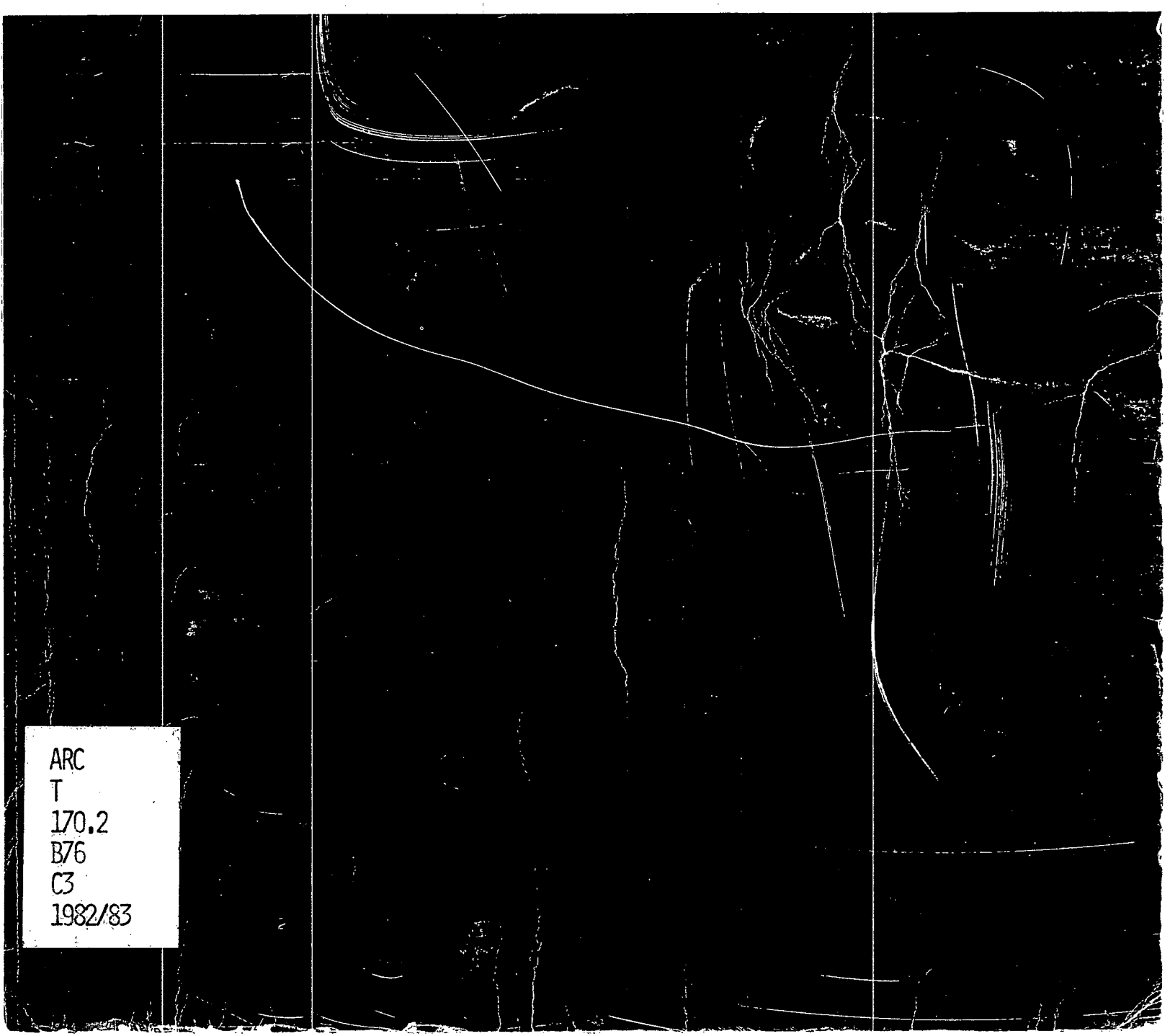
ARCHIVES

BCIT
1982·83



ARC
T
170.2
B76
C3
1982/83

T 170.2 B76C3
1982/83 C.1
A 0 0 0 3 8 2 9 1 9 B

Published by
BCIT Public Relations Department
D.D. Melville, Director

Editor: Trisha Mason
Typesetting and Graphics: Professional Graphics & Translation Ltd.
Photography: Al Maertz
Ken Oxenham, The Link

BCIT
3700 Willingdon Avenue
Burnaby, B.C. Canada
V5G 3H2
Phone: (604) 434-5734

ARCHIVES
M# 111643
c# 382919

Hello!

By looking at this calendar you are expressing an interest in the British Columbia Institute of Technology.

You may be a potential student, the parent of one, or a leader in industry interested in the course content of the various technologies. This publication is designed to guide the student through the program of study which will lead him or her to the acquisition of a Diploma of Technology from BCIT, one of the most coveted credentials in the British Columbia work force. This publication also outlines the thrust of the technological training and provides evidence of the currency of course content for the employer.

Last, but not least, the calendar lists the faculty of BCIT who provide the technological expertise and training. The faculty and its strong desire to remain current is surely the backbone of the Institute, and those instructors, along with the mark made by our graduates, are responsible for the value of a BCIT diploma in the work force.

The courses are intensive and there is much work to be done before obtaining a diploma, but more than 17,000 graduates since 1964 are glad they made the effort. When you think about your own future or, as an employer considering personnel, think about BCIT — The Career Campus.

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

ARC
T
170.2
B76
C3
1982/83

LIBRARY
B.C. INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE
BURNABY, B.C.
V5G 3H2

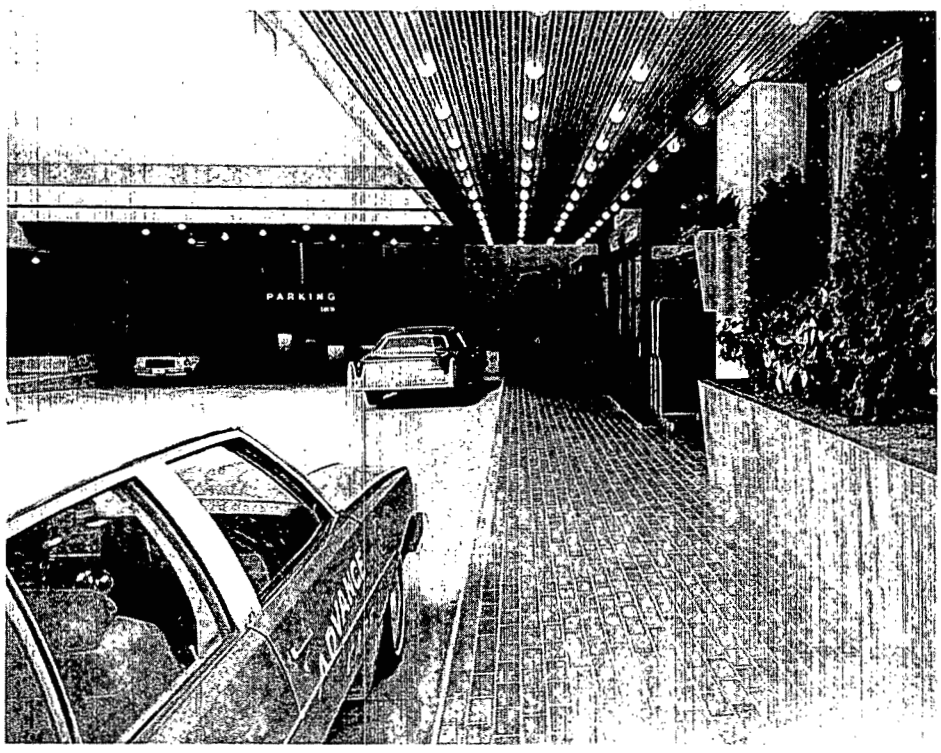
ARCHIVES

1982-83

LIBRARY
B.C. INSTITUTE OF TECHNOLOGY
3700 WILLINGDON AVENUE
BURNABY B.C.
V5G 3H2

Contents

Business Management



Prospective students intending to apply for 1983-1984 business programs should note that Business and Consumer Math 11 will no longer be an acceptable mathematics pre-requisite for Administrative, Marketing, Financial and Operations Management Technologies.

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	Transporation 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	—	—

Year 2	Term 4 cont.			
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 analyzing, 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 analyze 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 applications 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 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, 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.E. Bissell, B.Comm., M.A.
C.H. Chiko, Ph.D.
C. Clark, B.A., M.A.
D. Davis, B.A., M.A., LL.B.
J.P. Dean, B.A., M.A.
C.J. Dickhoff, B.A., M.A. (Econ.), M.A. (Public Admin.), Program Head
R.S. Diggon, B.A., M. Comm.
P. Durkee, B.B.A., M.A.
L.A. Fingarson, B.Comm., Program Head
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., Chief Instructor
L.E. Johnson, B.A., M.B.A., Senior Instructor
L. Jones, B.Sc., M.Sc.
T.P. Juzkow, B.A.Sc., M.B.A., P.Eng., Program Head
A.G. Liddle, M.B.A., Program Head
D. Pepper, B.A., M.Sc., Ph.D.
D. Schram, B. Comm., M.Sc. (Intn. Bus.)
R.M. Sharp, B.A.Sc., M.B.A., P.Eng.
G. Storey, B.A., M.Sc.
N.E. Stromgren, C.D., B.A.
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., Senior Instructor

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. audiovisual 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, television or cable facilities exist.

The Program
Television Production — Concentration is on the production tools of a modern television broadcast station or cable facility. 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 possible is provided in AM and FM radio. Detailed instruction is given in announcing, on-air work, commercial copywriting and production, as well as other areas of radio operations. Students also receive 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 substantial 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 and news aptitude tests 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, just off the north foyer in building A. 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, history and other humanities, as well as current events will also prove of value. The ability to type is essential, with a speed of 25 wpm as the minimum requirement.

Course of Studies

Year 1	Term 1	Radio	TV	Clrm hrs/wk Bdcst. Jrn.
10.111	Economic Issues for Journalists	—	—	3
10.121	Interpersonal Relationships	3	3	—
12.101	Radio Operations	8	—	—
12.102	Introduction to Television	—	12	—
12.103	Radio News	2	—	—
12.105	Industry Organization	2	2	—
12.106	History and Current Events	—	2	—
12.107	Technical Introduction	2	2	—
12.108	Time Management — Entrepreneurial	—	2	—
12.111	Announcing and Current Events	9	—	—
12.113	Introduction to Broadcast News Reporting	—	—	2
12.114	Announcing Introduction	—	—	4
12.115	Broadcast News Writing	—	—	4
12.116	Radio Basics	—	—	2
12.117	Television Basics	—	—	6
12.118	Picture Basics	—	—	2
12.131	Municipal Government for Reporters	—	—	2
12.190	Writing and Sales	3	3	—
31.112	Communications for Broadcasters	4	4	4
	Directed Study and Projects	2	5	6
		35	35	35

Year 1	Term 2	Radio	TV	Bdcst. Jrn.
12.201	Radio Operations	9	—	—
12.202	Introduction to Television	—	15	—
12.204	Photography and Darkroom Techniques	—	1	—
12.205	Industry Organization	2	2	—
12.206	History and Current Events	2	—	—
12.208	Television News	—	2	—
12.209	Theory of Color Television	—	1	—
12.211	Announcing and Current Events	8	—	—
12.213	Introduction to Broadcast News Reporting	—	—	3
12.214	Announcing Introduction	—	—	4
12.216	Radio Newsroom Lab	—	—	6
12.217	Television News Lab	—	—	4
12.220	Computer Systems for Broadcasting	2	—	2
12.232	Government and Politics	—	—	4
12.233	Current News Issues	—	—	2
12.234	**B.C. Broadcast Tour (one week in March)**	**8 hrs/ day for 5 days**	—	**8 hrs/ day for 5 days**
12.290	Writing and Sales	3	3	—
22.212	Statistical Applications to Media	2	2	—
31.212	Communications for Broadcasters Directed Study and Projects	4	4	4
		3	5	6
		35	35	35
12.219	**Practicum (mid April to term end)**	**35**	—	**35**

Year 2	Term 3	Radio	TV	Bdcst. Jrn.
12.301	**Radio (2 week cycle)**	***20**	—	—
12.302	Television Production	—	14	—
12.306	History and Current Events	—	2	2
12.307	Radio News	2	—	—
12.308	Television News	—	4	—
12.309	Color Television Theory	—	1	—
12.310	Television Production Planning	—	2	—
12.311	**Radio Operations (2 week cycle)**	***35**	—	—
12.312	Cablecasting	—	1	—
12.313	Investigative Reporting	—	—	2
12.314	Announcing	—	—	2
12.315	Newsroom Operations	—	—	4
12.316	Radio News	—	—	10
12.317	Television News	—	—	10
12.320	Computer Systems for Television	—	3	—
12.324	**B.C. Broadcast Tour (TV) (one week in October)**	—	**8 hrs day for 5 days**	—
31.312	Advanced Communications for Broadcasters Directed Study and Projects	4	4	4
		2	4	1
		35	35	35

12.319 **Technical Review and Practicum for Second Year TV Students. Starts September, 1982, 4 weeks full-time.**

***This total of 55 hours over 2 weeks averages 27.5 hours per week.**

Year 2	Term 4	Radio	TV	Bdcst. Jrn.
12.401	**Radio (2 week cycle)**	***19**	—	—
12.402	Television Production	—	14	—
12.403	Television Theory	—	4	—
12.404	Film for Television	—	3	—
12.406	History and Current Events	2	—	—
12.407	Marketing Sales and Promotion	2	2	—
12.408	Television News	—	4	—
12.411	**Radio Operations (2 week cycle)**	***34**	—	—
12.413	Newsroom Management and Editorial Policy	—	—	2
12.414	Announcing	—	—	2
12.415	Newsroom Operations	—	—	6
12.416	Radio News	—	—	10
12.417	Television News	—	—	10
31.412	Advanced Communications for Broadcasters Directed Study and Projects	3	4	4
		5	4	1
		35	35	35

12.419 **Industry Practicum for all Second Year Broadcast Students. Last 4 weeks of term.**

***This total of 53 hours over 2 weeks averages 26.5 hours per week.**

Subject Outlines

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

10.121 Interpersonal 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. Camera, lighting equipment, telecine equipment, video switchers, video-tape recording and color. Manual dexterity is developed in the operation of this equipment in a studio and control-room situation. The first term will also include the development of planning and scheduling skills, time management and entrepreneurial skills.

12.103 Radio News — This course is specifically tailored to the radio option and introduces students to the process of gathering and presenting news for radio. The course covers news sources and the role of news in radio programming. Attention is also given to legal questions, including libel and contempt of court.

12.105, 12.205 Industry Organization — A study is made of the history of broadcasting from its first steps through to present-day. The rules and regulations under which broadcasting in Canada is governed

is also covered. The student is introduced to the development of programming, copyright, broadcast systems and management.

12.106, 12.206, 12.306, 12.406 History and Current Events — It is essential that people in broadcasting have as broad a base of external knowledge as possible. This course combines lectures and practical exercises and deals with present-day happenings on the local, regional, national and international level.

12.107 Technical Introduction — Students are introduced to the basics of electricity, magnetism, batteries and other principles which are then applied to the equipment they will be working with. The origin of sound is traced through the entire processing and transmission system to its ultimate reception in the listener's home. The same is done with the sending and receiving of television pictures. This is an elementary introduction to explain "how things work".

12.108 Time Management — Entrepreneurial

12.111, 12.211 Announcing and Current Events — 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, 12.213 Introduction to Broadcast News Reporting — This course deals with the substance of news stories and how to approach the task of reporting for radio and television. Among the topics covered are police matters, the courts, community emergencies, labor negotiations, libel and taste.

12.114, 12.214 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 for reading on air. The course includes consideration of copy formats and editing skills, but its stress is on practice and coaching.

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

12.117 Television Basics — 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 students require for later television newscasting work.

12.118 Picture Basics (Jrn. Option) — This course covers the fundamentals of picture taking, including practical aspects like focus, lighting etc., and creative aspects like how to tell stories with pictures. The course provides the conceptual base for later work in electronic news gathering (E.N.G.) techniques.

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

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

12.201 See 12.101

12.202 See 12.102

12.204 Photography and Darkroom Techniques — This course, which is designed for TV students, concentrates on 35 mm photography in TV stations where the production of slides for news and commercial use is often extensive. Students learn how to take good pictures and to develop and print them.

12.205 See 12.105

12.206 See 12.106

12.208, 12.308, 12.408 Television News — Designed for students taking the Television Option, this course familiarizes students with the basics of newsroom operations, key position and on-air presentation. There is a close liaison between the Journalism Option and the Television Option in the daily presentation of a television newscast.

12.209 Theory of Color Television — This course begins with the psychophysics of human color vision and explains how the eye sees and adapts to colored objects. This theory is then applied to the N.T.S.C. color television system used on this continent. The course then explores how the television system processes the color signal, how to properly set up and match color cameras and how to properly adjust a color picture monitor.

12.211 See 12.111

12.213 See 12.113

12.214 See 12.114

12.216 Radio Newsroom Lab — In a lab situation, students practice news writing, makeup and delivery of newscasts and filing systems operation. Attention is also given to story treatment and developing news judgment.

12.217 Television News Lab — This course trains students to gather, research and edit a news story for television. Practical work on story content and Electronic News Gathering (E.N.G.) techniques are assigned both within and outside of classroom hours. Some attention is also given to television newscast makeup and presentation.

12.219 Practicum — In this four-week practical exercise, students operate a full-time radio station and radio and television newsroom applying and developing those skills that have been acquired over the previous two terms.

12.220 Computer Systems for Broadcasting — 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 and democratic republics.

12.233 Current News Issues — 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 B.C. Broadcast Tour — During the spring term, students will be taken on a one-week tour of interior British Columbia radio stations and 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 (2 week cycle) — 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 full use of studio facilities in the production of television programs, commercials, special events coverage and carrying out on-the-job training projects.

12.306 See 12.106

12.307 Radio News — A weekly seminar on the operation of a radio newsroom for Radio Option students only.

12.308 See 12.208

12.310 Television Production Planning — This course explores the professional techniques involved with scene design, planning and construction and the use of lighting to enhance the mood of the set design. The pre-planning of any television production, and how it affects the work to be done in various departments is also covered in detail.

12.311, 12.411 Radio Operations (2 week cycle) — Daily operational lab experience using the campus radio station as a basis for learning, experimentation and professional development.

12.312 Cablecasting — A vital part of the television system is that of Cable through which many new and innovative program ideas will soon be occurring. This course teaches students to differentiate the philosophy of cablecasting from television broadcasting. It will teach them how to become programmers, working intimately with their community.

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, 12.414 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 Newroom Operations — Strategy of news coverage, file systems, newsroom operational techniques and development of news judgment through lectures and detailed critiques of assignments, provides the theoretical base to go with concurrent lab courses.

12.316, 12.416, Radio News (Lab) — Rotating between outside reporting and inside news desking positions, students 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 (Lab) — Rotating through the list of television newsroom functions during the course of the terms, students undertake tasks directed toward the production of a daily local television newscast.

12.319 Technical Review and Practicum — Starts September 1982—4 weeks full time for Second Year TV students.

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

12.324 B.C. Broadcast Tour — Students travel by bus to TV stations and cable operations in Prince George, Kamloops, Kelowna and Vernon. They are given the opportunity to examine the various plants and learn the stations' policy and philosophy of operation. Assignments, which will demand individual research in each centre to complete, are given to students prior to the tour.

12.401 See 12.301

12.402 See 12.302

12.403 Television Theory — This course explores a variety of topics that are not necessarily equipment oriented, such as types of programs, management, budgeting and automation. These topics are essential reference subjects for a variety of situations a television employee could be engaged in, or should have as reference knowledge.

12.404 Film for Television — Some of the program material presented on television originates on film. This course introduces students to the equipment, techniques and procedures that will enable them to produce creditable films. Super-8 sound filming, basic animation and special effects are also covered in this course.

12.406 See 12.106

12.407 Marketing, Sales and Promotion — The "unseen" and "unheard" broadcaster also enjoys a creative and rewarding career. This course is an introduction to successful salesmanship.

12.408 See 12.208

12.411 See 12.311

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 Industry Practicum — During the last month of final term, students are located in industry positions where they are given the opportunity to observe and often do "hands-on" work.

22.212 Statistical Applications to Media — This course initially examines the elements of descriptive statistics; these comprise techniques for collecting, summarizing and treating data so as to facilitate its use and comprehension. Graphic presentation is emphasized. Forecasting techniques are discussed, as is the construction of basic index numbers, with emphasis on the Canadian Consumer Price Index and its ramifications. The B.B.M. and the Nielsen ratings, opinion polling and station rate cards are also covered in detail.

31.212 See 31.112

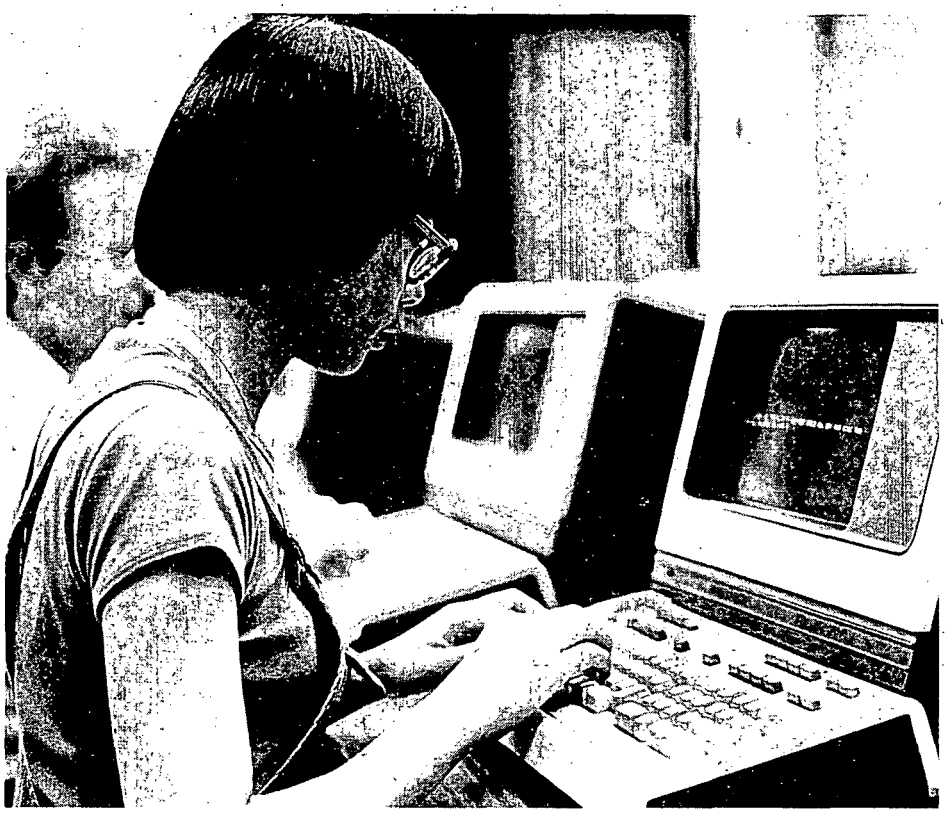
31.312, 31.412 Advanced Communications for Broadcasters — Emphasis in this course is placed upon writing for the media. Sales messages, dramatic scripts, documentaries, news copy and original program proposals are written by the student, who also participates in voice exercises and play readings. To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

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. Antonson, Dipl.T.
H. Dorfman, B.A.
T.J. Garner, B.A., Program Head, Radio
M. Hesketh
K.W. Hughes, Dipl.Ed., Program Head, Television
J.J. Kemp
R. Liepert
B.G. McMaster, B.A., M.A., (on leave)
K.J. Mitchell
P. Munoz
R.H.B. Nason, B.A. (on leave)
B. O'Neill
R. Riskin, Dipl.T.
K. Shaw, Dipl.T.
D.W. Short
W.A. Smith
S. Smolar, B.A.
T. Stacey, B.A. Program Head, Journalism



Computer Systems

The computer has made it possible to store, retrieve and analyze vast quantities of complex information at high speed and has become invaluable as a managerial tool. Computers are 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

Year 1	Term 1	Clrm hrs/wk
10.102	Management I	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

Year 2	Term 3	Infor Syst	Mgt Syst
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	Management II	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 I — An orientation to the nature of business management and the administrative process. Elements of planning, organization and leadership techniques are examined. Study and discussion is undertaken of actual business cases illustrating problems frequently met in industry 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 marco-economic issues in the Canadian economy using theoretical tools of economics. Microeconomic theory is 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 organization, as well as the individual's effect on the achievement of the organization's purposes. Concepts such as leadership, communications, power, authority, change and conflict are examined.

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

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 — This course provides an introduction to the major accounting and financial applications of a business and the techniques used in evaluating and designing manual systems. Topics covered in this course also include charting techniques, forms analysis, control and design, coding structure design and the procedures required to improve a manual system.

14.260 Computer Programming II — This course is a continuation of the Assembler language introduced in 14.160. Topics include base/displacement addressing, table searching and data validation. Introduction to COBOL language using structured programming. Topics include divisions, arithmetic, logic, PERFORM statement, updating disk files.

14.270 Computer Systems II — Introduction to computer systems design and basic systems analysis techniques. Emphasis is on financial applications. Human factors and ethical issues are stressed.

14.296 Business Systems and Procedures II — This course provides an introduction to the major accounting and financial applications of a business and the techniques used in evaluating and designing manual, micro and minicomputer systems. Topics include: data centre and in-house computer systems and conversion of a manual system to a minicomputer.

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. Completion of COBOL language. Students write several programs incorporating a variety of programming techniques.

14.370 Computer Systems III — Continuation of systems analysis introduced in 14.270. Topics include disk storage characteristics, on-line systems and an in-depth study of file organization methods, Sequential, Indexed and Direct.

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 to PL/1 language, including the chief programmer team approach and on-line systems. For a four week period students work on one of the following electives: Additional PL/1, RPG, Additional Operating Systems, PASCAL. Considerable time is spent on a large multi-program system which includes the use of Mark IV. This system is programmed from the design work performed in Computer Systems IV (14.470).

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.

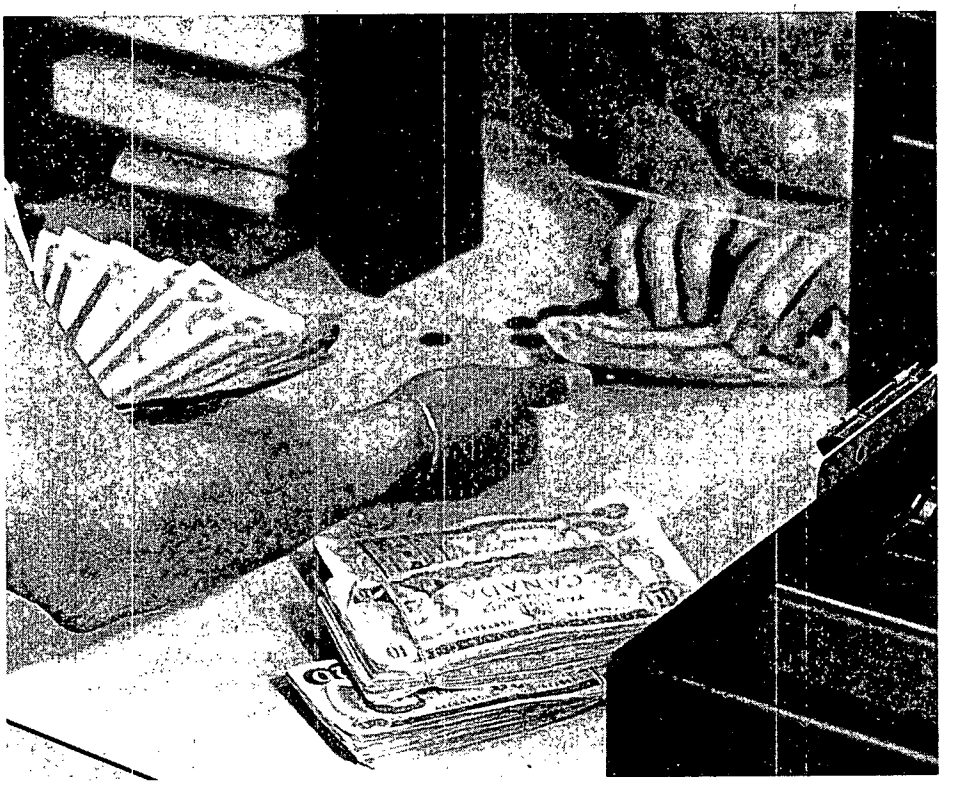
22.434 Management Engineering II — A continuation of 22.334, involving the application of scientific problem-solving techniques used in business organizations. The projects require research and detailed analysis, plus the preparation and presentation of technical reports.

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 are also taught the skills of speaking to small and large groups.

31.214 See 31.114

Faculty and Staff

G.H. Farrell, Dipl.T., M.B.A., R.I.A., *Department Head* (Acting)
P. Abel, B.A. (Hons.), C.G.A., Program Head, 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.
B.A. MacLaren, B.A.
R. McGowan, Dipl.T.
E.N. Newton, B.Voc.Ed.
M. Ramkay, B.Sc.
M. Scriabin, M.B.A., (on leave)
F. Senior, B.A. (Hons.), Program Head
C.P. Simmons, C.G.A.
K. Takagaki, B.A. (Hons.), R.I.A.
M.E. Turner, M.B.A., P.Eng., (on leave)
G.N. Weir, C.D.P.
A.Y.W. Wong, B.A.Sc., M.Eng., P.Eng., Senior Instructor, 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 insurance, accounting or finance.

Job Opportunities
Opportunities in insurance include a variety of positions in underwriting, broking, adjusting and agency operations in the general insurance field. Life insurance companies also require agents and underwriters. Pensions, trusts and financial planning are other possibilities.

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.

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

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, theft, accidents, early death or prolonged old age. The general studies courses in first year are followed by specialized courses in the principles of insurance, claims losses, adjustments, and estate and insurance planning.

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 acccounting.

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.

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

Professional Accreditation
The Certified General Accountants (C.G.A.) and The Society of Management Accountants (R.I.A.) recognize several courses for exemption credits.

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	—	—

Year 2	Term 4 cont.	Acctg	Fin	Clrm hrs/wk Ins
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	—	5	—
16.470	Projects in Industry	4	4	4
16.480	Principles of Insurance	—	—	5
16.484	Estate and Insurance Planning	—	—	4
	Library and Research	4	7	7
		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 analyze 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 invovling 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 costs and benefits; risk and its management; legal framework; major fields of insurance; origins and development of insurance in B.C. and Canada; structure of the insurance industry and its regulations; documentation and re-insurance; automobile, property and casualty insurance; arson and loss prevention.

16.382 Claims, Losses and Adjustments — This course examines insurance claims and adjustments. It consists of legal background, torts and contracts; rights and obligations of parties involved; roles and duties of adjuster and insured; ICBC claim centre operation; independent adjusters and claims departments; policies, conditions, proof of loss, co-insurance and apportionment of loss. Property and Marine claims adjusting are also covered.

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 — How to plan for contingencies of death, disability and retirement. The course includes: instruments of planning; wills; life insurance; pensions; RRSP's; annuities; term, whole life and endowment insurance; Canada Pension Plan; functions, licensing and ethics of agents; actuaries; mortality tables and rate schedules; policy and application; structure and regulation of industry.

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.

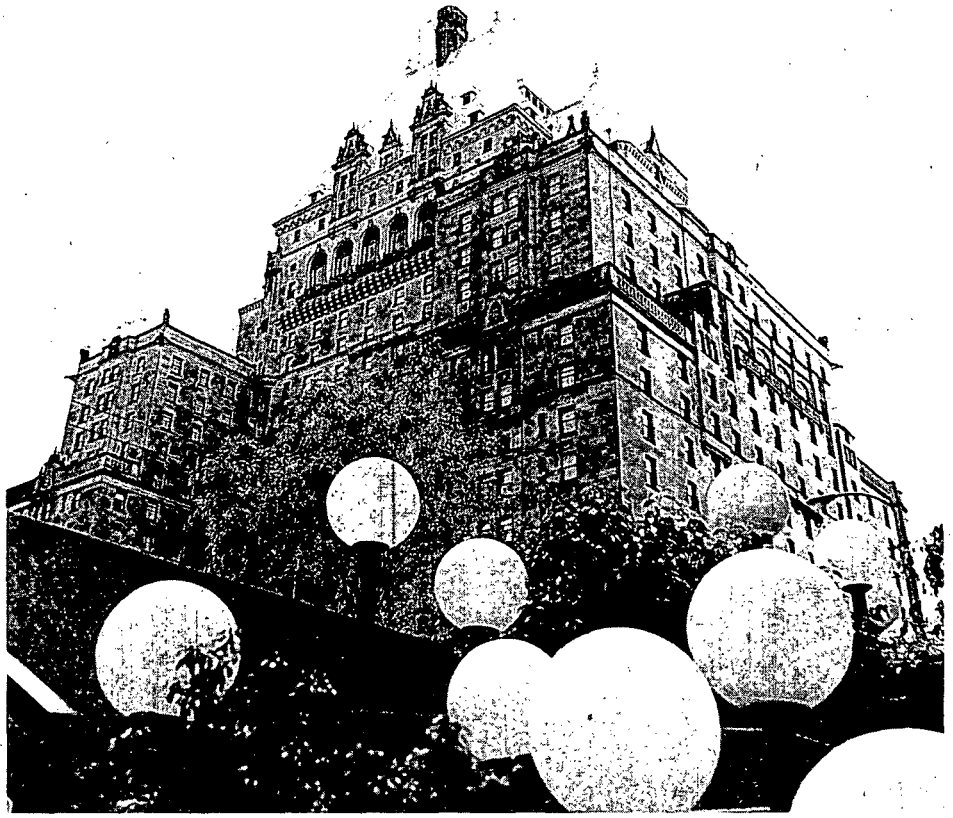
22.216 Business Statistics — Major emphasis on descriptive statistics, including numerical and graphical presentation of data, measures of central tendency and dispersion, elementary probability, index numbers and time series. Introduction to inferential statistics through selected topics such as sampling, 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 to present a report.

31.216 See 31.116

Faculty and Staff

P.J. Woolley, B.A., M.A., F.C.A., *Department Head*
R. Allex, Dipl.T., R.I.A.
R.C. Bell, B.A. (Econ.), C.G.A.
C.M. Briscall, B.Comm., M.B.A., R.I.A., Program Head
D.K. Chan, B.Comm., M.B.A., C.A.
A.D. Cobbett, Dipl.T., M.B.A., R.I.A. (on leave)
J.R.H. Curtis, B.Comm., M.B.A. (on leave)
H. Dick, B. Comm.
R.J. Dolan, B.B.A., M.B.A., Program Head
G.H. Farrell, Dipl.T., M.B.A., R.I.A. (on leave)
K.M. Hamm, B.Comm.
E.M. Iannacone, B.Comm., M.B.A., R.I.A.
R.W. Jackson, M.C.I., Chief Instructor
H.M.J. Lawson, B.Sc. (Econ.), M.B.A.
D.H. Mapleton, F.C.I.
J.C. McAdam, B.A.Sc., M.B.A., P.Eng.
R.B. McCallum, B.Eng., M.B.A., R.I.A., Senior Instructor (Acting)
E.C. McIntosh, B.Comm., C.G.A.
P. Meyer, Dipl. Adult Ed., B.A., M.Ed.
R.C. Nichols, B.Comm., R.I.A., Program Head
C. Priester, F.C.B.A., B.Comm., M.A.
M.F. Thurgood, B.Comm., M.B.A., R.I.A.
C.J. Trunkfield, B.A., M.B.A., F.C.G.A.
H.B. Yackness, B.Comm., M.B.A., C.A., Chief Instructor (Acting)



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 BCIT'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 a C+ standing or better in English 12 and Algebra 11 or Business and Consumer Math 11.

Applicants should be reasonably familiar with the components, and careers available in the hospitality and tourism industry sectors. Preference may be given to applicants with some industry-related practical work experience.

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

Informational meetings about the program and career opportunities in the hospitality and tourism fields, may be offered from February through June. Applicants may also be invited to an interview with a faculty member, and may be required to write a short essay outlining their reason for applying to the Hospitality and Tourism Technology. Applicants should specify on the application form whether they wish to take the Hotel, Motel and Food Service Option or the Travel and Tourism Option.

Course of Studies

Hotel, Motel and Food Service

		Clrm
Year 1	**Term 1**	hrs/wk
10.116	Economics	3
16.140	Accounting	5
16.145	Credit and Collections	4
18.102	Food and Beverage	5
18.111	Oral Communication Skills	2
22.118	Business Mathematics	4
31.118	Business Communication	4
	Library and Research	8
		35
Year 1	**Term 2**	
10.216	Economics	3
14.050	Introduction to Data Processing	3
16.240	Accounting	5
18.201	Rooms Operations	4
18.202	Food and Beverage	5
18.203	Front Office Machine Posting Practicum	1
22.218	Basic Management Engineering	3
31.218	Business Communication	4
	Library and Research	7
		35
Year 2	**Term 3**	
18.300	Work Practicum	—
18.302	Food and Beverage Management I	2
18.305	Food Production and Service I	6
18.313	Food and Beverage Cost Control	4
18.316	Human Relations	2
18.325	Marketing and Sales Promotion	5
18.330	Tourism Plant Design	4
18.331	Introduction to Tourism	3
22.318	Business Statistics	4
	Library and Research	5
		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	6
18.413	Hospitality Industry Accounting	4
18.416	Human Relations	2
18.418	Front Office Accounting	2
18.425	Marketing and Sales Promotion	5

Year 2	Term 4 cont.	Clrm hrs/wk
18.450	Term Project	4
	Library and Research	7
		35

Travel and Tourism

Year 1	Term 1	Clrm hrs/wk
10.116	Economics	3
16.140	Accounting	5
16.145	Credit and Collections	4
18.111	Oral Communication Skills	2
18.131	Introduction to Travel	4
18.132	Packaged Vacations	3
22.118	Business Mathematics	4
31.118	Business Communication	4
	Library and Research	6
		35

Year 1	Term 2	
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	7
18.235	Travel Geography of N. America	3
22.218	Basic Management Engineering	3
31.218	Business Communication	4
	Library and Research	5
		35

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

Year 2	Term 4	
18.400	Work Practicum	—
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 analyze 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

18.102, 18.202 Food and Beverage — Background of industry; sanitation; meal planning and menu preparation; selection of foods; purchasing methods; principles of food preparation; equipment layout and specifications; service of foods; menu writing; administrative requirements; organization of the catering department. The course also covers the development of basic skills, attitudes and knowledge required for the identification, handling and cooking of food items found on a restaurant menu; care and handling of tools and restaurant equipment; preparation of stocks, soups, sauces, seafoods, meats, vegetables and specialty items. Also includes an industry practicum. Cocktail lounge operations, including the care and handling of glassware, types of beverages, dispensing devices, inventory procedures and practical mixology sessions are also covered.

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.

18.131 Introduction to Travel — The objective of this course is to introduce students to the basics of the travel and tourism industry, i.e. terminology, abbreviations, travel geography, reservations, procedures, use of reference books, tariffs and rules. Tourism organizations and travel legislation in B.C. are also covered. This course is a prerequisite for 18.233 and 18.234.

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

18.201 Rooms Operations — This course covers front office organization and psychology; materials, equipment and supplies; rooms salesmanship; reservations; registration and front office accounting for various size hotels; handling of cash and credit transactions; processing accounts; housekeeping organization and duties; control forms; supplies and equipment; specifications for purchasing equipment and linen; laundry operations.

18.202 See 18.102

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

18.233 Transportation Facilities and Schedules — Successful completion of 18.131 is a prerequisite. Major emphasis is

placed on transportation modes with special passenger interests, reflecting on historic beginnings to present-day passenger uses. Travel by train, bus and ship is covered as well as by private automobile and U-drive. Passenger terminals are visited and their role examined.

18.234 Air Travel — Successful completion of 18.131 is a prerequisite. The objective of this course is to train the student in the practical use of the commonly used tariffs. The ability to research correct tariffs, tied in with routings and pertinent rules for air travel within Canada, transborder and the U.S. as well as worldwide, will be developed. This course is a prerequisite for 18.334.

18.235 Travel Geography of N. America — The objective of this course is to familiarize the student with the geography of North America. Particular emphasis is placed on the realities of tourism and tourism's requirements, offerings and facilities.

18.300 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 preparaton 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 preprequisite for 18.426.

18.330 Tourism Plant Design — A study of language in the building and construction fields, as related to physical design; blueprint reading elements and design interpretation; zoning and municipal bylaw conformity; fundamentals of building, room design and esthetics; building maintenance and preventative maintenance factors; use of color, light and sound in themes and atmosphere.

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 a prerequisite. Based on the theories of 18.234, this course covers practical application through regular staffing of an on-campus travel and tourism information and booking office; computerized reservations and ticketing and follow-through of practical labs. Also includes an update of new and different airline offerings, specialized fares by regular IATA carriers and offerings by Canadian and U.S. carriers.

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 Accounting and Controls for the Travel Industry — 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.

18.400 Work Practicum — During the first month of Term 1, Year 1, each student receives a "**Passport to Travel and Tourism Wisdom—Proof of Internship**". The objective of the practicum is to provide each student with a minimum of 500 hours of proven work in the industry. They will each work at least 40 hours in each of the following areas: office, sales, tourist counselling, airport and hotel. Passport entries will be made by employers and checked by instructors.

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, mechancial 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 and Sales — 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 docu-

mentation 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.

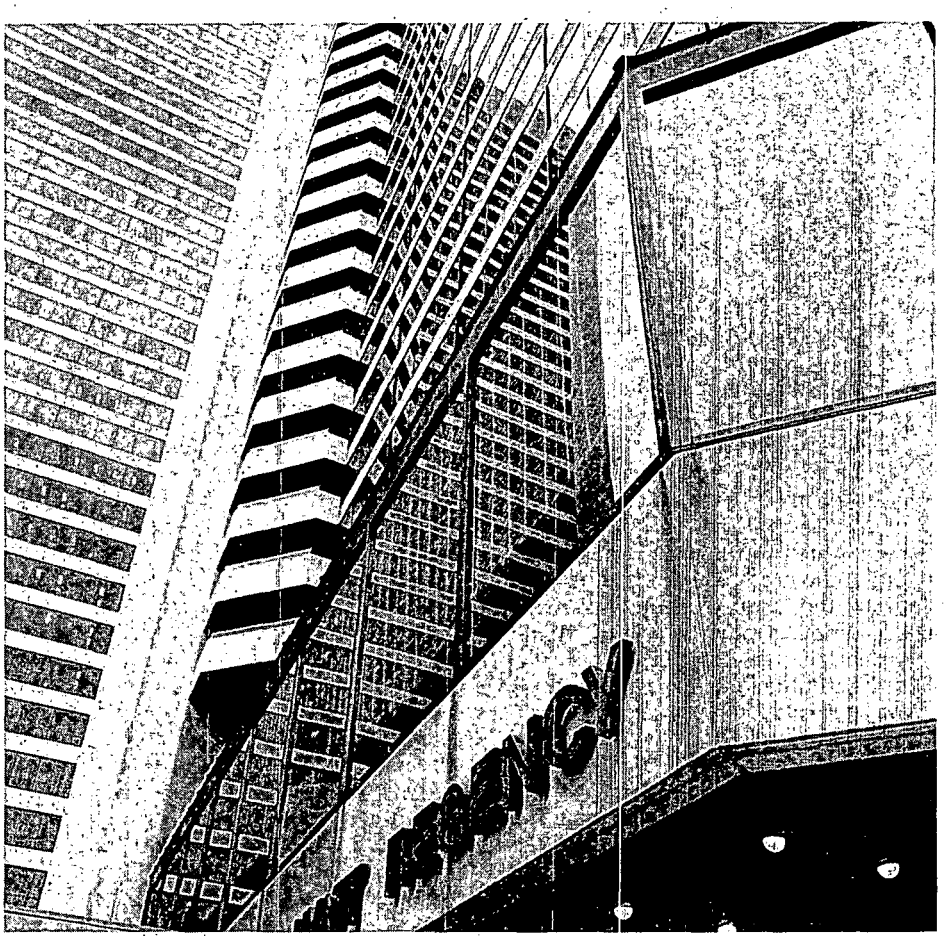
22.318 Business Statistics — Major emphasis on descriptive statistics, including numerical and graphical presentation of data, measures of central tendency and dispersion, elementary probability, index numbers and time series. Introduction to inferential statistics through selected topics such as sampling,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

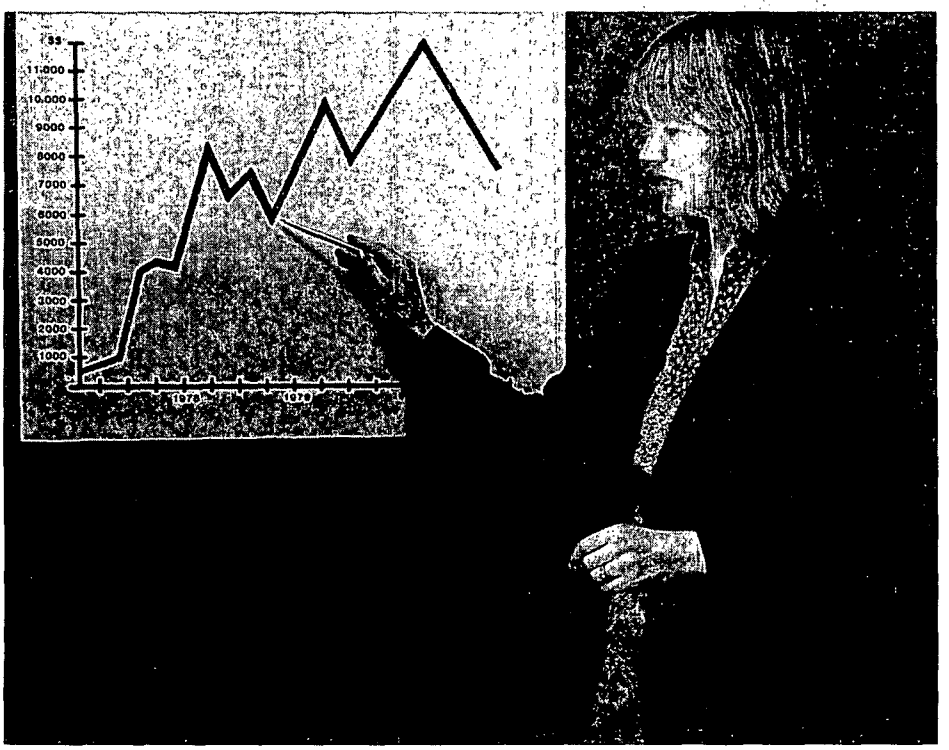
31.118, 31.218 Business Communication — This is an applied business communications course which concentrates on techniques and applications of written and spoken business communications. The discussion topics, explanations, illustrations and assignments are related as closely as possible to the hospitality 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., *Department Head*
R. Agon
R.A. Brett
E.J. Cooke
F.N. Daniels
B. Ellsworth
B.J. Fernandes
K.F. Krueger, Program Head
L. Lous
C. Morelli
R. Oliver
P.F. Renner, Dipl.Ad.Ed., Dipl.Couns.Psy., M.A. ED.
R. Schlyecher, Program Head
G.J. Wilson (on leave)





Marketing Management

The marketing executive determines the needs of potential customers, explores the possibilities 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. 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.

