S.M. Terry Memorial Prize
Bennett Pollution Controls Limited Prize ($50)
The Bingham-Willamette Limited Prize ($200)
The Wright Engineers Limited Prize ($250)
The H.A. Simons (International) Limited Prize ($150)

Surveying
The Corporation of Land Surveyors of the Province of British Columbia Prize

Health Division

Medical Laboratory
The Warner-Chilcott General Diagnostics Prize for General Proficiency ($100)
The Coulter Electronics of Canada Limited Prize in Hematology
The Metropolitan Clinical Laboratories Limited Prize in Biochemistry ($100)
The Metropolitan Clinical Laboratories Limited Prize in Bacteriology ($100)
The Ortho Diagnostics Prize in Immunohematology ($50)
The Sherwood Medical Industries Inc., Lancer Division, Paraplast Prize in Histology ($100)

Nuclear Medicine
The Metropolitan Clinical Laboratories Limited Prize ($100)

General Nursing
The British Columbia Institute of Technology General Nursing Clinical Prizes ($100)

Psychiatric Nursing
The British Columbia Institute of Technology Psychiatric Nursing Clinical Prizes ($125)

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 Division Dean or Registrar believes a student's conduct is such that it is detrimental to the interests of the institute, a recommendation may be made to the Principal to exclude the student from further attendance. The Principal has the final power to suspend or expel a student for disciplinary reasons, subject to the student's right to appeal this decision to a committee designated by the Board of Governors. A student who has been expelled or suspended for misconduct will not be admitted to the institute grounds or buildings.

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

3. If through 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 completing the course. In case of illness or other unavoidable cause of absence, the student should communicate immediately with his department head, stating the cause of absence. Special regulations governing attendance in clinical experience areas are prescribed by the 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.....Dean of Students
Elaine Del Gobbo ..... Registrar
Cindy Boire ..... Secretary to Registrar of Admissions and Systems

Located in the Campus Life Trailer (next to the Student Activity Centre):
Wally Rowan ..... Campus Recreation Coordinator
Derek Swain ..... Athletic Services Coordinator
Karen Ford.....Secretary - Campus Life
Graham Fane..... Student Affairs Coordinator

Located in the Maquinna Residence office:
Val Karpinsky ..... Manager of Student and Conference Housing
Cathy Magistrale ..... Secretary

Located in the Athletic Office (in the SAC Building):
Jim Mitchell..... Assistant Athletics Coordinator Services
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 p.m. during the week and from 10 a.m. to 10 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 Reed Turcotte, produces the orientation newspaper, "BCIT Daze", the student newspaper, "The Link", and the yearbook.

The Student Association offers a wide range of food and beverage services. Our Food and Beverage Manager, Richard Thé, is also willing to cater for large or small groups in the SAC cafeteria.

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 the 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.

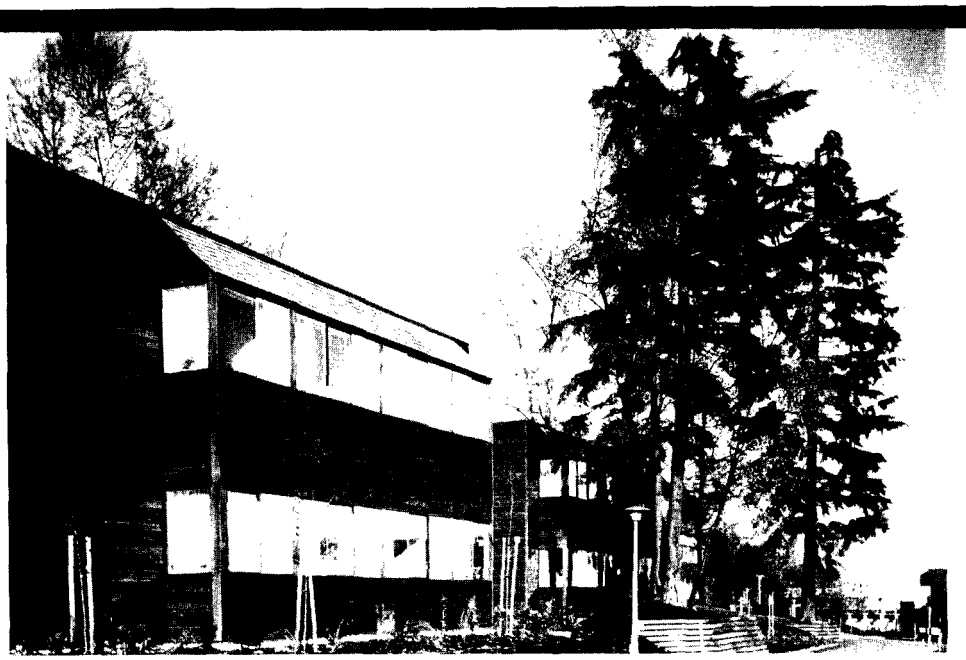
In addition to the spirited Bierfest celebrations in the fall, a beer garden is held from 4:30 p.m. to 10 p.m. Monday to Thursday, 3:30 p.m. to 10 p.m. on Friday, and 7 p.m. to 1 a.m. on Saturday. Dances and other entertainment are scheduled for almost all Fridays and some Thursdays and for these events the pub remains open until 1 a.m. 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, wine-making, 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 campus shops and a used bookstore. See page 131 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 Maquinna Residence which opened in September 1978. Or you may prefer private housing.