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

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 four options: Marketing Management, Real Estate Management, International Business, or Advertising and Sales Promotion. Courses in the **Marketing Option** give students a thorough background in both retail and industrial businesses. 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 of foreign market opportunities. Students in the **Advertising and Sales Promotion** Option will develop creative communication skills.

Students who successfully complete the first year of Marketing Management are eligible to enter the one-year Transportation and Distribution Management program offered through the Operations Management Technology. For details, refer to the appropriate page of this calendar.

Prerequisites

Graduation from the Selected or Combined Studies Program with a C+ in 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 will be selected by requested option.

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

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

Marketing Management

Year 2	Term 3	
10.387	Business Law	3
16.342	Marketing Management Accounting I	5
20.310	Small Business Development	4

Year 2	Term 3 cont.	Clrm hrs/wk
20.322	Marketing Management	4
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
20.411a	Retailing	2
20.411b	Merchandising	2
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	4
		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 Management	4
20.351	Propery Management	3
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 Management	4
20.451	Appraisal — Real Property	3
20.482	Marketing Research	3
20.490	Directed Studies	6
	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	Clrm hrs/wk
10.467	Personnel Administration	4
10.487	Business Law	3
16.442	Marketing Management Accounting II	5
20.422	Marketing Management	3
20.462	International Marketing Management	4
20.463	Financing International Trade	3
20.482	Marketing Research	3
20.490	Directed Studies	6
	Library and Research	4
		35

Advertising and Sales Promotion

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
20.372	Industrial Marketing	3
20.373	Advertising and Sales Promotion Management	4
20.374	Principles of 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
20.375a	Advertising Creative	2
20.375b	Media Planning	2
20.411a	Retailing	2
20.411b	Merchandising	2
20.422	Marketing Management	3
20.482	Marketing Research	3
20.490	Directed Studies	6
	Library and Research	3
		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 analyze 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 I and II — 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 Small Business Development — All the planning stages involved in starting a new business are covered including market, financial and legal feasibility requirements. Major emphasis in this course is placed on preparation of a business plan.

20.322, 20.422 Marketing Management — This course integrates the planning, analysis and control functions in marketing from a managerial viewpoint. Through computer-assisted and experimental learning tools, the decision-making responsibilities of the marketing manager are examined. Examples of managerial activities considered include the influence of business policies, use of market research, demand analysis in a competitive environment, cost analysis, market planning and development.

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.

20.350, 20.450 Real Estate Management — The real estate function includes law, estates and interests in land and the personal and business management decision process. The economic characteristics of urban real estate and the market, city growth and development, locational factors in influencing the determination of land use and ownership, institutional lenders, the mortgage market and the functions of the real estate agent, salesman and appraiser are covered. This is a credit course recognized by the Real Estate Council of British Columbia and the Department of Real Estate Studies at UBC. It exempts the student entering the real estate brokerage business from the salesman's prelicensing course.

20.351 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 the complex purchase process faced by a company in selling to industry, government and institutions. Alternative distribution and pricing strategies are considered. Emphasis is placed on understanding the bourgeoning industrial base in British Columbia.

20.373 Advertising and Sales Promotion Management — This course identifies the factors involved in carrying out advertising plans from the viewpoint of clients, agencies and media organizations. The anatomy of advertising plans is examined, with primary focus on the development, execution and control of total campaigns. Emphasis is placed on organizational considerations, developing advertising budgets, objectives and strategies for both creative design and media planning, the implementational stages and the campaign support functions of sales promotion.

20.374 Principles of Advertising and Sales Promotion — This course examines the evolution and functions of advertising and sales promotion within the contexts of society and the business system. The topic is surveyed rigorously, with consideration being given to its application in the fields of retailing, wholesaling, manufacturing, professional and industrial activities.

20.375a Advertising Creative — Provides a practical insight into the implementation of creative strategies. The use of freelance creative resources is discussed, illustrating the means by which the manager may translate creative concepts into publication or broadcast-ready material. In a practical sense the course will concentrate on developing copywriting skills for the individual student.

20.375b Media Planning — Emphasis is placed on development and execution of the media plan. Close contact is maintained by the students with the agency media buyers and other industry factors to ensure a practical direction to the course. Quantitative media planning techniques are evaluated in light of the most recent computer applications. The main objective of this course is to provide marketable skills in media planning and buying to qualify students for career entry consideration in the advertising agencies.

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

20.411a 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.

20.411b Merchandising — 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.

20.422 See 20.322

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 estage, 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 Management — 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.

20.463 Financing International Trade — This course covers the various financing methods in both import and export situations. Documentation requirements are thoroughly covered. Students become familiar with the operations of foreign exchange markets and methods of financing foreign investments.

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.

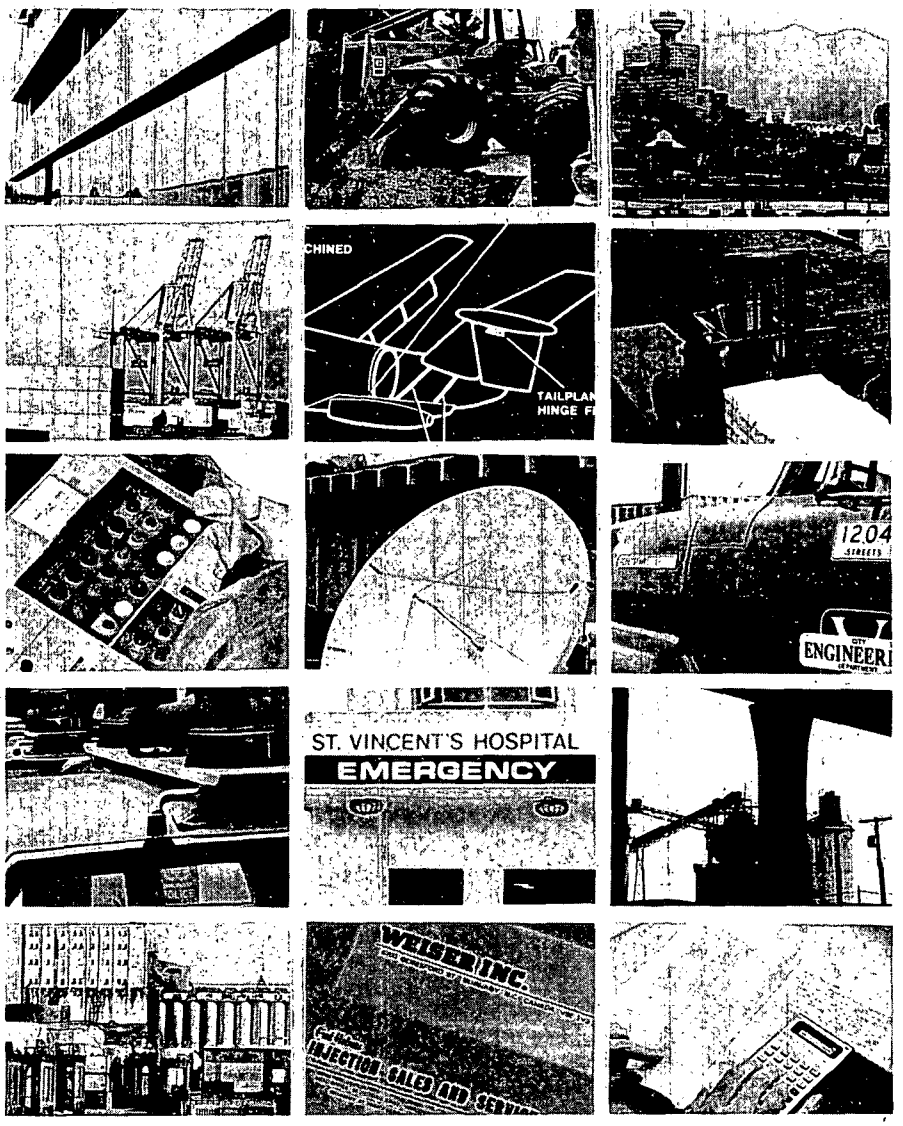
22.320 Management Engineering — The scientific approach to problem-solving, with particular application to business enterprises. Topics include method study, systems and procedures, charting and analysis, forms design and control, work distribution, layout, planning and scheduling, work measurement and 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

R.W. Vandermark, B.A., *Department Head*
G.H. Abbott, B.Comm., M.B.A. Chief Instructor
P. Cherry, B.Comm.
D.K.N. Chowdhury, B.Sc., M.B.A.
D.F. Clark, B.Comm., M.B.A.
J.O. Hicks, R.I. (B.C.), F.R.I.
G.T. Jacob, B.A. (Hist. & Econ.), B.A. (Bus. Admin.), M.B.A., Program Head, International Business
G.S. Rees, M.B.A.
M.I. Shacker, B.A., Program Head, Marketing Management
D.D. Ulinder, B.Sc., (U.L.E.) Program Head, Real Estate Management
R.A. Venne, B.Comm. (Hons.Econ.), M.B.A.
W.A.E. Walley, B.A.
J. Welch, B.Comm.
T. Winder, B.A., M.B.A., Program Head, Advertising and Sales



Operations Management

In today's changing world managers must be flexible and well equipped with the skills necessary to appreciate and understand rapidly developing technologies. The Operations Management program has been designed with this in mind.

With the emphasis on management, problem-solving, computer applications, planning communications, decision-making and interpersonal skills, graduates will acquire the tools necessary to manage and solve problems in a complex environment.

Job Opportunities

Operations Management graduates can choose from a variety of dynamic, highly paid management careers in:

operations management
production inventory control management
cost accounting management
systems management
project management
methods improvement management
distribution management
health care facilities management
management consulting
materials management
transportation management
purchasing management
quality control management
industrial engineering management

Graduates find career opportunities in a variety of industries and institutions including:

manufacturing
mining
forestry
construction
warehousing and distribution
food
health care
transportation
government

Students who successfully complete the first year of Operations Management are eligible to enter the one-year Transportation and Distribution Management program offered by the Operations Management Technology. For details, refer to the appropriate page of this calendar.

Prerequisites

Graduation from the Selected or Combined Studies Program with Algebra 11 or Math 11. This requirement may be waived for mature students on approval of the Department Head. Individuals applying to the Operations Management program should ask themselves the following questions:

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

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

Year 2	Term 3 cont.	Clrm hrs/wk
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 analyze 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.

10.228 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 is 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 are illustrated and practised with an H.P. minicomputer operating interactively. Elementary computer programs are written and tested on the computer. Use of flow-charting and elementary data processing systems design will illustrate the achieving of data processing objectives.

16.142 Introduction to 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 is also dealt with.

20.115 Market Research — Familiarization with the basic approaches to market research. Lectures and workshop sessions will emphasize data gathering techniques, the analysis and intepretation 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 Operations Management — A study of the business firm with respect to its organization and functions. Emphasis is placed on how the operations management graduate will fit into the organization. This is 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, students will have gained 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 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 are used to practise these skills. There will be approximately 10 assignments each term; each assignment is 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 is 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

B.R.M. Morrow, B.Comm., *Department Head*
C. Chan, M.B.A.
B. Curtis, M.B.A., Chief Instructor
S.E. Dudra, B.Comm., M.B.A.
F.L. Gruen, B.Mgt.Eng., M.A.Sc., Chief Instructor
P.R. Harrison, P.Eng.
K.C. Hartley, B.A.Sc., P.Eng.
A.S. Lee, B.Eng., P.Eng., M.Ed.
J.E. Lloyd, M.Ed., P.Eng.
E.Y. Maitland, B.A.(Hon.)
D.W. Malcolm, B.Sc.
D.J. Mallory, B.A.Sc., M.A., Ph.D.
E. Mason, B.A.Sc., P.Eng.
J.A.I. Millette, B.A., M.Ed.
G.W. Murray, Dipl.T., Program Head
H.T. Pevecz, Dipl.T., B.Econ.
J. Ribic, B.I.E.
W.J. Sheriff, B.A., B.Sc.
L.A. Smith, Dipl.T., C.A.M.
C.V. Spong, Dipl.T.
J. Young, B.Sc., M.B.A., P.Eng.

Operations Management
Transportation and Distribution Management Option

The Operations Management Technology offers successful first year Business students the opportunity of acquiring those skills necessary to operate within a rapidly developing area of business — namely Transportation and Distribution Management.

This **one-year** program emphasizes systematic analysis for cost reduction or control within an organization, while increasing its customer service and strengthening its market position through a more effective distribution system.

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

Effective September, 1982 a full two year program will be available through the Operations Management Technology to students wishing to enrol directly into the Transportation and Distribution area of study. For further information contact the Operations Management Department.

Job Opportunities

Graduates in Transportation and Distribution Management become involved with the *buying and selling* of transportation and ancillary services.

Graduates wishing to pursue a career in **Transportation Management** become involved with the *selling* of transportation and ancillary services.

Transportation companies or carriers operate the modes/vehicles that transport commodities and passengers. These modes, which include airlines, railroads, pipelines, highways and marine transport, may be operated for public use or by a company for its private use.

Career opportunities with transportation companies cover sales and marketing, operations, procedures, stores, claims, rates, analysis, administration and terminal management.

Also within the scope of "sellers of the service" are the ancillary services performed by freight forwarders, customs brokers, export-import agents, consultants, groupage agents and tariff bureaus.

Graduates wishing to pursue a career in **Distribution Management** become involved with *buying* transportation and ancillary services. Their responsibilities within retail, wholesale manufacturing industries cover freight expenditures on inbound and outbound goods; selection of carriers; analysis of transportation costs; rate negotiation; tracing; expediting; claims procedures; arranging exports and imports; selection of plant sites; warehousing; in-plant transportation; managing company fleets; packaging; material handling; distribution studies; stores; purchasing; and inventories.

Prerequisites

Transfer into the Transportation and Distribution Management Option is permitted under the following circumstances:

— completion of comparable first year courses at any community college or university.

or

— completion of the following first year BCIT Business Division technologies: Operations Management, Administrative Management, Financial Management, Marketing Management.

and

— permission from the Department Head.

Course of Studies

		Clrm hrs/wk
Year 2	**Term 3**	
10.360	Business Law	3
14.052	Computers in Transportation	4
20.323	Sales Management	4
20.382	Marketing Research	4
22.370	Management Engineering	3
22.371	Modes of Transportation and Distribution	7
22.372	Transportation Economics	3
22.374	Transportation Regulation	3
	Library and Research	4
		35
Year 2	**Term 4**	
10.460	Business Law	3
10.467	Personnel Administration	3
16.443	Management Accounting	4
20.482	Marketing Research	3
22.471	Distribution Management	4
22.474	Traffic and Transportation Management	4
22.476	Principles of Importing and Exporting	4
22.479	Transportation Trends	6
	Library and Research	4
		35

Subject Outlines

10.360, 10.460 Business Law — A study of the 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.

10.460 See 10.360

10.467 Personnel Administration — This course is designed to provide students with an opportunity to experience and learn about cause-and-effect human relationships within a business environment. The course involves the study of individuals, groups and organizations from a managerial and personnel administrative point of view. Emphasis is placed on involvement and simulation techniques as the keys to understanding management of the human resource.

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: a review of basic information given in *Introduction to Data Processing*; control systems which cover computer systems employed in the day-to-day operations of a transportation system and 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.

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 reports, accounting aids for sales and production management, measuring managerial performance, direct costing and the contribution approach.

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. An examination of sales research, planning, organization and analysis is also made. The course finishes with a discussion on sales management ethics.

20.382, 20.482 Marketing Research — The purpose of this 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 also be examined.

20.482 See 20.382

22.370 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 transportation and distribution management.

22.371 Modes of Transportation and Distribution — This course introduces students to the various ways and means of moving commodities, including the methods and equipment employed by air, highway, pipeline, rail and water carriers. The requirements of the distribution department are also discussed and students are shown the relationship between the purchasing function and correct inventory management. The course ends with an examination of the industrial sales function as it relates to the distribution concept.

22.372 Transportation Economics — This course provides students with an understanding of the relationship of economic concepts and the applied economics of transportation, specifically the economic aspects of the costing of transportation. Students gain an understanding of the various procedures used in costing transportation. Each mode of transportation is analyzed to show the importance of economics in relation to the movement of goods and people. Outside factors must be considered by transport operators, 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.

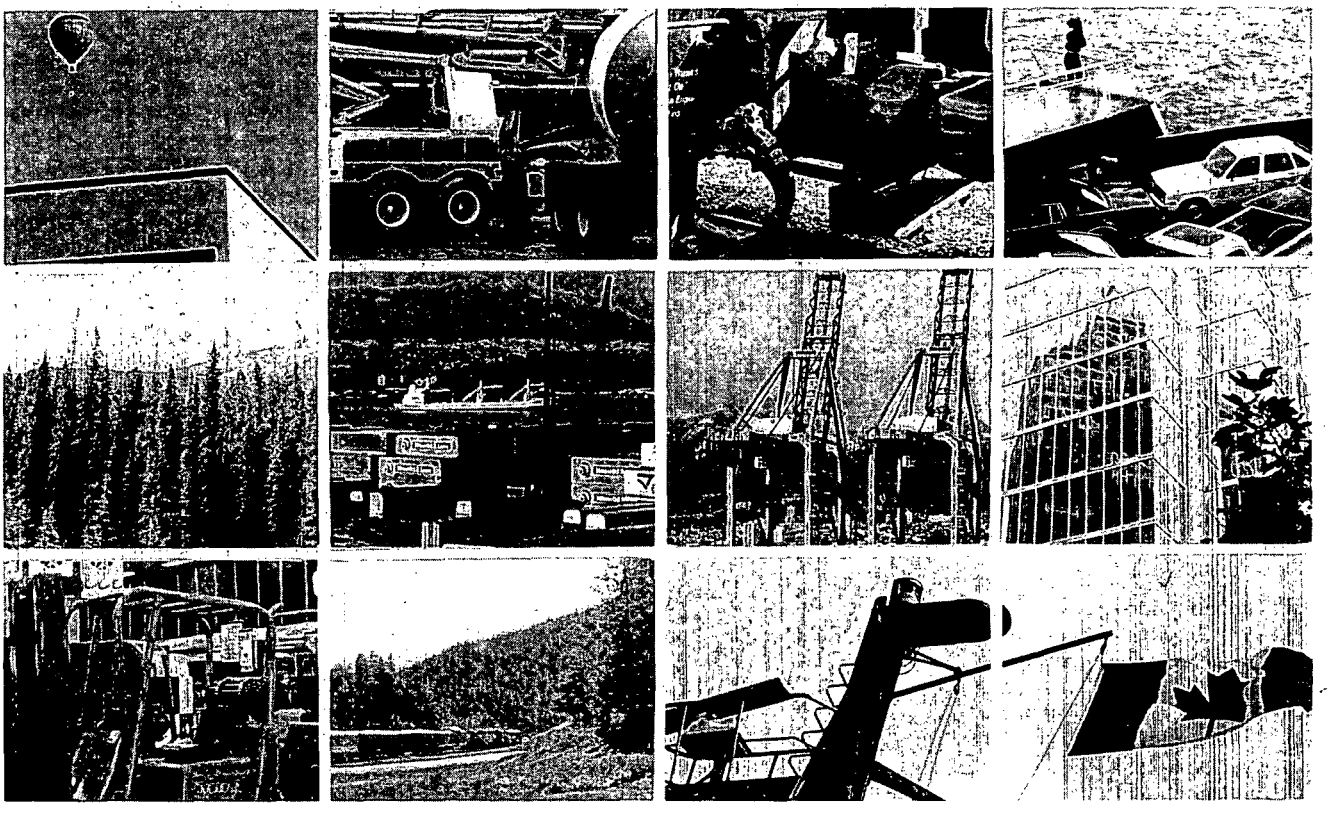
22.374 Transportation Regulation — This course provides students with an understanding of the regulations governing Canadian transportation. The course covers transportation law and its application to British Columbia, Canada, the Pacific Rim trading community and world trade. Students study the various regulations as they apply to the carriage of goods and people as a service, and affect users of the service.

22.471 Distribution Management — This course, which is a continuation of 22.371, gives students a perspective on the role and contribution that distribution functions provide in the whole business picture. It also gives them an understanding of how distribution functions operate within an organization, an appreciation and understanding of the cost factors that supporting functions contribute to the total economic structure, and the knowledge to become well-informed business decision-makers. An overview of the Total Distribution Concept forms the core of the course. Areas of study include logistics, locational analysis, customer service, order processing, computer applications and distribution economics.

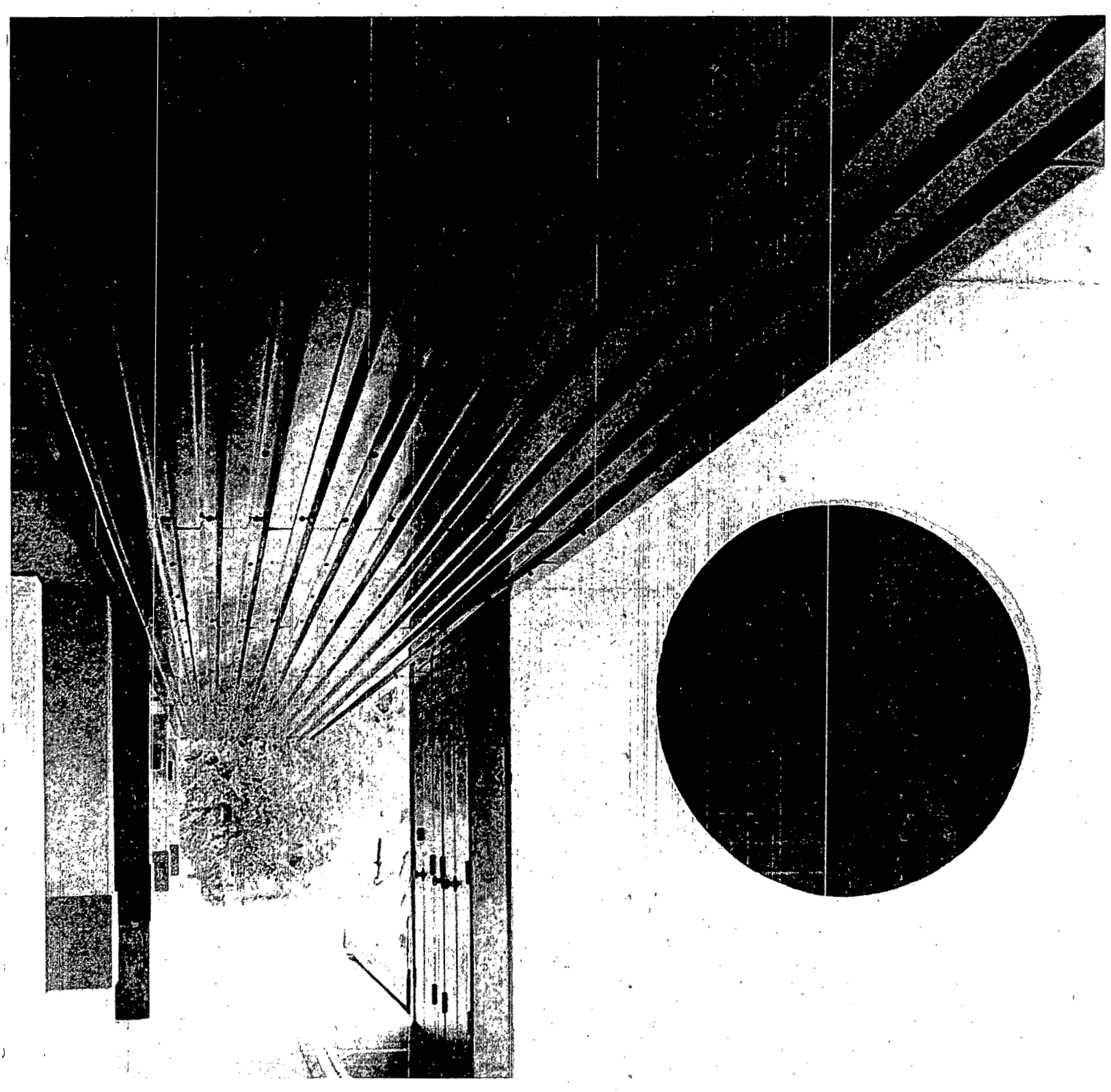
22.474 Traffic and Transportation Management — The first part of this course provides a continuation of 22.374 by covering those factors necessary for a comprehensive practical knowledge of transportation. Students are introduced to the various types of freight tariffs and learn how to deal with freight claims. The course also covers an introduction to marine insurance and the various agencies involved in transportation regulation and deregulation in the USA, with application to shippers and receivers in Canada. The second part of this course, which deals with transportation from the carrier's point of view, looks at the following topics: the effect of regulation and deregulation on the operator, competition, route structure, ownership patterns, pricing and ratemaking, control and organization, the operations department, carrier marketing, public relations and advertising, equipment selection, finance and credit, labor relations and collective bargaining, location of transport operations.

22.476 Principles of Importing and Exporting — The emphasis in this course is placed on the import and export of commodities and their importance to Canada. As well as a study of the rules and regulations necessary for international shipments, students also examine how techniques are developed for the movement of goods throughout the world. The practical approach is emphasized. During this course the intent is to assist students to understand the complexities and terminology of international trade and international trading activities at home and abroad.

22.479 Transportation Trends — Six hours of the student's timetable have been allocated to a major project. The project is chosen by the student and has to be in the area of transportation, distribution or international trade. It can cover either economic studies, problem solving or feasibility studies. Projects are carried out under the guidance of assigned faculty members.



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 before they proceed to one of three options: Food Processing, Food Production or Landscape Horticulture.

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

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.

Math 12 is only acceptable if taken prior to 1978

Course of Studies

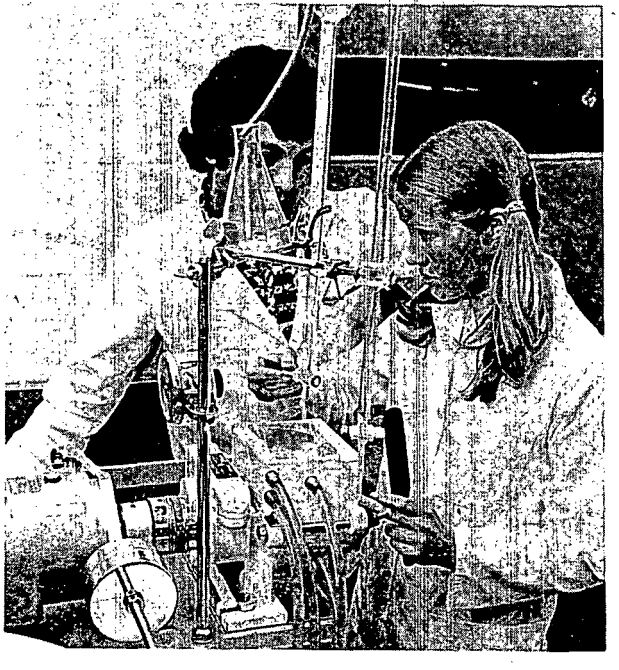
Biological Sciences Program

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



Food Processing students acquire a thorough knowledge of food preservation techniques 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.

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.

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.

		Clrm hrs/wk	
Year 2	**Term 4**	**4A**	**4B**
10.403	Management I	4	—
32.444	Computing	4	—
43.456	Instrumentation	—	6
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
	Library and Research	5	5
		36	34

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**
10.203	Management I	—	4
30.217	Applied Chemical Principles	6	—
31.244	Technical Communication	3	3
33.202	Physics for Biological Sciences	5	5
40.244	Landscape Drafting	3	3
44.253	Introductory Botany and Soils	6	6
44.263	Horticulture I	4	5
51.205	Introduction to Surveying	3	3
	Library and Research	5	5
		35	34

Year 2	**Term 3**	Clrm hrs/wk
31.344	Advanced Technical Communication	2
40.344	Landscape Drafting	3
44.343	Landscape Mechanics	5
44.363	Horticulture II	6
44.364	Nursery Crop Production	6
44.366	Landscape Techniques	5
44.367	Advanced Plant Identification	3
	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 Practices	6	6
44.466	Landscape Techniques	6	6
44.468	Supervisory Practices	4	—
44.481	Soil Technology	5	5
45.412	Silviculture and Forest Nurseries	—	4
	Library and Research	5	5
		35	35

Management in Agriculture (Agri-Management) Program

Year 1	**Term 1**	
10.103	Management I	3
10.113	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**
10.213	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

Year 2	**Term 3 cont.**	Clrm hrs/wk
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**
10.483	Personnel Management	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

10.103, 10.203, 10.403 Management I — An orientation to the nature of business management and the administrative process. Elements of planning, organization and leadership techniques are examined. Study and discussion of actual business cases, illustrating problems frequently met in industry and requiring managerial analysis, decision and action will be undertaken.

10.113, 10.213 Economics — The aim is to develop an understanding of the organization and operation of the Canadian economy. Students analyze 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.

10.203 See 10.103

10.213 See 10.113

10.403 See 10.103

10.483 Personnel Management — The Personnel Management course provides students with an opportunity to experience and learn about cause-and-effect human relationships within a business environment. Individuals, groups and organizations are studied from a managerial and personnel administrative point of view and heavy emphasis is placed on involvement and simulation techniques as the key to effective understanding of management of the human resource.

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; depart-

mental and branch operations; consolidations.

16.240 See 16.140

20.105 Agricultural Business — The objective of this course is to introduce the application of business skills to agribusiness 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 illustrate the practical problems of agri-business.

22.110 Business Mathematics — A 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 is placed 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, hypotheses testing and simple linear regression.

22.344, 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.

22.444 See 22.344

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 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 skills learned in the lecture. Students will write informal and formal reports, letters, resumés and memos, and will give at least one oral presentation each term.

31.244 See 31.144

31.344 Advanced Technical Communication — In two hours of lab sessions each week, students practice, under supervision, typical kinds of engineering communications such as letters, memos, reports, proposals and meetings. Some assignments are carried out jointly with various biological sciences courses. The equivalent of one short writing assignment per week is 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 computing, using the BASIC language: flow charting; input-output statements, branching, looping, sub-scripted variables, subroutines; applications from the Biological Sciences Technology.

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. Measurements, data analysis, experimental techniques and report writing are stressed.

33.202 See 33.102

40.244 Landscape Drafting — Elements of landscape structural details relative to concrete slab on grade, foundations, curbs, driveways, walks, retaining walls, stairs and pools. Basic drafting, as applied to above.

40.344 Landscape Drafting — Continuation of 40.244. Elements of landscape structural details relative to post and beam, masonry and concrete roof decks. Drafting, as applied to above.

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; and the occurrence and flow of water under and above ground. By means of a project, the student learns to assess runoff flows through hydrological methods, designs a retaining dam for a recreational site complete with inlet and outlet flood-control structures, and estimates quantities for construction purposes.

43.456 Instrumentation — An orientation course for the Food Processing Option covering the principles and practices of instrumentation; measurement of pressure, level, temperature and flow; and an introduction to negative feedback and automatic control systems.

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

44.122 Biology — A study of the principles underlying living phenomena, including the organizational attributes of living matter. Evolutionary development is traced from one-celled organisms to higher plants and animals. The economic importance of various classes of plants and animals is included.

44.150 Agricultural Concepts — An overview of agricultural production in British Columbia, including terminology types, areas, size and trends. Business and management principles as applied to agriculture. A brief exposure to government and marketing board involvement in agriculture. Information on farm-related businesses which supply and support the agricultural producer.

44.201 Food Processing — The nature and packaging of foods; an introduction to the principles and processes of canning,

freezing, dehydrating, fermenting and pickling; food additives. Experimental portions 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 significant to food processing for the purposes of differentiation and classification. Maintaining high bacteriological standards in processed foods. Shelf-life studies. Spoilage control. Food fermentations. Assessing microbiological test results and report writing to management.

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 food production, including basic plant science with reference to plant morphology and physiological processes; soil science with reference to soil classification and soil development; animal science with emphasis on general production and marketing.

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 Horticulture I and II — The principles of environmental control and plant response. Plant growth regulators. Genetic principles pertinent to ornamental horticulture. Basic greenhouse and plant propagation techniques. Principles of plant taxonomy and nomenclature. Recognition and use of woody species found in the landscape.

44.290 Agricultural Marketing — This course examines the marketing of agricultural products, from farm gate to final consumption. Includes the collection, transportation, storage, processing, distribution, financing and merchandising of food products, as well as government involvement, marketing boards, auctions, and marketing strategies of service and supply firms.

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.

44.303 Nutrition for Food Processing — A study of the nutrients found in food, their importance, metabolic function and dietary requirements. The selection of diets to meet varied nutritional needs. The relationship of nutrition and health. Nutritional labelling. The effect of processing on the nutritional quality of foods.

44.311 Quality Control — An assessment of food quality. Responsibilities and organization of a quality control department in the food industry. Statistical procedures for sampling. Federal and provincial government regulations. An introduction to tri-stimulus colorimetry, and the measurement of color in foods.

44.312 Introductory Food Analysis — An introduction to the theoretical and practical aspects of sampling and sample preparation. The proximate analysis of foods and livestock rations. An introduction to carbohydrate and protein chemistry with selected analyses, using the best equipment available.

44.341 Mechanics of Machines — Basic mechanical principles of food processing and agricultural equipment. Power transfer devices. Introduction to electrical power. Fluid mechanics as applied to pumping systems. Equipment lubrication and construction materials. Heat transfer. Psychrometrics.

44.343 Landscape Mechanics — A study of basic engineering principles of landscaping and nursery crop equipment. Landscape irrigation and drainage. Greenhouse systems.

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. Application of various plant culture techniques in crop production, with reference to representative cereals, forages, vegetables, small fruits and tree fruits grown in British Columbia.

44.363 See 44.263

44.364 Nursery Crop Production — Field and container culture of nursery plants. Nursery stock specifications. Site selection and layout. Growing structures and equipment.

44.366, 44.466 Landscape Techniques — History and principles of landscape design. Inventory of client requirements. Site analysis. Preparation of working drawings, bidding and contract documents.

44.367 Advanced Plant Identification — A continuation of the plant identification studies begun in Horticulture I and Nursery Crop Production, with particular reference to the species and cultivar level. The use of plants in the landscape. Students must present a plant collection as part of the course requirement.

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 — Business organization methods used by farm and agricultural businesses. Management applications in agriculture: goal setting, planning, resource acquisition, staffing, coordinating, controlling, monitoring the operation. Use will be made of available farm business management programs. Computer applications in agriculture. Applying knowledge in many areas to learn effective decision making.

44.392 Agricultural Business Law and Taxes — Major aspects of law and taxation as they affect agricultural producers and supply and support businesses. Property and income taxes, estate planning, laws of contract. Federal and provincial laws affecting agriculture in areas such as labor and expropriation. How to obtain and analyze information in the fields of law and taxation.

44.393 Agricultural Business Finance and Appraisal — Capital and credit in farm business administration, including sources of agricultural funds, analysis and appraisal of commercial farms, analysis of financial statements, discussion of financial controls on the farm and in related businesses, and the use of capital budgeting.

44.394 Summer Technical Report — Students prepare and present a technical report on a phase of agricultural management experienced during the 12 week practicum. Financial and decision making aspects are emphasized.

44.401 See 44.301

44.402 Process Analysis — This course acquaints students with the basic engineering aspects of the unit operations encountered in food processing. The engineering principles of raw material operations, conversion and preservation operations are covered, together with materials handling and plant design. Lab sessions involve experimentation, demonstration and problem solving.

44.411 Quality Control — The sensory evaluation of food; facility design; selection of taste panels; statistical analysis of data; laboratory measurement of consistency and texture of foods; recording and reporting with control charts; and evolutionary operations.

44.412 Food Analysis — An introduction to the chemistry of fats and oils. Practical laboratory analysis of lipids, vitamins, and minerals using the latest equipment available.

44.413 Agricultural Analysis — An introduction to the chemistry of fats and oils, with selected analyses of lipids. A practical training in soil analysis, plant analysis and fertilizer analysis using the latest equipment available.

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

44.415 Enzymatic Analysis — An introduction to the use of enzymes to perform specific determinations of a variety of food constituents with great sensitivity and specificity. This is a relatively new and promising analytical tool. A high quality, ultra-violet spectrophotometer is used in this course.

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. Tractor components and maintenance. Spraying systems. Irrigation and drainage systems. Tillage and harvesting systems. Introductory environmental control. Animal waste management.

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. Currently recommended pesticides 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 Practices — Maintenance practices, estimating, project programming. Landscape construction, planting procedures and use of materials.

44.466 See 44.366

44.468 Supervisory Practices — This course provides an understanding of effective supervisory practices and of organizational behavior. Knowledge of labor laws, legal and tax information and government regulations is gained as well as management of resources for improved performance.

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

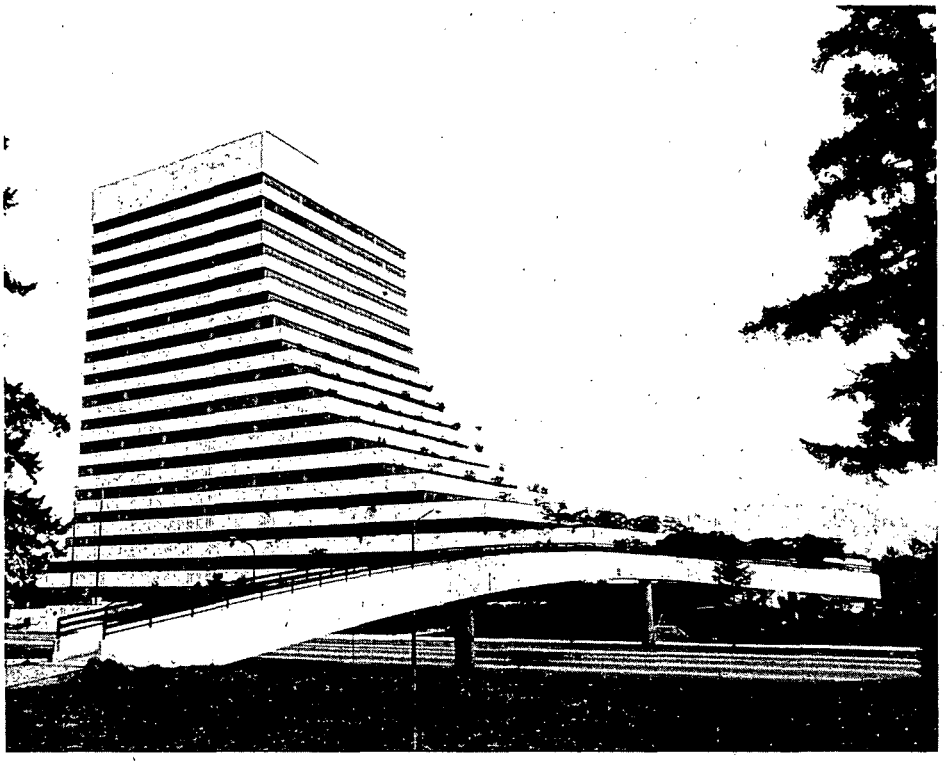
44.495 Crop and Livestock Management — The principles involved in management of crops and livestock. Optimizing production through application of knowledge and analysis of alternatives. Livestock disease prevention, recognition and treatment. Knowledge of good production standards will be acquired.

45.412 Silviculture and Forest Nurseries — An introduction to silviculture as practised in B.C., with emphasis on artificial regeneration of disturbed sites, using planting stock. A review of stock types used in the regeneration process, their characteristics and methods of production, and an analysis of the field conditions under which each might be used.

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.Sc., P.Ag., *Department Head*
S.B.J. Andersen, B.A., Chief Instructor
R.S. Berry, B.S.A, P.Ag.
K.G. Cummings
J.T. Gillingham, B.S.A., M.Sc., Ph.D.
R.N.E. Hargreaves, Dipl.T., 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., Chief Instructor
J.H. Muir, B.S.A., P.Ag., Chief Instructor
S.M. Murray, B.Sc. (Agr.)
B.E. Rothe
J.K. Soutter, H.D.F.T.



Building

Spiralling advances in technology have increased the public's expectation of their communities and the buildings constructed within them. Structures are expected to be managed and constructed to rigorous standards of workmanship and safety while at the same time incorporating all the features which contribute to speed of erection and financial efficiency. The construction industry is one of the major employment fields in Canada, turning over the largest dollar volume of business in the country.

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

Job Opportunities

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

With experience, graduates become senior drafting personnel, job captains, specification writers, estimators or contracts managers, building inspectors, officials in property management departments, appraisers and assessors, partners in construction organizations and technical representatives for building supplies and equipment manufacturers. Many graduates will become estimators with general and sub-trade contractors, preparing bids and checking job costs and progress. 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 testing and balancing mechanical installations.

The Program

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

First year courses are common to all students and, in addition to English, math and physics, include various basic technological subjects. 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 by doing 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 specialized 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 **Mechanical 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 some of the examinations in their syllabus of studies for articled students.

For those students 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.

Math 12 is only acceptable if taken prior to 1978

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 1	6
40.104	Materials and Methods	4
40.105	Construction Site Processes	3
42.140	Building Structures 1	3
49.140	Heating and Ventilating	3
	Library and Research	3
		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	4	4
40.202	Building Construction 2	7	6
40.203	Construction Contracts	2	—
40.204	Estimating	—	4
40.205	Illumination	—	3
42.240	Building Structures 2	3	3

Year 1	Term 2 cont.	Clrm hrs/wk 2A	2B
49.240	Plumbing and Drainage	3	—
	Library and Research	5	3
		35	35

Year 2	Term 3	Arch	Mech Econ	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
40.303	Electrical Systems	4	4	4
40.304	Estimating	4	4	4
40.305	Economics Major	—	6	—
40.306	Bldg. Const. for Economics Major	—	6	—
42.340	Building Structures 3	3	3	3
49.340/ 49.341	Mechanical Systems Major	—	—	6
	Library and Research	6	6	6
		35	35	35

Year 2	Term 4A			
22.440	Operations Management	2	2	2
31.340	Advanced Technical Communication	2	2	2
32.440	Mathematical Methods and Computing	—	4	—
40.401	Architectural Major	6	—	—
40.402	Building Construction 4	6	—	6
40.403	Construction Specifications	2	2	2
40.404	Estimating	4	4	4
40.405	Economics Major	—	6	—
40.406	Building Construction for Economics Major	—	6	—
40.407	Acoustics	3	—	—
40.408	Codes and Regulations	2	2	2
40.410	Mech. Systems Vibration	—	—	3
42.440	Building Structures 4	3	3	3
49.442/ 49.443	Mechanical Systems Major	—	—	6
	Library and Research	5	4	5
		35	35	35

Year 2	Term 4B			
10.403	Industrial Management	—	4	4
40.401	Architectural Major	6	—	—
40.402	Building Construction 4	6	—	6

Year 2	Term 4B cont.	Clrm hrs/wk		
40.403	Construction Specifications	2	2	2
40.404	Estimating	4	4	—
40.405	Economics Major	—	6	—
40.406	Building Construction for Economics Major	—	6	—
40.409	Construction Contracts	2	2	2
42.440	Building Structures 4	3	3	3
49.441	Space Conditioning	—	—	3
49.444	Mechanical Systems Major	—	—	6
49.446	Mechanical Estimating	—	—	4
49.453	Space Conditioning	3	—	—
51.206	Introduction to Survey	3	3	—
	Library and Research	6	5	5
		35	35	35

Subject Outlines

10.403 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 Operations Management — Upon 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; 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 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 1 and 2 — 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. The planning, implementing and controlling of construction site processes from the point of view of the project superintendent are studied.