New BCIT Residence

Located on campus less than one minute's walk from classes, the Maquinna 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 physicians and nurses 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. No appointment is needed to visit Medical Services except for complete physical examinations. All visits are confidential.

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
Shirley Tempest, R.N., Nurse
Joan Barrett, Receptionist

Counselling

Free confidential counselling services are available to all students or prospective students who wish assistance. In a friendly atmosphere students can discuss a wide range of concerns with trained counsellors and admissions advisors. Career counselling is the centre's focus. Individuals may receive direction in a choice of career fields based on aptitudes, skills and interests. Sometimes personal concerns such as family problems, stress, fear, loneliness, depression, anxiety or personal conflicts will hinder a student's academic progress. Our professionally trained counsellors will help guide an individual through any ups and downs.

Throughout the academic year the Counselling Centre offers special workshops which include programs for women, foreign students and handicapped students. Career search workshops are available for those contemplating a career change or looking for direction.

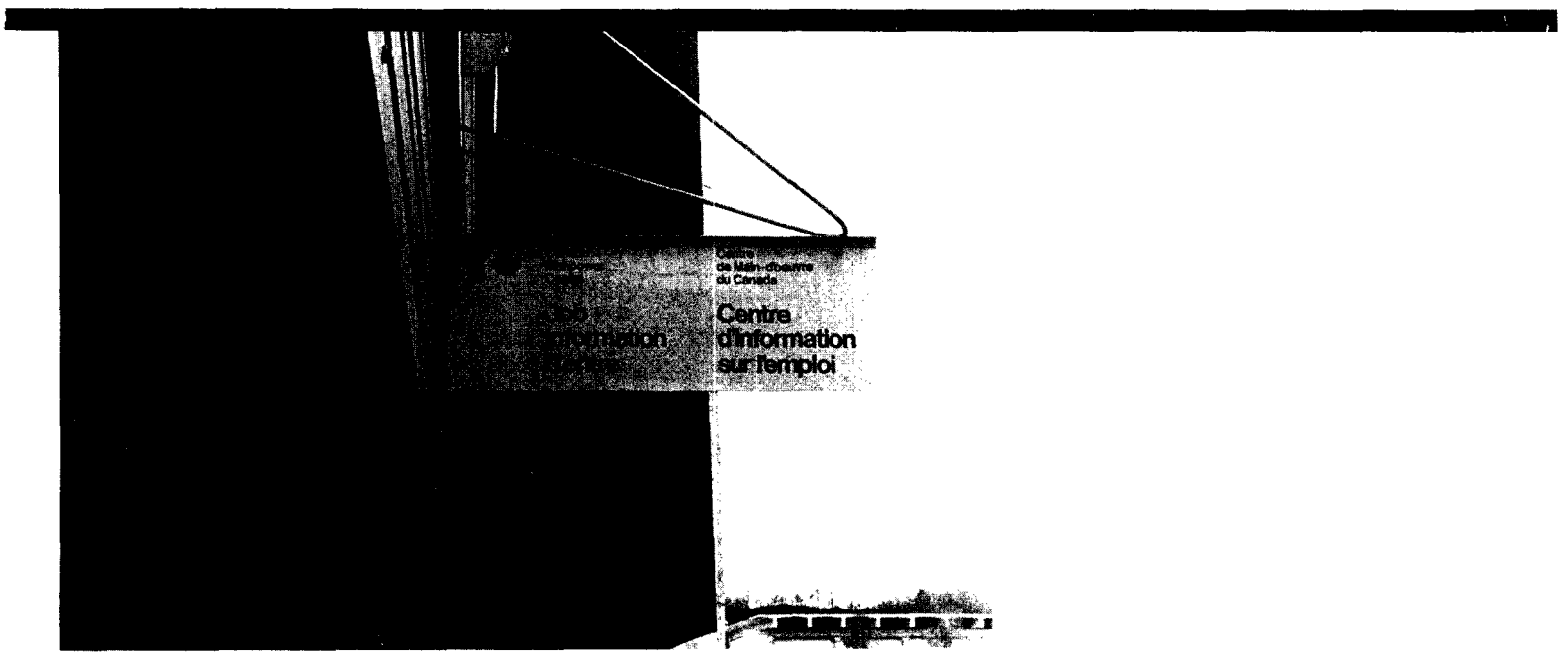
A career resource centre containing resource materials on vocational, educational and personal areas is also available in the BCIT Counselling centre. Included is literature on job opportunitites, employers, college and university calendars, career tapes and audiovisual presentations on BCIT technologies.