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, 40.304, 40.404 Estimating — Basic theories and principles of estimating construction costs, including methods of measurement of works and pricing of construction on unit systems. Course concludes with an introduction to the elemental analysis method of forecasting project costs.

40.205 Illumination — This course deals with the types and characteristics of lighting sources, quantity and quality of light, lighting units, terminology and calculations.

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 3 and 4 — 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 Electrical Systems — An introduction to the theory and characteristics of single and three phase systems. Deals with ac theory and the effects of reactance, impedence, true, reactive and apparent power and power factor on energy utilization and cost.

40.304 See 40.204

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.

40.306, 40.406 Building Construction for Economics Major — Principles of building construction with particular emphasis on actual on-site construction organization, methods, procedures, tools, equipment, costs and lease/rentals. The course work is arranged to follow the various divisions of work set out in the uniform construction index and includes field trips and the preparation of analytical reports.

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 various kinds of construction work, particularly wood-frame and reinforced-concrete systems.

40.404 See 40.204

40.405 See 40.305

40.406 See 40.306

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 Acoustics (40.407). The course also covers overall systems noise control strategy; equipment sound sources, sound absorption and insulation; evaluation of sound propagated to occupied space via mechancial 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.

42.140 Building Structures 1 — Basic theory of statics, including an analysis of applied and reacting forces; the relationship between forces acting on structures and the internal stresses developed. Calculations of the mathematical properties of structural sections and their resistance to bending, shearing, deflection and buckling are also studied. This course lays the groundwork for elementary structural design and is presented in lectures followed by student tutorial problem sessions.

42.240 Building Structures 2 — An introduction to the physical properties of materials used in structural sections, the performance capability of these sections under loading and their structural limitations. The course includes laboratory testing of concrete, steel and timber sections and students are instructed on the correct design and placing of concrete.

42.340 Building Structures 3 — The distribution of forces within building structures and the lateral stability and seismic resistance of frames calculated in design projects are discussed. Working stresses and factors of safety, and their effects on design are introduced through analysis of existing buildings in steel, concrete and timber. Students are familiarized with standard design catalogues and tables used in the construction industry.

42.440 Building Structures 4 — The emphasis in this course is placed on structural design associated with fieldwork. Formwork design for concrete structures is covered in detail and soils engineering is introduced. The choice of foundation systems is discussed and the safety of retaining walls and site excavations are taught through practical design projects.

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

49.240 Plumbing and Drainage — This course is divided into a series of labs and lectures to give students a fundamental understanding of piping, plumbing fixtures, and their application in storm and sanitary drainage systems. The B.C. Plumbing Code will be applied in the preparation of working drawings for drainage systems.

49.340, 49.341, 49.442, 49.443 and **49.444 Mechanical Systems Major** — Space heating; cooling and ventilating fundamentals, embodying fuel combustion; fuel handling; solar energy utilization;

refrigeration; air handling; system control methods and water flow in closed loop piping systems; application of the above topics to the design of hot water space heating, ventilation, constant volume HVAC and variable volume HVAC systems; water supply systems for potable water supply and fire protection; drainage systems for sanitary and storm drainage.

49.341 See 49.340

49.441, 49.453 Space Conditioning — The student will study and analyze factors influencing indoor comfort, including building solar orientation, evaluation of cooling loads, properties of air, air-conditioning processes, and gain an overview of air conditioning methods.

49.442 See 49.340

49.443 See 49.340

49.444 See 49.340

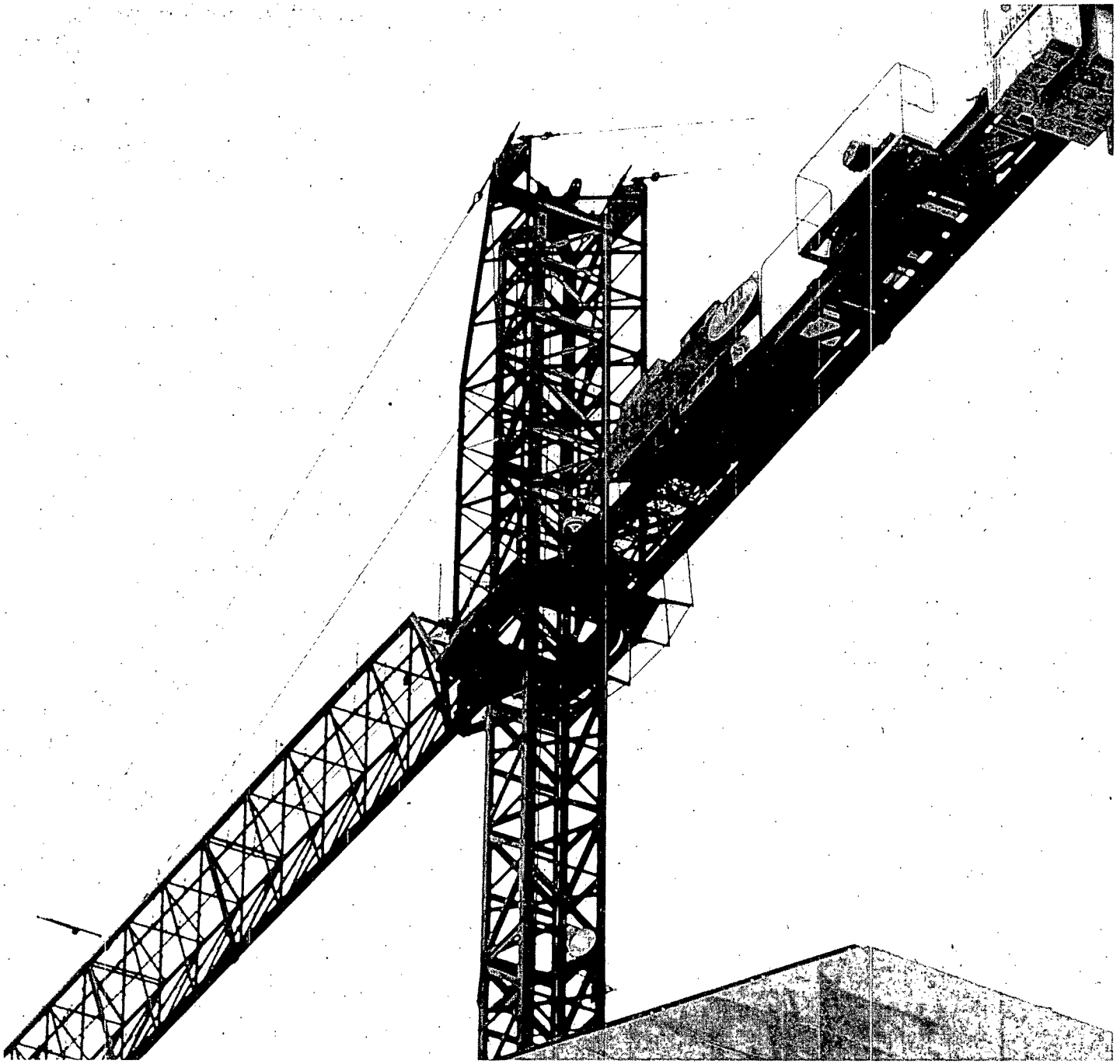
49.446 Mechanical Estimating — A practical course dealing, in particular, with measurement and pricing of mechanical work.

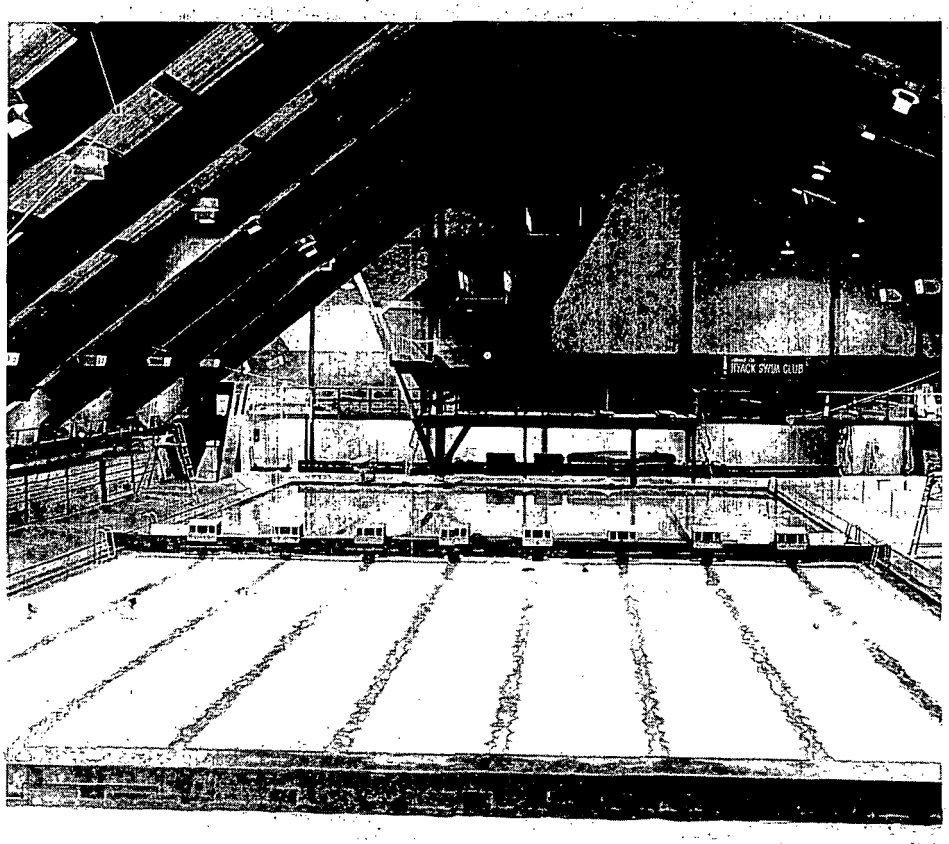
49.453 See 49.441

51.206 Introduction to Survey — An introduction to engineering survey; linear distance; introduction to 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, M.A.I.B.C., 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.A.I.B.C., M.R.A.I.C.
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.A.I.B.C., M.R.A.I.C., Senior Instructor
H.E. Kuckein, M.R.A.I.C., M.A.I.B.C.
J. Lancaster, B.Comm., M.C.I.Q.S.
A. Maharajh, Dipl.T., C.E.T.
J.A. McInnes, P.Eng. (on leave)
M. Stepler, Dipl.T.
T. Thonig, Dipl.T., C.E.T.
D.D. Workman (on leave)





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 in effectively managing people, programs, budgets and physical plant operations is essential. The potential manager will learn skills aimed at maximizing public utilization and enjoyment of recreational facilities by means of efficient, responsive management practices.

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 the need for qualified people able to work effectively in the public and private sectors 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 should be able to enter employment at different levels, depending upon past experience, or part-time job experience gained during the two-year program. It is expected that most graduates will reach the supervisory level in capacities such as assistant managers, facilities coordinators or as managers of single purpose facilities such as squash courts, arenas or pools.

In general, initial placement will occur in positions that fall between those that are specifically program-oriented and others involving senior administration 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. Success depends upon acquired "hands on" expertise and, to some degree, program aptitude and interest.

The Program

Recreation facilities management personnel must be equipped with an understanding of accounting processes 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, is also important. The program will stress current thoughts and concepts in the fields of philosophy and programming for leisure and recreation, as well as the ability to effectively administer funds for the operation of leisure services.

The program will include some fieldwork 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.

Math 12 is only acceptable if taken prior to 1978

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
22.135	Introduction to Operations Management	5
22.154	Mathematics of Finance	5
31.154	Technical Communication	3
33.122	Physics for Recreation Facilities Management	3
40.154	Recreation Facilities Building Construction	3
49.154	Physical Plant Equipment and Maintenance	5
54.101	Recreation Facilities Management	7
	Library and Research	4
		35
Year 1	**Term 2**	
16.240	Introduction to Accounting	3
22.235	Basic Management Engineering	3
22.254	Applied Statistics	4
31.254	Technical Communication	3
33.222	Physics for Recreation Facilities Management	3
49.254	Physical Plant Equipment and Maintenance	5
49.264	Building Services (Plumbing)	4
54.201	Recreation Facilities Management	7
	Library and Research	3
		35
Year 2	**Term 3**	
10.333	Industrial Relations	4
10.363	Management of Human Resources	2
14.050	Introduction to Data Processing	4
18.102	Food and Beverage Management	5
20.090	Marketing Management	4
49.354	Building Services (Heating and Ventilating)	5
54.301	Recreation Facilities Management	7
	Library and Research	4
		35

Year 2	Term 4	Clrm hrs/wk
10.433	Industrial Relations	3
18.202	Food and Beverage Management	5
20.482	Marketing Research	2
22.454	Supervision	3
40.454	Recreation Facilities Landscape Construction	3
43.452	Building Services (Electrical Systems)	4
54.401	Recreation Facilities Management	9
	Library and Research	6
		35

Subject Outlines

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

10.363 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 is placed on involvement and simulation techniques as the key to effective understanding of management of the human resource.

10.433 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 are illustrated and practised with and H.P. minicomputer operating interactively. Elementary computer programs are written and tested on the computer. Use of flow-charting and elementary data processing systems design will illustrate the achieving of data processing objectives.

16.240 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: 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

20.090 Marketing Management — This introduction to the marketing environment and marketing institutions includes a detailed study of the basic marketing functions; marketing research; product planning; selection of trade channels; merchandising; advertising; sales promotion, and salesmanship. Marketing of consumer goods, as well as industrial goods will also be covered.

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.

22.135 Introduction to Operations Management — A study of the business firm with respect to its organization and functions. Emphasis is 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 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 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 — An 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.

31.154, 31.254 Technical Communication — The course is divided into a one-hour lecture and a two-hour lab per week. In the lecture, students 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 are used to practice these skills. There are approximately ten assignments each term, each assignment designed to develop a specific communication skill that the student will need in his/her field.

31.254 See 31.154

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

40.154 Recreational Facilities Building Construction — A functional analysis of space planning, public safety regulations and structural systems. Drafting and drawing intepretation relative to recreation facilities will be studied.

40.454 Recreational Facilities Landscape Construction — The elements of landscape, as applied to recreational facilities. Topics include site analysis; grading and drainage relative to pedestrian and vehicular circulation; sports and playground facilities; and drafting, as described above.

43.452, 49.264, 49.354 Building Services — Introduction to building service systems in regard to water supply, drainage, heating, ventilating and electrical systems.

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.

49.254 See 49.154

49.264 See 43.452

49.354 See 43.452

54.101, 54.201, 54.301, 54.401 Recreation Facilities Management — Each term will emphasize a different aspect of current thinking in the recreation and leisure services industry. Theories, trends, and applications of recreation and leisure services management are discussed. Four major subjects are covered: management of recreation services, maintenance of recreation facilities, programming of recreation facilities and philosophy of leisure and recreation. One term is 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

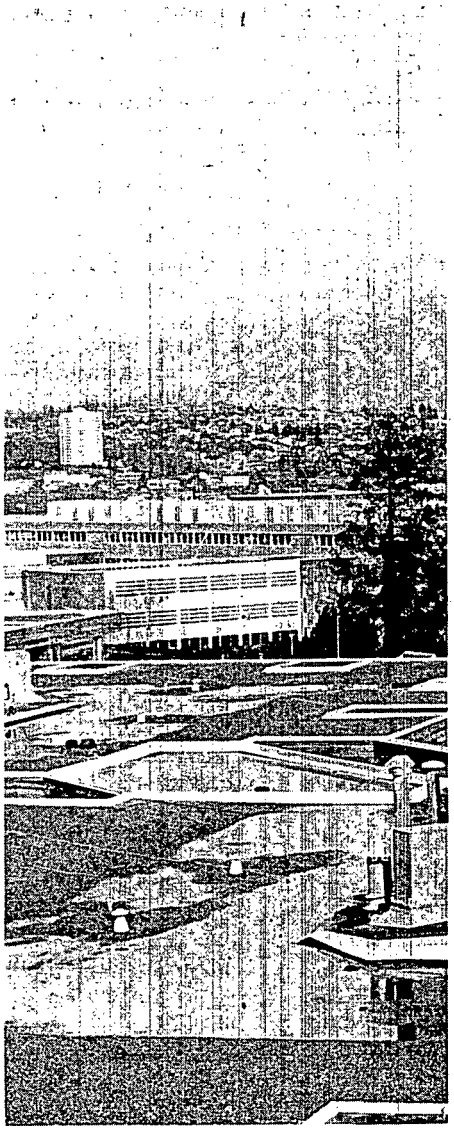
54.401 See 54.101

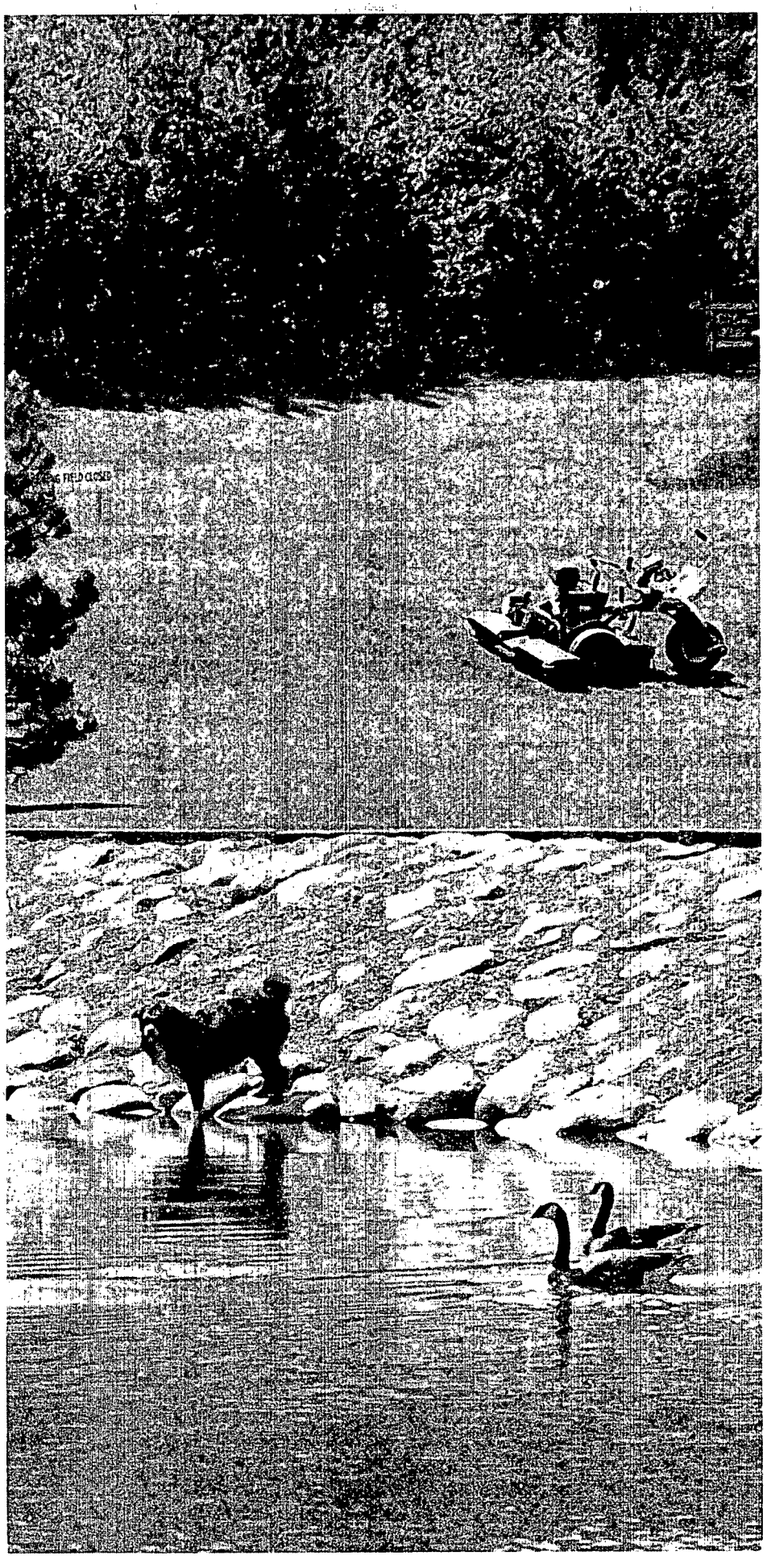
Faculty and Staff

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

M.D. Powley, B.Ed., M.B.A., Program Head

E.W. Wilmink, B.Rec.





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 plywood and lumber.

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 management, research and development, technical services and sales.

Graduates from the Forest Products Program are employed in the sawmilling and plywood industries as management trainees in production, production control, quality control, sales and maintenance.

The Program
Students enrolling in the Forest Products Technology study basic sciences and introductory courses in forest utilization, wood technology, sawmilling and plywood. In succeeding terms there is increased emphasis on lumber and plywood and students study the techniques and economics involved in converting wood to products such as lumber, plywood and particleboard.

Classroom and lab instruction is augmented by field trips to coastal and interior operations

note: Pulp and Paper, formerly an option within the Forest Products Technology, has been transferred to the Chemical Sciences Technology.

Prerequisites
Graduation from the Selected or Combined Studies Program with Algebra 12 or Math 12 and one science 11 (Biology, Chemistry or Physics). Industrial experience strengthens an application and skill in report writing is essential.

Initiative, efficiency and leadership ability are important qualities.

Math 12 is only acceptable if taken prior to 1978

Scholarships
Industry-sponsored, two year combined scholarship-mill employment awards are now available to selected students entering the Program.

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

Course of Studies

Year 1	Term 1	Clrm hrs/wk
31.146	Technical Communication	3
32.146	Basic Technical Mathematics	5
33.118	Physics	5
46.101	Forest Utilization	7
46.115	Lumber Grading I	2
46.198	Lumber Tallying*	2
46.199	Log Utilization	4
	Drafting Fundamentals	2
	Tutorial	1
	Library and Research	4
		35

Year 1	Term 2A	
31.246	Technical Communication	3
32.264	Statistics and Quality Control	5
33.218	Physics	5
41.208	Engineering Materials	3
46.215	Lumber Grading II*	8
46.220	Wood Properties	4
49.205	Drafting	2
	Library and Research	5
		35

Year 1	Term 2B	
31.246	Technical Communication	3
32.264	Statistics and Quality Control	5
33.218	Physics	5
41.208	Engineering Materials	3
46.215	Lumber Grading II*	8
46.220	Wood Properties	4
49.205	Drafting	2
	Library and Research	5
		35

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

Year 2	Term 3	Clrm hrs/wk
14.321	Computer Applications	3
22.346	Operations Management I	3
31.346	Advanced Technical Communication	2
43.354	Electrical Equipment Applications	4
46.315	Wood Processing I	10
46.370	Mill Services I	8
46.399	Summer Technical Report	1
	Library and Research	4
		35

Year 2	Term 4A	
14.408	Linear Programming	3
20.110	Wood Products Sales and Distribution	4
22.446	Operation Management II	4
31.446	Advanced Technical Communication	2
46.415	Wood Processing II	9
46.470	Mill Services II	6
49.471	Mechanical Equipment	3
	Library and Research	4
		35

Year 2	Term 4B	
14.408	Linear Programming	3
20.110	Wood Products Sales and Distribution	4
22.446	Operations Management II	4
31.446	Advanced Technical Communication	2
46.415	Wood Processing II	9
46.470	Mill Services II	6

Year 2	Term 4B cont.	Clrm hrs/wk
49.471	Mechanical Equipment	3
	Library and Research	4
		35

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

Subject Outlines

14.321 Computer Applications — Computer applications in engineering technologies; how a computer works; recognizing problems suitable for computer solution; flow-charting; and communicating with computer personnel. Emphasis is on the use of computers to solve problems related to the technology. Where available, "package" programs are demonstrated and used by students. FORTRAN or BASIC programming language is taught.

14.408 Linear Programming — Graphical method; algebraic method; simplex method; analysis of simplex results; LKP problem formulation; use of computer to solve problems; analysis of computer solution; use of reduced costs and shadow prices; sensitivity analysis; practical applications and limitations of LP; implementation of results.

20.110 Wood Products Sales and Distribution — This course examines the major domestic and export markets for lumber and plywood, including ongoing changes in all types of distribution and transportation systems used by the forest products industry. The sales process, from telephone solicitation to complete documentation of FOB and CIF orders, is covered in detail.

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

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 a comprehensive inhouse project. As a term project the student selects, for study, a job in an industrial plant in the forest products industry. The student applies the techniques learned in 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.

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 these skills to various business formats i.e. 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.

32.264 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.

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

41.208 Engineering Materials — A comparison of materials important in forest products industries, including wood and wood products, concrete, metals, alloys, polymers and ceramics. Common causes of failure in service including corrosion, wear, fatigue and embrittlement. Lab sessions emphasize physical testing and non-destructive testing.

43.354 Electrical Equipment Applications — Topics include ac and dc motors and their application in sawmills, distribution equipment, protective equipment, and metering equipment. Students also learn characteristics of electrical systems, economic factors, the importance of power factor, safety and an introduction to solid state devices as used in sawmill equipment.

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, chiping, screening, conveyance and storage.

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

46.198 Lumber Tallying — A full course on the tallying and shipping of lumber, followed by an industrial examination. The following topics are covered: conversion of order data to quantities in foot-board measure, specified lengths, pieces, bundles and packages; information on moisture content and shrinkage of wood, metric conversion and lumber price calculations. Final examinations for certification are given by The Council of Forest Industries (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 — This course introduces the basic log-scaling procedures used in coastal mills and also includes different log-sorting methods and recovery calculations used in sawmill and plywood industries. Considerable time is spent practicing scaling techniques on selected log booms.

46.215 Lumber Grading II — Students attend industry lumber grading classes sponsored by the Council of Forest Industries (C.O.F.I.) and receive further instruction at BCIT. 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, micro- and ultra-structure, wood protection and preservation. The lab section of this course is largely made up of a research project, with emphasis on reporting of methods and results.

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. Methods of controlling quality, recovery and productivity are examined and coastal and inland operations are compared in the classroom and/or field trips.

46.370, 46.470 Mill Services I and II — This 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 time is spent on specific assignments in various manufacturing plants.

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

46.415 See 46.315

46.470 See 46.370

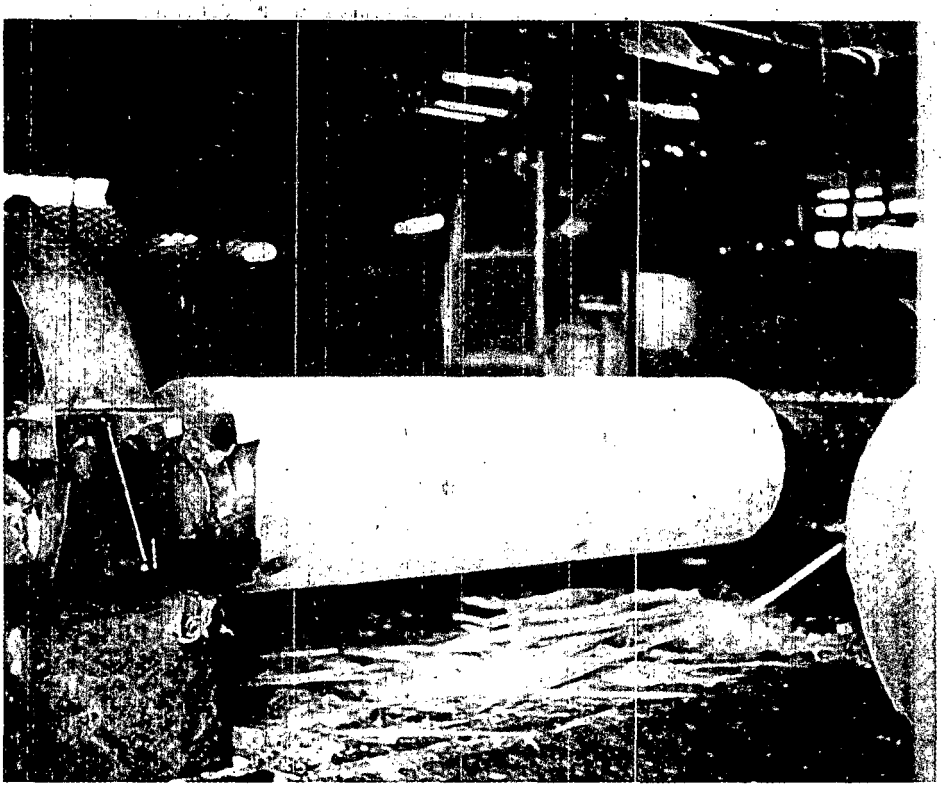
49.101 Drafting Fundamentals — Techniques of reading and producing orthographic drawings using standard format, and the development of basic skills in applying these techniques. Use of instruments, line work, geometric constructions, orthographic projection, isometric drawing and sketching, sections,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

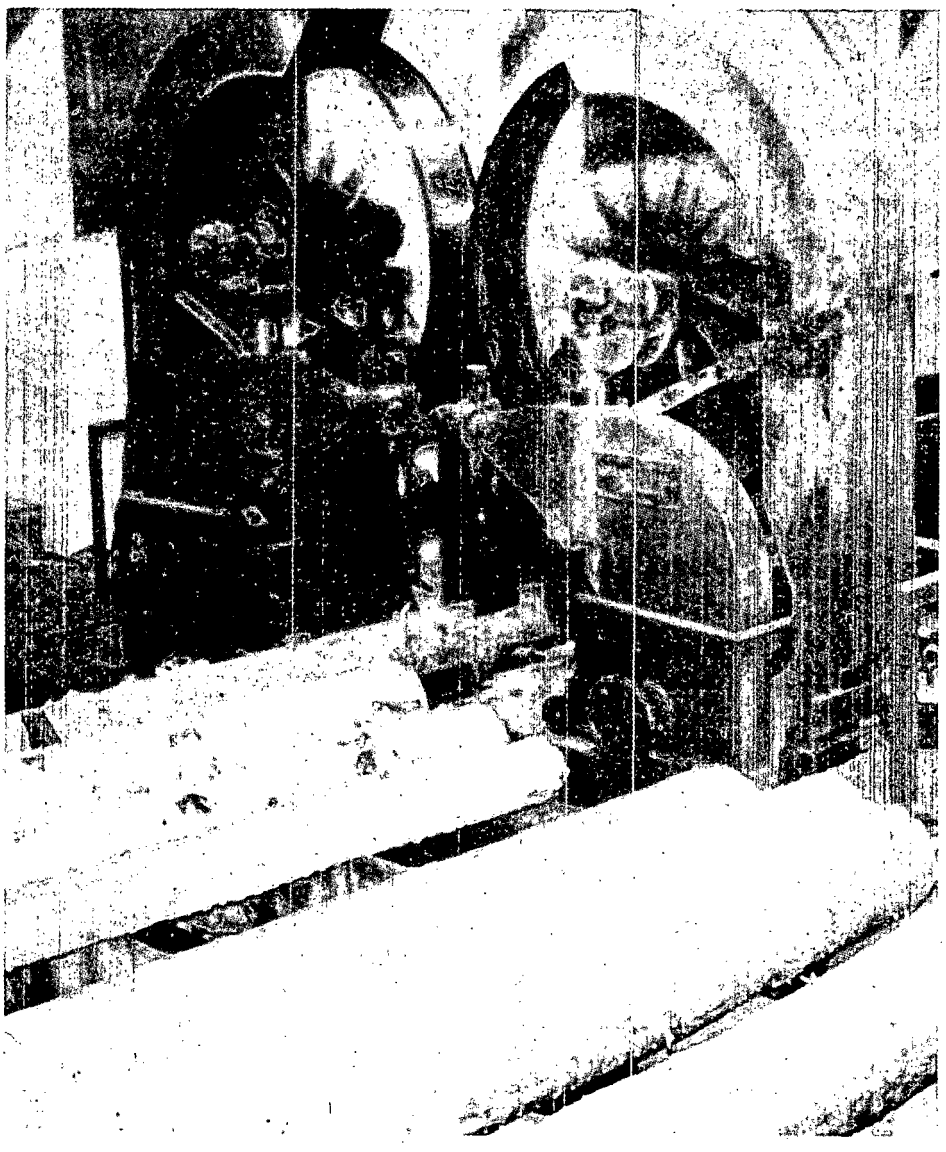
49.205 Drafting — Covers topics on intersections, developments, descriptive geometry, isometrics and piping, drawings and mechanical equipment detail, and layout projects associated with lumber production. Prerequisite: Drafting Fundamentals (49.101).

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 is made to steam generation, steam processes and power generation, as well as preventive maintenance.

Faculty and Staff

I.M. Anderson, M.I. GasE., E.Eng., *Department Head (Acting)*
H. Kettner
B.R. Leslie, B.A.
B.D. McKinney, Dipl.Tech.
J.T. Neilson, B.A.Sc., P.Eng.





Chemical Sciences

Chemical principles and processes form the base of modern industrial society. Whether in the research laboratory, or industrial chemical plant, the chemical analyst and chemical process technologist are in great demand. Their skills find challenges on many fronts, including solving problems of environmental pollution. Because chemical principles are so universally used, graduates of the Chemical Sciences program find employment in almost every major industrial and research activity in B.C.

Job Opportunities
Graduates are employed as chemists and analysts in research facilities and commercial and industrial labs; as engineering assistants in consulting firms; as production supervisor trainees in production plants; as laboratory field analysts in environmental laboratories and waste disposal units; as assayers or mineral processing technicians in extractive metallurgy plants; as process technologists in pulp mills and as corrosion specialists and non-destructive testing specialists.

The Program
The Chemical Sciences Program offers the student grounding in general science and technology courses in the first year of studies, with the opportunity for further specialization in second year.

The first year curriculum emphasizes applied chemistry, general laboratory procedures and testing, and introduces the student to a wide range of industrial chemical processes.

In the second year Analytical Chemistry and Unit Operations are compulsory throughout, while most other courses are chosen on an elective basis, depending on which technology the student wishes to specialize in. The following technologies are offered: **Industrial Chemistry, Laboratory Chemistry, Pollution Sciences, Pulp and Paper, Extractive Metallurgy, Physical Metallurgy**.

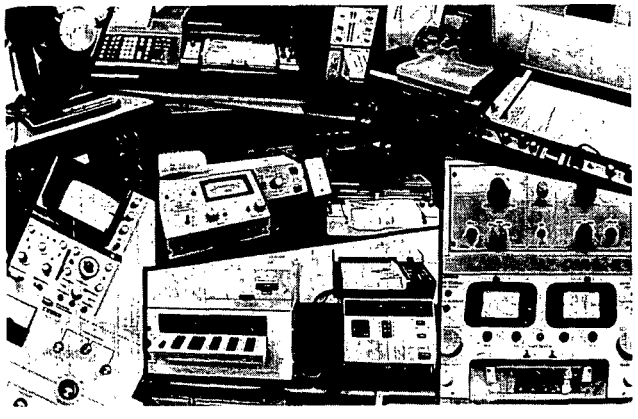
Prerequisites
Graduation from the Selected or Combined Studies Program with Algebra 12 or Math 12.

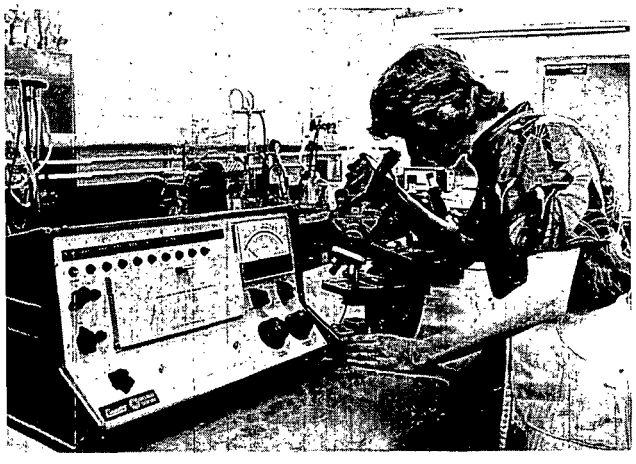
Math 12 is only acceptable if taken prior to 1978

Course of Studies

Year 1	Term 1	Clrm hrs/wk
30.101	Applied Chemical Principles	6
31.141	Technical Communication	3
32.141	Basic Technical Mathematics	5
33.114	Physics	5
41.103	Engineering Materials	3½
41.119	Environmental Science	4½
49.101	Drafting	4
	Library and Research	4
		35

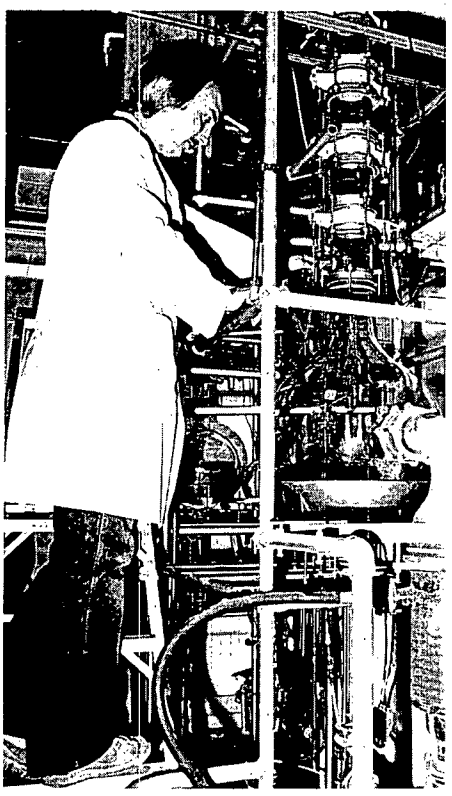
Year 1	Term 2	2A	2B
30.201	Applied Chemical Principles	6	6
30.204	Chemical Laboratory Techniques	3	3
31.241	Technical Communication	3	—
32.241	Statistics I and Calculus I	5	5
33.214	Physics	5	5
41.202	Laboratory Workshop	1½	1½
41.203	Engineering Materials	3½	3½
41.246	Industrial Chemical Processes	4	4
	Library and Research	4	4
		35	32





Laboratory Chemistry Electives
These courses include Organic Chemistry, Environmental Analytical Methods, Ore Analysis, and Analytical Instrumentation. Together with Analytical Chemistry, they will provide students with the systematic study of the theory and application of modern instrumental analysis necessary for work in mineral, food, drug, environmental, petroleum and other industrial analytical laboratories. Students also become capable of performing analytical work in classical analysis with minimum on-the-job training.

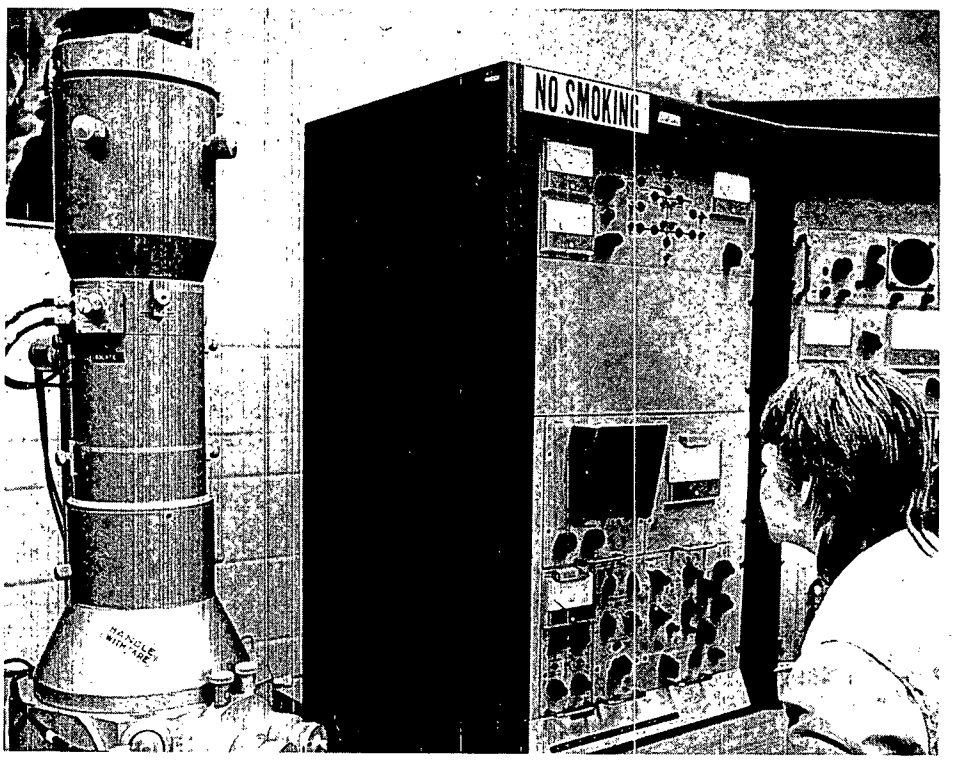
Pollution Science Electives
These courses include Pollution Science, Environmental Analytical Methods, Waste Management, and Pollution Control. They deal with the environmental problems of modern industrial society and provide specialization in the chemical detection methods and engineering control techniques for air and water contaminants. Graduates of this program are qualified to perform the detailed pollutant analyses required by industrial and government laboratories and engineering firms. They are also qualified to conduct general laboratory analyses in other areas such as food, petrochemicals, pharmaceuticals and ore assays.



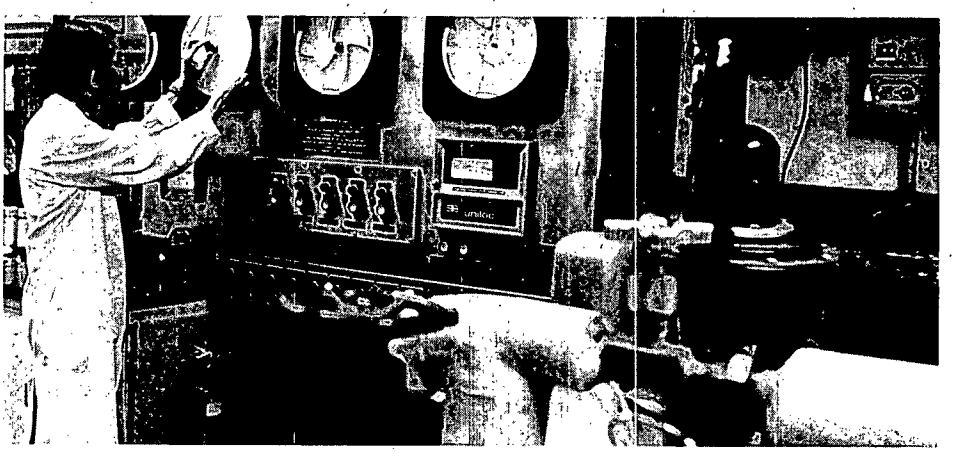
Industrial Chemistry Electives
These courses include Organic Chemistry, Unit Operations, Process Instrumentation, Process Dynamics and Pollution Control. They qualify the graduate to work as a process technologist in a great variety of chemical process industries.

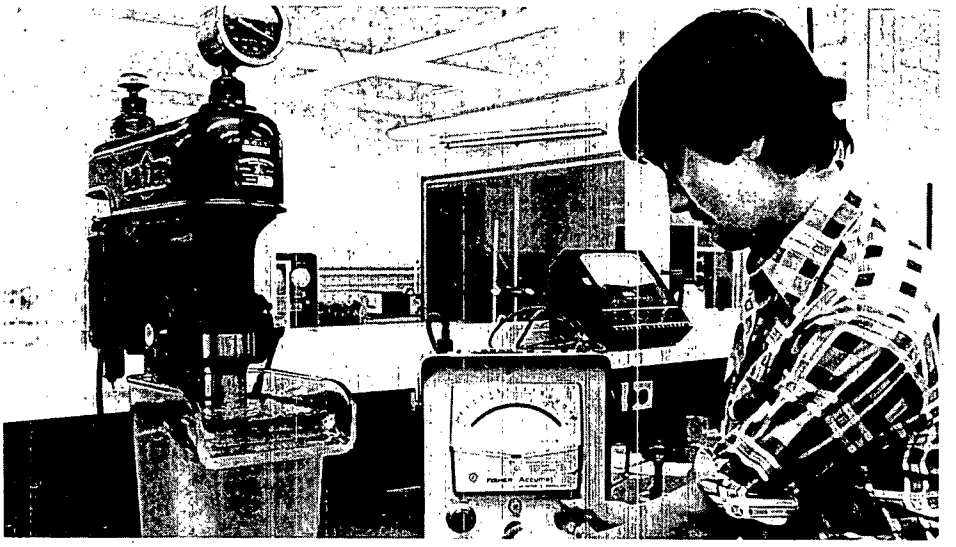
Pulp and Paper Electives
These courses include Pulp and Paper Technology, Process Instrumentation, Process Dynamics and Waste Management. They provide the specialization in pulp and paper manufacture, wood chemistry, quality control and pollution abatement required by the pulp and paper industry. Students benefit from the presence of a fully equipped, operational pilot plant facility on the BCIT campus.

Extractive Metallurgy Electives
Extractive Metallurgy is that branch of science and technology which deals with obtaining mineral concentrates and metals from ores. These courses include Extractive Metallurgy, Ore Analysis, Process Dynamics, Process Instrumentation and Coal Chemistry. Graduates find employment either as laboratory analysts or as metallurgical process technologists.



Physical Metallurgy Electives
These courses, which include Physical Metallurgy and Engineering Materials, lead to specialization in physical testing of materials, microscopy and non-destructive testing.





Students must take all the common courses listed for term 3, plus one elective.

Year 2	Term 3	
	Common	
30.310	Physical Chemistry	5
30.314	Analytical Chemistry	6
32.341	Numerical Methods and BASIC	5
41.320	Unit Project	2
41.341	Unit Operations	6
	Library and Research	5
	Electives	
30.309	Organic Chemistry	6
41.304	Physical Metallurgy	6
41.307	Extractive Metallurgy	6
41.311	Pollution Science	6
41.346	Pulp and Paper Technology I	6
		35

Students must take all the common courses listed for term 4, plus six electives.

Year 2	Term 4	4A	4B
	Common		
30.414	Analytical Chemistry	6	6
41.441	Unit Operations	6	6
	Library and Research	5	5
	Elective 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
41.446	Pulp and Paper Technology II	6	6
	Elective 2		
41.408	Ore Analysis	3	3
41.412	Waste Management	3	3
	Elective 3		
41.413	Environmental Analytical Methods	3	3
47.409	Process Dynamics	3	3
	Elective 4		
32.441	Calculus II and Differential Equations	3	3
41.420	Unit Project	3	3
	Elective 5		
30.416	Analytical Instrumentation	3	—
43.457	Process Instrumentation	3	—
	Elective 6		
41.438	Coal Chemistry	—	3
41.448	Industrial Chemistry and Pollution Control	—	3
43.457	Process Instrumentation	—	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 techniques are emphasized.

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

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

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

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 determining the common metals in ores and alloys. Basic methods of fire assaying for gold and silver are also covered.

30.409 See 30.309

30.414 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.

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 and letter or memo —for business or industrial audiences.

31.241 See 31.141

32.141 Basic Technical Mathematics — Topics in algebra, logarithms and trigonometry, including graphical linear programming.

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 and estimation. The calculus section covers the differentiation and integration of algebraic functions, together with their applications.

32.341 Numerical Methods and BASIC — Elements of the BASIC computer language up to and including arrays and subprograms. Numerical methods in theory and practice; solution of simultaneous equations by Gauss-Jordan methods; linear programming and Simplex methods; interactive methods in solving algebraic and transcendental functions; numerical integration.

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

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 introduction to pollution measurement and control techniques.

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

41.203 See 41.103

41.246 Industrial Chemical Processes — A description of the chemical processes involved in major industrial chemical plants in B.C. Emphasis is placed on chemicals and chemical operations associated with the pulp and paper industry, including chemical pulping,

water treatment, chloralkali and sulfuric acid. Lab sessions involve the testing and control procedures utilized in industrial applications.

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 — This course is concerned with the unit operations of coal and nonferrous metals recovery and upgrading and with the unit processes of nonferrous and precious metal recovery from ores and concentrates. Mineral processing covers the basic operations of comminution, particle size analysis, classification, screening, flotation, gravity separation. Extractive metallurgy covers the fundamental principles and processes of hydrometallurgy, pyrometallurgy and electrometallurgy. Solutions to design and operating problems are emphasized.

41.311 Pollution Science — An introduction to organic chemistry, with applications to industrial pollution problems.

41.320, 41.420 Unit Project — Projects relating to the student's chosen specialty are assigned 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; properties of steam; fluid flow and measurement in pipes and channels, piping, pipe fittings and valves; flow of heat, conduction, convection, radiation, film and overall transfer co-efficients, heat exchangers; principles and application of equipment for evaporation, distillation, absorption, extraction; humidification and dehumidification; drying; solid-liquid and liquid-liquid extraction.

41.346, 41.446 Pulp and Paper Technology I and II — Pulp and paper technology is concerned with mechanical and kraft pulping, chemical and heat recovery, bleaching, papermaking, newsprint manufacture, process control and product testing. The lab portion of this course is designed to equip students with basic testing skills and provide "hands-on" experience with typical mill unit operations. Projects are undertaken in term 4 to involve students in planning and carrying out practical project work.

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 — The following topics are discussed: air pollution meteorology, air pollution chemistry, air sampling methods, classical and instrumental techniques for measuring atmospheric and indoor contaminants (e.g. hydrogen sulfide, mercaptan, sulfur oxides, carbon monoxide, ozone, nitrogen oxides, various organic contaminants, and lead, mercury, cadmium and zinc in air, etc), particulate counting and sizing, stack sampling and some of the principles and techniques used in water pollution microbiology. Laboratory sessions include standard methods used by industrial and government laboratories.

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

41.413 Environmental Analytical Methods — This course surveys suitable methods of examining many types of water, waste water and materials related to control of sanitation and water quality. Reference is made to 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 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 on practical water sampling and the provincial environmental water resources lab are included.

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

41.446 See 41.346

41.448 Industrial Chemistry and Pollution Control — This is a survey course covering the major chemical process industries and their pollution control methods. Lecture material is selected from the following topics: chlorine and caustic, aluminum production, petroleum refining, pulp and paper, metal refining, plastics, phenol and resins, nuclear energy and other sources of energy.

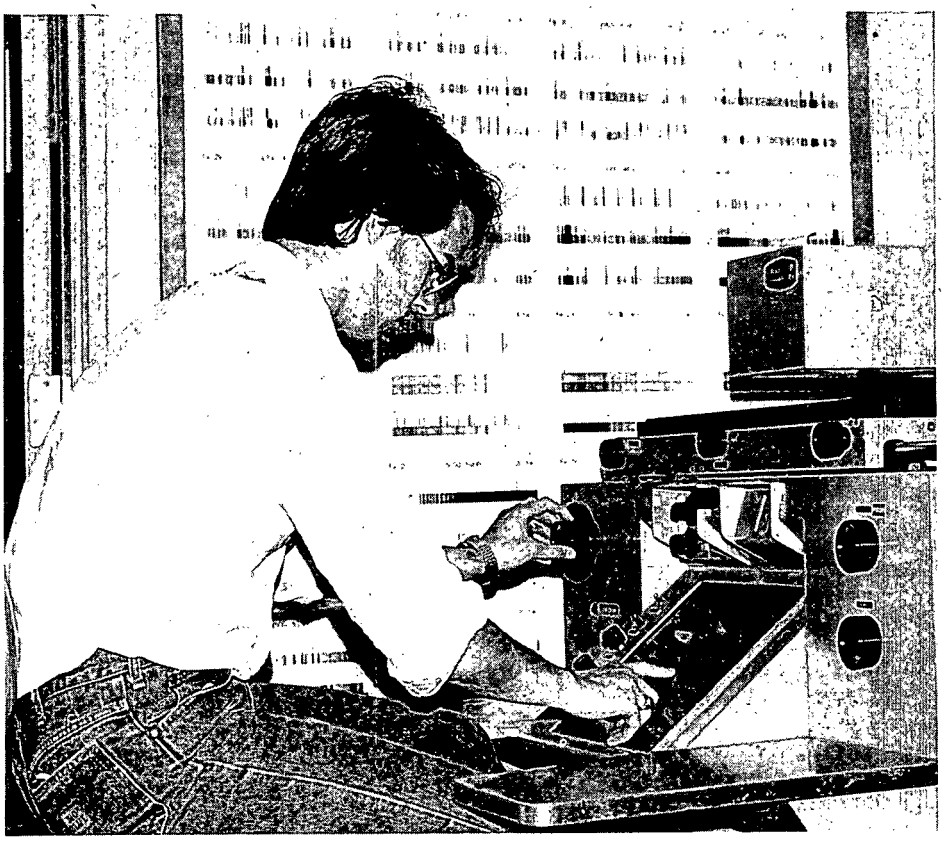
43.457 Process Instrumentation — An orientation course with emphasis on lab exposure to industrial equipment. Standard methods of applying commercial instruments to measure pressure, level, flow and temperature variables are included. The course ends with an introduction to the principles of regulators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

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 Drafting — Students learn techniques of reading and producing orthographic drawings using standard format, and develop basic skills in applying these techniques. Also included is the use of instruments, line work, geometric constructions, orthographic projection, isometric drawing and sketching, sections and dimensioning.

Faculty and Staff

I.M. Anderson, M.I., Gas.E., C.Eng., *Department Head*
S. Berghold
J. Berry, B.Sc., M.Sc., Ph.D.
W.J. Bogyo, B.C.L.Ass., Senior Instructor
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
G.A. Smook, B.S., P.Eng.
T. Voksepp, B.A.Sc., 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 recent years. 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.

Math 12 is only acceptable if taken prior to 1978

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	Engineering 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	5
33.201	General Physics	3
49.201	Drafting	2
50.201	Geology	3
50.202	Mining	2
51.210	Engineering Surveying	3
	Library and Research	5
		32

Year 2	Term 3	
31.350	Advanced Technical Communication	2
32.350	Statistics I	5
33.304	Mining Geophysics	1½
41.305	Assaying	4
41.314	Mineral Processing	3½
42.501	Statics and Strength of Materials	4
50.301	Geology — Structural	3½
50.302	Mining — Operation and Equipment	3½
51.310	Surveying	3
	Library and Research	5
		35

Year 2	Term 4	
31.450	Advanced Technical Communication	2
32.450	Numerical Methods	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 is used to apply the principles learned in the lecture. Students also practice oral communication skills and participate in a month-long reading and study skills course.

31.250 See 31.150

31.350, 31.450 Advanced Technical Communication — This course includes brief reviews of memoranda writing, oral reports and discussions, write-ups of field trips and lab reports. Note taking from oral reports or articles as used at conferences, abstract writing from technical articles, information retrieval and the technical roots of English are also 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 includes 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 at BCIT and the course will include an introduction to computer programming.

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.

33.304 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 analyze 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 Statics and Strength of Materials — Simple stresses; stress, strain elasticity; compound bars and columns; temperature stress; elastic limit; limit of proportionality; yield; ultimate; factor of safety; load factor; ductility; resilience; fatigue; shock. Properties of sections; bending moments; shear forces; theory of flexure; deflection of beams; eccentric loading; lateral loading; compound stress and strain; Poisson's ratio; principal stress and strains; Mohr's circle; testing techniques; machines; extensometers; strain gauges; photo elasticity. Special sessions on rock mechanics, earth pressures and slope stability.

49.101 Drafting — Techniques of reading and producting 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: Drafting Fundamentals (49.101).

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

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

50.201 See 50.101

50.202 See 50.102

50.301 Geology—Structural — Brief review of mechanical principles of rock deformation and of the primary structures of sedimentary, igneous and metamorphic rocks. The origin, nature and classification of joints, folds and faults, with emphasis on their relation to mineral resources. Lab work includes examinations of specimens, methods of recording structural data, mapping and solution of structural problems, with emphasis on economic aspects.

50.302, 50.402 Mining—Operation and Equipment — Mining economics; cost components; selection and utilization of equipment; break-even ratio; breaking ground; ground support; ore-and waste-removal; development drives; examples of mining practice; control of water, drainage, grouting; ventilation; occupational hazards; "Mines Regulation Act", mine organization, lab sessions; field trips to mines and suppliers of mining equipment for familiarization with mining methods, systems and equipment. Sessions are also 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 obtained.

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 illustrates and develops techniques in megascopic study and identification of hand specimens; valuation of mineral deposits.

Field trips are 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.

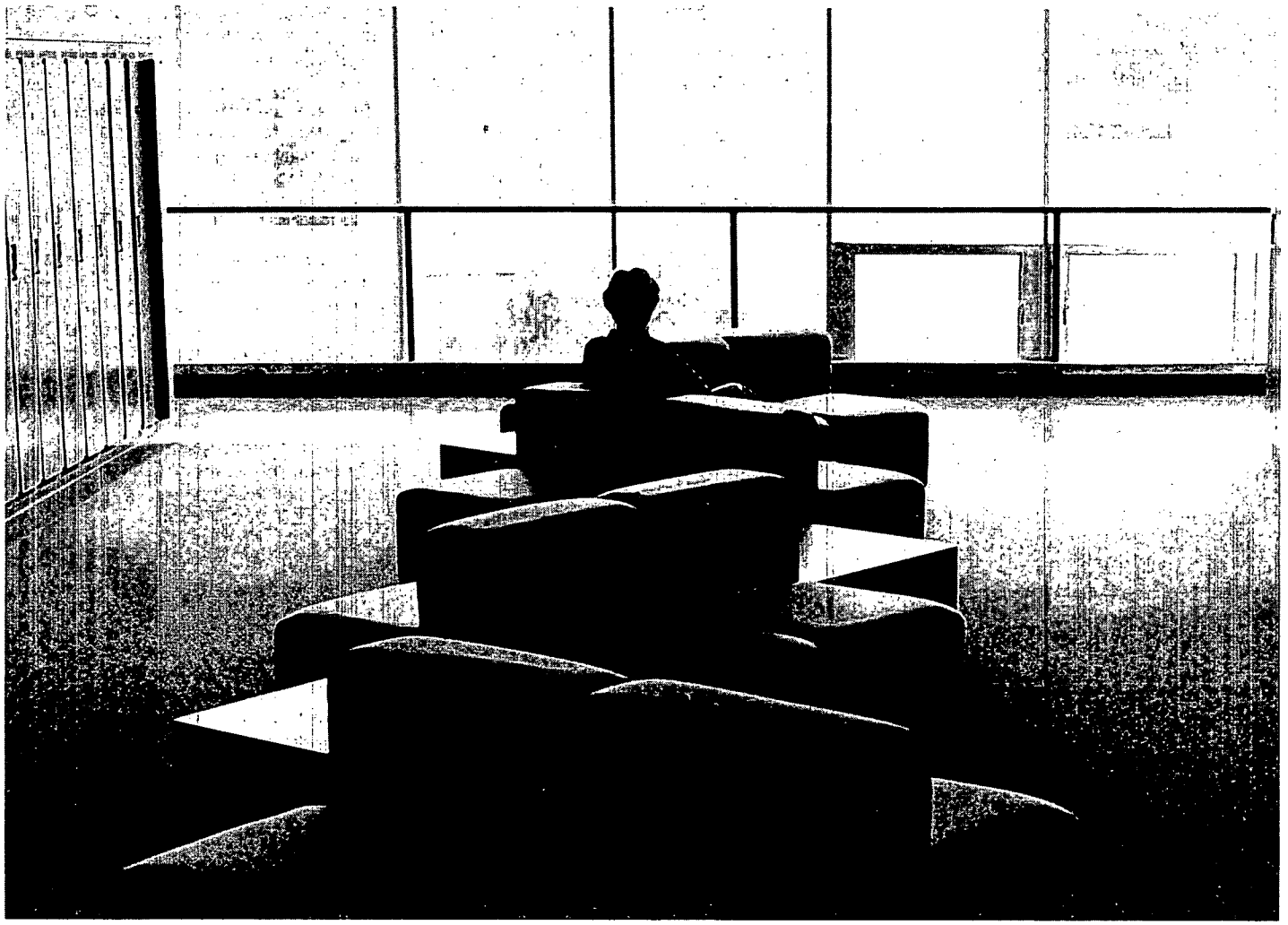
51.210 See 51.110

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.,
Department Head (Acting)
J.F. Fairley, B.A.Sc., P.Eng.
D.J. Hardie, H.N.C.



Natural Gas and Petroleum

Because of its size and diversity, the petroleum industry is unique, both in its extremely wide range of occupational opportunities, and in the many challenges it offers employees for learning and growing.

Job Opportunities

The petroleum industry can be considered under four general areas: Exploration and Production, Transmission and Distribution, Manufacturing (refining) and Marketing. There are a great variety of positions to be filled by Natural Gas and Petroleum Technology graduates in each of these areas. Past graduates are successfully employed in all these areas, both in Canada and throughout the world. Positions available include:

Exploration and Production: geologic studies, reservoir studies, well testing and serving.

Transmission and Distribution: operation and maintenance of pipelines, utility studies and corrosion control.

Manufacturing: process operations, laboratory and product quality control, effluent control.

Marketing: product application for all of the petroleum products produced for commercial and industrial equipment.

The Program

The curriculum is designed to cover all major aspects of the petroleum industry, thereby enabling the graduate to successfully enter any area of the industry.

The first year covers the basic scientific and engineering principles required for the specialized training given in the second year. Thus, in the first year there is emphasis on chemistry, physics and mathematics, together with an introduction to petroleum geology and the behavior of petroleum hydrocarbons.

In the second year, the following areas are studied: Oil and Gas Production, Pipeline Construction and Operation, Gas Distribution and Utilization, Oil Refining and Utilization. There will be considerable emphasis placed on measurement and computerized process control.

Classroom and laboratory instruction will be supplemented by field trips to local installations.

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 or Chemistry 11. Students should have a keen interest in the operation of large-scale equipment, be prepared to work outdoors and, with training, must be capable of assuming responsibility for the satisfactory and safe operation of highly complex plant equipment.

Math 12 is only acceptable if taken prior to 1978

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
51.208	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 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 students with the skills necessary for 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 is also included. 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 Petroleum Geophysics. (33.406).

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, floatation; 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 — This course introduces students to the chemical composition and physical properties of natural gas and crude oil, the phase behavior of these fluids at high pressures in a reservoir and their handling and treatment when recovered from the reservoir before entering the transmission line.

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 — Petroleum refining is a very complex operation due mainly to the multitude of products that are made. Each product has its own individual requirements depending upon the use to which it is to be put. Lecture periods cover the refining processes involved in producing the various petroleum products. These processes include distillation, cracking, reforming, hydro-heating, lube oil refining, etc. For each type of petroleum product, the desirable properties, specifications and equipment in which the product is used are examined. Laboratory periods cover the testing of various products obtained from a typical crude oil. Supplementing these studies are field trips to local refineries, to acquaint students with actual equipment and to meet people in the industry.

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.

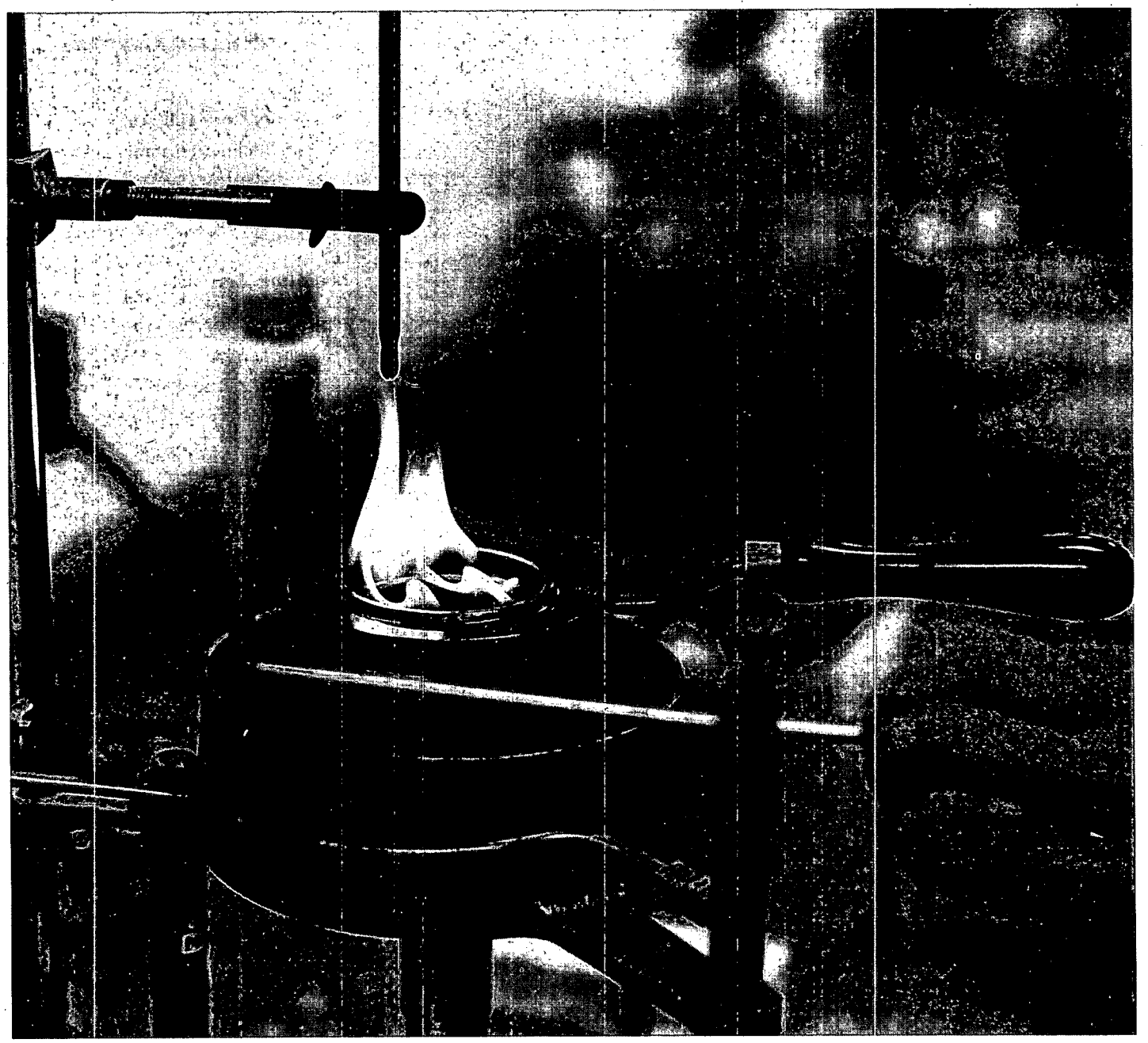
50.101 Geology — Definition, basic concepts, earth's crust, geologic time; atomic structure of minerals, crystal forms and symmetry systems; properties of common minerals, sedimentary rock types, clastic and chemical sedimentaries; igneous rock types, classification; deformation of earth's crust, folds, 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.

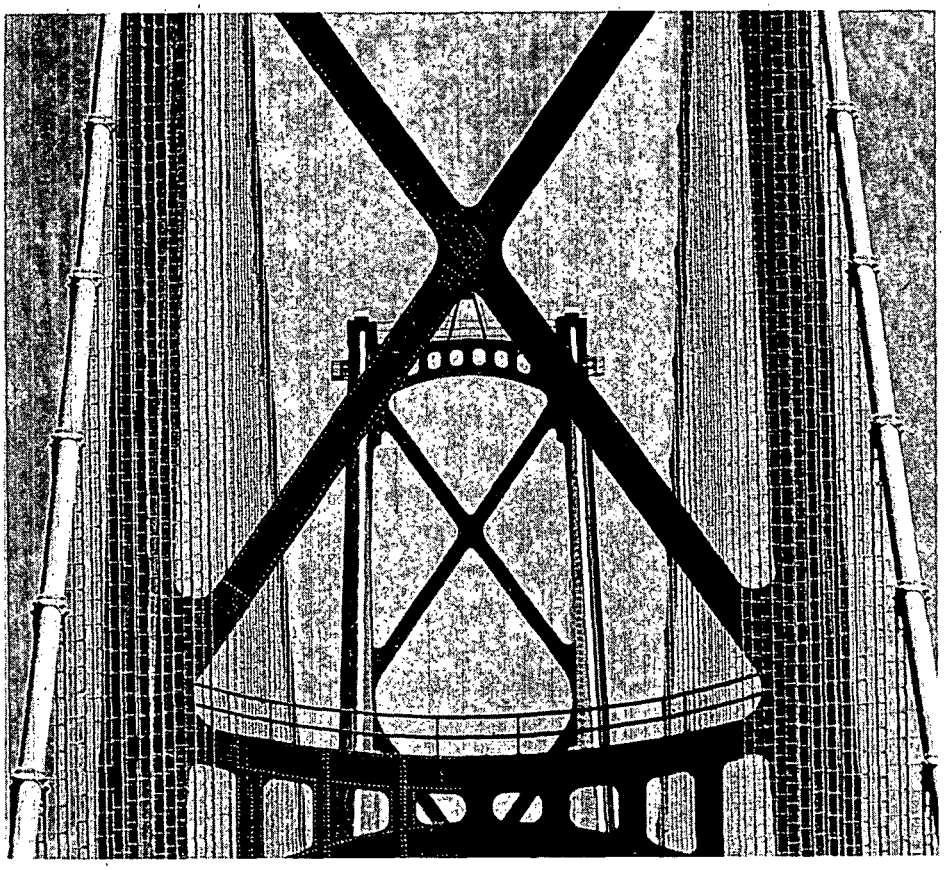
51.208 Introduction to Surveying — Introduction to the theory of engineering survey; practical application of linear measurements; introduction to and theory of the theodolite; bearings and

traverse computations; introduction to and theory of levelling; computation of areas and volume.

Faculty and Staff

I.M. Anderson, M.I. Gas E., C.Eng., *Department Head*
D.A. Campbell, B.A., (Hons.), M.Ed.
R.G. Kinney, Dipl.T., C.E.T.





Civil and Structural

Civil and structural technologists are involved in the design and construction of highways, bridges, airports, railways, municipal works, power developments, dams, canals, docks and harbors. The field has enormous creative potential and offers the technologist involvement in all phases of a project, from the design stage to finished job.

Job Opportunities
Graduates find employment as inspectors, construction supervisors, testing lab technicians, design detailers and investigation and construction technologists in government and in private industry. A number of graduates have founded their own consulting or construction businesses. Others are placed in engineering, contracting, surveying or architectural firms as project managers or supervisors, or to work in design or analysis. These jobs usually entail an equal amount of time spent outdoors as indoors. Fieldwork usually takes place from spring to fall.

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

In the second year students may choose their course content to provide a degree of specialization in varying areas of the civil or structural technology.

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.

Preference will be given to students who have the necessary academic qualifications and who have relevant work experience.

Math 12 is only acceptable if taken prior to 1978

Course of Studies

		Clrm hrs/wk
Year 1		
Mandatory Core Subjects:		
31.142/ 31.242	Technical Communication	3
32.142/ 32.242	Basic Technical Math and Calculus	5
33.107/ 33.207	Physics	5

Mandatory Technical Subjects:

		Clrm hrs/yr	
42.001	Statics	60	
42.002	Hydrology	30	
42.003	Hydraulics 1	60	
42.004	Transportation	60	
42.005	Elementary Structural Design	60	
42.006	Materials Behavior	60	
42.007	Concrete Technology	30	Total =12
49.101/ 49.202	Drafting		2
51.109/ 51.209	Surveying		3
	Library and Research		5
			35

Year 2
Mandatory Core Subjects:

31.342/ 31.442	Technical Communication	2
32.342/ 32.442	Matrices, Statistics and Numerical Methods	4
14.324	Computer Applications (Term 3 only)	3

Mandatory Technical Subjects:
(each student must complete a minimum of 630 hours during year)

		hrs/yr	
22.342/ 22.442	Operations Management 1 and 2	90	
42.021	Soil Mechanics 1	60	
42.022	Soil Mechanics 2	60	
42.030	Construction	30	
42.041	Structures 1	60	
42.042	Structures 2	60	
42.043	Structures 3	60	
42.044	Structural Design General	60	
42.047	Structural Detailing	60	
42.051	Municipal Services 1	60	
42.052	Municipal Services 2	60	
42.053	Municipal Services General	60	
42.055	Environmental Management	30	
42.056	Hydraulics 2	60	
42.061	Highway Design	60	
42.062	Traffic Studies	30	
42.064	Asphalt Technology	30	
42.099	Projects (by arrangement)	30	Total =21
	Library and Research		5
			35

Year 2 cont.

Night School Continuing Education and Industry Services courses (by arrangement)

Subject Outlines

14.324 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 2 — 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 materal studied in class. The projects are designed to meet the needs of the civil engineering student.

31.142, 31.242 Technical Communication — In one lecture each week, students receive information on basic writing skills, technical correspondence and related technical writing tasks, videotaping and other audiovisual techniques, oral presentations and informal and formal reports. The two labs per week are devoted to practicing writing and speaking skills. Students are expected to complete approximately ten assignments per term. The shorter assignments are done in the labs, while the longer assignments—reports, oral presentations and video-taping projects—require additional work out of class. Students 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 Technical Communication — In two hours of lab sessions per week, students practice writing, under supervision, typical kinds of engineering communications such as letters, memos, reports, specifications and proposals. Some assignments are done jointly with various civil and structural engineering courses. The equivalent of one short writing assignment per week is 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 associated with these include conics and calculus problems, and partial differentiation.

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

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

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

33.207 See 33.107

42.001 Statics — 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.

42.002 Hydrology — Through lectures and problem sessions, the occurrence of water in nature is studied. Its movement is examined with special regard to surface and sub-surface runoff phases and the application of those phenomena to the development of flood control and water supply systems. Measurement techniques of rainfall, flow, snowfall, solar radiation, snowmelt, storm characteristics and fluvial erosion are studied. The use of the Rational Formula for estimating flood runoff, the use of Unit Hydrographs in the study of watershed flow characteristics, the use of Integrated Hydrographs (Mass Curves) in developing water supply sources are explained, and may be practiced in problems and projects. Flood routing and detention storage schemes are discussed and evaluated. Finally, all students participate in the study, assessment and analysis of a watershed area (including the campus) to determine probable flood sizes and to evaluate the adequacy of existing drainage works within the area.

42.003 Hydraulics 1 — Through problem sessions and lectures, the student learns to determine the hydrostatic forces exerted by water on a variety of structures, gates, tanks and dams. As part of a project, the student analyzes a complex tank full of water to determine the forces and centres of pressure. Special problems 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 analyzes a simple pump-driven circulation system and graphs all energy gradients in profile along the system. Evaluation is by individual interview, problems and quizzes.

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 acquires a knowledge of basic engineering terminology in construction, design, inspection and specifications relating to these various modes, and gains knowlege 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 gain an understanding of horizontal and vertical curves, pavement design, asphalt and concrete pavements, super-elevation, 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, students learn to apply these to analysis of real structures.

They also study the effects of wind, snow and earthquake loads as determined by national standards. Design and analysis of steel and timber beams, columns and trusses and their connections are used as examples.

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

42.007 Concrete Technology — The student learns how to design concrete mixes to meet strength, durability and workability requirements. Admixtures, curing methods, transporting and placing of concrete are discussed and each student is introduced, in the laboratory, to the latest sampling and quality control tests of concrete and its aggregates.

42.021, 42.022 Soil Mechanics 1 and 2 — 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 design problems, 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.

42.022 See 42.021

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, engineering and contracting businesses. Topics include contracts and specifications, estimating and bidding, labor-management relations, construction inspection and control, safety, environmental regard, construction problems abroad and specific current projects in the B.C. region. In addition, the student may participate in investigative projects on specific aspects of civil engineering construction or on construction techniques. Reports on planning or scheduling the construction of an already designed project like a bridge or approaches, wharf, dredging or an industrial building often involve the English Department.

42.041 Structures 1 — In general the course deals with elementary structural design through students' individual progress in projects, aided when 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 2 — 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; analyzes 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 during all projects.

42.043 Structures 3 — An existing bridge is chosen in consultation with the instructor, and the student designs, aligns and details an alternative crossing to the original. The student learns about layout, moving loads, influence lines, continuous girders, trusses, arches, deflections of spans, bridge deck floor systems, sway bracing, deck slabs, joint details, piers and abutments and piling.

42.044 Structural Design General — This course is designed for students taking Civil options. Through analysis and design projects, students are introduced to reinforced concrete as a structural material. The effects of continuity within structures are discussed in lectures, and connection details for all structural components in basic building materials are developed.

42.047 Structural Detailing — Students are required to design and detail connections and draw solutions to detailing problems taken from structures used in other related courses, i.e. timber, steel and reinforced concrete. Includes bill of materials and reinforcing bar lists.

42.051, 42.052 Municipal Services 1 and 2 — 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 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, stree 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.

42.052 See 42.051

42.053 Municipal Services General — 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.

42.055 Environmental Management — Through lectures and field trips students are introduced to the methods of waste water and solid waste treatment. Pollution control and the environmental impact of waste disposal are discussed and the students prepare project reports based on research and lecture material.

42.056 Hydraulics 2 — 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.

42.061 Highway Design — 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 design supervisor and consultant. Topics include preliminary investigations, design criteria, location, alignment, surface geometry, quantities, mass haul analysis, pavements and highway drainage.

42.062 Traffic Studies — This course is designed to introduce the student to basic concepts of traffic engineering through lectures and assignments. Topics include traffic stream characteristics, highway and intersection capacity, data collection techniques, intersection design and traffic control. This knowledge can

be applied in the areas of planning, highway engineering and commercial development.

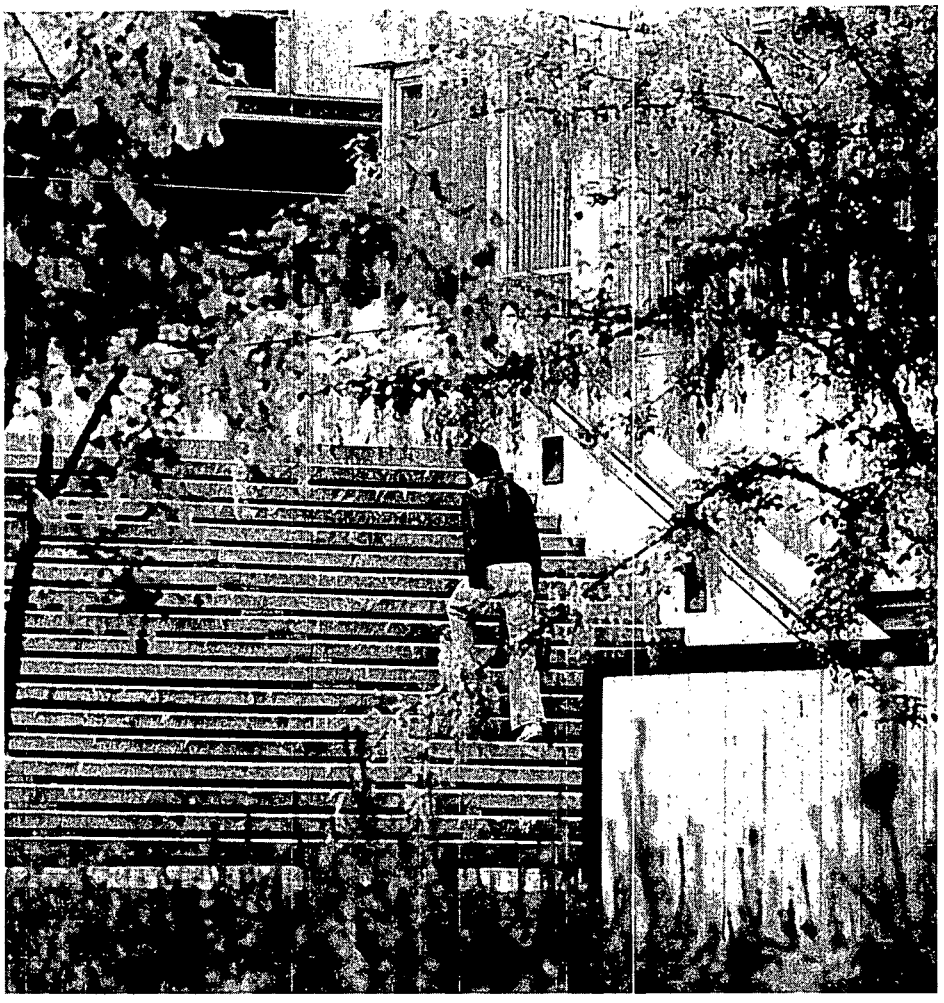
42.064 Asphalt Technology — This course introduces students to elementary practice and theory in the design, manufacture and control of asphalt quality. On completion of the course students should be able to: (1) identify asphalt cements and their uses; (2) test and blend aggregates for asphaltic concrete; (3) design asphalt mixes using the marshall method; (4) have an understanding of paving methods and inspection techniques.

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 generally 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



Faculty and Staff

R.B. Robins, M.Sc., M.I.C.E., C.Eng., P.Eng., *Department Head*
A.R. Barren, B.Sc., Ph.D., P.Eng., Chief Instructor
R.B. Brown, Dipl.T.
R. Butler, M.I.C.E, M.I.Struct.E., C.Eng., P.Eng.
M.J. Heinekey, Dipl.T., C.E.T.
F.G.Katzel, B.Sc., M.Sc., P.Eng.
G.Q. Lake, B.A.Sc., P.Eng.
J. McLean, B.Ed., C.E.T.
C.A. Payne, B.A.Sc., M.A.Sc., P.Eng.
E. Reid, M.I.C.E, C.Eng., P.Eng.
R.C. Starr, B.Eng., M.A.Sc., P.Eng., Chief Instructor
C.E. Wade, B.Sc., P.Eng.

Electrical

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

The Electrical 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. Graduates can choose 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 establishments such as B.C. Research, Department of the Environment, and smaller firms specializing in custom design and manufacture 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

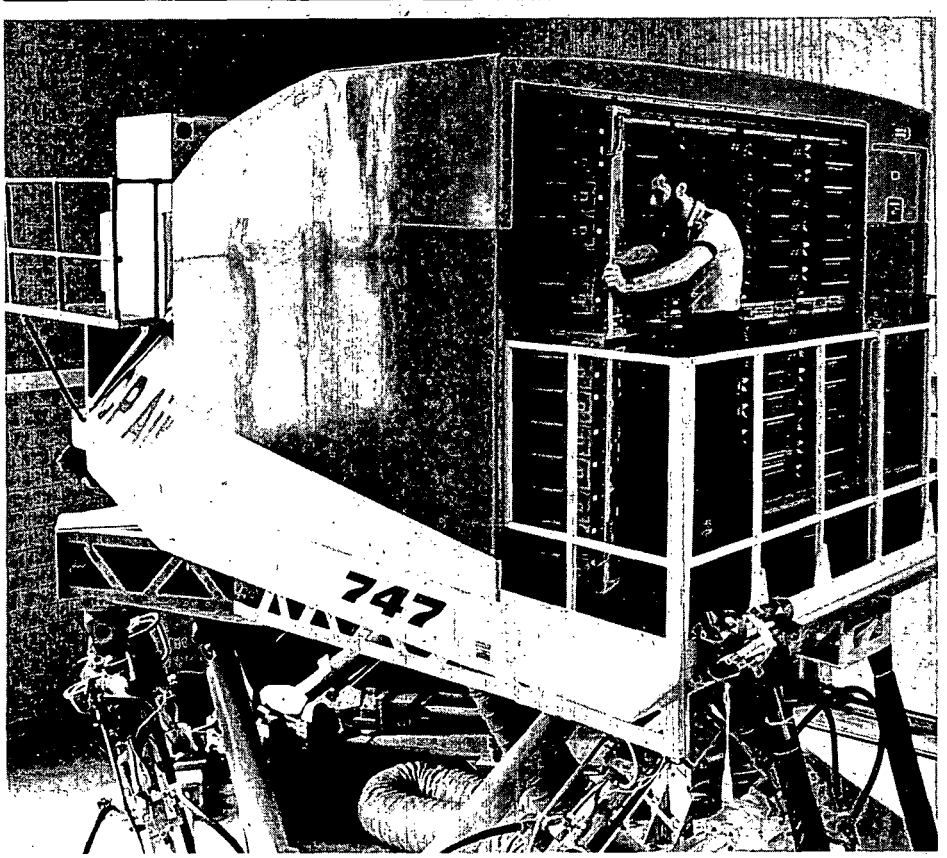
Four options are offered in the Technology: Control Electronics, Instrumentation, Power and Telecommunications.

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

Prerequisites

Graduation from 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.

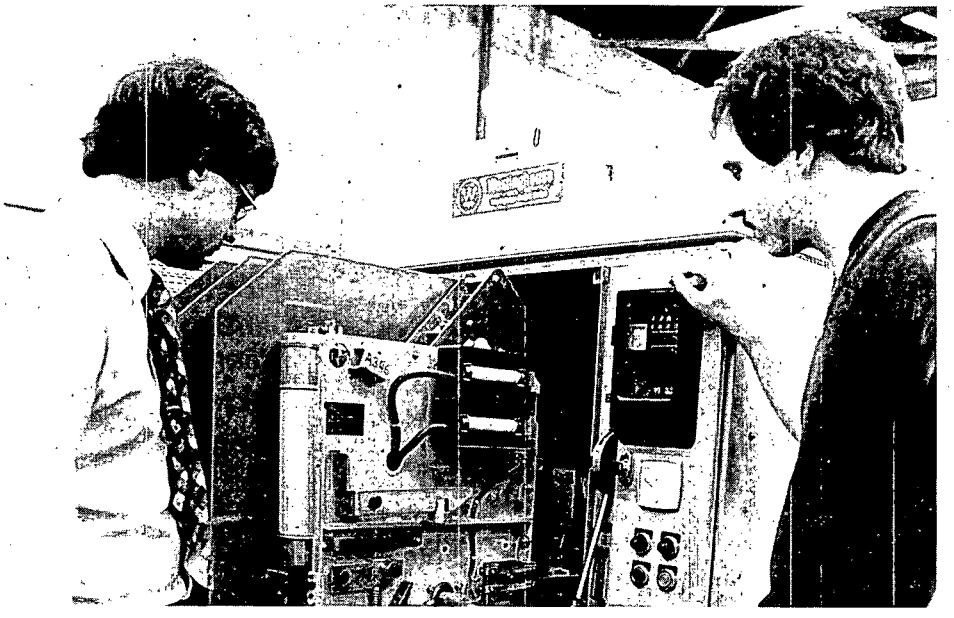
Math 12 is only acceptable if taken prior to 1978



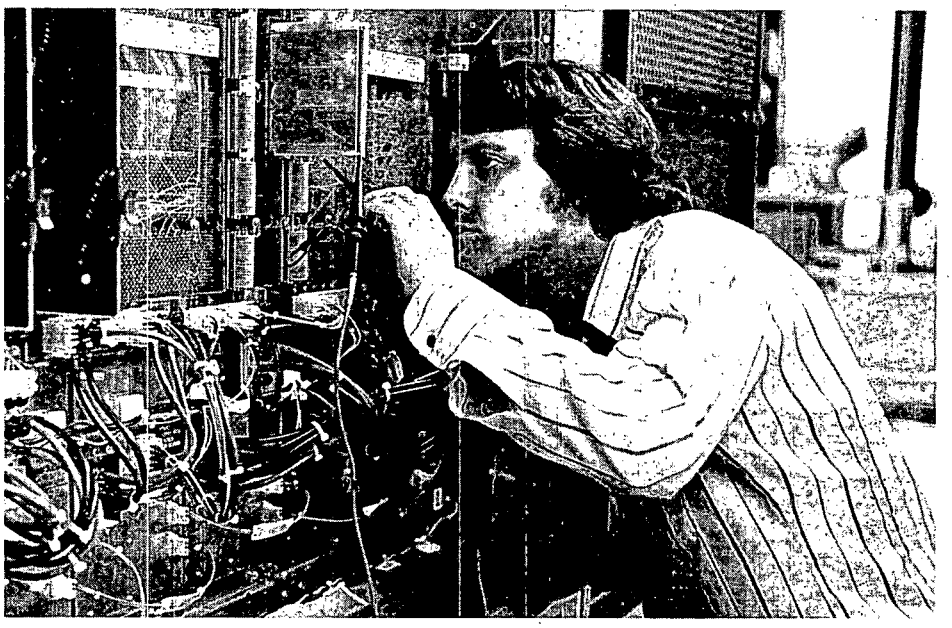
The **Control Electronics Option** presents a broad-based electronics course of study designed to provide the student with the background necessary for entry into a wide variety of areas in the electronics career field. Some emphasis is placed upon digital electronics, industrial electronics and digital 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 lecturers.

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-oriented 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 this 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 emphasis is placed on the practical aspects of all courses; consequently, a good portion of the student's time is spent carrying out practical assignments.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
31.143	Technical Writing	4
32.143	Basic Mathematics	7
33.106	Physics	5
41.109	Materials	3
43.102	Circuit Analysis 1	6
43.103	Shop Practice 1	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 1	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	
10.303	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	Industrial 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
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	
10.303	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	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	3	3
43.423	Power System Analysis	6	6
43.424	Industrial Systems	7	7
43.425	Utility Systems	7	7
	Library and Research	5	5
		35	35

Telecommunications

Year 2	Term 3	
32.343	Numerical Methods and Computing	3½
43.331	Electronic Circuits 2	6
43.332	Digital Principles	6
43.333	Non-linear Circuits	6
43.334	Telecommunication Principles 1	6
43.335	Electronic Fabrication	3½
	Library and Research	4
		35

Year 2	Term 4	4A	4B
10.403	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 2	6	7
43.435	Radio Systems and Propagation	—	7
43.436	Microwave Techniques	6	—
	Library and Research	5	5
		35	35

Subject Outlines

10.303, 10.403 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.