If you have any inquiries, drop into D205 of the 2N Building. Appointments are recommended for prospective students and may be made in person or by phoning 434-5734, local 327. Office hours: Monday to Tuesday 8 a.m. to 9 p.m. Wednesday, Thursday, Friday 8 a.m. to 4:30 p.m. June to August hours are 8 a.m. to 4 p.m., Monday to Friday.

Staff

A.S. McLean, B.A., B.S.W., M.S.W., Director
S.R. Gibbs, B.A., P.T.C., M.S.Ed., Counsellor
N.J. Hawkes, B.A., M.Ed., D.Ed., Counsellor
H. Hyde, B.A., M.A., Counsellor
J. Say-Yee, B.A., B.S.W., M.S.W., Counsellor
N.E. Johnson, B.A., M.A., Counsellor
Y. Choate, Admissions Advisor
J. Hunt, Admissions Advisor
C. Lloyd, Admissions Advisor

Placement



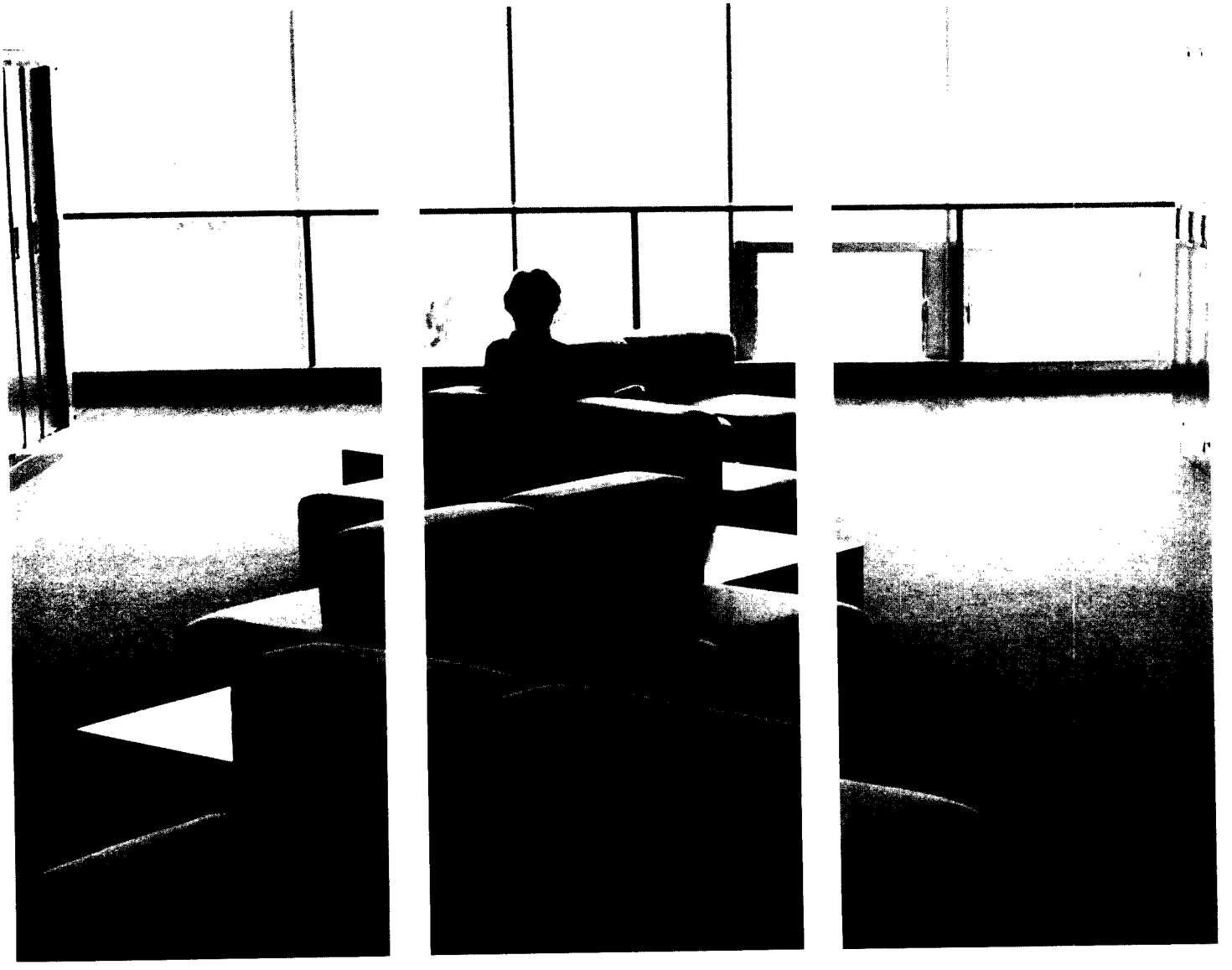
Canada Employment Centre, a placement and career counselling centre staffed by federal government personnel, is located in room D204 of the 2N Building. Hours are 8 a.m. to 4:30 p.m., Monday through Friday, throughout the year.

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.

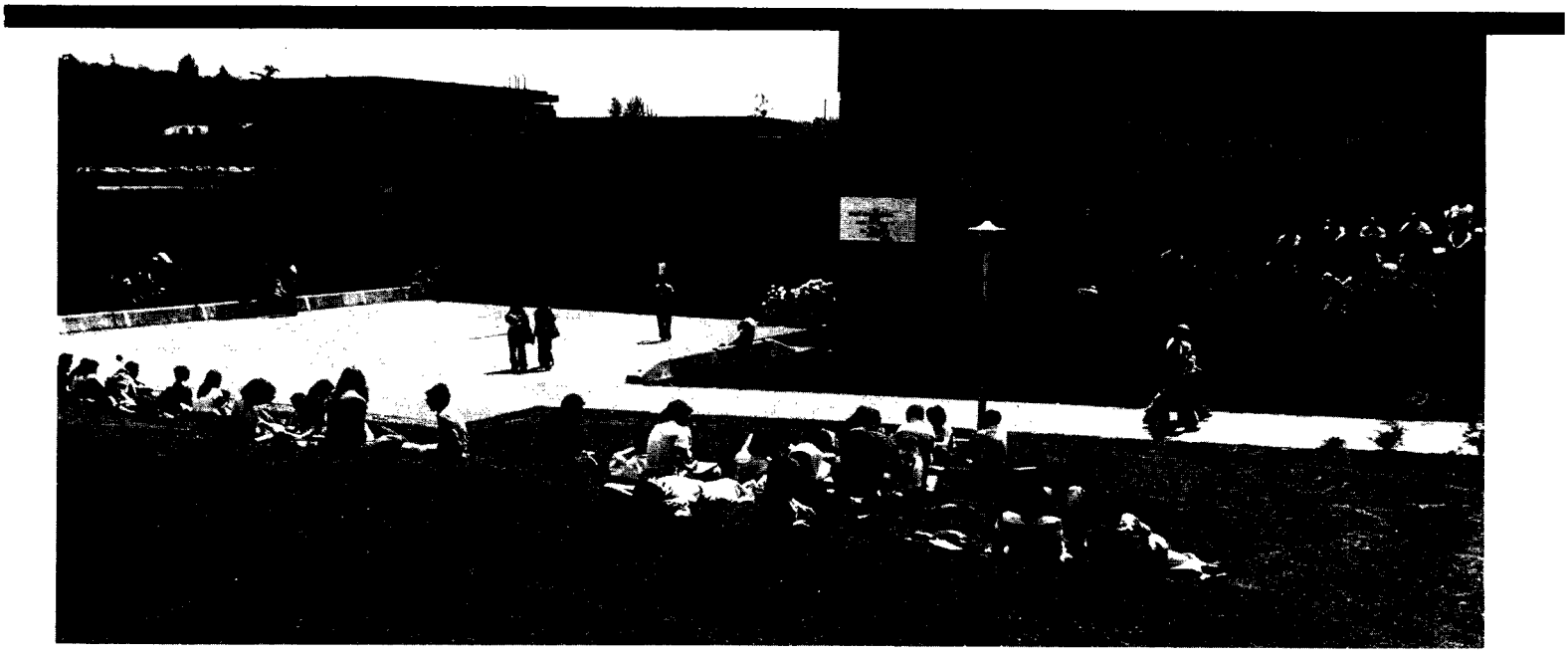
To assist students in developing a career plan and preparing for interviews, a library of current information on companies is maintained. In addition, a counsellor is always available to discuss employment problems, resumés and job search techniques.