10.403 See 10.303

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 include electro-chemical principles and terminology, selection of transducers, electrolytic conductivity, specific ion probes, specific ion electrodes, flame ionization detectors, chromatographs and spectrophotometers. Lab exercises consist of design, construction and calibration of transducers such as coulometric electrodes and ionization detectors as well as construction of characteristic signal linearization and amplification circuitry.

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 audiovisual 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. An introduction to solving problems with the aid of a computer is also included.

32.243 Calculus — An introductory course with appropriate applications throughout 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; solution of algebraic and transcendental equations; numerical dif-

ferentiation 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 write computer programs with 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, temperature, heat, thermal properties of matter, vibrations and waves, electromagnetic 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 include transportation of fluids, fluid dynamics, Bernouli's equation and flow measurements, thermodynamics, heat transfer, heat balance equations, mass and energy balance, evaporation and distillation. Lab exercises involve "hands on" interaction with absorption columns, heat exchangers, flow measuring devices, flue gas analyzers, batch and binary distillation columns, energy balance and energy management.

41.441 See 41.341

43.102, 43.202 Circuit Analysis 1 and 2 — 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 1 and 2 — Provides practical training in the development of manipulative skills, as well as familiarization with electrical and electronic components. Topics include safety procedures; wiring methods and materials; electronic components; printed circuits; drawing standards and interpretation; drafting techniques and engineering standards.

43.201 Electronic Circuits 1 — Teaches how electronic circuits work, how to analyze them numerically and how to design, modify and combine them to perform complex functions. Topics include interpretation of transistor characteristic curves; voltage and current amplifying circuits; loadline analysis; choice of Q-point; bias circuits, stability; a.c. equivalent circuits; interstage coupling and frequency response; feedback; oscillation and oscillator circuits; power supplies, including voltage and current regulating circuits in discrete and integrated form; low frequency power amplifiers of various types; heatsink calculations; characteristics and application of other devices such as unijunction transistors, thyristors and field-effect transistors.

43.202 See 43.102

43.203 See 43.103

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

43.311 Electronic Circuits 2 — 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 application 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 Telecommunication Circuits — An introduction to 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 — This course deals with digital control logic and its 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 Electrical Equipment — This course is designed to give an understanding of the theory, characteristics and operation of equipment used in the electrical industry. Each item is covered individually, together with its application to complete electrical systems and drives. Topics include d.c. and a.c. motors and generators (types, losses, efficiencies, load requirements, running characteristics); 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 Principles — Instructs the student on the principles of digital electronics and prepares them for studies in the application of these principles in the succeeding term. Topics include an introduction to digital electronics; switch and relay control; number systems; solid state logic (TTL, CMOS); Boolean algebra; standard logic symbols; analysis and creation of combinational logic circuits; binary codes and coding; arithmetic logic; flip-flops; counters; shift registers and simple digital-to-analog and analog-to-digital conversion.

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 students to the principles of telecommunications. Beginning with the history of communications and the nature of speech and waveform composition, discussion develops into the various modulation techniques. These include amplitude modulation and its derivative, 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 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 devices are investigated. Operational amplifiers are also studied with emphasis on d.c. characteristics, important in such applications as differential and instrumentation amplifiers. Lab work consists 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 include logic gating networks. Boolean algebra, minimization techniques, code converters, flip flops, latches, registers, oscillators and arithmetic circuitry. Electronic properties of various gating families will be analyzed along with interface techniques between families and to the outside world. Lab exercises 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 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 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 include automatic control principles; feedback circuit design principles, devices and systems; block diagrams and transfer functions; pneumatic and hydraulic amplifier circuits applied to transmitters; signal converters; power amplifiers; computing circuits and position servomechanisms; control valve characteristics, specification and sizing: process static and dynamic characteristics influencing automatic control. Lab exercises are 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. 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 is 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 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 with equal emphasis on analogue and digital (microprocessor) systems. 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 Assembly 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; power transformers and associated reactances; development of the per unit computation method as applicable to voltage regulation of industrial and utility type three-phase power systems under steady state and transient conditions; short circuit studies of power systems and the technique to select suitable power circuit breakers; further development of symmetrical components and the introduction of sequence networks; double line and single line to ground and line to line asymmetrical power system faults; grounding transformers; power transfer capabilities of transmission systems and power circle diagrams and transient stability of power systems under fault conditions. In addition to regular class tutorials, students are assigned an individual high voltage power project which will be computer-monitored to check its accuracy.

43.425 Utility Systems — Deals with the characteristics of the equipment used by an electrical utility, its organization and operation. Topics include synchronous machines; generating sources (hydro and thermal); synchronizing; load sharing; HV breakers ad their control circuitry; HV fuses; arrestors; current and potential transformers; protective relaying; coordination studies; transmission systems; substations; and rate structures. This course is a continuation of Electrical Equipment (43.324).

43.424 Industrial Systems — Teaches the design of electrical systems for industrial plants and commercial buildings. Topics include electrical system organization; protective devices (i.e. fuses and circuit breakers); lighting equipment and layouts; feeder calculations and ratings; demand factors; motor feeders, motor control centres; switchboards and unit substations; voltage levels; grounding and ground fault protection; system protection and coordination; together with the appropriate sections of the Canadian Electrical Code.

43.431 Voice and Data Networks — This course introduces students to the present day North American Telecommunications Network. Topics include evolution of the telephone system, both transmission and switching areas; transmission mediums; frequency division multiplexing; time division multiplexing including pulse code modulation; introduction to data communications applications; introduction to fiber optics; switching systems including step by step (strowger), crossbar—common control; electronic space and time division types; all associated signalling, power and traffic considerations.

43.432 Digital Applications — Applies the knowledge gained in 43.332 to study the sub-systems used in Digital computers and industrial communications, and navigation equipment. Topics include Digital test equipment; time division Analog and Digital multiplexing; solid state memories; introduction to the digital computer; hardware organization of typical microcomputers; simple Assembler language programming; interfacing microcomputers with external devices; application of the microcomputer as a sub-system of communication and navigation systems.

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 2 — Continues the development of circuits and techniques 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 modes of propagation of electromagnetic energy and the types of equipment used to establish telecommunication links. Topics include ground, sky and space-wave propagation; microwave paths; environmental factors; site considerations; point-to-point communications; and noise performance of communication systems.

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

43.441 Electronic Signal Conditioning — In this course, the students study the means by which process signals are transmitted and conditioned in the process control loop. Topics 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 are also studied. Lab practice includes 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 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 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 (43.343) this course covers industrial measurement techniques for strain, temperature, humidity and dewpoint.

Topics 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 consist of design and construcion, and analysis of typical transducers.

43.444 Process Control Systems — This course is a continuation of Control Devices and Techniques (43.344). 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 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 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 multimode controllers used in instrumentation. Topics 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 is studied as well as the trade-offs between electronic and microprocessor based systems. Analysis of industrial 3-Mode controller circuitry is included, as well as interface requirements from typical computer-manual and computer-auto-manual stations to computer-based control systems. Lab exercises include construction of hardware and software controller circuits and testing of their operation on real and simulated processes.

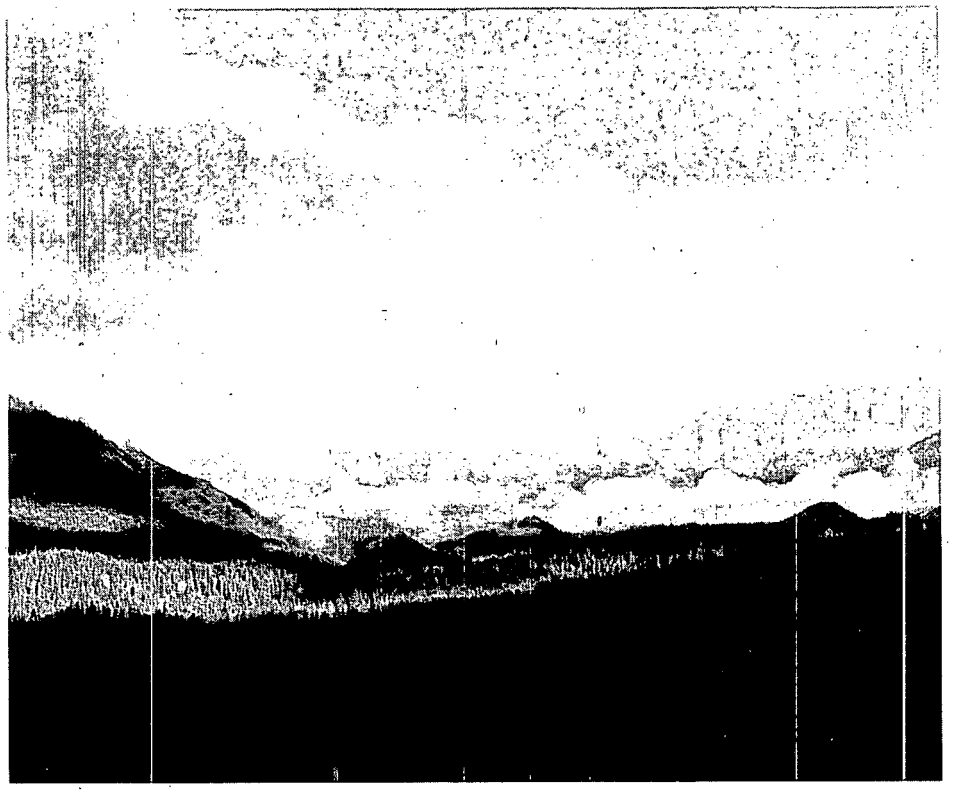
43.447 Process Computers — This course deals with the applications of mini- and micro-computer systems to real time monitoring and control of industrial processes. Topics include Assembler and high level language programming techniques, configuration of typical process interfaces and implementation of 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 (43.443) developing skills in 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 are studied. The laws of spectrometry are investigated as well as ultra violet, visible and infra-red spectrometers, dispersion and diffraction methods and non-dispersive analyzers. Students also learn the industrial applications of pH measurement and typical methods by which it is controlled. Lab exercises 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*
E.H.V. Back, Dipl.T., C.E.T.
R.J. Barrett
U.R. Bottcher
J.C. Browne
J.H. Casimir, B.A.Sc., P.Eng., Chief Instructor
R. Chadwick
T.W. Coghlan, Dipl.T., C.E.T.
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.
G.R. Harland, Dipl.T.
J.A. Hopkins, Chief Instructor
S.D. Hughes, B.A.Sc., P.Eng., Chief Instructor
K. Kajiwara, Dipl.T., C.E.T.
E.J. Kemp
J.G. Kenyon, P.Eng.
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.
I. Ross, B.Sc. (hons.)
R.T. Russell
L. Sawkins, Dipl.T.
J.W. Schoonover, Dipl.T., C.E.T.
E.W. Scratchley, B.A.Sc., M.A.Sc., P.Eng.
J.N. Tompkin, B.Sc. (Eng.), P.Eng., Chief Instructor
E.A. Upward, Dipl.T., C.E.T., Chief Instructor
A.R. Walker, B.Sc.
J.E. Warkentin, Dipl.Adult Ed., M.A. (Ed.), C.E.T.



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 Opportunities

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

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

The Program

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

Fish, Wildlife and Recreation covers the management of fish, wildlife, and 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. Industrial experience strengthens an application for either of the options. Skill in report writing is highly desirable, and initiative, efficiency and leadership abilities are important qualities.

The following special prerequisites are required for individual options:

Forestry:	Algebra 12 with a C+ standing, and a science 11 (Biology preferred). If the standing in Algebra 12 is not adequate, Math 32.950 (pre-entry mathematics) with at least 65% standing (or approved equivalent) must be completed before entry.
Fish, Wildlife and Recreation:	Algebra 12 as above 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

Year 1	Term 1	Forestry Clrm hrs/wk	F.W.R. Clrm hrs/wk
31.145	Technical Communication	3	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	—
45.104	Natural Resources I	7	7
45.106	Photo Interpretation and Mapping	4	4
45.110	Fire Control I	3	3
45.121	Special Computer Applications	—	2
	Library and Research	4	3
		35	35

Year 1	Term 2	Forestry Clrm hrs/wk	F.W.R. Clrm hrs/wk
10.273	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
45.202	Forest Measurements II	8	—
45.204	Natural Resources II	5	5
45.206	Photo Interpretation and Mapping	4	4
45.210	Fire Control	2	—
45.220	Soils	4	4
	Library and Research	3	5
		35	35

Year 2	Term 3	Forestry Clrm hrs/wk	F.W.R. Clrm hrs/wk
10.381	Organizational Behavior	3	3
31.345	Advanced Technical Communication	2	2
45.302	Forest Measurements III	6	—
45.305	Timber Harvesting	5	—
45.308	Roads and Transportation I	6	—
45.313	Forest Pestology I	4	—
45.317	Silviculture I	4	—
45.321	Recreational Land Management I	—	5
45.322	Wildlife Management I	—	5
45.323	Fish Management I	—	6
45.327	Projects	—	6

Year 2	Term 3 cont.	Forestry	Clrm hrs/wk F.W.R.
45.328	Summer Technical Report	1	1
45.329	Environmental Inventory Techniques I	—	5
	Library and Research	4	2
		35	35

Year 2	Term 4	Forestry	F.W.R.
31.445	Technical Communication	2	—
45.402	Forest Measurements IV	6	—
45.405	Log Production and Cost Control	4	—
45.408	Roads and Transportation II	5	—
45.413	Forest Pestology II	4	—
45.416	Forest Management	4	—
45.417	Silviculture	5	—
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 II	—	4
45.430	Law Enforcement	—	2
	Library and Research	5	6
		35	35

Subject Outlines

10.273 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 studies 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. In particular the course looks at how his behavior affects the achievement of the organization's purposes. Within this context, such concepts as leadership, communications, power, authority, change and conflict are 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 occurs directly in lab periods and some takes 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.

31.245 See 31.145

31.248 Technical Communication — A continuation of 31.145, covering job-finding techniques; letters and memos; long, formal reports. The course is presented through one lecture and two labs per week.

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

31.445 Technical Communication — Public speaking: oral communication techniques, graphics and audiovisual 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, 32.154 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, 32.254 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 is designed to familiarize the student with forest surveying methods used in logging layout and forest measurements.

45.103 Wood Utilization — This course 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.

45.104 Natural Resources I — The 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 plants, in forest, range land and alpine habitats of British Columbia, and their uses in land management practices.

45.106, 45.206 Photo Interpretation and Mapping I and II — Practical use and application of aerial photography in natural resources. Classification, reconnaissance, planning and inventory 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 Map-O-Graph, Kail plotters and pantographs. Drafting and map reproduction techniques.

45.110, 45.210 Fire Control I and II — Historical review of fire behavior simulated to show the effects of topography, fuel and weather conditions. Presuppression, including fire-danger ratings, detection, reporting and general preorganization of industrial and government agencies. "Forest Act", Part XI. Fire suppression techniques through fire simulation training in initial action and problem-solving.

45.121 Special Computer Applications — Introduction to computers and their application to various Fish, Wildlife and Recreation requirements.

45.202 Forest Measurements II — Methods of measuring 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.

45.204 Natural Resources II - This course provides students with background information on and an understanding of the important uses of forest land. It covers those resources associated with forest land and the problems of administration, management, multiple use and utilization. The principal resources considered are forests, fish, wildlife, range land, water, recreation and minerals. The course also covers ecology, from two main viewpoints. Ecological principles first, and the practical application of these principles to renewable resource management second. Examples

are drawn from current environmental issues.

45.206 See 45.106

45.210 See 45.110

45.220 Soils — A study of the geology, landforms and development of soils in British Columbia. Physical and chemical nature of soils. Soil erosion and preventive measures. Soil surveys and land use studies.

45.302, 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 coastal 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 road location, construction, maintenance and costing. Preparation of plans and profiles. Measurement of earth and rock work. Optimum road standards, Culvert and simple logspan bridge design, construction and maintenance. Hauling costs. Log dumps, land sorting areas and booming grounds. Water transportation of logs.

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.

45.317 Silviculture I — 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, wild-land 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 fish, including anatomy, taxonomy, physiology, behavior and ecology. Management aspects of fisheries, including population dynamics, habitat evaluation and improvement, harvesting, pollution and fishery regulations. Labs deal with methodology as it applies to the above, and much of the training in this regard will be done in the field. Emphasis throughout is on the British Columbia situation.

45.329 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

45.413 See 45.313

45.416 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.

45.417 Silviculture II — 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.

45.421 See 45.321

45.422 See 45.322

45.423 See 45.323

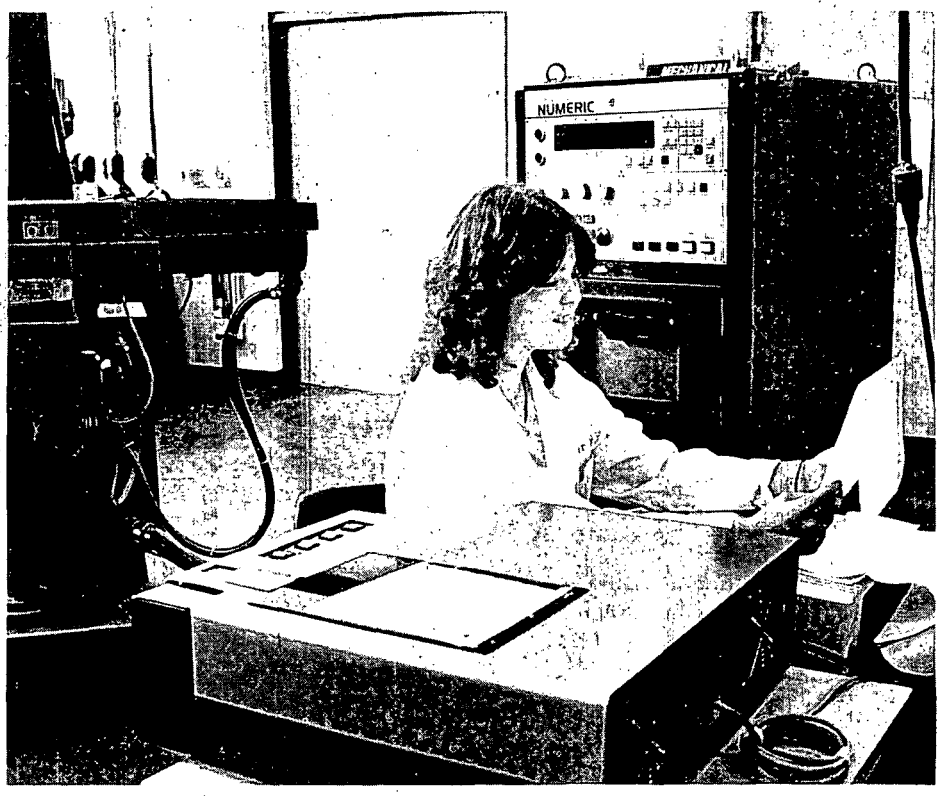
45.427 See 45.327

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

H.R. Chisholm, B.A.Sc., P.Eng., *Department Head*
N.E. Alexander, M.P.M.
M.R. Angelo, B.S.F., M.F.
D. Campbell, Dipl.T.
W.R. Cannon, B.A., Chief Instructor
F. Cassetta, B.Sc.F., R.P.F.
C.W. Chestnut, B.A., Ph.D., Senior Instructor
T.D. Chisholm, B.Ed.
E.C. Crossin, B.S.F., R.P.F.
J.A. Cuthbert, B.S.F., R.P.F.
G. Daykin, B.A.Sc., P.Eng.
C.J. Diebold, C.A.M.
D. Guthrie, B.Sc., M.Sc., Ph.D.
V. Heath, B.S.F., R.P.F.
D.C. Holmes, B.A.Sc., M.F., R.P.F., P.Eng., Chief Instructor
E.W. Howard, M.F., Senior Instructor
A.G. Jakoy, B.S.F., M.F., R.P.F.
R. Kley, Dipl.T.
H. Lenko, B.S.F., R.P.F.
H. Lynum, B.A.Sc., R.P.F.
C. Macintosh, Dipl.T.
R.W. Reisen, E.T.I.
J. Simpson, B.Sc.F., M.Sc., Senior Instructor - Second Year
B. Sivak, Ph.D., R.P.F.
P. Willms, Dipl.T.
P. Yanciw, B.A.Sc.



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 analyze problems, propose efficient technical solutions, implement these solutions and evaluate the results.

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

The Program
In the first three terms, all students in the technology have the same curriculum which includes math 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.

Math 12 is only acceptable if taken prior to 1978

Course of Studies

		Clrm
Year 1	**Term 1**	hrs/wk
31.149	Technical Communication	4
32.149	Basic Technical Mathematics	5
41.105	Engineering Materials	4
49.100	Mechanical Drafting I	3
49.107	Statics	4
49.145	Manufacturing Processes I	6
49.160	Engineering Economics	4
	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	3
49.207	Dynamics (Term 2A)	4
49.208	Mechanics of Materials	4
49.212	Thermal Processes (Term 2B)	4
49.245	Manufacturing Processes II	4
	Library, Research and Field Trips	4
		35

Year 2	**Term 3**	
32.349	Numerical Methods with BASIC	4
43.353	Electrical Equipment Applications	4
49.300	Mechanical Drafting III	2
49.312	Machine Design I	5
49.325	Thermal Engineering I	5
49.335	Fluid Engineering I	6
49.345	Manufacturing Processes III	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**	
32.494	Computer Graphics	3
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
	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 for them to become effective writers and speakers in engineering industries. The lectures introduce students to communication theory and to the style, content and graphics of technical writing. The labs review writing and speaking skills and apply these to oral reporting, writing lab reports, technical letters, 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 practical training in the technical reporting that is used in engineering industries. Students 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, introduction to differential and integral calculus with emphasis on the mechanical field. Prerequisite for 32.249.

32.249 Calculus — An introductory course to calculus and its technical applications. Topics include 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 BASIC — 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.

32.494 Computer Graphics — This course introduces students to interactive BASIC, and concepts of programming in two and three dimensions. Students experience "hands-on" practice with computer graphics systems.

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 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.

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.

49.160 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 analyzed.

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.

49.207 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.

49.208 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 cyclinders, riveted and welded joints. Lab testing of engineering materials and common machine elements.

49.212 Thermal Processes — This course is intended to provide an introduction to 49.325. Topics include heat energy, work, processes and systems, ideal gases, enthalpy and entropy, first and second law 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.

49.300 Mechanical Drafting III — Advanced practises in geometric tolerances, cams, structural steel and plant layouts, motor and pump mounting and material handling conveyors are studied.

49.312 Machine Design I — This course consists of a study of the 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 makes 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.

49.412 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 analyzing 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.

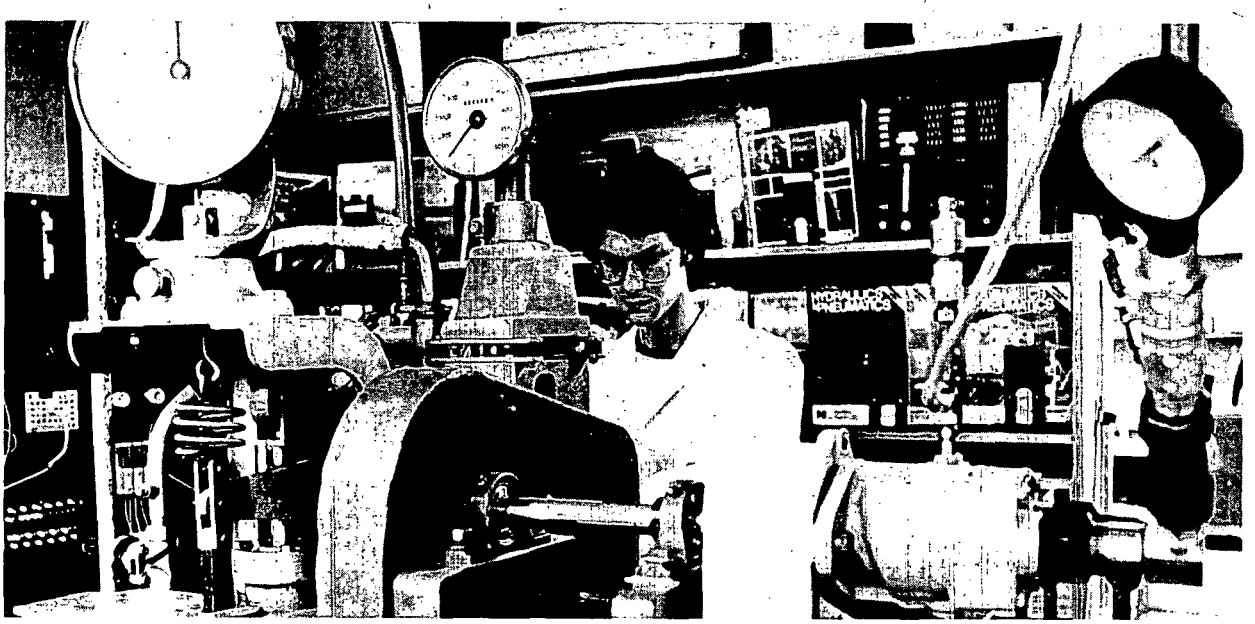
49.460 Metrology — Interferometers and associated devices. Optical comparators, measurement of surface texture and surface flatness. Air electronic, mechanical and pneumatic gauging procedures. Metrology of angles and screw threads. Use of precision measuring instruments. Fundamentals of inspection and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

S.C. Todd, M.I.Mech.E., C.Eng., F.I.E.D., P.Eng., *Department Head*
M.E. Acosta, M.I. Mar.E.(Columbia)
A.P. Adamo, B.Sc.
D.K. Bannerman, B.A.Sc., S.M., P.Eng., M.A.S.M.E.
G.T. Benson
R.M. Brown
R.O. Darling, B.Sc., P.Eng.
O.C. Edwards, B.A.Sc., M.S., P.Eng. Chief Instructor
M. Fairburn, H.N.C.
D.C. Gerlitz, B.Sc., M.S., P.Eng.
E. Graham, C.E.T., M.A.S.M.E., H.N.C.
R.G. Graham, B.Sc., M.A.S.H.R.A.E., P.Eng., Assistant Head
G. Henderson, Dipl.T., C.E.T.
B.E. Horlacher, Dipl.T.
G.D. Johnson, M.I.Mech.E., C.Eng., M.I.Prod.E. P.Eng, Chief Instructor
K. Johnson, A.S.T.M.E.
E.H. Labounty, M.A.S.H.R.A.E.
W.D. Mason, C.E.T.
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 provide 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 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 good stereo vision.

Math 12 is only acceptable if taken prior to 1978

Course of Studies

Year 1	Term 1	Clrm hrs/wk
31.151	Technical Communication	3
32.151	Basic Mathematics	7
33.115	Physics for Surveying Technology	5
42.512	Elementary Hydrology	3
49.101	Drafting	2
51.101	Plane Surveying Computations	3
51.104	Field Surveying I	8
	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 - Survey	2
51.201	Plane Surveying Computations	3
51.204	Field Surveying I	8
	Library and Research	5
		35

Survey Option

Year 2	Term 3	Clrm hrs/wk
14.322	Computer Applications	2
32.351	Statistics	3
51.301	Plane Surveying Computations	2
51.302	Geodetic Surveying II	3
51.303	Mathematical Cartography	3
51.304	Field Surveying II	7
51.305	Drafting	3
51.306	Astronomy	2
51.307	Photogrammetry	2
51.308	Description for Deeds	2
	Library and Research	6
		35

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

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

Year 2	Term 4 cont.	Clrm hrs/wk
51.420	Planning and Land Utilization	2
	Library and Research	4
		35

Subject Outlines

14.222 Computer Applications — This course covers computer applications in engineering and medical technologies: how a computer works; recognizing problems suitable for computer solution; flowcharting and communicating with computer personnel. Emphasis is on the use of computers to solve problems related to the technology concerned. Where available, "package" programs will be demonstrated and used by students. FORTRAN or BASIC programming language is taught depending on the technology.

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 also be spent on oral skills. Students receive core information in the one-hour weekly lab. This information is applied to specific writing and speaking tasks in the weekly two-hour lab. Students 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 Plane Surveying Computations — Mathematical basics; plane trigonometry; solution of triangles; computers; coordinate systems (Rectangular, Polar); inversing bearings and angles; traverses (open and closed); adjustments, compass and transit rules; location of errors; missing parts; U.T.M. traverses; adjustment of level loops; areas by D.M.D. and coordinates; geometry of the circle; application of curves in surveying; vertical curves; introduction to transition curves; areas and volumes; intersection and resection, inaccessible base.

51.104, 51.204 Field Surveying I — An introduction to the types of surveying and the history of surveying. The course also covers fundamental principles; accuracy and precision; linear measuring; trigonometric and differential levelling; plane table; angular measurement; compasses; theodolites; basic electronic distance measuring; stadia; circular curves; and topographic surveys.

51.201 See 51.101

51.204 See 51.104

51.301, 51.401 Plane Surveying Computations — Geometric spaces in surveying, surveying measurements, propagation of errors, computers and numerical approaches in surveying; computations of control surveys, triangulation, trilateration, traversing, reduction of eccentric measurements, intersection, resection, inaccessible base; transformation of coordinates, partitioning of land, horizontal and vertical curves; integrated surveying; deformations; three dimensional surveying systems.

51.302, 51.402, Geodetic Surveying II — This course generally deals with surveys which take into account curvature of the earth. It covers computations on the ellipsoid, triangulation, trilateration, trigonometric levelling, geodetic levelling, satellite geodesy and 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 — This course deals with the field methods used in conjunction with plane and geodetic surveying. Course work is done together with 51.304 (students learn how to use the different instruments) and 51.404 (students make use of the instruments in practical projects). The 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 — An 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 — An 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 — The 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 — This course 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

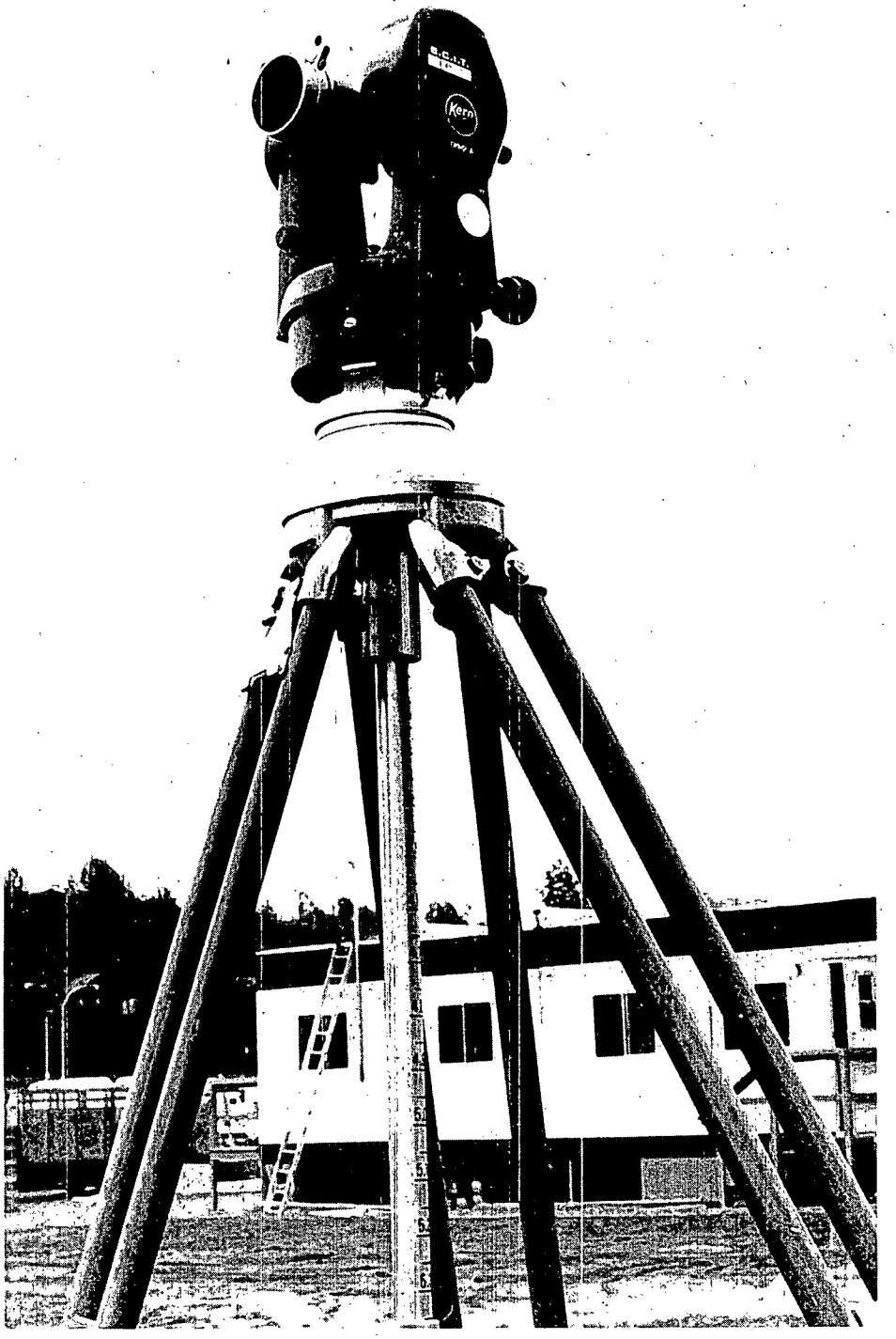
51.417 See 51.317

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.

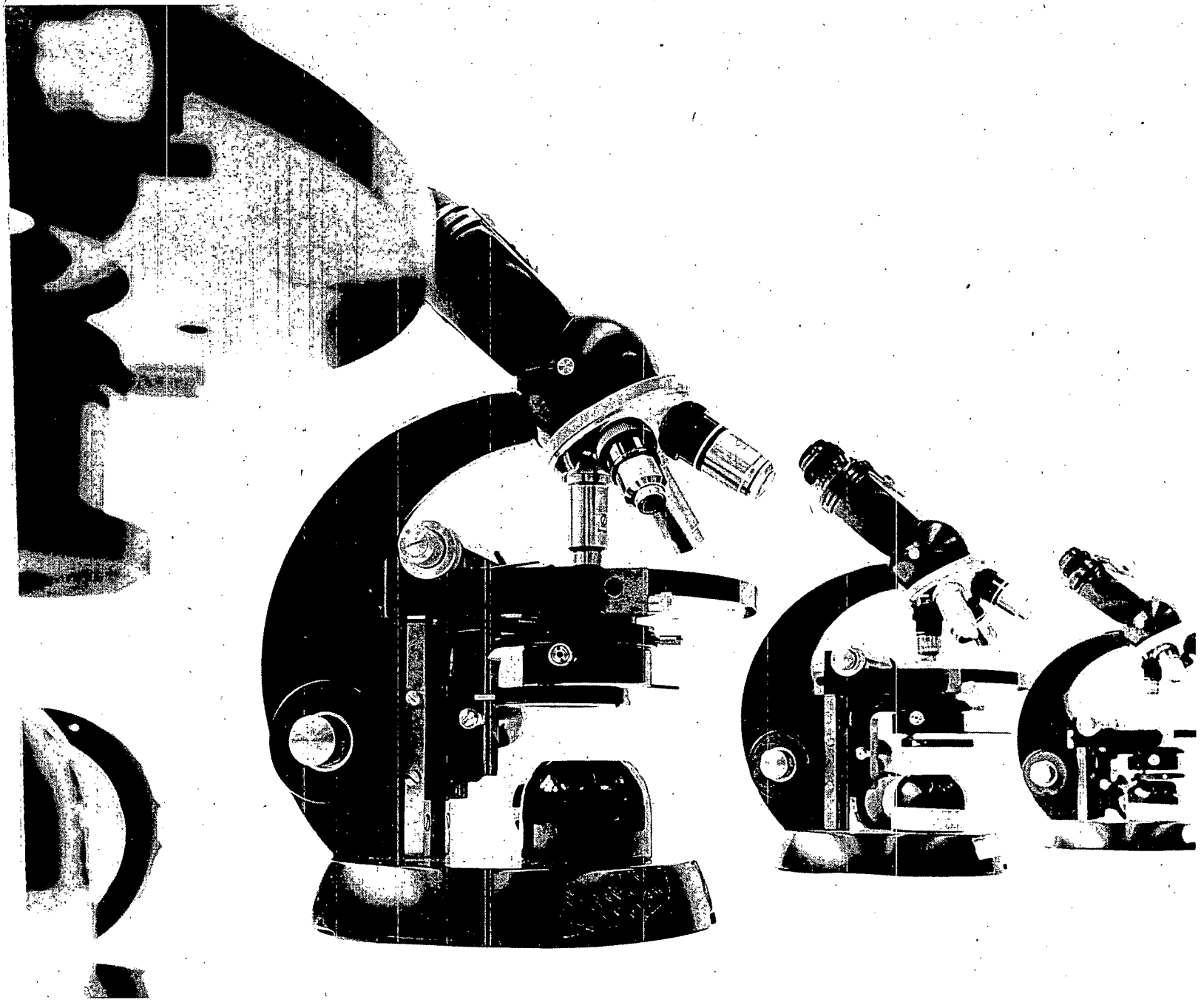
51.421 Natural Sciences — A study of the forest flora of British Columbia; the characteristics of native trees, their identifying features and common uses; elementary geology, including the study of rocks and minerals, geologic structures, general location and uses of common ores, soil classification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

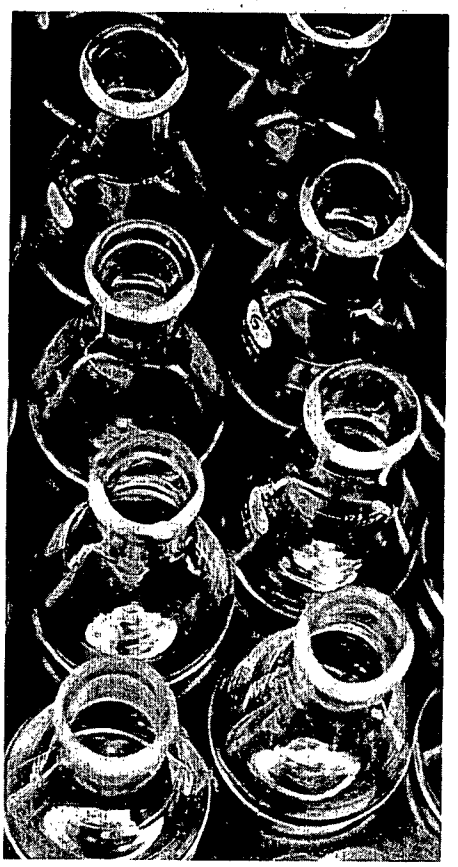
Faculty and Staff

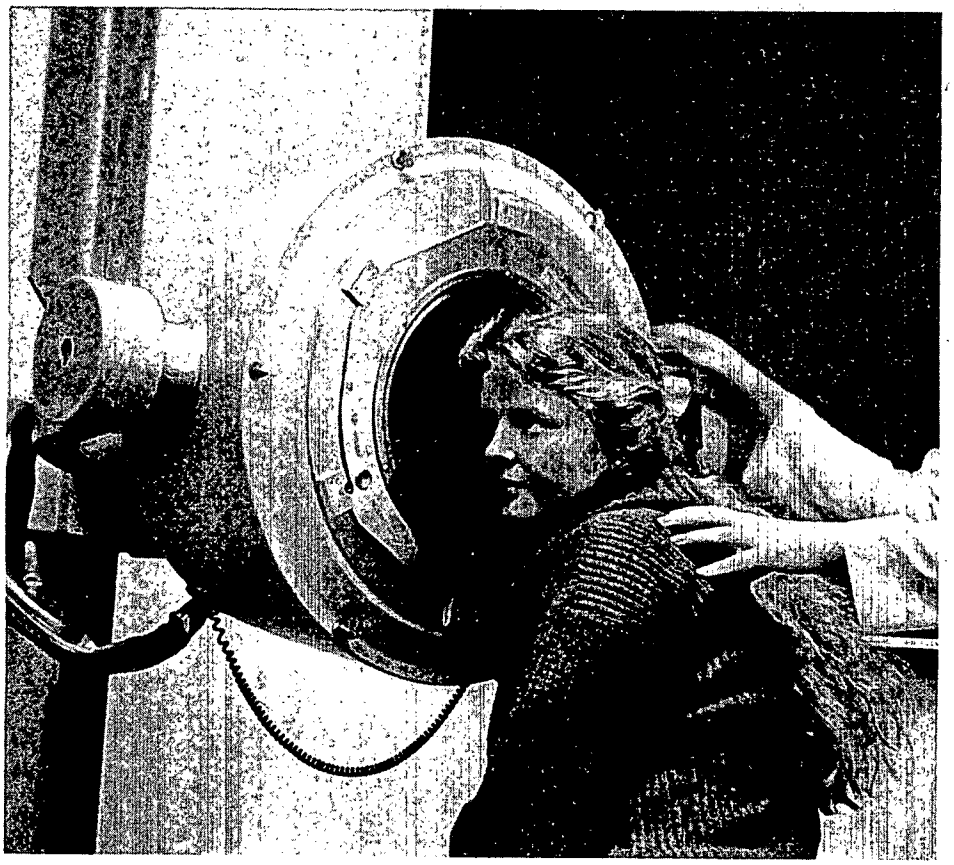
R.I. McNeil, B.Surv., B.C.L.S., D.L.S., Dipl. Adult Ed., P.Eng., *Department Head*
G.E. Anderson, Dipl.Adult Ed.
G.T. Bedwell
R. Bremner, Dipl.T.
J.S. Caldwell
D.C. Deans, B.A., Chief Instructor
K. Errington, B.C.L.S., Cert.Min.Surv., Senior Instructor
K. Frankich, Dipl.Ing., M.A.Sc.
K. Gysler, B.Eng., M.Eng., D.L.S., P.Eng., Chief Instructor
D. Jarvos, Dipl.T.
G. Kehoe, B.A.Sc., B.C.L.S.
D.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.



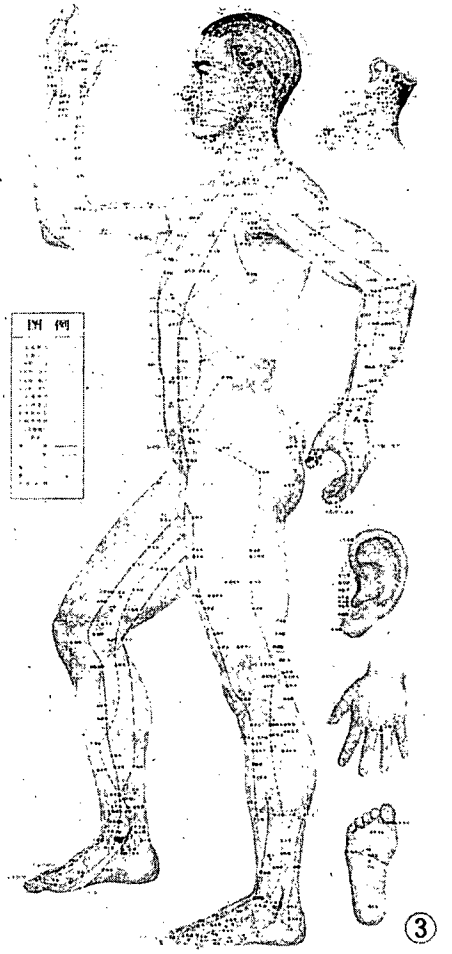
Health

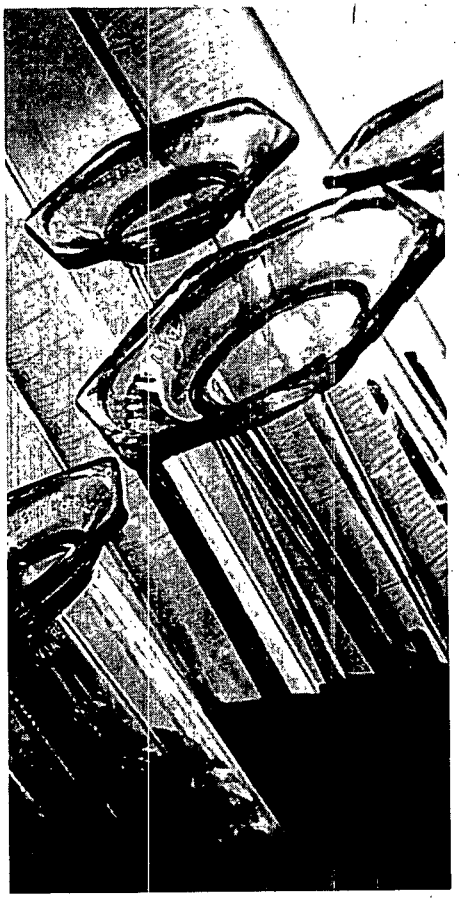






针灸穴位挂图





Basic Health Sciences

Department of Basic Health Sciences

This department provides basic courses in human anatomy and physiology, genetics, immunology, microbiology and the behavioral sciences for students enrolled in health technology programs. These courses are designated by the prefix "98". Each course is oriented towards a particular technology so that, although the material studied is introductory in nature, the student quickly becomes aware of applications. In many cases these courses become the foundation upon which specific technology subjects are built. The department's responsibility, therefore, is to teach those concepts of 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 possess excellent communicative skills, as well as considerable tact and discretion in working with people at all levels within the community.

Job Opportunities

Employment possibilities for public health inspectors include municipal, provincial and national health agencies, environmental and pollution control agencies and private businesses and industries like 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 from 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. Applicants should be able to show evidence of maturity, have a positive outlook and be interested in serving the community.

Math 12 is only acceptable if taken prior to 1978

Post-graduation

After completing the requirements of the two-year program leading to a Diploma of Technology, graduates must complete six months of field training in a recognized health unit under the direction of a medical health officer and a public health inspector. Successful candidates may then sit a national 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	4
82.102	Food Sanitation	4
82.103	Public Health Inspection I	4
98.123	Public Health and Pollution Control/Microbiology	3
	Library and Research	10
		35
Year 1	**Term 2**	
30.208	General Chemistry for Environmental Health	6
31.282	Communication for Health Technologists	2
32.282	Statistics	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**	
30.418	Industrial Chemical Processes	2
31.482	Advanced Communication for Health Technologists	1
41.413	Environmental Analytical Methods	3
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 combusion 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.

30.418 Industrial Chemical Processes — This course is designed to give the student an overview of the various chemical processes used in industry; the chemicals used, chemical reactions, products manufactured, waste products and pollutants produced and the hazards to personnel. Students will make field trips to selected industries.

31.282 Communication for Health Technologists — This course provides an introduction to the general principles of writing and their application to professional writing tasks. A short course in reading and study skills is included.

31.382 Advanced Communication for Health Technologists — This course offers an intensive study of report formats commonly used in the public health field: memoranda, field reports, formal reports and letters.

31.482 Advanced Communication for Health Technologists — This course is a continued study of report writing. There is also some practice in oral reports and meeting participation.

32.182 Basic Mathematics — Measurements systems of units; review of algebra, functions and graphs; exponents and logarithms, logarithmic and exponential equations; log-log and semi-log graphs; trigonometry.

32.282 Statistics — Descriptive statistics; probability; binomial and normal distributions; sample mean and estimation; hypothesis testing; regression and correlation.

33.212 Environmental Physics — An introduction to the physical principles, properties and relationships of physical quantities and how they affect each other. Motion, force, energy, power, properties of matter, thermal energy, electricity, wave motion, sound light and radiation as they apply to environmental topics. The lab program emphasizes measurements, data analysis and experimental techniques while confirming and expanding the lecture concepts.

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 to 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 in 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.

82.311 Environmental Health Relations — — This course examines the interrelationships and interactions between various government departments, agencies and corporations. Additionally, the forces which underly the social behavior of groups, large organizations and communities will be examined. Interpersonal relations will be exemplified through the practical application of public health education and the interaction of personnel in the environmental health field. Principles of public relations will also be examined with emphasis on problems peculiar to public health.

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 calibration techiques, utilizing state-of-the-art instrumentation.

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 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, distribution and associated problems of municipal water supplies. Various methods of municipal sewage treatment, the collection system, characteristics and treatment of domestic and industrial wastes and waste 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 to food, water, sewage and waste disposal.

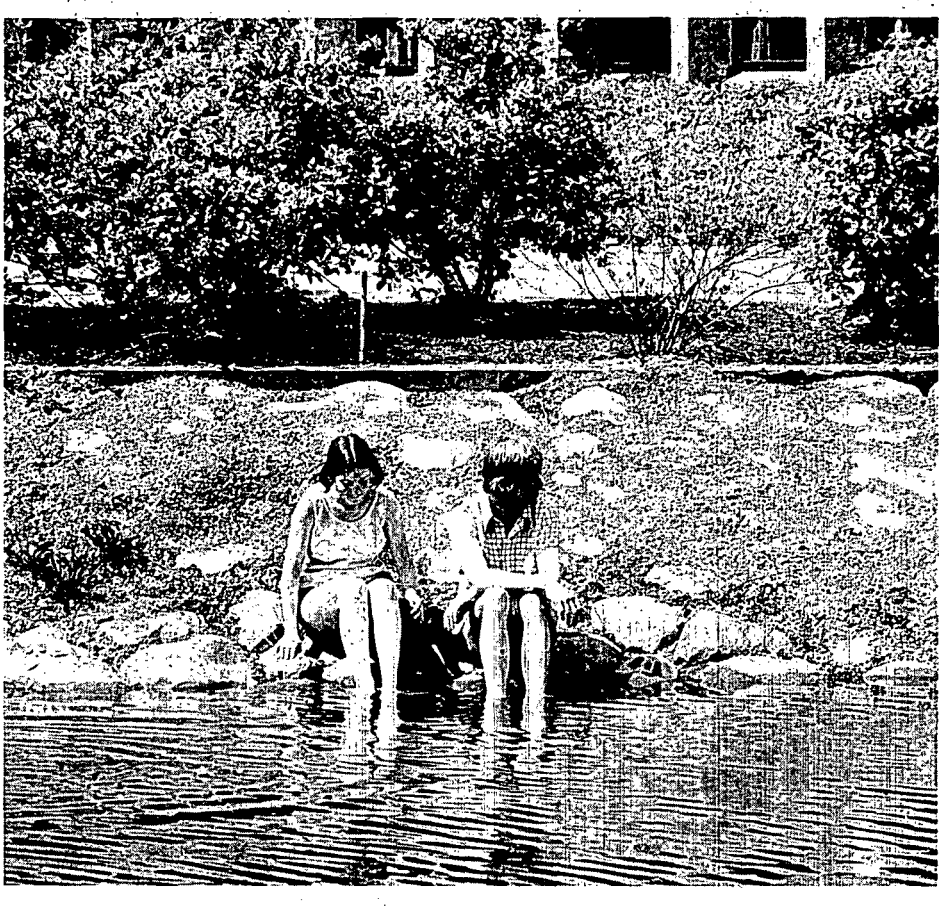
98.204 Basic Anatomy and Physiology — This course is designed to provide a basic knowledge of human anatomy and physiology. Emphasis is placed on the physiology of the human body systems and how environmental factors can affect these systems.

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)



Occupational Health and Safety

Department of Environmental Health Services

One of the primary purposes of this program is to graduate individuals who are able to provide the knowledge and leadership necessary to develop programs in industry that will assist in conserving life, health and property. They will consult with company and labor officials on ways to improve productivity by implementing loss control programs.

Graduates will also identify health and safety hazards in the work environment and advise corrective action.

The occupational health and safety officer will assume a major role in the development and conduct of safety-training programs for workers. Accidents will be investigated to identify their root causes, and methods found to eliminate recurrences.

To achieve these career objectives the applicant is expected to be a mature, objective person who possesses the ability to communicate decisions and goals in a tactful and professional manner.

Job Opportunities

Employment opportunities in the Occupational Health and Safety field are excellent. Private industry and the public sector have shown a definite need for graduates.

Career openings are available in industries where the health and safety of the workers is of concern.

The Program

The science-oriented program includes combined studies in the health, engineering and business fields. This ideal combination prepares the student to understand the potential safety and health hazards of the work environment, as well as the human relations involved in seeking a beneficial solution or method of improving the workplace environment.

Prerequisites

Graduation from the Selected or Combined Studies Program with Algebra 12, Chemistry 11 and Physics 11 or their equivalents. Mature students lacking a prerequisite will be considered on their related academic or employment records. Candidates will be interviewed.

Course of Studies

Year 1 Term 1	Clrm hrs/wk
Communication I	3
Basic Mathematics	5
General Chemistry I	5
Physics I	5
Drafting and Blueprint Reading	2
Principles of Accident Prevention I	5
Library and Research	10
	35

Year 1 Term 2	
Communication II	3
Calculus, Probability and Statistics	3
General Chemistry II	5
Physics II	5
Mechanics of Materials	2
Organizational Behavior	2
Principles of Accident Prevention II	4½
Anatomy and Physiology	2
Library and Research	8½
	35

Year 2 Term 3	
Organic Chemistry I	5
Machine Design	5
Engineering Materials I	4
Management Engineering (with Ergonomics)	5
Personnel Administration	2
Industrial Hygiene I	5
Policies in Industrial Health and Safety I	3
Library and Research	6
	35

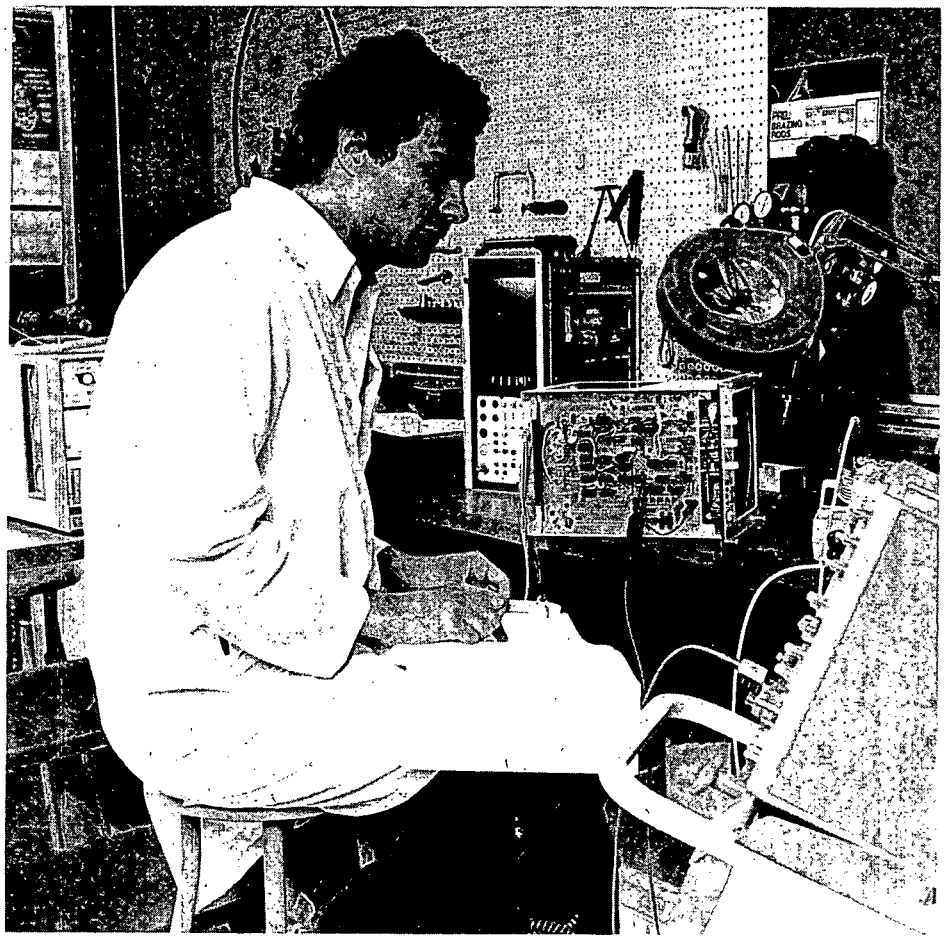
Year 2 Term 4	
Communication III	2
Organic Chemistry II	5
Industrial Chemical Processes	3
Engineering Materials II	4
Fundamentals of Electrical Power and Electrical Machinery	4
Industrial Relations	2
Industrial Hygiene II	5
Policies in Industrial Health and Safety II	3
Library and Research	7
	35

Subject Outlines

Occupational Health and Safety commenced as a new program in 1981. As courses were still being developed during preparation of this calendar, subject outlines are not included. However, specific course descriptions will be available upon request from the Department of Environmental Health.

Faculty and Staff

John M. Pelton, B.A., C.P.H.I. (C), *Department Head*
E.J. Borsky, Dipl.T.
Lars G. Larsson, C.R.S.P., Program Head



Biomedical Electronics

Department of Health Engineering Services

In recent years there has been a growing demand for technologists with knowledge in both medical and engineering fields. The widespread use of medical electronic apparatus for diagnostic and therapeutic purposes, and an awareness of the need for its safe use and maintenance, have further increased this demand.

Job Opportunities

A biomedical electronics technologist can be employed in a hospital, a clinic, a research lab or in industry. His or her basic capability is to maintain and repair electronic equipment used in medicine and biology. Occasionally this equipment will be used by the technologist to obtain biomedical data to aid physicians in their diagnosis and treatment of disease. Such equipment may include patient monitors, electroencephalographs, difibrillators, electrosurgical units, telemetry devices, analytical, chemical and biochemical instruments, x-ray machines and ultrasound diagnostic and therapeutic units. Some of the servicing may involve mechanical/electro-mechanical devices such as respirators, pumps and opto/electronic instruments. In addition to servicing equipment, the biomedical electronics technologist may also be responsible for the following equipment procedures: inventory control; preventive maintenance programs; specification, evaluation and purchasing; instruction in operation and handling; safety inspections.

As well as the servicing of equipment, job opportunities for biomedical electronics technologists do exist in other areas. A limited number are employed to design and modify equipment for special purpose tasks in research and/or product development. In addition, an increasing number of technologists are employed in the sales departments of various medical equipment supply companies.

The Program

The Biomedical Electronics Program provides education and training in the following subject areas: technical communications; algebra; calculus; statistics; basic, organic and biochemistry; analytical chemistry; human anatomy and physiology; materials science; biophysics; electricity and electronics; biomedical electronics; digital techniques and microprocessor applications. This exposure allows the graduate to work in close association with biomedical engineers, physicians and others who use, maintain, design and supply scientific and medical equipment. During the second year, each student spends four weeks in clinical training, under supervision, in a local hospital, research agency or equipment supply firm.

Throughout the program emphasis is placed on practically-oriented instruction. Authentic "hands-on" laboratory experience is provided and students are trained in engineering problem solving methodology to allow them to upgrade and maintain their knowledge.

A professional attitude is encouraged throughout the program. Membership in the Society of Engineering Technologists (SET) and active participation in the local chapter of the Canadian Medical and Biological Engineering Society (CMBES) is recommended.

The Biomedical Electronics program is nationally accredited by SET. Graduates are eligible for registration as Certified Engineering Technologists (CET's) after two years of relevant work experience following graduation.

Prerequisites

High School graduation from the Selected or Combined Studies Program with Algebra 12, Physics 11, Chemistry 11 and a selection/counselling interview with members of the Department. It has been found that those applicants with post-secondary education, or a period of full-time employment after high school graduation, usually obtain maximum benefit from the program.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
30.107	General Chemistry	6
31.178	Technical Writing	3
32.178	Basic Mathematics	8
43.151	Electrical Measurements	4
78.100	Electronics Principles and Practice I	9
	Library and Research	5
		35

Year 1	Term 2	2A	2B
30.207	Organic and Biochemistry	6	6
32.278	Calculus, Numerical Methods and Boolean Algebra	8	8
43.251	Electronics Principles and Practice II	—	8
76.102	Patient Care	—	2
78.200	Electronics Principles and Practice II	10	—
98.202	Human Anatomy and Physiology	7	7
	Library and Research	4	4
		35	35

Year 2	Term 3	hrs/wk
31.378	Technical Writing	3
32.378	Statistics	3
33.330	Biophysics	3

Year 2	Term 3 cont.	Clrm hrs/wk
43.352	Measurement Principles and Techniques	4
78.300	Electronics Principles and Practice III	6
78.301	Biomedical Electronics	6
78.310	Digital Principles and Techniques I	5
	Library and Research	5
		35

Year 2	Term 4	4A	4B
30.411	Instrumental Analysis Methods for Biomedical Electronics	4	4
41.491	Materials and Lab Workshop	4	4
43.451	Electronics Principles and Practice IV	4	—
78.401	Biomedical Electronics	8	8
78.402	Biomedical Electronics Project	3	3
78.403	Medical Imaging	—	6
78.410	Digital Systems and Microprocessors	8	7
	Library and Research	4	3
		35	35

78.420	Practical Experience in Biomedical Electronics (5 weeks including seminar week)	35

Subject Outlines

30.107, 30.207 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

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

31.178, 31.378 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 audiovisual devices.

31.378 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, Numerical Methods and Boolean Algebra — A course in calculus, numerical methods and Boolean algebra covering topics with applications throughout the electrical and electronics fields, e.g. the differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions; techniques of integration, partial differentiation, first and second order differential equations; an introduction to numerical methods using the computer to solve problems; an introduction to Boolean algebra concepts which can be applied to digital circuit simplification and design.

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. Computer packages will be discussed.

33.330 Biophysics — A study of biophysics covering mechanics, fluids, waves and heat. The emphasis in lectures, seminars and projects is on the application of physics to biological systems.

41.491 Materials and Lab Workshop — 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 non-ferrous metals; polymers, elastomers and organic adhesives; corrosion and aging of materials; interaction of materials with biological tissues; toxicity; reference sources and materials selection. In the laboratory workshop students will be instructed in the use of hand and bench tools; soldering, brazing, welding and adhesive bonding; basic glass-working; sheet metal working and compression fittings.

43.151 Electrical Measurements — Safety in electrical measurement techniques is emphasized throughout this course. **Topics**: error % and prediction, standards and calibration, device testing, analog and pulse signals, electrical noise, earthing, understanding service manuals. **Equipment used**: analog and digital meters, function and signal generators, bridges, frequency counters, curve tracers, oscilloscopes and attachments.

43.251 Electronics Principles and Practice II — This course continues the training of students in semiconductor circuits and theory (see 78.200). Topics include: transistor amplifiers, power amplifiers, power supplies, oscillators, Field Effect transistors, FET transistor circuits and characteristics.

43.352 Measurement Principles and Techniques — An orientation course covering basic devices for measuring pressure, temperature, density and flow. A study of the principles of analysis instruments, using potentiometric, amperometric and polarographic techniques; ultraviolet, visible and infrared spectroscopy; flame photometry; paper and column chromatography; electrophoresis and refractometric methods. Concept of regulation and feedback control.

43.451 Electronics Principles and Practice IV — This course covers the use of the transistor as a switch, various multivibrator designs, Schmitt trigger, blocking oscillators and others. Lab exercises are coordinated with course content.

76.102 Patient Care — This course introduces students to the hospital environment and the basic safety concepts of patient care. It includes observation and communication skills, body mechanics, fire safety and medical and surgical asepsis.

78.100 Electronics Principles and Practice I — This course provides students with the basic knowledge of electrical quantities, their units and relationship. The course includes dc circuit analysis techniques for R, RC, RL and RLC circuits; ac circuit analysis for R, RC, RL circuits. Examples of applications to biomedical electronics are included. Lab exercises are coordinated with course content.

78.200 Electronics Principles and Practice II — This course analyzes the properties of RLC circuits when driven by ac sources. As an extension of 78.100 it introduces students to the topics of phasor and impedance diagrams, circuit Q, Resonance and Bandwidth. The course also includes an introduction to active devices, i.e. the semiconductor theory, bipolar transistors, transistor biasing and stability, transistor amplifiers and their properties. Lab exercices are coordinated with course content.

78.300 Electronics Principles and Practice — This course covers advanced topics such as tuned amplifiers, integrated circuit components and the use of various other semiconductor components, e.g. FET, SCR and so on. Lab exercises are coordinated with course content.

78.301 Biomedical Electronics — This course introduces 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 are coordinated with course content.

78.310 Digital Principles and Techniques I — A study of 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.

78.401 Biomedical Electronics — This course introduces students to the various types of electronic equipment used in the biomedical environment. Selected equipment types are covered in detail — patient monitoring, cardiac resuscitation, EEG, electrosurgical, telemetry and nuclear medicine equipment. General and specific electrical safety considerations are also included. Lab exercises are coordinated with course content.

78.402 Biomedical Electronics Project — Students are taught proper fabrication methods, including printed circuit design. Two projects will be created, including a design of the students choice (from a sample of practical biomedical circuits).

78.403 Medical Imaging — This course presents students with the basic concepts of x-ray imaging. Practical work in the x-ray lab is coordinated with course content.

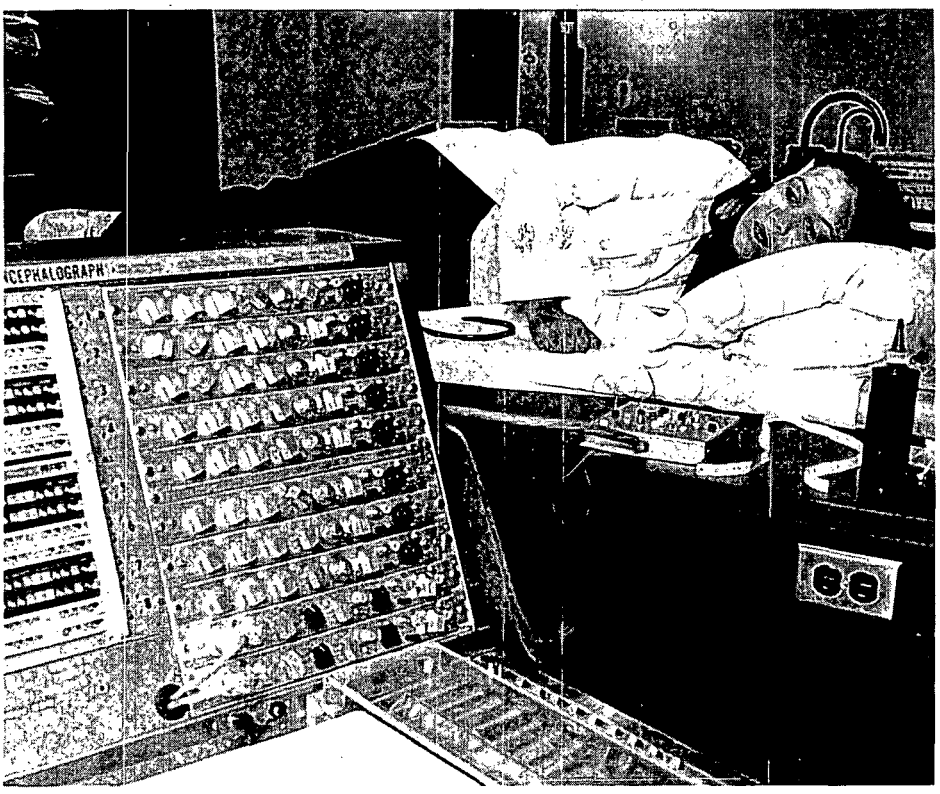
78.410 Digital Systems and Microprocessors — This course expands the student's basic digital knowledge into LSI and VLSI digital systems. Topics include: NMOS, CMOS, ECL, Schottky ITL circuits, A/D and D/A conversion, multiplexing, time and frequency measurement, frequency synthesis, microprocessor hardware (8080/8085). The course also introduces students to assembler level programming. Topics include: microprocessor fundamentals, microprocessor/microcomputer system organization, machine language instruction set, assembler programming, interrupts, I/O, subroutines, interrupt I/O, real-time system concepts. Lab exercises are coordinated with course content.

78.420 Practical Experience in Biomedical Electronics — During this period of training students gain practical experience in biomedical electronics and related fields while working, under supervision, at a number of hospitals, research agencies and private companies throughout the province. The work experience portion of this course is four weeks in duration and is followed by one week of student presentations, lectures and seminars at BCIT.

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 with emphasis on the cardiovascular, nervous, respiratory, muscular and urinary systems.

Faculty and Staff

A.D. Nichols, B.A.Sc., P.Eng., *Department Head*
P.K. Chiu, B.Eng., M.Sc., Ph.D., P.Eng., Senior Instructor
N. Fong, B.Sc., B.A.Sc., P.Eng.
R. Gravelle, Dipl.T., C.E.T.



Electrophysiology

Department of Health Engineering Services

Modern hospitals and health care clinics require the services of trained technologists to operate sophisticated electro-neurophysiological testing equipment and other related biomedical equipment. In order to understand the operation of this equipment the graduate will have studied mathematical, physical science and engineering subjects. Course work in the basic health sciences will inform the student about human physiology and the biological signals to be measured. In addition, course work in the social sciences will prepare the student for interpersonal relationships with the clinical environment. Extensive clinical experience is built into the program to ensure that the student develops the necessary practical skills in the work environment.

Job Opportunities

Graduates of the Electrophysiology Program will find employment in hospitals or private clinics in the following fields: electroencephalography (electrical activity of the brain), electromyography (electrical activity of the neuro-muscular system), cardiology (electrical and mechanical activity of the heart), and evoked potentials (activities generated by stimulation of the neuro otologic system) which include electronystagmography, electroretinography, electro-occulography and visual evoked response.

Graduates will principally find employment in the Neurophysiology Departments of hospitals. In addition to performing a wide variety of tests on patients, the graduate will be expected to evaluate the results in order to assess the performance of the test equipment. Where necessary, tests will be repeated if an equipment/patient interface problem is identified. In addition to an ongoing evaluation of performance, the graduate will perform quality control procedures on equipment and simple calibration/maintenance functions.

The Program

The program is a combination of lab and lecture instruction at BCIT and clinical experience in the Neurophysiology Departments of local hospitals.

The first year of the program is essentially the same as first year Biomedical Electronics. Electrophysiology students and Biomedical Electronics students take their classroom and lab instruction in the common subjects together.

As the second year of the program is essentially clinically-oriented, students in Electrophysiology will share only two courses with the Biomedical Electronics program. In the fall term special courses in Electrophysiology, Digital Techniques, Medical Terminology, Neuroanatomy and Neurophysiology will train students in the basics of biological signal measurement and clinical apparatus. In the spring term (20 weeks) four areas of clinical experience will be covered: electroencephalography; audiology; opthamology (and other evoked potentials); and cardiology.

Upon successful completion of the two year program the student will receive a National Diploma of Technology in Electrophysiology. After a period of work experience in a clinical situation the student will become eligible to write the National Certification Examinations of the appropriate certifying body of their chosen field of interest.

It is expected that a few students will undertake a double-diploma in both Biomedical Electronics and Electrophysiology. This would be a desirable qualification for small hospitals where the workload in either field could not justify hiring a full-time technologist.

Prerequisites

High school graduation from the Selected or Combined Studies Program with Algebra 12, Physics 11 and Chemistry 11. Individuals wishing to enter this new and growing field should be interested in the welfare of people, and should have an aptitude for physics and things electrical and mechanical.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
30.107	General Chemistry	6
31.178	Technical Writing	3
32.178	Basic Mathematics	8
43.151	Electrical Measurements	4
78.100	Electronics Principles & Practice I	9
	Library and Research	5
		35

Year 1	Term 2	2A	2B
30.207	Organic and Biochemistry	6	6
32.278	Calculus, Numerical Methods and Boolean Algebra	8	8
43.251	Electronics Principles & Practice II	—	8
76.102	Patient Care	—	2
78.200	Electronics Principles & Practice II	10	—
98.202	Human Anatomy & Physiology	7	7
	Library and Research	4	4
		35	35

Year 2	Term 3	
31.378	Technical Writing	3
33.330	Biophysics	3
78.300	Electronics Principles & Practice III	6
90.300	Electrophysiology	9
90.310	Digital Principles & Techniques I	7
98.XXX	Medical Terminology	2
98.XXX	Neuroanatomy and Neurophysiology	2

		Clrm hrs/wk
Year 2	**Term 3 cont.**	
	Library and Research	3
		35
Year 2	**Term 4**	
90.400	Clinical Experience	35

Subject Outlines

30.107, 30.207 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

31.178, 31.378 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 involved. Students practice preparing all the documents needed in the job search; formal and informal reports, with emphasis on the most used forms of technical writing and graphics; and oral reporting, with some emphasis on the use of audiovisual devices.

31.378 See 31.178

32.178 Basic Mathematics — This course covers linear equations, matrices and determinants with application to mesh circuit analysis; logarithmic and exponential functions with application 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, Numerical Methods and Boolean Algebra — A course in calculus, numerical methods and Boolean algebra covering topics with applications throughout the electrical and electronics fields, e.g. the differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions; techniques of integration, partial differentiation, first and second order differential equations; an introduction to numerical methods using the computer to solve problems; and introduction to Boolean algebra concepts which can be applied to digital circuit simplification and design.

33.330 Biophysics — This study of biophysics covers mechanics, fluids, waves and heat. The emphasis in lectures, seminars and projects is on the application of physics to biological systems.

43.151 Electrical Measurements — Safety in electrical measurement techniques is emphasized throughout this course.
Topics: Error % and prediction, standards and calibration, device testing, analog and pulse signals, electrical noise, earthing, understanding service manuals.
Equipment Used: Analog and digital meters, function and signal generators, bridges, frequency counters, curve tracers, oscilloscopes and attachments.

43.251 Electronics Principles and Practice II — This course continues the training of students in semiconductor circuits and theory (see 78.200). Topics include: transistor amplifiers, power amplifiers, power supplies, oscillators, Field Effect transistors, FET transistor circuits and characteristics.

76.102 Patient Care — This course introduces students to the hospital environment and the basic safety concepts of patient care. It includes observation and communication skills, body mechanics, fire safety and medical and surgical asepsis.

78.100 Electronics Principles and Practice I — This course provides students with the basic knowledge of electrical quantities, their units and the relationship between them. Course content includes: dc circuit analysis techniques for R, RC, Rl and RLC circuits; ac circuit analysis for R, RC and RL circuits. Examples of applications to Biomedical Electronics are included. Lab exercises are coordinated with course content.

78.200 Electronics Principles and Practice II — This course analyzes the properties of RLC circuits when driven by ac sources. As an extension of 78.100 it introduces the topics of phasor and impedance diagrams, circuit Q, Resonance and Bandwidth. The course also includes an introduction to active devices including the following topics: semiconductor theory, bipolar transistors, transistor biasing and stability, transistor amplifiers and their properties. Lab exercises are coordinated with course content.

78.300 Electronics Principles and Practice III — This course covers such advanced topics as tuned amplifiers, integrated circuit components and the use of various other semiconductor components, e.g. FET, SCR and so on. Lab exercises are coordinated with course content.

90.300 Electrophysiology — The following areas will be covered: theory and operation of EEG equipment and its use, telemetry and EEG; theory and operation of equipment related to ECG, echocardiograms, phonocardiograms and stress testing; monitoring and evaluation of implanted pacemaker performance; theory and operation of non-invasive techniques to assess patients for blood vessel disease; theory and operation of EMG equipment and its use; theory and operation of equipment related to ERG, EOG, VER, and CVA (color vision assessment); theory and operation of ENG related equipment; related important clinical tests for the above equipment; ultrasonics.

90.310 Digital Principles and Techniques — This course teaches students the techniques basic to digital equipment and their application in biological and neurophysiological testing equipment. Topics include: switch and relay control; number systems; Boolean algebra; codes and coding; solid state logic (TTL, CMOS, NMOS); 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; digital systems, and microprocessors.

90.400 Clinical Experience — An appropriate amount of time is spent in each of the following clinical areas: EEG; EMG; cardiovascular laboratory; audiology; opthalmology.

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 with emphasis on the cardiovascular, nervous, respiratory, muscular and urinary systems.

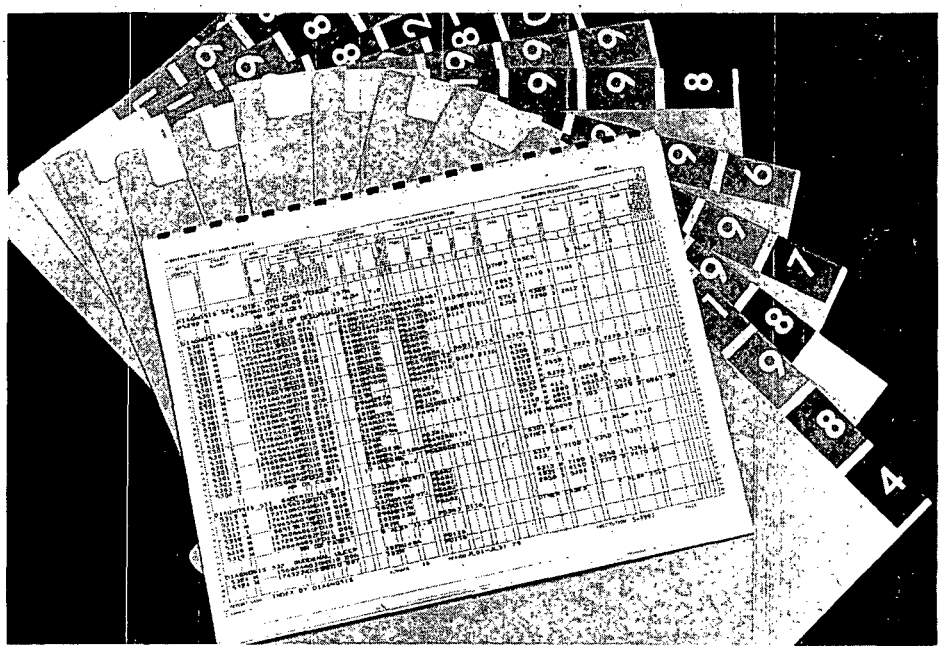
98.XXX Neuroanatomy and Neurophysiology — This course reviews the normal anatomy and function of the brain, and disease states encountered in EEG practice. Also included is the neuromuscular system and nerve condition; the eye, optic nerves and tract; the ear and auditory nerves; fetal development and physiology; and the cardiovascular system.

98.XXX Medical Terminology — A study of the medical terminology of concern to medical technologists with regard to patient records.

XXX = Full course number as yet unassigned.

Faculty and Staff

A. Nichols, B.A.Sc., P.Eng., *Department Head*



Health Information Technology

Department of Health Engineering Services

Health Information Technology (formerly Health Data) offers students interested in this important field of health care, the advantage of two program options—the Health Record Administrator option and the Health Record Technician option. While the two programs may appear similar in design, they offer two alternative career opportunities.

***Health Record Administrator Option**

This is a **two-year** program designed to train students for management and administration in the health record departments of hospitals and health agencies. Each graduate receives a Diploma of Technology from BCIT and is eligible for registration by the Canadian College of Health Record Administrators at the Certificant Level (CCHRA(C)).

***Health Record Technician Option**

This is a **one-year** program designed to train students in the technical aspects of the health record department. Each graduate receives a Certificate of Technology from BCIT and is eligible for registration by the Canadian College of Health Record Administrators at the Associate Level (CCHRA (A)).

Health Records

Health records are maintained in all health care facilities, and provide a permanent, confidential report of the individual patient's encounter with the health care delivery system. The health record is a complete and accurate document of medical observations concerning health, illness or injury and is an important tool in evaluating the quality of care given on a retrospective, current or prospective basis. As the necessity for accurate documentation in health care grows, computerization is also becoming an important consideration in the recording and utilizing of health information, including the linking of records.

*See following pages

Faculty and Staff

A. Nichols, B.A.Sc., P.Eng., *Department Head*
Ms. E. Gibson, C.C.H.R.A. (C)
Mrs. B. Nelson, C.C.H.R.A. (C), Program Head

Health Record Administrator

Department of Health Engineering Services

Health record departments of hospitals and health agencies require the specialized services of health information technologists to develop, manage and utilize health information systems. Through the Health Information Technology, BCIT offers students interested in this field a two year program in health record administration.

Job Opportunities

The health information technologist can be employed as a health record administrator in the hospital health record department, as the director of the department or in a staff position. In addition to the traditional employment in hospitals, other facilities such as community health centres, government agencies and industry may also employ health record personnel to develop, implement and maintain health information systems.

Health record administration is an expanding field. With initiative, today's health information technologist can enter any area in which knowledge of health record standards and systems is necessary. As the use of computers grows, the health information technologist can expect the design, analysis and use of computerized systems to become an increasingly important part of his/her work.

The Program

In collaboration with the Health Record Association of British Columbia and health care agencies, BCIT has designed the Health Record Administrator Program to provide two years of instruction in the form of lectures, lab exercises and practical experience. In the first year, students concentrate on the basic health sciences and will acquire a fundamental knowledge of health record science. Some practical experience in Lower Mainland hospitals will be provided. In the second year, health record administration, management, organization theory and computer applications will be stressed. During the last term of the program, classroom and lab instruction at BCIT will be supplemented by a ten week practicum in health record departments of local hospitals and various health agencies. Students may incur the costs of travel and living expenses during practicum sessions.

Students are expected to become members of the Health Record Association of British Columbia (HRABC) while attending the program. Graduates will write the national examination of Canadian College of Health Record Administrators (CCHRA) and become Certificant members of the CCHRA. Graduates are expected to continue their professional memberships.

Graduates of this program will be granted a Diploma of Technology. They will possess the skills required to meet today's demand for technologists trained in health record procedures and managerial skills, as well as the needs of the future.

Prerequisites

Graduation from the Selected or Combined Studies Program plus Algebra 12, Biology 12 and proficiency in typing (approximately 50 wpm). Maturity, responsibility and an interest in health care and information handling are essential. The work involved demands attention to detail, accuracy, initiative, and effective interpersonal skills.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
31.180	Communication for Health Technologists	5
32.180	Basic Mathematics	5
80.100	Health Record Science	10*
80.101	Concepts of Disease Processes	4
98.107	Human Anatomy and Physiology	4
98.122	Microbiology and Epidemiology	4
	Library and Research	3
		35

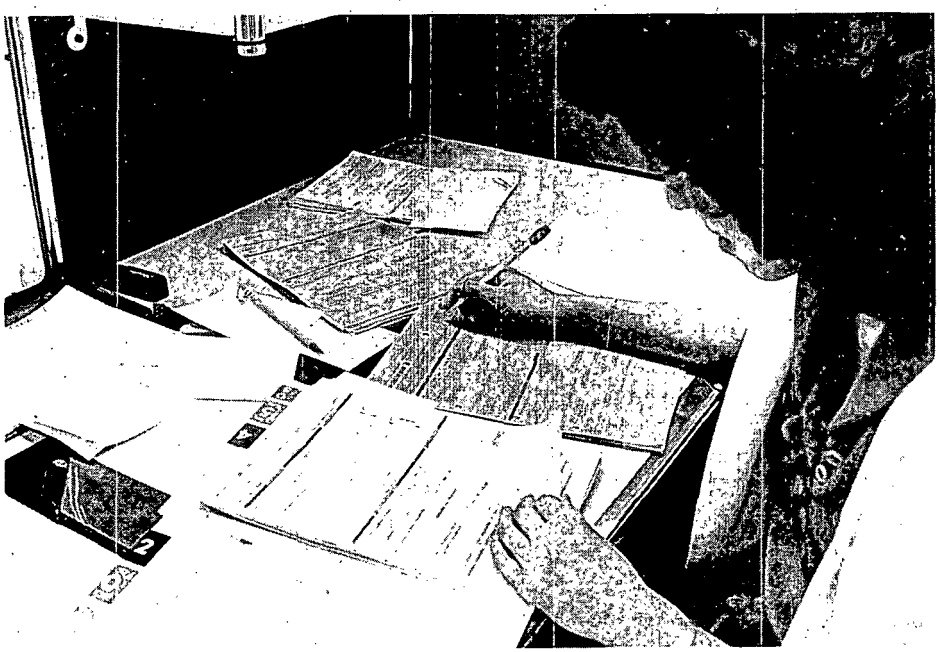
**Includes a one day per week and a one week practicum*

Year 1	Term 2	2A	2B
14.210	Introduction to Data Processing	—	5
31.280	Communication for Health Technologists	4	—
32.280	Statistics	5	5
76.190	Introduction to Pharmacology	3	—
80.200	Health Record Science	10	10
80.201	Concepts of Disease Processes	4	4
80.202	Medical and Surgical Transcription	2	2
98.209	Human Anatomy & Physiology	4	4
	Library and Research	3	5
		35	35

Year 2	Term 3	
14.310	Computer Applications I	3
22.380	Management Engineering I	4
70.307	Introduction to Clinical Laboratory Procedures	2
80.300	Health Record Science	6
80.302	Medical and Surgical Transcription	2
80.303	Health Information Processing	9
98.337	Organizational Psychology	4
	Library and Research	5
		35

Year 2	Term 4	4A	4B
14.410	Computer Applications II	4	—
22.480	Management Engineering II	4	—
40.309	Building Renovation and Planning Procedures	4	—
80.400	Health Record Science	5	—
80.402	Medical and Surgical Transcription	2	—
80.403	Health Information Processing	6	—
80.410	Health Information Practicum	—	35
98.415	Genetics	3	—
98.437	Organizational Psychology	3	—
	Library and Research	4	—
		35	35

Subject Outlines on page 96



Health Record Technician

Department of Health Engineering Services

The health record technician is a highly-skilled member of the health care team. Through the Health Information Technology BCIT has designed a one year program of study for those individuals interested in pursuing this career option.

Job Opportunities

In a small health care facility the health record technician may be fully responsible for the operation of the health record department, i.e. the initiation, development, operation and maintenance of health information systems. In a larger institution the health record technician may specialize in one particular area of work. This includes assembling, collating and technically evaluating health records according to established standards; compiling various health and administrative statistics; coding and abstracting data from health records according to recognized classification and data collection systems; and maintaining and using a variety of indices, storage and retrieval systems.

Optimum patient care is of prime importance. The health record technician contributes to this goal, especially in the area of confidentiality. Health record technicians are sensitive to the confidential nature of the information they handle and are trained in the ethics which govern all members of the health care team.

The Program

Lectures, lab exercises and practical experience are combined in the training of health record technicians. Basic health sciences and the fundamentals of health record science are taught in depth. Some practical experience in hospitals in the Lower Mainland will be provided during term 1. During term 2, the student will be introduced to health information processing, data processing, management theory and organizational psychology, as well as continuing some term 1 courses. There is a five week practicum at the end of term 2, in which classroom and lab instruction at BCIT will be supplemented by experience in the health record departments of local hospitals and a variety of 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 BCIT. Upon graduation, students become members of the Canadian College of Health Record Administrators (CCHRA) at the Associate level. Graduates are expected to continue their professional memberships.

Graduates of this program will be granted a Certificate of Technology.

Graduates who wish to become health record administrators may do so in a number of ways, such as completing certain specified BCIT continuing education courses or, after suitable experience, returning to BCIT for the second year of the Health Record Administrator Option.

Prerequisites

Graduation from the Selected or Combined Studies Program plus Algebra 12, Biology 12 and proficiency in typing (approximately 50 wpm). Maturity, responsibility and an interest in health care and information handling are essential for a successful career in the health information field. The work involved demands attention to detail, accuracy and steadfastness.

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
31.180	Communication for Health Technologists	5
70.307	Introduction to Clinical Laboratory Procedures	2
80.101	Concepts of Disease Processes	4
80.150	Health Record Science	7
80.160	Health Information Practicum	7
98.107	Human Anatomy and Physiology	4
98.122	Microbiology and Epidemiology	4
	Library and Research	2
		35

Year 1	**Term 2**	**2A**	**2B**
14.210	Introduction to Data Processing	—	5
31.280	Communication for Health Technologists	4	—
76.190	Introduction to Pharmacology	3	—
80.201	Concepts of Disease Processes	4	4
80.250	Health Record Science	7	5
80.252	Medical and Surgical Transcription	4	4
80.253	Health Information Processing	6	5
80.255	Introduction to Management	—	3
80.256	Introduction to Organizational Psychology	—	3
98.209	Human Anatomy and Physiology	4	4
	Library and Research	3	2
		35	35

Year 1	**Term 2C**	
80.260	Practicum (5 weeks) (May to end of June)	35

Subject Outlines on page 96

Subject Outlines For Health Record Administrator and Health Record Technician

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 are illustrated and practiced with an H.P. minicomputer operating interactively. Elementary computer programs are written and tested on the computer. Use of flow-charting and elementary data processing systems design will illustrate the achieving of data processing objectives.

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 Information 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 record keeping. 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 the 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 will take place, with the presentation of a formal report in respect to the field project.

31.180, 31.280 Communication for Health Technologists — This course introduces students to the general principles of effective written and oral communications. Students also receive exposure 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 health 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, 80.200 Health Record Science — This first year course provides students with knowledge of the fundamental principles and practices of health record science. After a brief orientation to the Health Information Technology and to the hospital scene, the areas studied in the first term will include a detailed examination of all aspects of the health record from formation to completion; the patients' index, numbering and filing systems; microfilming, record retention; hospital accreditation; interdisciplinary relations; and confidentiality and release of medical information. The first term will also include a one day per week and a one week practicum in a local acute care general hospital. In the winter, studies include an analysis of the health record practitioner's professional responsibilities, an introduction to the problem-oriented record, legal aspects of health records, and B.C. Hospital Programs. Coding records according to ICD-9-CM and ICD-9 will be initiated. In the second term, other coding systems are examined and students given the opportunity to become proficient in a variety of systems. Coding sessions will be accompanied by instructions and practice in PAS and HMRI abstracting.