Staff

R.D. Forbes-Roberts, Branch Manager
Jacquie Jones, Dipl.T., 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. Growlies, a student-operated cafeteria in the Student Activity Centre, offers a wide variety of salads and custom-made sandwiches. A cafeteria on the ground level of the 2N Building offers hot foods, snacks and refreshments. Service hours are Monday to Friday, 7 a.m. to 3:30 p.m. and Saturday, 8:30 a.m. to 1 p.m. A take-out service the "Road Runner" is located in room 237, second floor of the 1A Building and offers light lunches, snacks and refreshments. Service hours are 7:30 a.m. to 3:45 p.m. and 6 p.m. to 9 p.m. 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 nonprofit basis by the BCIT Student Association, is open from August 15 to September 30. Located in the Student Activity Centre, the bookstore offers used textbooks at substantial savings for the cost-conscious student.

Parking is available for students in unreserved areas on a "first-come, first-served" basis. Student parking lots are located at the east and south side of the campus. Students should not park in staff reserved lots, in spaces reserved for visitors, service vehicles and handicapped persons, in fire lanes, beside fire hydrants, along yellow curbs or on yellow lines on roadways or anywhere else that impedes free traffic flow. BCIT does not accept liability for damage to, or theft from, vehicles parked on campus. Students are encouraged to ensure that vehicles are kept locked and that valuables are not left in them. Handicapped students may apply for special parking privileges by contacting the BCIT Security Department located in portable 2T (local 719). Bus service to BCIT includes the 30 Willingdon, 820 Canada Way and a Special 39 Delta which leaves once per day, Monday - Friday at 7:30 a.m. from the corner of Halifax and Willingdon. (Students should check current BC Hydro bus schedules for any changes).

Lost and Found enquiries should be referred to the BCIT Security Department, Portable 2T.

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 campus store has two outlets on campus; one in the north foyer of the 1A Building and one on the ground level of the 2N Building. The shops sell stationery and school supplies, as well as BCIT souvenir items and confectionaries. The This and That 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.

Chairperson:
Michael C.D. Hobbs
General Manager, Cominco

First Vice-Chairperson:
Barbara J. Rae, M.B.A.
President, Office Assistance

Second Vice-Chairperson:
John E. Leech, Dipl. T., C.E.T.
Executive Director
Society of Engineering Technologists of B.C.

Wayne W. Allen
Senior Executive Vice-President
Bank of British Columbia

Dennis Barkman
President and General Manager
Fraser Valley Broadcasters Limited

George T. Bedwell
Surveying Technology
BCIT

J. Russell Curtis, B. Comm., M.B.A.
Financial Management Technology
BCIT

G. Rex McMeekin, B.Sc., (Chem. Eng.)
Manager, Public and Community Relations
Cominco Limited

Donald B. Rix, M.D., F.R.C.S.(C)
Director of Laboratories
Metropolitan Clinical Laboratories Ltd.

Gordon Rollick, B.Sc.
Student
Administrative Management Technology
BCIT

Robert Simons, Dipl.T.
Product Manager, Toll Options
B.C. Telephone Company

Marie Taylor
Training Manager, B.C. Operations
Simpson-Sears Limited

Paul C. Trussell, Ph.D.
Director, B.C. Research

Hugh B. Weydert
President, International Association of Machinists and Aero Space Workers

Joseph L. Whitehead
President and Publisher
Journal of Commerce

Academic and Administrative Personnel

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

Education
D.J. Svetic, B.A.Sc., P.Eng.,
Vice Principal
D.M. Brousson, B.Sc., P.Eng.,
Dean, Continuing Education and Industry Services
Jos. E. Carver, C.D., B.A., B.L.S.,
Dean, Library Services
B. Gillespie, B.Sc., M.Sc.,
Dean, Core Division
E.M. Iannacone, B.Comm., M.B.A., R.I.A.,
Dean, Business Management Division
Vacant
Dean, Health Division
R.C. Mason, B.A.Sc., P.Eng.,
Dean, Engineering Division

Human Resources
J. Dale Michaels, B.A.(Hons.), B.Sc., M.B.A.,
Vice Principal
G.N. Lloyd, B.Sc., P.T.T.,
Dean of Students
Elaine Del Gobbo, B.A.,
Registrar
A. McLean, B.A., B.S.W., M.S.W.,
Director, Counselling
Barbara Copping, M.D., B.Sc., M.Sc.,
Director, Medical Services
D. Dickson Melville,
Director, Public Relations
Lois Spindler, B.A., M.A.
Director, Personnel/Labour Relations

Administration and Finance
D.M. Macpherson, C.A.,
Vice Principal
R.V. Skulski, C.A.,
Comptroller
R.C.W. Smyth, C.Eng., P.Eng.,
Director, Physical Plant
J.G. Harvey,
Director, Computer Resources
W. Hepple,
Director, Purchasing
E. Schmutz,
Director, Campus Food Services

Institutional Planning
J.G. Johnston, B.Ed., M.Ed., Ed.D.,
Director, Institutional Planning

Calendar of Events

Business Management, Engineering and Health Divisions 1980-81 (proposed)

July 4/80	Term 1 fees due for classes starting Sept. 3/80
Aug. 4	Term 3 fees due
Aug. 25	Orientation Day for 1st year Medical Radiography students
Sept. 1	Labor Day
Sept. 2	Orientation Day for new students (Term 1)
Sept. 3	Term 1 and 3 classes begin
Sept. 5	Hospitality and Tourism Term 3 fees due
Sept. 8	Registration day for Term 1 Medical Radiography students
Sept. 17	Last day to withdraw from classes in order to receive a full refund (less $75 commitment fee)
Sept. 24	Shinerama, Staff Development Day
Oct. 6	Hospitality and Tourism Term 3 Registration/ Orientation and start of classes
Oct. 13	Thanksgiving
Nov. 11	Remembrance Day
Nov. 14	Last day to withdraw from program in order to receive a "W" (withdrawn) on transcript. If withdrawing after the deadline, the transcript will show "F" (failure) for all courses dropped.
Dec. 8-12	Term 1 and 3 exams
Dec. 15 - Jan. 2/81	Christmas Break
Jan. 5	Terms 2 and 4 classes begin
Jan. 9	Deadline for Terms 2 and 4 fees
Mar. 9-13	Spring Break
Apr. 3	Last day to withdraw from program in order to receive a "W" (withdrawn) on transcript. If withdrawing after the deadline, the transcript will show "F" (failure) for all courses dropped.
Apr. 17	Good Friday
Apr. 20	Easter Monday
May. 18	Victoria Day (may be changed by Order in Council)
May 15-22	Terms 2 and 4 exams
June 12	Convocation

General Nursing and Psychiatric Nursing 1980-81 (proposed)