80.101, 80.201 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.

80.150, 80.250 Health Record Science — This course is similar to 80.100, 80.200 but with emphasis on the role of the health record technician.

80.160, 80.260 Health Information Practicum — This course provides students with practical experience in the health records department of a local hospital or health care agency under the supervision of an appropriate facility supervisor and a faculty member. In term 1 this involves one day per week in a local agency. In term 2C the student will work for five weeks from the end of classes until the end of June.

80.200 See 80.100

80.201 See 80.101

80.202, 80.302, 80.402 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 progress in production standards is expected.

80.250 See 80.150

80.252 Medical and Surgical Transcription — Similar to 80.202, but with emphasis on the role of the health record technician.

80.253 Health Information Processing — This course covers the following topics: classification systems; coding principals; abstracting principals; vital statistics; collection and presentation of data; basic statistics in health care; quality assurance.

80.255 Introduction to Management — Topics covered in this course include: definitions; importance and role of HRT; organizational structure in hospitals (chart of organization, line and staff responsibilities); role of management; role of supervisor; functions of management.

80.256 Introduction to Organizational Psychology — Areas of study include: the individual in the organization; interpersonal relationships; characteristics and influences of groups; leadership styles.

80.260 See 80.160

80.300, 80.400 Health Record Science — A problem solving approach to certain aspects of health record science, focusing on such areas as interdisciplinary relationships; specialized hospitals and their records (psychiatric, rehabilitative, extended-care); current trends in health care, (i.e., community health centres, the changing role of emergency departments); health record linkage.

80.302 See 80.202

80.303, 80.403 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 compiling certain basic statistical data in hospitals or other health facilities. The student learns how to manually tabulate data and to prepare and present a proper, accurate statistical report using appropriate techniques. Federal and provincial vital statistics are studied, particularly as they relate to the health information 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 information technologist. Emphasis is placed on the role of the health information technologist in the quality assurance process involving physicians, nurses and other health professionals. During 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 and HMRI coding and abstracting.

80.400 See 80.300

80.402 See 80.202

80.403 See 80.303

80.410 Health Information Practicum — Practical experience in the health record departments of general and specialized hospitals and other health facilities, under the supervision of the director of health record services and a faculty member. Students spend two intramural sessions in various hospitals and health care facilities for a total of 10 weeks. The final week is spent at BCIT in comparative analysis and discussion of the health record procedures as performed at practicum locations. In addition, a general health record science review is conducted. A preliminary practicum will be held for one day per week and for one week at the end of the first term of the first year. See Health Record Science (80.100).

98.107, 98.209 Human Anatomy and Physiology — This course provides a basic knowledge of anatomy and physiology. It relates this knowledge to the medical terminology used by health information technologists and to other aspects of their work, e.g. pathology, operative procedures and coding.

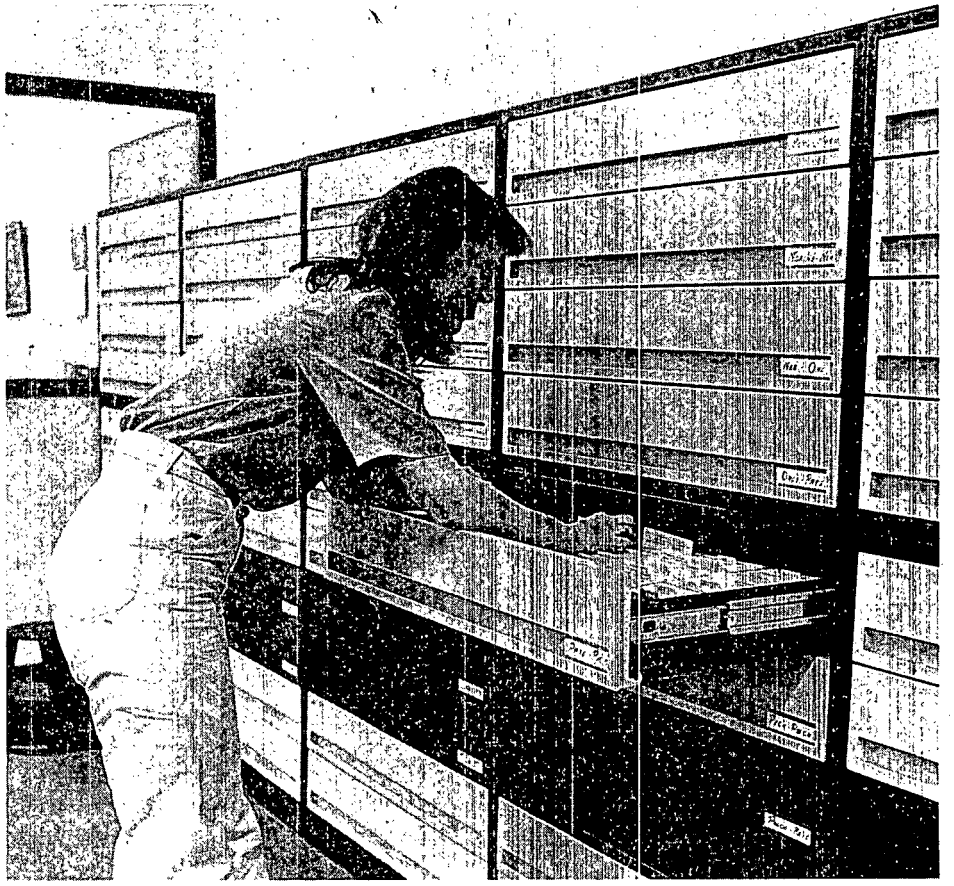
98.122 Microbiology and Epidemiology — This course deals with the basic characteristics of various types of microorganisms that cause disease in man. The concepts of communicability and host resistance are included. The epidemiology of specific infectious diseases is also considered.

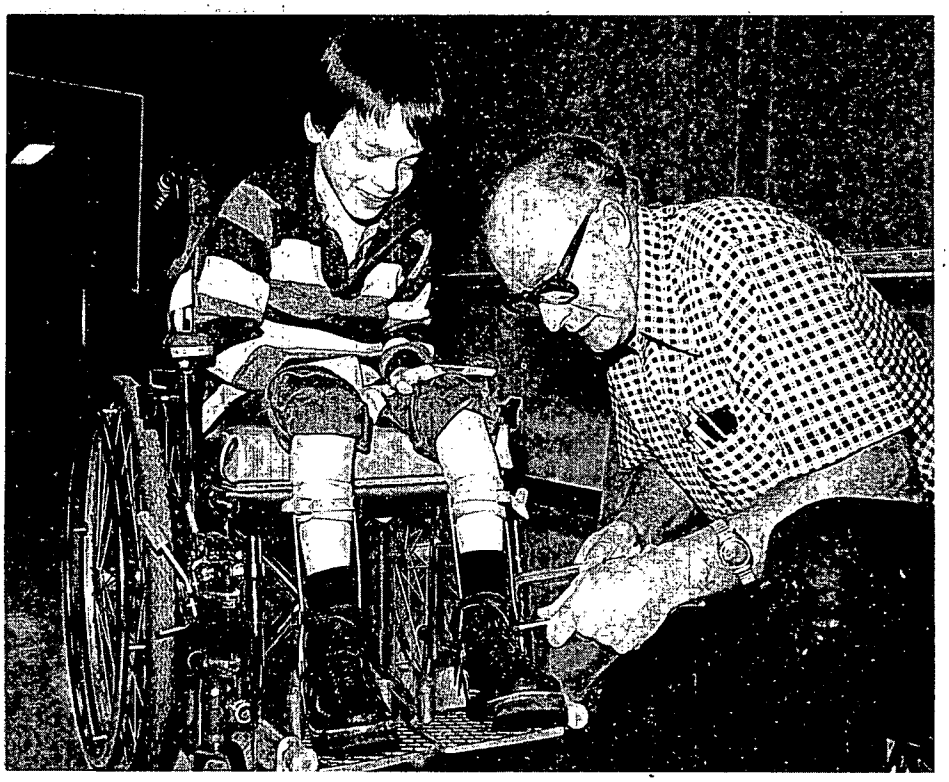
98.209 See 98.107

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 that will enable the health information technologist to communicate, supervise and evaluate in the medical records work situation.

98.415 Genetics — An introduction to the basics of medical genetics. Knowledge of basic principles of hereditary transmission are related to the medical terminology used by medical and paramedical personnel.

98.437 See 98.337





Prosthetics and Orthotics

Department of Health Engineering Services

Prosthetists and orthotists help people who have become disabled or who were born with physical defects by fitting them with artificial limbs or supports. The prosthetist designs, constructs, and fits artificial limbs, while the orthotist designs, constructs, and fits orthopaedic braces and supports. Both work closely with doctors, physiotherapists, and others in rehabilitation medicine. After assessing the needs of a patient, the prosthetist or orthotist may assemble the components of an artificial limb or support, or may develop specifications for its construction by a technician. The device is then fitted and adjusted to the patient. From time to time, repairs and maintenance work must also be done.

Job Opportunities

Prosthetists and orthotists work in rehabilitation hospitals and ambulatory care services, in special treatment facilities such as arthritis centres, and in private practice. Many are employed by the Department of Veterans' Affairs. Starting salaries are about $13,000 per year, rising to about $21,000 after certification.

The Program

The two year course of studies will combine lectures, labs and practical experience in local health agencies. The curriculum will equip the graduate to recognize patient problems, assess individual needs, design and construct appliances, select appropriate materials and deal with the emotional difficulties of patients. Graduates will also have a thorough understanding of the required business procedures.

The next intake of students is set for September, 1982. At that time, subject to funding, a yearly intake of twelve students is anticipated.

Post-graduation

After three year's work experience under the guidance of a certified orthotist or prosthetist, graduates may write the national certificate examination of the Canadian Board of Certification for Prosthetists and Orthotists.

Prerequisites

Graduation from the Selected or Combined Studies Program with Algebra 12 and Physics 11. Metalwork and woodwork courses are recommended. Applicants should have a good academic background, manual dexterity, mechanical aptitude and good interpersonal skills. Patience and inventiveness are of considerable importance.

Expenses

In addition to tuition fees, students will need approximately $300 for textbooks for the two year program. Students are also responsible for costs of travel to and from agencies where practicums are held, and should be prepared to purchase certain small hand tools.

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
31.184	Technical Writing	3
32.184	Mathematics	4
33.121	Physics	4
43.152	Electronic Circuits	6
49.184	Shop Practice	5
84.100	Prosthetics & Orthotics I	6
98.110	Anatomy and Physiology	4
	Library and Research (Physical Medicine)	3
		35
Year 1	**Term 2A**	
31.284	Technical Writing	3
32.284	Mathematics	4
84.200	Prosthetics & Orthotics II	8
98.210	Anatomy and Physiology	4
98.242	Behavioral Science	2
	Library and Research (Physical Medicine)	4
		25
84.202	Practicum	1½ days
Year 1	**Term 2B**	
31.284	Technical Writing	3
41.284	Materials	3
84.200	Prosthetics & Orthotics II	8
98.210	Anatomy and Physiology	4
98.242	Behavioral Science	2
	Library and Research (Physical Medicine)	5
		25
84.202	Practicum	1½ days
Year 2	**Term 3**	
10.305	Business Practices	2
84.300	Prosthetics & Orthotics III	6
84.310	Patient Assessment and Care	2
98.310	Pathology and Pathophysiology	2
	Library and Research (Physical Medicine)	2
		14
84.302	Practicum	3 days
Year 2	**Term 4**	
84.400	Prosthetics & Orthotics IV	5
84.420	Biomechanics	2
	Library and Research (Physical Medicine)	5
		12
84.402	Practicum	4 days

Subject Outlines

10.305 Business Practices — The objective of this course is to give students a basic understanding of the planning, organizing, directing and controlling functions of business management. Topics such as human relations; management of time; budgeting and accounting; record keeping; and labor relations will be covered, with examples drawn from actual prosthetic/orthotic facilities. The ethical and legal concerns of a health care professional will also be presented. **2 hrs/wk for 15 weeks**

31.184, 31.284 Technical Writing — Through a series of lectures and projects, students improve their ability to express themselves clearly and appropriately to patients and their families, to other health care professionals, and to such groups as government and fee-paying agencies. Topics include: basic skills in writing instructions, memorandums, letters, and reports; general medical terminology; and effective public speaking. Library orientation and research techniques are also emphasized. **3 hrs/wk for 35 weeks**

31.284 See 31.184

32.184, 32.284 Mathematics — Students are provided with a solid grounding in the mathematical elements essential to their work. The course includes graphs and functions, systems of linear equations, trigonometry, and complex numbers. Wherever possible, alternative methods of solution are suggested to encourage creativity in problem solving. Students are provided with enough background material to pursue more advanced investigation of specialized areas of their technology. **4 hrs/wk for 25 weeks**

32.284 See 32.184

33.121 Physics — A general level course with emphasis on the application of physics to prosthetics and orthotics. Topics lie in the general field of mechanics and include, specifically, kinematics, dynamics, statics, simple machines, energy, and fluid mechanics. Measurement and problem solving techniques are stressed. Mathematical treatment requires algebra and trigonometry. **4 hrs/wk for 15 weeks**

41.284 Materials — This course provides a basic coverage of the structures, properties, and applications of common engineering materials with emphasis on those used in prosthetic and orthotic devices. Concepts such as tensile and yield strength, fatigue, hardness, and deformation will be explored both in theory and in the testing laboratory. The aim is to provide an appreciation of the materials which are, or may be used in prosthetic/orthotic devices, and to explain at least some of the factors involved in selecting a material for a specific purpose. **3 hrs/wk for 10 weeks**

43.152 Electronic Circuits — The student is introduced to basic and modern electronic principles and utilizes these principles in the operation, building and laboratory testing of control systems. Students become familiar with such concepts as: the basic theory and operation of D.C. and A.C. circuits; techniques in measuring electrical quantities; and the basics of modern electronics used in control systems, including analog and digital control systems. To supplement and implement the theory, strong emphasis is placed on "hands on" training. **6 hrs/wk for 15 weeks**

49.184 Shop Practice — This course is intended to develop manual skills and to utilize some of the basic machine tools available in most metal-working laboratories. On completion, the student will be able to operate most basic hand and machine tools well enough to produce relatively simple metal projects. Time is also spent on the joining of metals by solder, braze and electric arc. **5 hrs/wk for 15 weeks**

84.100 Prosthetics and Orthotics I — Initially, students are oriented to the terminology, general concepts, and devices commonly prescribed in the field. The area of Lower Limb Orthotics is then treated in detail, with the aim being to develop students' competence in the use of the materials, components, and tools commonly used in the construction of ankle-foot and knee-ankle-foot orthoses. Students design, construct and fit a variety of devices, including shoe modifications, from the point of prescription to final evaluation. **6 hrs/wk for 15 weeks**

84.200 Prosthetics and Orthotics II — The area of Lower Limb Prosthetics is examined in detail. Design principles underlying the patellar-tendon-bearing prosthesis, its variants, and the quadrilateral above-knee prosthesis are analyzed. Students design, construct, fit, and align a variety of prostheses for below-knee and above-knee amputees. While casting techniques, fitting procedures, and alignment principles are emphasized, attention is also given to proper use of materials, acceptable workmanship, and cosmetic finishing. **8 hrs/wk for 20 weeks**

84.202, 84.302, 84.402—Practicum — The student is given the opportunity to apply his/her knowledge of design principles and fitting procedures to a variety of patients under the supervision of a practicing prosthetic or orthotic clinician. Participation in clinical activity and discussion of unusual fitting problems are encouraged. Specific projects aimed at amplifying work done in the Prosthetic and Orthotic courses are required. **84.202:** 1½ days/wk for 20 weeks **84.302:** 3 days/wk for 15 weeks **84.402:** 4 days/wk for 20 weeks

84.300 Prosthetics and Orthotics III — Lower Limb Prosthetics is completed with the treatment of, first, Symes and partial foot prosthesis and, second, hip disarticulation prosthesis. The area of Upper Limb Orthotics is then examined. While the emphasis again is on the principles of design and alignment, each student will construct and fit a variety of devices, both to apply the appropriate principles and to gain familiarity with the tools, materials, and components currently in use. **6 hrs/wk for 15 weeks**

84.302 See 84.202

84.310 Patient Assessment and Care — A series of presentations and projects help students learn how to evaluate patients from the viewpoint of functional loss, select appropriate devices to restore function, and design solutions to specific needs not met by available componentry. Basic principles and procedures for handling the disabled are also covered. **2 hrs/wk for 15 weeks**

84.400 Prosthetics and Orthotics IV — The area of Spinal Orthotics is covered, from the principles involved in fitting a corset, to the construction of a CTLSO, Milwaukee type. Biomechanical principles and fitting guidelines will be emphasized more than construction techniques. The area of Upper Limb Prosthetics is then explored. Students become familiar with the components and socket designs commonly used for different levels of amputation, and fit a variety of upper limb prostheses. Towards the end of this course, the topics of external power in Upper Limb Prosthetics and Orthotics is examined, with students fitting various myoelectric or switch-controlled devices. **5 hrs/wk for 20 weeks**

84.402 See 84.202

84.420 Biomechanics — Force tolerance and mobility of the skeletal system are examined in some detail to determine the functional loss associated with various physical disorders or amputations, and the residual function upon which a prosthesis or orthosis can be based. The effect of pressure on soft tissue is also explored. Various prostheses and orthoses are analyzed from the viewpoint of the mechanical forces at work and their effect on the disabled person. **2 hrs/wk for 20 weeks**

98.110, 98.210 Anatomy and Physiology — The aim of this course is to make the student knowledgeable about the composition and functions of the human body, with emphasis on the nervous, muscular and skeletal systems. Functional anatomy of the musculo-skeletal system is treated in detail. Emphasis is also placed on growth and aging processes. **4 hrs/wk for 35 weeks**

98.210 See 98.110

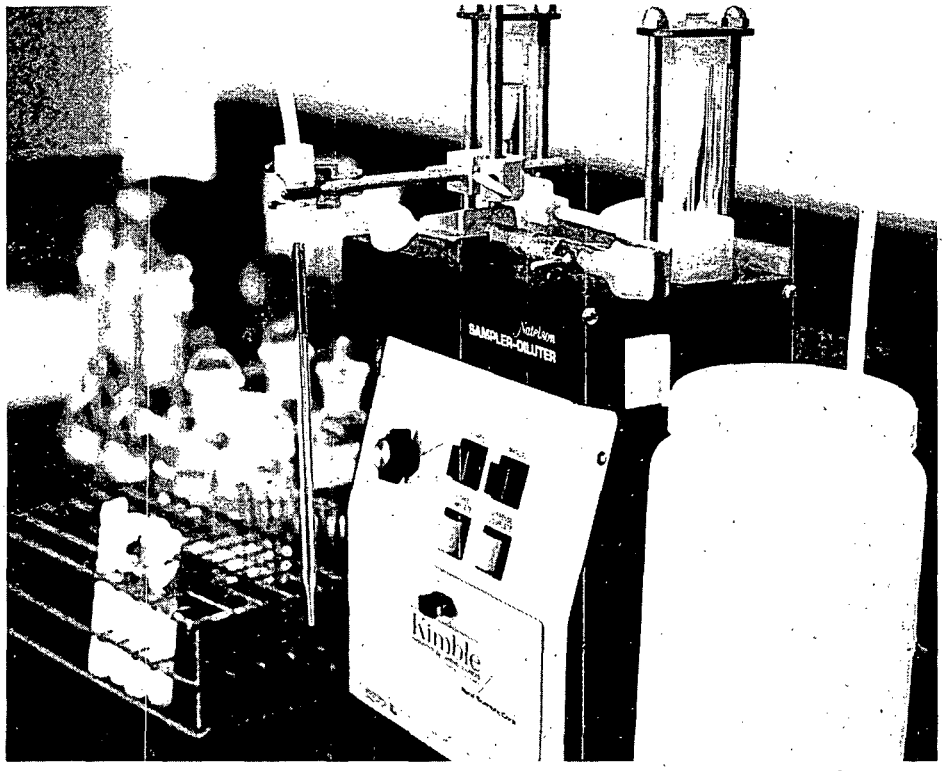
98.242 Behavioral Science — In a series of lectures, discussions and planned experiences, students are given a greater understanding of how various people react to physical loss or illness, and of the role to be played in assisting the handicapped to reintegrate into society. Topics include: the psychology of being ill; understanding stress behavior; pain management; interpersonal communication; adjustment in self-image; the disabled person in society; and relationships among health care professionals. **2 hrs/wk for 20 weeks**

98.310 Pathology and Pathophysiology — Students explore basic concepts of the disease process, and the nature of the various disorders they are most likely to see in their prosthetic/orthotic practices. Topics such as cellular injury and death; trauma; inflammation; and healing are covered. Specific disorders

include bone, joint and muscle pathologies; neurological and hemodynamic disorders; metabolic and congenital abnormalities; and neoplasia **2 hrs/wk for 15 weeks**

Faculty and Staff

A.D. Nichols, B.A.Sc., P.Eng., *Department Head*
Wm. J. McGuinness, M.A., C.P.O., Program Head



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 new lab procedures and the rising demand generally for health services assures a wide range of employment opportunities.

Job Opportunities

Medical laboratory technology offers a variety of scientific pursuits within the modern hospital, the private clinic and the research laboratory. These fields include histotechnology, clinical chemistry, hematology, microbiology and immunohematology. The trained technologist may pursue any one or a combination of these fields after completion of training.

The Program

An academic, science-oriented first year is followed by a didactic second year, during which the five disciplines within medical technology are studied in depth. Students spend these two years at BCIT 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 if completed before 1978), Chemistry 11 and 12 and Physics 11. Preference will be given to those students who have also successfully completed Biology 12. Applicants should have a strong interest in science and be meticulous in their work habits. Color blindness precludes admission.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
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
	Library and Research	4
		35

Year 1	Term 1 cont.	Clrm hrs/wk
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 for 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.

32.170 Mathematics for Medical Laboratory Technologists — Review of basic algebra with applications; functions and graphs; 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 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 application 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 various 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 gastro-intestinal tract. The study of electrolytes, acid-base balance, enzymes, carbohydrates, lipids, urine, gastric juice and cerebrospinal fluid. The measurement of various constituents 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.
P. Bradbury, F.I.M.L.S., A.R.T., Senior Instructor
Mrs. G.M. Camden, B.A., A.R.T., Chief Instructor
F.L. Curtis, F.I.M.L.S., A.R.T.
Miss L.J. Marshall, A.R.T.
Mrs. K.E. Nicholson, B.Sc., R.T.
D.A. Ruisaard, R.T.
Mrs. J.M. Scriabin, B.Sc. (Hons.) A.R.T. (on leave 1980-82)
L. Simandl, A.R.T.
Mrs. A.F. 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 one-week orientation period in a hospital x-ray department is required. Arrangements for this orientation will be made by BCIT.

During training, medical radiography students receive intensive theoretical and practical instruction in lectures, labs and tutorials at BCIT, as well as practical experience in hospitals. In the second year, students spend alternate weeks at BCIT and in a hospital. A third year of in-service training must be completed at one of the participating hospitals (four in the Lower Mainland; two in the Interior; one on Vancouver Island). This additional training 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.A., and several other countries.

Prerequisites

Graduation from the Selected or Combined Studies Program with Math 12, Algebra 12 or Algebra 12 (Honors), two science 11s and one science 12.* A C+ average in the final year of secondary school is required.

Math 12 is only acceptable if taken prior to 1978

Applicants must have a strong sense of responsibility, an interest in the welfare of others, particularly the sick and injured, and meticulous work habits.

Students must complete an immunization program. A preadmission interview with a member of the Medical Radiography Program staff is conducted to assess the applicant's suitability for this field. Students are expected to be competent in written and oral English.

**Experience has shown that Physics 11 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	Basic Radiography	4½
72.102	Medical Imaging	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	Positioning 1	9
72.203	Radiographic Anatomy and Physiology	6
72.204	First Aid	1
76.106	Patient Care	3
	Tutorial	1
		29
Year 1	**Term 2B**	
33.209	Physics of Medical Radiography	5
72.201	Positioning 2 and Clinical Orientation	11½
72.202	Medical Imaging	4½
72.203	Radiographic Anatomy and Physiology	6
	Tutorial	1
		28
Year 2	**Term 3**	
72.301	Positioning 3	9
72.302	Medical Imaging Equipment	7
72.307	Pathology for Medical Radiographers	4

Year 2	Term 3 cont.	Clrm hrs/wk
76.306	Patient Care	6
	Tutorial	1
		27
72.306	Clinical Experience in Medical Radiography (Hospital)	35*

Year 2	Term 4A	
72.401	Positioning 4	9
72.403	Radiation Biology	4
72.407	Pathology for Medical Radiographers	4
72.409	Quality Control	3
98.427	Microbiology and Epidemiology	3
98.440	Human Behavior	5
	Tutorial	1
		29
72.406	Clinical Experience in Medical Radiography (Hospital)	35*

Year 2	Term 4B	
72.401	Positioning 5	11
72.405	Radiation Protection	4
72.409	Quality Control	3
98.427	Microbiology and Epidemiology	4
98.440	Human Behavior	6
	Tutorial	1
		29
72.406	Clinical Experience in Medical 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 are taught the basic skills of effective writing for reports, letters, job applications, resumés and memoranda. Students are also 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 Basic Radiography — This course will acquaint students with activities in 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 Medical Imaging — This course introduces students to the standard equipment used in the production of a radiograph. Fundamentals of the photorecording 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 subjects is included.

72.201 Positioning 1 and 2 and Clinical Orientation — 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 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 Medical Imaging — 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 — In the first half of this course a detailed study is made of the human skeleton. In the second half the body organs, glands, vessels and nerves are studied according to region. Throughout the course much attention is given to surface anatomy and the radiographic appearance of structures. Emphasis is placed upon those details of structure and function which are pertinent to radiographic procedures.

72.204 First Aid — This is an eight hour St. John Ambulance Safety Oriented First Aid course. Instruction is given in the basic first aid procedures and skills required during an emergency situation where no professional medical help is present.

72.301 Positioning 3 — This course represents a continuation of the study of urinary, digestive and biliary systems 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 Medical Imaging Equipment — The equipment used in fluoroscopy, serial, radiography and skull, dental and mobile units is studied. Special imaging equipment—spot-cameras, cine-cameras, image amplifiers and closed circuit television is also included. Image storage, retrieval and enhancement methods are covered, and some allied medical imaging systems are introduced.

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 — Students are introduced to pathologic terminology and the basic mechanisms underlying disease processes. The balance of the course deals with pathological conditions of bone.

72.401 Positioning 4 & 5 — 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.

72.403 Radiation Biology — The student is reintroduced to the basic interactions of radiation with matter. An in-depth study of intracellular responses to radiation is made. The latter part of this course deals with radiation pathology and human experience with radiation injury.

72.405 Radiation Protection — The aims and objectives of radiation protection are discussed, as well as the various organizations responsible for establishing protection standards. The course then deals with regulations governing the use of diagnostic radiation and methods of reducing exposure to the patient, the technologist and fellow workers.

72.406 Clinical Experience in Medical Radiography (Hospital) — This course runs concurrently with 72.401. The student applies more advanced classroom and lab training in a clinical situation.

72.407 Pathology for Medical Radiographers — This course, which follows 72.307, deals with pathological conditions affecting the remainder of the body. The student is also made aware of how pathology will affect technical factors used in the production of a diagnostic radiograph.

72.409 Quality Control — This course covers the concepts and application of quality control in the Radiology Department. Emphasis is placed on the significance of quality control in modern radiography. Control of processing machines is stressed. Quality control planning, cost control, reject analysis,

machine calibration and various mechanical tests are covered.

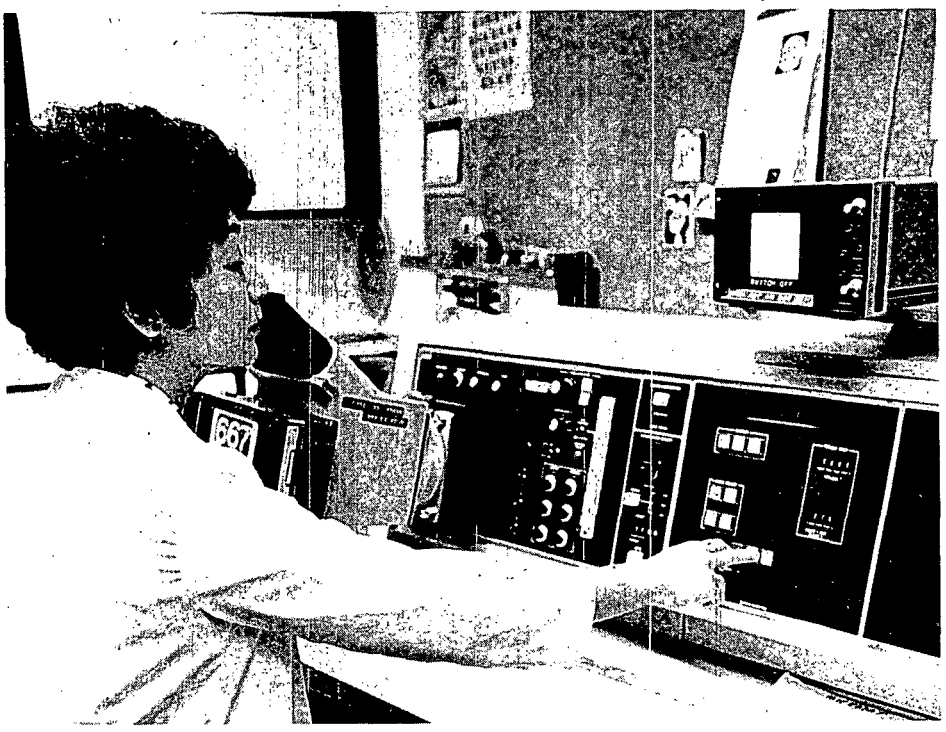
76.106 Patient Care — This course introduces students to the basic safety concepts of patient care. It includes observational and communication skills, body mechanics, fire safety and medical and surgical asepsis.

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 systematic 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.

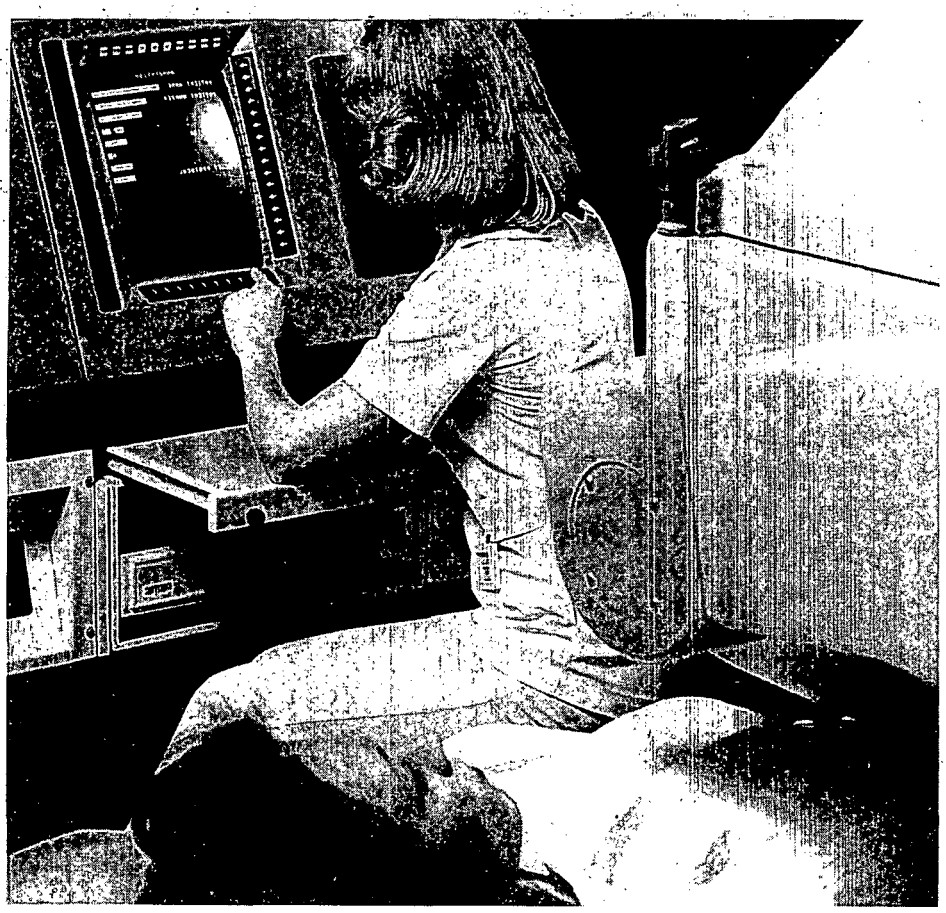
98.427 Microbiology and Epidemiology — An introductory course designed to present the student with a basic knowledge of medically important microorganisms; host-parasite relationships; communicability of infection; sources of infection, particularly as they exist in a hospital environment; methods of control, including asepsis and use of destructive agents.

98.440 Human Behavior — This course provides students with social and psychological concepts relating to processes occurring within hospitals, particularly in radiography departments. Professional and ethical considerations, and ways of dealing with common hospital events are explored.



Faculty and Staff

W.E. Noel, R.T.&N., *Department Head*
Miss M. Cousineau, R.T.
Miss A. McMillen, R.T.
Mrs. M. Moores, B.Sc., R.T.
Miss P.M. Rogers, R.T.
E. Seeram, B.Sc., R.T.
Miss N. Smith, B.A., R.T., Program Head
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 those nine 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. Successful candidates may use the designation **R.T. (N.M.)** after their names and work as registered nuclear medicine technologists anywhere in Canada or in many parts of the world. An **Advanced Certification** is now available for those technologists wishing to advance in the field.

Prerequisites

Graduation from the Selected or Combined Studies Program with Math 12 (pre-June, 1978), Algebra 12, or Algebra 12 (Honors) (post June, 1978), Chemistry 11 and 12 and one other science 11. A C+ average in the final year of secondary school is required. Since the work is highly technical and exacting, the student must feel comfortable with complex instruments, possess manual dexterity and meticulous work habits. Applicants must have a strong sense of responsibility and a desire to work with and for patients of all age groups. Applicants are expected to be competent in oral and written English. The Nuclear Medicine Technology is open to men and women.

A preadmission interview is conducted with members of the Nuclear Medicine Program staff to assess the applicant's suitability for the field. Students must undergo a medical examination by their own physician and a complete updating of immunizations. Students are required to complete the Safety-Oriented First Aid Course (St. John Ambulance) prior to admission, or during the first term of the program.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
30.106	General Chemistry for Nuclear Medicine Technology	6
32.174	Basic Technical Mathematics	5
33.105	Basic Physics for Nuclear Medicine	6

Year 1	Term 1 cont.	Clrm hrs/wk
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
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 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 for 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.

31.474 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 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, and interaction of radiation with matter and nuclear reactions. The measurement portion of the course concentrates on instrumentation. Topics include an in-depth study of scintillation-type detector systems and Anger-type gamma cameras.

33.305 Measurement of Radioactivity — This course completes the instrumentation work begun in 33.205. Topics include sensitivity and resolution in scanning, collimators, liquid scintillation counting, G.M. detectors, proportional counters, ionization detectors, semiconductor detectors, TLD, positron scanning and the Pho-Con camera.

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 — This course covers the basic principles of radioassay procedures. A study is made of the components of the test system, the practical aspects of performing the tests and data reduction techniques. The clinical significance of routinely performed assays is discussed.

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.

74.205 Radiobiology and Protection — A detailed study is made of ionizing radiation and its interaction with matter. The units and safety guidelines of radiation are also discussed. Emphasis is on the practical applications of radiation safety in the working environment.

74.207 Radiopharmaceuticals — A study is made of the preparation and quality control of radiopharmaceuticals in routine use. Emphasis is placed on the radionuclide generator. Dosage forms and calculation and dispensing of doses are covered, along with the clinical application of various pharmaceuticals.

74.209, 74.305, 74.405, 74.409 Clinical Experience in Diagnostic Procedures — These courses require full-time attendance in the nuclear medicine department of an affiliated hospital. The purpose is to further develop the skills necessary for students to function safely and adequately in a nuclear medicine lab. Hands-on experience will be gained in all aspects of "in vitro" and "in vivo" procedures.

74.304 See 74.204

74.305 See 74.209

74.308 Imaging — This course is designed to familiarize Nuclear Medicine Technology students with the many methods and materials used to visually display the spatial distribution of radioactivity in nuclear imaging procedures. The utilization of optical, photographic, video tape and computer visual displays will be covered in theory and practice.

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 technical 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.

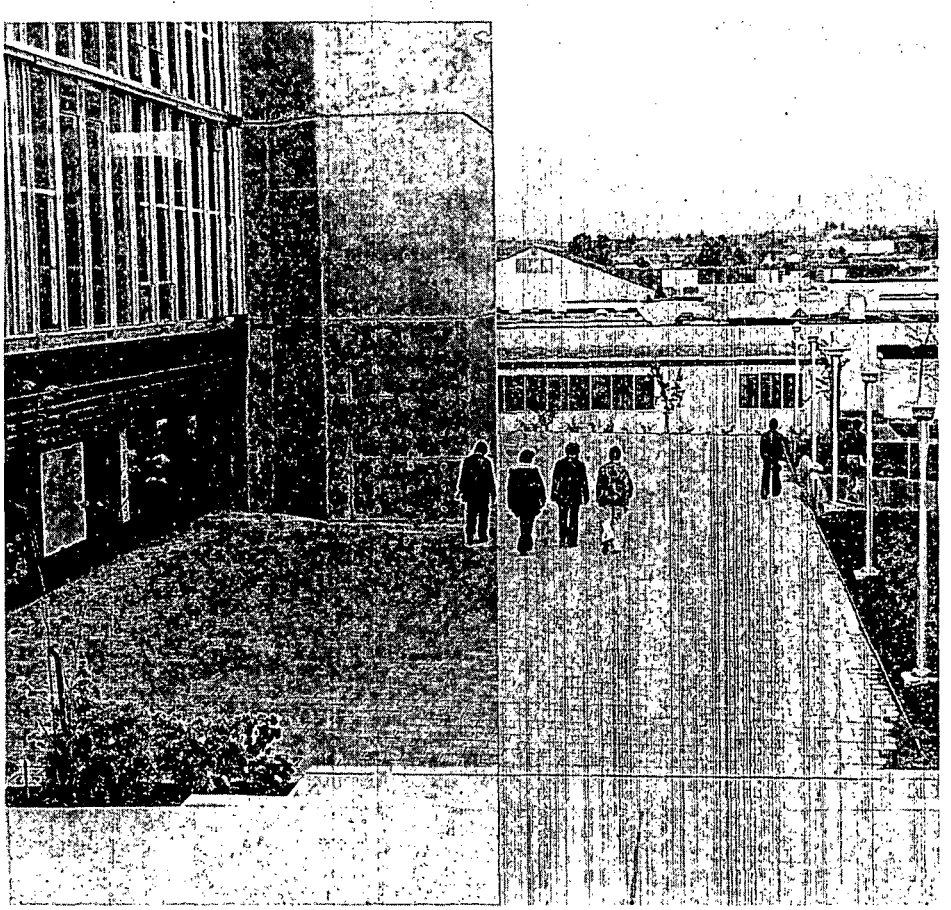
98.206, 98.306 Physiology and Pathophysiology — A systematic examination of the normal physiology of the human body and its derangement in disease states. General concepts of the disease process are included, as well as disturbance in function of specific body systems. Pathological examples are chosen 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.&N. *Department Head*
Ms. B. Clark, R.T., (T.&N.M.), Program Head
Miss J. Miki, R.T. (N.M.), R.T.C.S.L.T.
R.A. Singer, R.T. (N.M.)
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 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 long-term 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 2⅓ year period. 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 and tutorials are complemented by clinical experience in a variety of settings.

Students will complete a program consisting of five terms. Each term is 4½ months in length. The fall term extends from mid-August to mid-December and the winter term from January to mid-May. Students are free of studies from mid-May to mid-August.

Admission Requirements
For applicants under 23 years of age at the time of entry into the program:

1. Graduation from grade 12 (B.C. secondary school or equivalent), with Chemistry 11 and either Chemistry 12 or Biology 12.
2. A minimum of C+ or better in both of the above courses; a minimum of C in Algebra 11 and English 12.
3. A valid St. John Ambulance standard First Aid certificate is required by the end of term 1, and preferably prior to entry into term 1.
4. Completion of the immunization program is required before complete acceptance into the program.
5. A physical examination by a physician of the applicant's choice, indicating satisfactory health.
6. An interview with a member of the General Nursing Department who will assess the applicant's:
   — knowledge of and motivation towards a nursing career
   — financial preparation
   — communication skills
   — experience in the health care field as a volunteer and/or employee.

The Student Selections Committee of the General Nursing Department is responsible for the selection of applicants who meet, to the greatest degree, the requirements outlined above.

For applicants over 23 years of age (mature) at the time of entry into the program:

1. Successful completion of grade 11 and grade 12 equivalency e.g. BTSD.
2. Chemistry 11 and either Chemistry 12 or Biology 12, to be completed within two years prior to enrolment.
3. A C+ or better in both of the above courses.
4. Part-time or full-time employment in the health care field prior to entry into the program. (A reference will be requested from the agency in which the applicant's latest experience was obtained).
5. A valid St. John Ambulance standard First-Aid certificate by the end of term 1 and, preferably, prior to entrance into term 1.
6. Completion of the immunization program.
7. A physical examination by a physician of the applicant's choice, indicating satisfactory health.
8. An interview with a member of the General Nursing Department, who will assess the applicant's:
   — knowledge of and motivation towards a nursing career

— financial preparation
— communication skills

The Student Selections Committee of the General Nursing Department is responsible for selecting applicants who meet, to the greatest degree, the requirements outlined above.

Expenses

In addition to tuition fees, students will spend approximately $400 for textbooks over the 2⅓ 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 Student Financial Services.

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.

Part-Time Program

BCIT also offers a part-time program in General Nursing at the Downtown Education Centre. Prerequisites are the same as for the full-time program and students have seven years to complete the entire program. For further information contact the General Nursing Department.

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
76.100	Nursing I: Theory	9
	Clinical	12
98.105	Anatomy and Physiology	3
98.118	Personal Fitness Management	2
98.138	Human Behavior	3
	Library and Research	6
		35
Year 1	**Term 2**	
76.150	Nursing II: Theory	8
	Clinical	12
98.205	Physiology	3
98.225	Microbiology	1
98.226	Immunology	1
98.238	Human Development	3
	Library and Research	7
		35
Year 2	**Term 3**	
31.376	Writing for Nurses	3
76.200	Nursing III: Theory	9
	Clinical	18
	Library and Research	5
		35
Year 2	**Term 4**	
31.476	Modern Literature	3
76.250	Nursing IV : Theory	7
	Clinical	18
	Library and Research	7
		35
Year 2	**Term 5**	
76.300	Nursing V: Theory (1 week)	28
	Clinical (for 15 weeks of term)	35

Subject Outlines

31.376 Writing for Nurses — This course teaches general writing skills and their specific application to professional writing tasks in the clinical area.

31.476 Modern Literature — This course is a general study of 20th Century literature with emphasis on social and psychological issues.

76.100 Nursing I — An overview of the nursing curriculum and the study of individuals who are able to satisfy their own needs or who require minimal assistance to satisfy needs. Emphasis is placed on the normal requirements for need satisfaction and the stressors associated with lifestyle patterns. The student is introduced to the 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 is provided in community and hospital setttings.

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 is placed on 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 is 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 is 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 is placed on developing supportive relationships with individuals and their involved family members. Clinical experience is provided in hospital settings, on family-centered maternity units and on pediatric units. Community visits are 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 is 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 is placed on developing therapeutic relationships with individuals and their involved family members. Clinical experience is provided in hospital settings on psychiatric and general medical-surgical units. Community visits are integrated throughout the course. Prerequisite: Nursing III (76.200).

76.300 Nursing V — Nursing emphasizes the integration of previously presented knowledge and skills. Theory focuses on leadership skills and the responsibilities of the graduate nurse. Clinical experience is provided on general medical-surgical units, where students are assigned to registered nurses, who assume the role of preceptor. Prerequisite: Nursing IV (76.250).

98.105 Anatomy and Physiology — A survey of the basic structure and function of human body systems. An introduction to the basic principles of genetics is also included.

98.118 Personal Fitness Management — A combined theory and practice course designed to emphasize the relationship of physical fitness to lifestyle patterns. The focus is placed on the student's own activity pattern.

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 — This course provides an introduction to basic microbiological concepts, including the distinguishing characteristics of micro-organisms, methods of controlling infectious disease and host-parasite relationships.