June 13/80	Term 1 fees due for classes starting Aug. 12/80
July 10	Terms 2, 3 and 4 fees due
Aug. 11	Orientation Day for Term 1. Term 2, 3, 4, 5 classes begin
Aug. 12	Term 1 classes begin
Aug. 26	Last day to withdraw from Term 1 in order to receive a full refund (less $75 commitment fee)
Sept. 1	Labor Day
Sept. 24	Shinerama, Staff Development Day
Oct. 13	Thanksgiving
Nov. 5	Term 1 fees due for classes starting Jan. 6/81
Nov. 11	Remembrance Day
Dec. 5	Terms 2, 3 and 4 fees due for classes starting Jan. 5/81
Dec. 8-12	Terms 1, 2, 3, 4, 5 exams
Dec. 22 - Jan. 2/81	Christmas Break
Jan. 5	Orientation Day for Term 1. Terms 2, 3, 4, 5 classes begin
Jan. 6	Term 1 classes begin
Mar. 9-13	Spring Break
Apr. 17	Good Friday
Apr. 20	Easter Monday
May 11-15	Terms 1, 2, 3, 4, 5 exams

Business Management, Engineering and Health Divisions 1981-82 (proposed)

July 10/81	Term 1 fees due for classes starting Sept. 9/81
Aug. 10	Term 3 fees due
Aug. 31	Orientation Day for 1st year Medical Radiography students
Sept. 4	Hospitality and Tourism (Term 3) fees due
Sept. 7	Labor Day
Sept. 8	Orientation Day for new students (Term 1)
Sept. 9	Term 1 and 3 classes begin
Sept. 14	Registration for Term 1 Medical Radiography students
Sept. 22	Last day to withdraw from classes in order to receive a full refund (less $75 commitment fee)
Sept. 23	Shinerama, Staff Development Day
Oct. 5	Hospitality and Tourism Term 3 Registration/ Orientation and start of classes
Oct. 12	Thanksgiving
Nov. 11	Remembrance Day
Nov. 13	Last day to withdraw from program in order to receive a "W" (withdrawn) on transcript. If withdrawing after the deadline, the transcript will show "F" (failure) for all courses dropped.
Dec. 14-18	Term 1 and 3 exams
Dec. 21 - Jan. 1/82	Christmas Break
Jan. 4	Terms 2 and 4 classes begin
Jan. 8	Deadline for Terms 2 and 4 fees
Mar. 8-12	Spring Break
Apr. 2	Last day to withdraw from program in order to receive a "W" (withdrawn) on transcript. If withdrawing after the deadline, the transcript will show "F" (failure) for all courses dropped.
Apr. 9	Good Friday
Apr. 12	Easter Monday
May 24	Victoria Day (may be changed by Order in Council)
May 14-21	Terms 2 and 4 exams
June 11	Convocation

General Nursing and Psychiatric Nursing 1981/82 (proposed)

June 19/81	Term 1 fees due for classes starting Aug. 18/81
July 17	Terms 2, 3 and 4 fees due
Aug. 17	Orientation Day for Term 1. Term 2, 3, 4, 5 classes begin
Aug. 18	Term 1 classes begin
Sept. 1	Last day to withdraw from classes in order to receive a full refund (less $75 commitment fee)
Sept. 7	Labor Day
Sept. 23	Shinerama, Staff Development Day
Oct. 12	Thanksgiving
Nov. 6	Term 1 fees due for classes starting Jan. 5/82
Nov. 11	Remembrance Day
Dec. 4	Terms 2, 3 and 4 fees due for classes starting Jan. 4/82
Dec. 14-18	Terms 1, 2, 3, 4, 5 exams
Dec. 21 - Jan. 1/82	Christmas Break
Jan. 4/82	Orientation Day for Term 1. Terms 2, 3, 4, 5 classes begin
Jan. 5	Term 1 classes begin
Mar. 8-12	Spring Break
Apr. 9	Good Friday
Apr. 12	Easter Monday
May 10-14	Terms 1, 2, 3, 4, 5 exams

Calendar

1980

January

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1981

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August

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September

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October

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November

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December

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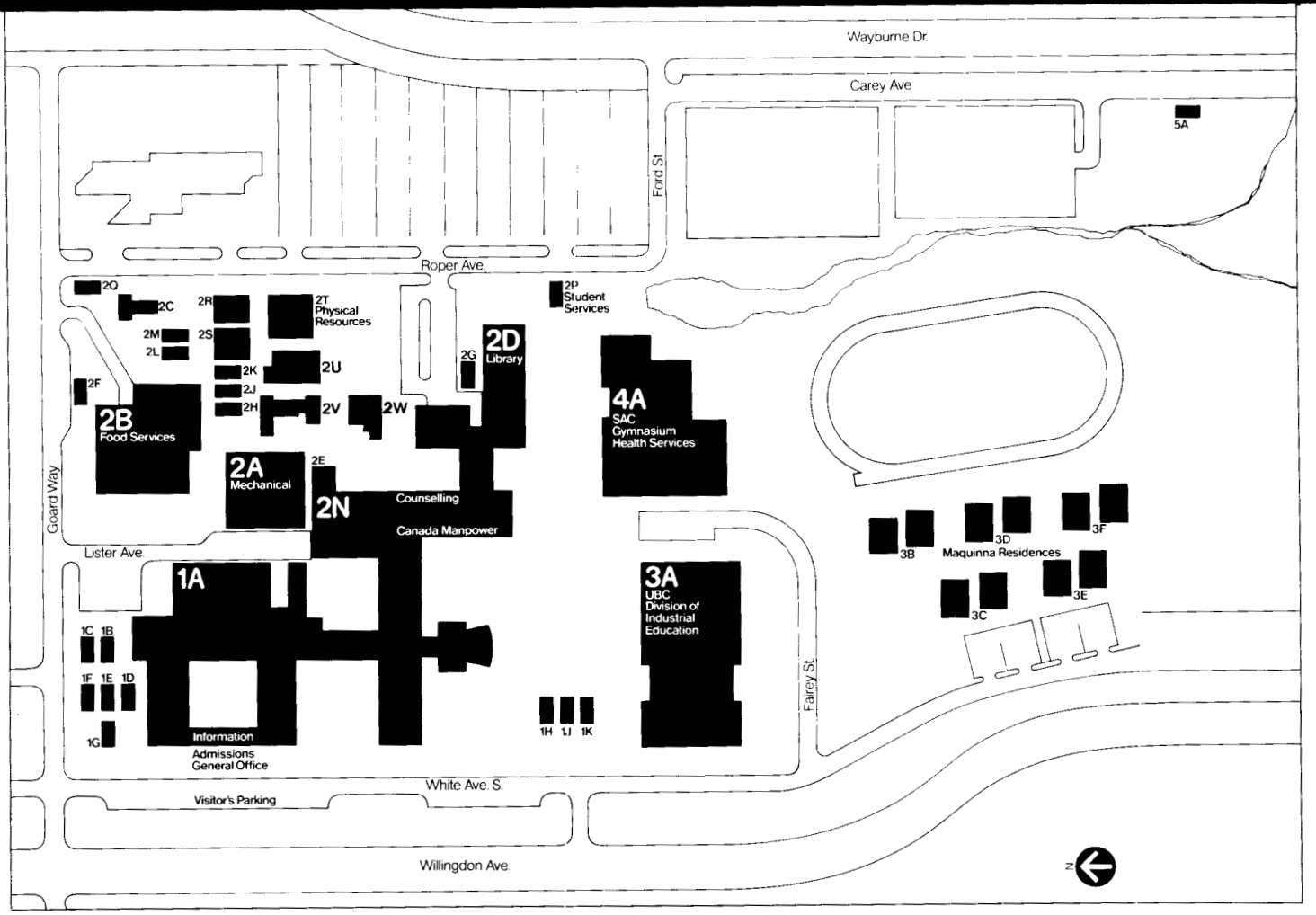
Campus Map



BUILDING IDENTIFICATION

1A	1962/67 Classroom/Laboratory; Administration; Continuing Education
1B	Continuing Education
1C	Continuing Education
1D	Financial Aid
1E	Information Services; Mathematics
1F	Mathematics
1G	Continuing Education
1H	Nursing
1J	Psychiatric Nursing
1K	RN & RPN Administration
2A	Mechanical
2B	Food Services and Training
2C	Greenhouse; Animal Holding
2D	Library; A/V; PEMC
2E	Telephone Exchange
2F	Electrical Sub-station
2G	PEMC
2H	Programme Development
2J	Directed Studies
2K	Food Services
2L	Food Services
2M	Food Training; PVI
2N	1976 Classroom/Laboratory; Computer Centre; Central Stores
2P	Student Services
2Q	Security & Parking
2R	Staff Offices
2S	Classrooms
2T	Physical Resources
2U	Classrooms
2V	Staff Offices
2W	Classrooms
5A	Loggers Sports

The numbering of buildings conforms to the signage system being developed. The system provides the adaptability essential to future building construction and identification.