98.226 Immunology — This course provides 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 discussions.

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

Mrs. C.A. Orchard, M.Ed., B.S.N., R.N.; *Department Head*
Mrs. L. Barratt, R.N., Diploma Psychiatric Nursing.
Ms. M.J. Belfry, B.N., R.N.
Mrs. D.M. Belyk, B.S.N., R.N., Chief Instructor Term III
Mrs. 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.
Mrs. J. Delesalle, M.S.N., B.S.N., R.N.
Ms. K. Doyle, B.N., R.N., Chief Instructor Term IV.
Mrs. K. Edwards, B.S.N. (Honors), R.N.
Ms. E.M. Fraser, B.S.N., R.N., Chief Instructor Academic Year I.
Mrs. S. Gallo, B.Sc., Ph.N., R.N.
Mrs. N. Goad, B.S.N., R.N.
Ms. B.A. Greenlaw, B.N., R.N., Program Head, Part-time Program.
Mrs. H.D. Hintz, B.S.N., R.N., Chief Instructor, Term V.
Mrs. A. Kenney-Lee, B.N., R.N.
Mrs. M. LaBelle, B.N., Diploma P.H., R.N.
Ms. B.A. Lawes, B.Sc.N., R.N.
Mrs. M.E. Martin, B.S.N., R.N.
Ms. L.P. Meredith, M. Adult Ed., B.S.N., R.N., LTD.
Mrs. L. Milligan, R.N., B.S.N.
Ms. M.H. Mysak, B.Sc.N., R.N.
Mrs. A.L. Novada, B.S.N., Diploma T.S., R.N., Chief Instructor Clinical Year I.
Mrs. M. Olson, B.S.N., R.N.
Ms. K.C. Peters, B.S.N., R.N.
Mrs. K. Quee, B.Sc.N., R.N.
Ms. M.N. Renwick, B.S.N., Diploma T.S., R.N.
Ms. A. Russell, B.Sc., R.N.
Ms. S.W. Stephens, B.Sc.N., R.N.
Mrs. A. Taylor, B.Sc.N., R.N.
Mrs. J. Verner, B.S.N., R.N.
Mrs. M. Walmsley, M.Ed., B.S.N., R.N.
Ms. M.W. Whitehead, M.A. (Educ), B.S.N., R.N. Diploma Obs., R.N.
Ms. P.V. Zabawski, B.Sc.N., R.N., Chief Instructor Curriculum.
Mrs. D. Zimka, B.Sc.N., R.N.

Part-time Faculty

Mrs. L. Christie, B.S.N., R.N.
Mrs. E. Erb, R.N., B.S.N.
Mr. E. McCrone, B.A., R.N.
Ms. E. McNiel, B.S.N., R.N.
Mrs. K. Negoro, Diploma Nrsg.Ed., R.N.
Mr. J. Taylor, B.S.N., R.N.

Support Staff

Mrs. S. Friesen-Nichol, Clerk Typist.
Mrs. G.S. Malm, Records Assistant.
Mrs. F. Nordstrand, R.N.
Mrs. 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.

The Program
The Psychiatric Nursing Program is designed to provide basic preparation for practice in psychiatric nursing. Over a 2⅓ year period, it provides 85 weeks of instruction in classroom, laboratory and clinical settings. Throughout the first four terms, theoretical and laboratory courses are given concurrently with clinical practicums, as well as support courses in the biological/behavioral sciences and English. In the fifth term, students are assigned on an individual basis to preceptors who are practising nurses.

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 17 weeks in length. The fall term extends from late August to Christmas and the winter term from January to early May. From early May to late 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.

New students are expected to attend a "Head Start" program prior to registration. This program provides instruction in study skills as well as pre-tests in English and arithmetic. Remedial instruction will be recommended for individuals with unsatisfactory scores.

Prerequisites
Graduation from the Selected or Combined Studies Program with Chemistry 11, and either Chemistry 12 or Biology 12 is required. Mature applicants must have English 12 or its equivalent, as well as the science prerequisites. A C+ standing or better in these subjects is preferred for all applicants.

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.

All students are required to have a current St. John Ambulance 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 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 a 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.

Educational Expenses
In addition to regular tuition fees, students should be prepared for further educational expenses. In Term 1 about $500 will be needed for expenditures such as textbooks, school supplies, uniforms and first aid course fees. In terms 2, 3 and 4 additional expenses are estimated to be $125 per term.

In the final term of the program students will require approximately $100 for the registration examination fee and $25 for school supplies. Many graduates also purchase a ring, which costs approximately $150. Students are responsible for transportation to community agencies and hospitals making the use of a motor vehicle two days per week in terms 1, 2, 3 and 4 and five days per week for term 5 highly desirable. The monthly cost of operating a motor vehicle is estimated to be $100. Additional costs for accommodation and travel may be incurred during the fifth term preceptorship.

Note: Figures given are estimates only. Expenses may vary considerably depending on individual preference and need.

Financial Assistance
Assistance for students in financial need is available through programs such as the **B.C. Student Assistance Program** (consisting of a loan/grant, plus an additional health bursary for qualifying health students) and the **BCIT Bursary Program.** For more details please refer to the Student Financial Services section of this

calendar. All applicants requiring financial support are urged to consult Student Financial Services early in the application process to discuss their individual situations with a counsellor.

Registration of Graduates
The Registered Psychiatric Nurses' Association of B.C. serves as a registering body and a professional association. 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 $100).
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 prior to completion of the program in order to ensure that documentation is complete, so that they are eligible to write the registration examinations following graduation from BCIT.

Employment Opportunities for Graduates
Following graduation and registration (RPN), employment opportunities in B.C. are excellent, with competitive salaries and benefits. From August 1 to December 31, 1981 salaries ranged from $1,731 to $2,046.

Registered psychiatric nurses are employed by: psychiatric hospitals, psychogeriatric hospitals, schools for mentally retarded, general hospitals, forensic facilities, rehabilitation agencies, extended and intermediate care services and other specialized agencies.

The Registered Psychiatric Nurses' Association of B.C. provides labor relations services for its members. The Health Sciences Association provides this service for registered psychiatric nurses employed in general hospitals.

Educational Opportunities for Graduates
Graduates are eligible to enter the General Nursing diploma programs at BCIT, Douglas and Okanagan Colleges with one year's advance credit. Graduates interested in administration are eligible to enter the One Year Management Program in Health Services available in the evenings through Continuing Education and Industry Services.

How to Apply
The Psychiatric Nursing Department welcomes applications from men and women and mature students, as well as recent high school graduates. Most students enrol in full-time study. There is also some opportunity for part-time study.

Registered nurses (R.N.'s) who wish to increase their skills in psychiatric nursing will be considered for admission into second year of the program, where they are required to complete one year of study before becoming eligible for a Diploma in Psychiatric Nursing.

Licensed practical nurses (LPN's) will be considered for direct entry into Term 2 of the program.

Applicants are advised to apply as early as possible to ensure adequate time for assessment and academic and financial counselling. For more information on the program, contact the Department of Psychiatric Nursing for an interview.

Dates of application:
January 2 for August classes
June 1 for January classes

Dates of Terms - 1982/83
August 23 - December 17 (inclusive)
January 3 - May 6 (inclusive)

Course of Studies

		Clrm hrs/wk
Year 1	**Term 1**	
77.100	Psychiatric Nursing 1	6
77.105	Psychiatric Nursing Practicum 1	9
77.110	Interpersonal Relationship Laboratory 1	2
77.120	Psychomotor Laboratory 1	3
98.105	Anatomy and Physiology	3
98.118	Personal Fitness Management	2
98.141	Human Behavior	4
		29
Year 1	**Term 2**	
77.150	Psychiatric Nursing 2	6
77.155	Psychiatric Nursing Practicum 2	10
77.160	Interpersonal Relationship Laboratory 2	2
77.170	Psychomotor Laboratory 2	3
98.208	Physiology	3
98.225	Microbiology	1
98.226	Immunology	1
98.241	Human Development	4
		30
Year 2	**Term 3**	
31.377	Writing for Nurses	3
77.200	Psychiatric Nursing 3	6
77.205	Psychiatric Nursing Practicum 3	15
77.210	Interpersonal Relationship Laboratory 3	2
77.220	Psychomotor Laboratory 3	2
98.308	Pathophysiology	2
		30
Year 2	**Term 4**	
31.477	Modern Literature	3
77.250	Psychiatric Nursing 4	6
77.255	Psychiatric Nursing Practicum 4	15
77.260	Interpersonal Relationship Laboratory 4	2
77.270	Issues in Psychiatric Nursing	2
		28
Year 2	**Term 5**	
77.300	Psychiatric Nursing 5	25 (for 2 wks)
		30 (for 1 wk)
77.305	Psychiatric Nursing Preceptorship	30 (for 14 wks) (incl. 1 evaluation wk)

Subject Outlines

Year 1 Term 1

77.100 Psychiatric Nursing 1 — An overview of psychiatric nursing and the health care system as it relates to mental health. Emphasis is placed on human functional behavior in response to stressors in the environment. Students are introduced to the nursing process, a conceptual model for psychiatric nursing practice and the professional responsibilities of a psychiatric nurse.

77.105 Psychiatric Nursing Practicum 1 — A clinical practice course offered concurrently with Psychiatric Nursing 1. Experience is provided in general hospitals, mental health, mental retardation and community settings with clients of all ages. Emphasis is placed on the development of skills related to assessment and activities of daily living, and the development of interpersonal relationships.

77.110 Interpersonal Relationship Laboratory 1 — A lab practice course offered concurrently with Psychiatric Nursing 1. Emphasis is placed on development of self-awareness and basic communication skills.

77.120 Psychomotor Laboratory I — A lab practice course offered concurrently with Psychiatric Nursing 1. Emphasis is placed on those nursing skills related to basic assessment and activities of daily living.

98.105 Anatomy and Physiology — A survey of the basic structure and function of human body systems. An introduction to the basic principles of genetics is also included.

98.118 Personal Fitness Management — A combined theory and practice course designed to emphasize the relationship of physical fitness to lifestyle. The focus is placed on the student's own activity.

98.141 Human Behavior — This course presents those concepts and methods of psychology and sociology which are most pertinent to the psychiatric nurse's understanding of human behavior in a

social context. The internal and external components of man's environment are investigated.

Year 1 Term 2

77.150 Psychiatric Nursing 2 — The study of people in relation to their growth and development and family environment. Emphasis is placed on 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 2 — A clinical practice course offered concurrently with Psychiatric Nursing 2. Experience is provided in the pediatric areas of general hospitals and mental retardation services. Emphasis is placed on developing therapeutic relationships and selected nursing skills. Prerequisites: all first term courses.

77.160 Interpersonal Relationship Laboratory 2 — A lab practice course offered concurrently with Psychiatric Nursing 2. Emphasis is placed on the development of therapeutic relationships. Prerequisites: all first term courses.

77.170 Psychomotor Laboratory 2 — A lab practice course offered concurrently with Psychiatric Nursing 2. Emphasis is placed on the development of selected nursing skills. Prerequisites: all first term courses.

98.208 Physiology — An approach to physiology based on control and coordinated regulation. The prerequisite survey of anatomy and physiology (98.105) establishes that certain physiological responses occur. This course concentrates on the factors which determine the timing and degree of these responses, with emphasis on the cardiovascular, respiratory, digestive, urinary, reproductive, nervous and endocrine systems.

98.225 Microbiology — This course provides an introduction to basic microbiological concepts. These concepts include the distinguishing characteristics of micro-organisms, methods of controlling infectious disease, and host-parasite relationships.

98.226 Immunology — This course provides an understanding of the immune response as it applies to immunity, surveillance, homeostasis, hypersensitivity, autoimmunity and immunohematology. The course progresses from discussions on the components and biological activities of the immune response to the immune response role in protective as well as disease conditions. Prerequisites: Human Behavior (98.141).

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 (98.141).

Year 2 Term 3

31.377 Writing for Nurses — This course teaches general writing skills and their specific application to professional writing tasks in the clinical area.

77.200 Psychiatric Nursing 3 — The study of adults 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 3 — A clinical practice course offered concurrently with Psychiatric Nursing 3. Experience is 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. Prerequisites: all second term courses.

77.210 Interpersonal Relationship Laboratory 3 — A lab practice course offered concurrently with Psychiatric Nursing 3. Emphasis is placed on the maintenance and termination of therapeutic relationships with adults. Prerequisites: all second term courses.

77.220 Psychomotor Laboratory 3 — A lab practice course offered concurrently with Psychiatric Nursing 3. Emphasis is placed on the development of selected nursing skills related to specified body systems and the care of the surgical patient. Prerequisites: all second term courses.

98.308 Pathophysiology — This course looks at pathology from a disease process approach, with emphasis on underlying principles. Common disorders encountered in the clinical area are used as examples. Complex patterns of disease, such as those encountered in the hepatic, renal, cardiac and respiratory systems, will be discussed. Prerequisites: Physiology (98.208)

Year 2 Term 4

31.477 Modern Literature — This course is a general study of 20th Century literature with emphasis on social and psychological issues.

77.250 Psychiatric Nursing 4 — The study of adults with multiple stressors. Emphasis is placed on nursing interventions for long-term multiple problems. Self-concept (identity and body image), loss, and support systems will be discussed. Professional responsibilities and organizational skills are continued from 77.200. Prerequisites: all third term courses.

77.255 Psychiatric Nursing Practicum 4 — A clinical practice course offered concurrently with Psychiatric Nursing 4. Experience is provided in long-term psychiatric and psychogeriatric settings. Emphasis is placed on initiating, maintaining and terminating therapeutic relationships with groups of clients and developing selected nursing and organizational skills. Prerequisites: all third term courses.

77.260 Interpersonal Relationship Laboratory 4 — A lab practice course offered concurrently with Psychiatric Nursing 4. 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 — Selected sociological issues are discussed. Emphasis is placed on their influence and relevance to the practice of psychiatric nursing.

Year 2 Term 5

77.300 Psychiatric Nursing 5 — A review of psychiatric nursing practices, with emphasis on assisting students to develop the abilities of a psychiatric nurse, to assume responsibility, and to work with health team members. Also included is an introduction to the theory of organizational structures and management functions. Psychiatric Nursing Preceptorship (77.305) follows this course.

77.305 Psychiatric Nursing Preceptorship — This clinical practice course follows Psychiatric Nursing 5 (77.300). Experience is provided in various mental health facilities in B.C. Emphasis is placed on the integration of knowledge and skills learned in terms 1 to 4; on working effectively with team members; on assuming responsibility; and on the workload of a graduated psychiatric nurse. Prerequisites: satisfactory completion of all courses in terms 1 to 4 and of 77.300 in term 5.

Faculty and Staff

Margaret S. Neylan, R.N., B.S.N., M.A., *Department Head*
Joan Anderson, R.N., B.Sc.N., M.A. (Education)
Linda Brazier, R.N., B.S.N.
John Crawford, R.P.N., Cert. in Adv. Nsg., B.A., Chief Instructor
Kathi Duncan, R.N., B.S.N., Chief Instructor
Shiron Erickson, R.N., Dipl.Psych.Nsg., B.N.
Mary Lou Evans, R.N., B.Sc.N.
Lynn Field, R.N., B.Sc.N., Chief Instructor
Ray Fournier, R.P.N.
Stephany Grasset, R.N., B.Sc., P.H.N.
Yvonne Greene, R.N., B.Sc.N., R.M.N., Chief Instructor
Jean Gunderson, R.N., R.P.N., Chief Instructor
Wilda Haydamack, R.N., Dipl.P.H.Nsg., Dipl.Psych.Nsg., B.Ed., M.Ed.
Joyce Heaton, R.N., B.Sc.N.

Anne Houseman, R.N., B.Sc.N.
Marnie Ireton, R.N., B.Sc.N.
Elaine Jackson, R.N., B.S.N.
Beverley Miller, R.N., B.Sc.N.
Jeanette Mossing, R.N., B.N.
Carol Niven, R.N., B.Sc.N.Ed.
Marie Riediger, R.N., B.N.
Ross Stewart, R.N., R.P.N., R.M.N.
Norma Vallentgoed, R.P.N., B.A.

Support Staff
Pat Ord

Acknowledgements
The Department acknowledges, with appreciation, the contribution of nursing service personnel to educational programs. In particular we wish to recognize the contribution of head nurses for the practicums in terms 1, 2, 3 and 4 and the preceptors in term 5.

Term 1
Head Nurses
D. Dowd, Burnaby General Hospital
L. Dunwell, Burnaby General Hospital
G. Hufnagel, West Lawn, Riverview
S. Kenyon, Brookside, Riverview
L. Licorish, West Lawn, Riverview
S. Mackenzie, East Lawn, Riverview
L. Pastorek, East Lawn, Riverview
L. Peterson, Leeside, Riverview
B. Sullivan, St. Vincent's Hospital

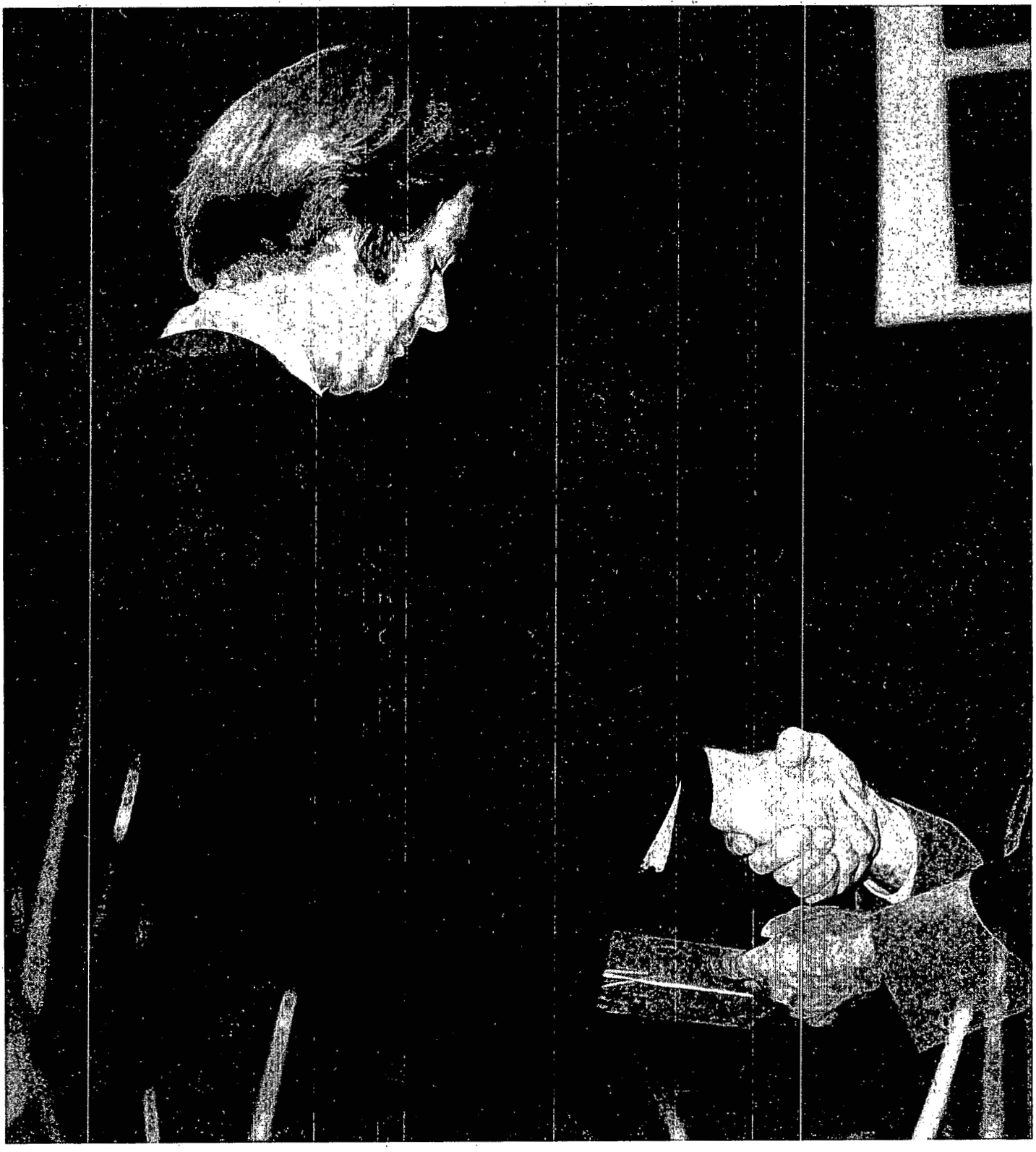
Term 2
B. Arnott, Medicine, Lion's Gate Hospital
G. Cameron, Crestwood School
K. Clark, Beacon Preschool
A. Hasle, Oakridge School
M. Johnson, Queen Elizabeth Annex
J. Kell, Pediatrics, Lion's Gate Hospital
P. McPhee, Sunny Cedars
J. Walker, Pediatrics, Burnaby General Hospital

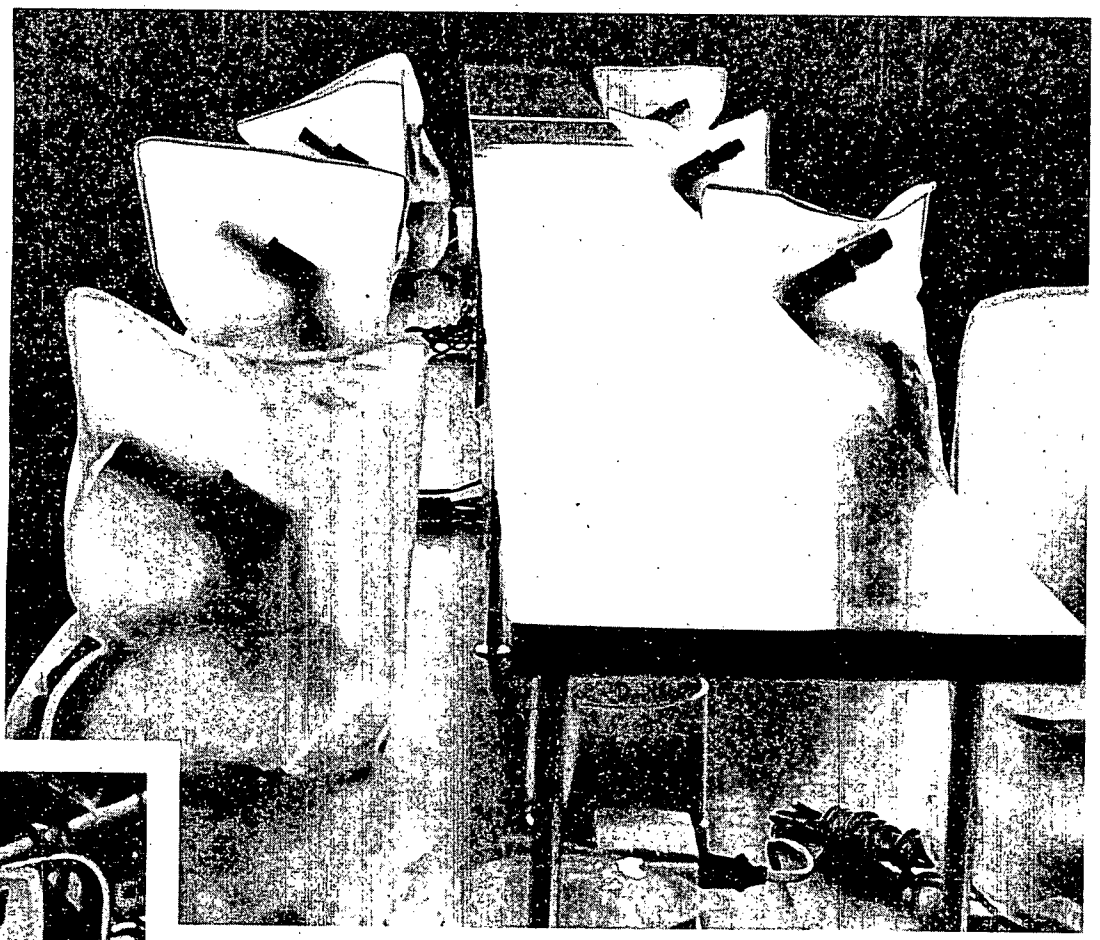
Term 3
D. Armstrong, A2, Lion's Gate Hospital
M. Cyr, O.R. (Supervisor) Surrey Memorial Hospital
G. Frith, 2A&C Burnaby General Hospital
J. Georgetti, 3C Burnaby General Hospital
A. Hodgkins, P.A.R. Burnaby General Hospital
K. Medford, West 2, Crease Clinic
S. Saunders, I.P.U. (Supervisor) Burnaby
J. Silletti, 4C Burnaby General Hospital
A. Tremere, East 2, Crease Clinic
G. VanDam, O.R. Burnaby General Hospital
B. Whitham, 2 South, Surrey Memorial Hospital

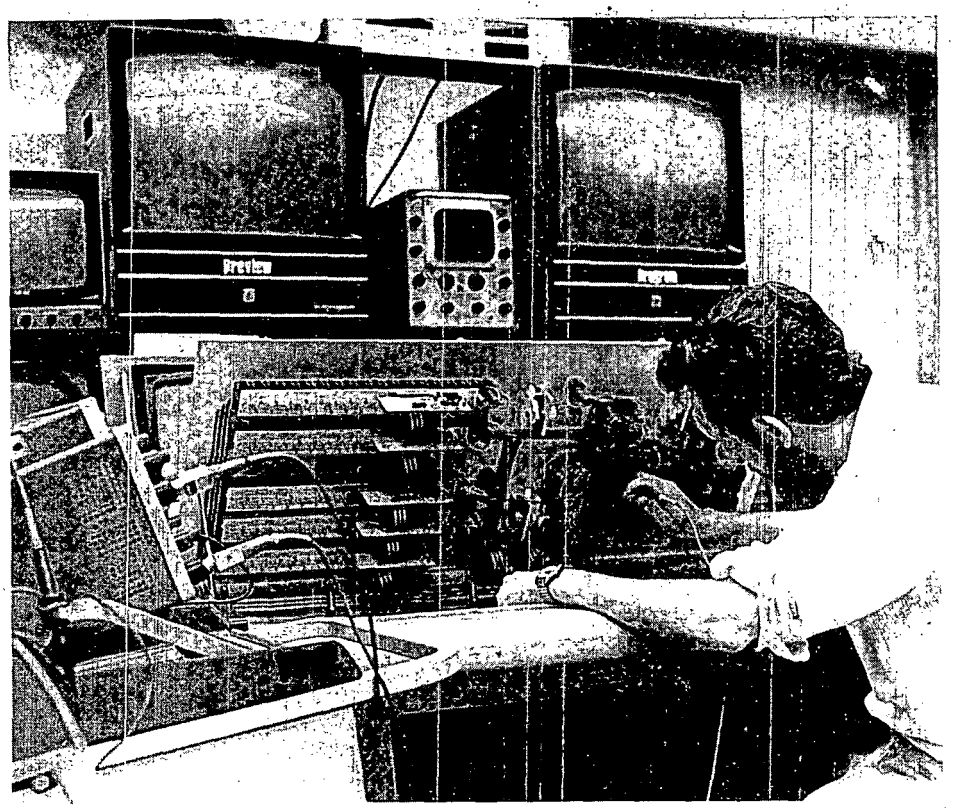
Term 4
Mrs. Y. Ashby, West Lawn, Riverview
Mrs. M. Evans, Valleyview
Mrs. B. Hjort-Olsen, East Lawn, Riverview
Ms. D. Jenkins, Valleyview
Mr. J. Kallenberger, Valleyview
Mrs. E. Lee, Fernwood, Riverview
Mr. K.Miyoshi, West Lawn, Riverview
Mr. D. Regnier, West Lawn, Riverview
Mrs. M. Routley, East Lawn, Riverview
Mrs. C. Theissen, Valleyview

Preceptors 1979-80, 1980-81
P. Andrews
R. Auguste
J. Bakker
K. Bartells
B. Bellinger
D. Bettison
B. Boivin
P. Bonneau
L. Bouma
H. Breitkruz
J. Broom
R. Bruvold
E. Burt
C. Cassar
E. Chan
R. Chan
A. Chatney
D. Chernoff
M. Cook
D. Cousins
B. Davis
M. Edwards
S. Ellis
L. Emmonds
S. Evans
M. Fenn
D. Fesser
R. Flemming
S. Fransen
K. Gallagher
P. Gilchrist
K. Godin
L. Greenaway
C. Haldin
T. Hardy
J. Henning
A. Heringa
C. Higgins
N. Howarth
L. Jessome
A. Jones
R. Jones
C. Kelly
M. Kennaugh
D. Kerr
A. Khout
C. Knott
N. Kollinger
E. LaSota
E. Leslie
V. Leslie
R. Lewis
E. Little
D. McMahon
J. McManus
J. McRae
K. Mann
R. Matovich
S. Milligan
D. Mitchell
C. Mokelki
W. Mokelki
L. Moreau
R. Nance
D. Nastile
S. Neal
S. Normey
K. O'Keefe
K. Paul
S. Power
M. Pringle
J. Ralph
S. Roberts
P. Sailes
K. Sample
B. Shatzko
H. Shaw
A. Shrubsall
J. Smart
C. Smith
D. Smith
K. Spearan
H. Speelan
J. Spooner
B. Stewart
S. Sullivan
M. Talson
D. Trotman
J. Turcott
S. Turner
D. VanLou
M. Vinge
D. Wharton
L. Wilson
B. Wood
L. Wowk
D. Yeung

Third Year Programs







Broadcast Engineering

Broadcast Communications Technology

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

The Program

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

Television studio systems and equipment provide the student with detailed experience in the maintenance of highly specialized equipment used in modern television and cable stations. Particular emphasis will be placed upon the servicing of video tape equipment, 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.

A.M. 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 National Diploma of Technology in Electronics, or equivalent experience in the work force.

Course of Studies

		Clrm hrs/annually
12.601	Basic Acoustics	38
12.602	Audio Technology I	76
12.603	Audio Technology II	76
12.604	A.M. Transmission Systems	38
12.605	F.M. Transmission Systems	38
12.606	Video Technology I	76
12.607	Video Technology II	152
12.608	Video Recording Systems	187
12.609	Digital Video Systems	38
12.610	Television Transmission Systems	38
12.611	Practicum	250

Subject Outlines

12.601 Basic Acoustics — The nature of sound-principles of hearing; definition and relationship of loudness and sound pressure levels; definitions and applications of white and pink noise; octave and third octave band filtering; noise criterion curves and applications; good design practice for noise control; sound level measurements; definition and significance of reverberation time; standing waves; absorption factors; measurement and control of reverberation time; good design practice for studio acoustics.

12.602 Audio Technology I — Audio signal sources; microphone types and characteristics; signal levels and impedances; typical control systems; amplifier performance criteria; input noise level and head-room; attennator networks; mixing and bridging networks; VU meter characteristics and calibration; program and graphic equalizers; artificial reverberation systems; signal distribution systems; audio monitoring systems; audio system test equipment and measurements.

12.603 Audio Technology II — Audio recording systems; reel/reel systems, principles and alignment techniques; NAB cartridge systems; principles and alignment techniques; disc recording principles and playback criteria; stereophonic signal control and processing; advanced audio signal processing techniques; peak limiters; volume compressors; selective processing; line transmission of audio signals; design criteria; advanced audio system test equipment and measurements.

12.604 A.M. Transmission Systems — A.M. transmission standards and channel assignments; typical A.M. transmitting systems; A.M. modulation techniques, including high-level, dougherty and phase/amplitude; DOC monitoring requirements; transmitter test and alignment techniques; selection and use of R.F. transmission lines for A.M. systems; antenna array design criteria; DOC/FCC protection requirements; horizontal pattern determination; vertical pattern determination; array efficiency factors; tuning and phasing equipment design criteria; array alignment techniques; DOC proof of performance requirements; supplementary proof requirements; test equipment calibration.

12.605 F.M. Transmission Systems — F.M. transmission standards and channel assignments; typical F.M. transmitting systems; F.M. modulation techniques; stereo multiplexing principles and techniques; SCA multiplexing techniques; DOC monitoring requirements; transmitter test and alignment techniques; selection and use of R.F. transmission lines for F.M. systems; transmitting antenna selection criteria; antenna performance measuring techniques; DOC initial commissioning requirements.

12.606 Video Technology I — The television signal format; principles of interlaced scanning; review of imaging devices, system limitations and critical parameters; typical monochrome camera system; typical monochrome control and distribution system; monochrome monitoring equipment; elementary video signal analysis.

12.607 Video Technology II — Principles of color signal encoding; color matrixing techniques; system limitations and critical parameters; typical 3 tube color camera

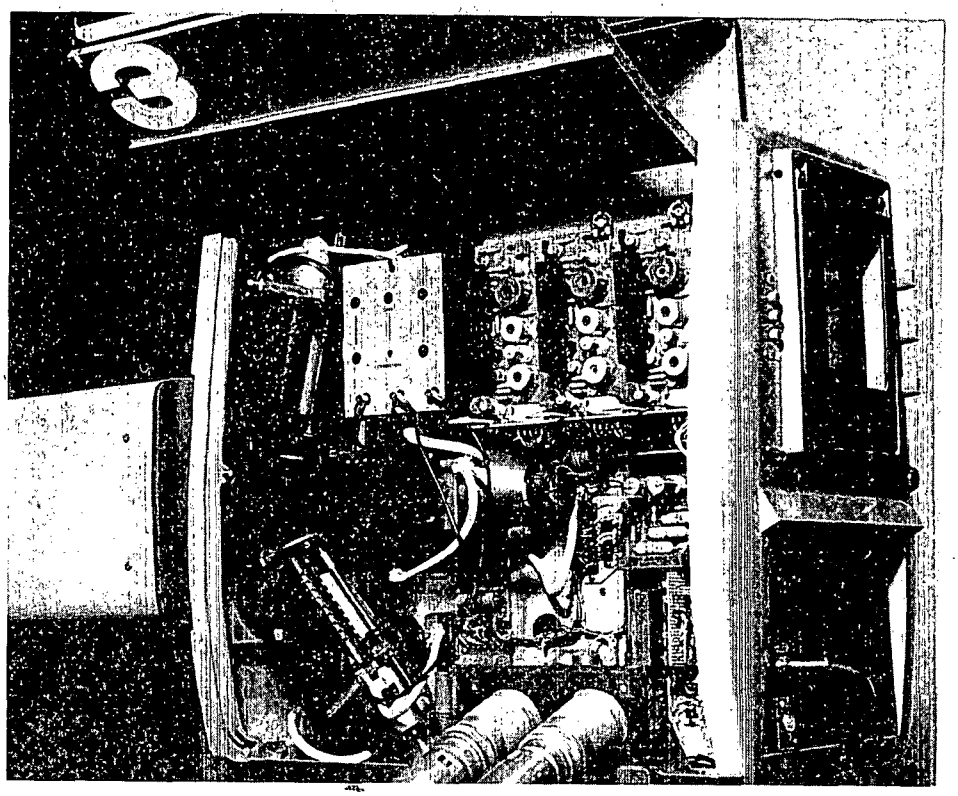
system; camera fault analysis and alignment techniques; color signal control and processing; advanced color video signal analysis; vertical interval test signals.

12.608 Video Recording Systems — Principles of helical scan video recording; detailed analysis of typical recorders; equipment test and alignment techniques; equipment servicing exercises; principles of quadruplex video recording; detailed analysis of typical recorder; equipment test and alignment techniques; equipment servicing exercises; principles of electronic video editing; analysis of typical editing system.

12.609 Digital Video Systems — Principles of digitizing video signals; advantages and limitations of digital signal processing; typical time-base correction system; typical digital frame store system; frame store applications, including standards conversion. Teletext and videotex data transmission systems; typical Telidon broadcast teletext transmission system; digital transmission performance analysis; typical Telidon decoding system.

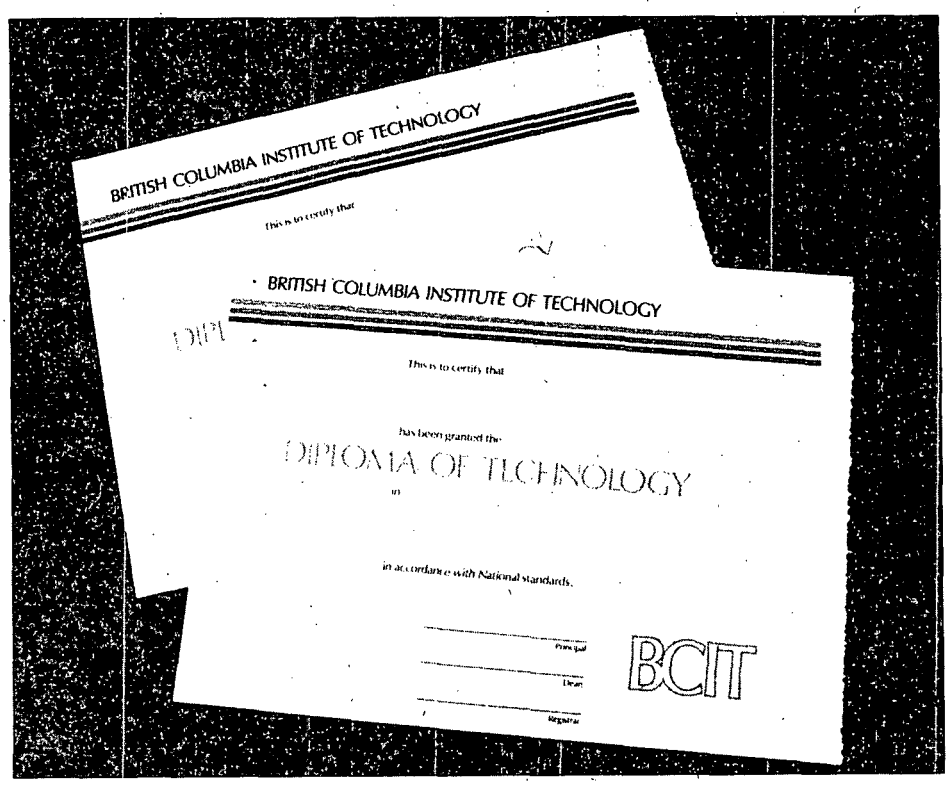
12.610 Television Transmission Systems — Television transmission standards and channel assignments; principles of vestilial sideband transmission and signal recovery, principle of negative modulation; DOC transmission standards and monitoring requirements; principles and merits of various forms of visual transmitter modulation, e.g. low-level, high-level and I.F. modulation; detailed analysis of typical transmitter circuitry; transmitter test and alignment techniques; equipment servicing exercises; selection and use of R.F. transmission lines for television transmission; transmitting antenna selection criteria; antenna system performance measurements.

12.611 Practicum — Practical experience working in and with the broadcast industry.



Faculty and Staff

F.L. Sanderson, Dipl.Ed., B.Th.,
Department Head
S. Smolar, B.A., Program Head



Business Administration

Administrative Management Technology

Following some experience in the work force, engineering and health technologists may assume supervisory and managerial responsibilities. Although well-versed in the technical aspects of their 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 for graduates in health and engineering technologies or equivalent.

The Program
The nine-month program includes such basic business subjects 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. All students are required to carry eight courses each term.

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

Year 1	Term 1	Clrm hrs/wk
10.110	Economics	3
10.300	Management III	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	8
		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 analyze 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 1 — 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, 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 such fields as finance, control, personnel, production, marketing and general management, for study and discussion. The course is designed to acquaint the student with the role of top management and the interrelationships between these fields. 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 individuals not specializing in data processing, a look is given at the types of computer systems currently used 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.

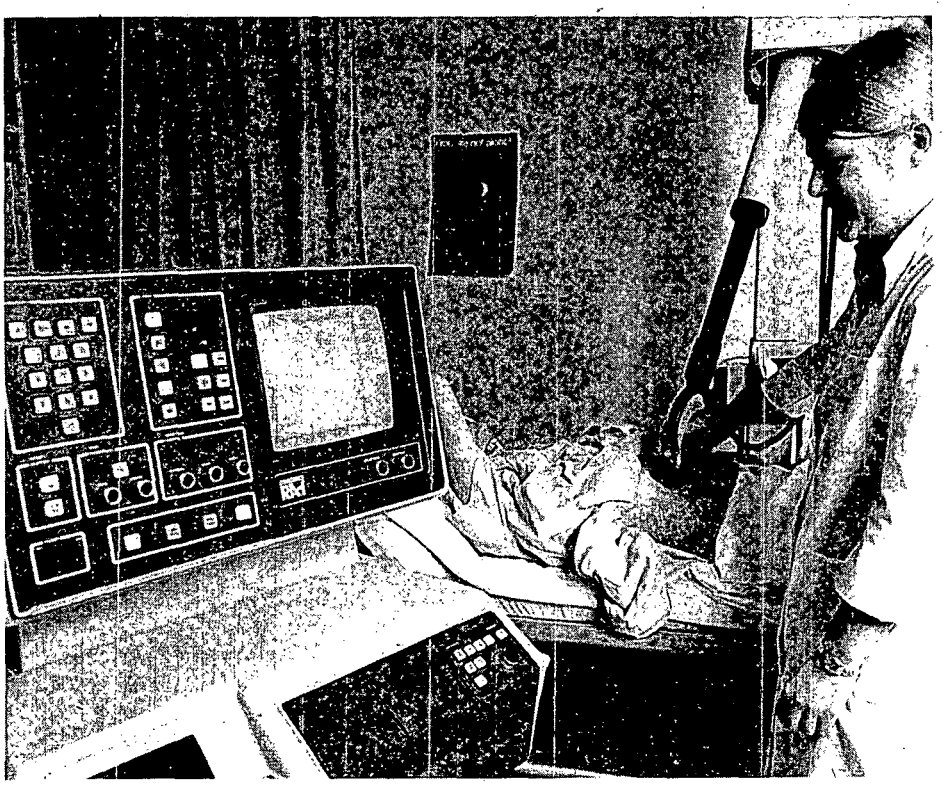
20.191, 20.291 Marketing — This course is designed to give students a good understanding of the role of marketing in a company. Marketing plays a critical role in any company dealing in a product or service, and the decisions made by the marketing manager are reflected in the company's administrative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

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.

22.408 Supervision — This course deals with the application of management to organizational problems at the supervisory level. The course will develop students' skills in planning, decision-making, interpersonal and inter-group relations and communications.

Faculty and Staff

R.A. Cradock, B. Comm., M.B.A., R.I.A., *Department Head*
T.P. Juzkow, B.A.Sc., M.B.A., P.Eng., Program Head
D. Pepper, B.A., M.Sc., Ph.D.
G. Storey, B.A., M.Sc.
R.A. Yates, LLB., M.B.A.



Diagnostic Medical Sonography

Department of Radiological Technical Services

Diagnostic ultrasound is a rapidly emerging, relatively new medical diagnostic technique. Using high frequency sound waves transmitted and reflected through various body parts, it is possible to image organs, masses, and fluid collections within the body. The technique provides valuable diagnostic information. Unlike x-rays, ultrasound waves are non-ionizing. Diagnostic ultrasound energy is non-invasive and non-traumatic, and to date no significant biological effects have been demonstrated.

The field of Diagnostic Medical Sonography is dedicated to the preservation of life and health by diagnosis and prevention of disease. The diagnostic medical sonographer (ultrasound technologist) is a skilled person, qualified by academic and clinical training to provide patient services using diagnostic ultrasound. Sonographers work under the supervision of a doctor of medicine, qualified in the use and interpretation of ultrasound procedures.

Studies performed by the sonographer include: echocardiography, abdominal sonography, obstetrical/gynecological sonography, ophthalmic sonography, and neonatal brain sonography.

Job Opportunities

Graduates in this dynamic new allied health field will assume an important role in maintaining high quality patient care, provide leadership in the development of health programs, and participate in medical research.

Employment opportunities exist in a hospital ultrasound facility, or an integral section of another hospital department, such as radiology, cardiology, or obstetrics. A large percentage of the hospitals in B.C. have diagnostic ultrasound equipment and its use is expanding rapidly.

The Program

Due to the requirement of training and knowledge in an allied health field, the program is only one year in length. The first term is devoted to the theory of diagnostic ultrasound. The clinical aspects comprise the larger portion of the training. Clinical training is provided in selected hospitals in B.C.

The course of studies includes anatomy and physiology; pathophysiology; physics of ultrasound; instrumentation; and applied sonography.

Upon successful completion of the program, the graduate is eligible to write the American Registry of Diagnostic Medical Sonographers examinations.

Prerequisites

Successful completion of a two year allied health program such as radiography, nuclear medicine, or registered nursing, or a Bachelor of Science, or equivalent in an appropriate health related science.

Course of Studies

Year 1	Term 1	Clrm hrs/wk
33.523	Physics of Ultrasound	3
73.101	Applied Sonography	8
73.105	Clinical Experience	15
98.108	Anatomy and Physiology	3
98.109	Pathophysiology	3
		32

Year 1	Term 2	
73.206	Clinical Experience in Echocardiography	12
73.306	Clinical Experience in Abdominal Sonography	12
73.307	Clinical Experience in Obstetrical and Gynecological Sonography	12
		36

Subject Outlines

33.523 Physics of Ultrasound — Topics include the physics of acoustic waves, transducers, ultrasonic field, ultrasonic imaging, basic pulse echo instrumentation, real time systems, cathode ray tubes, doppler effect, acoustic power, testing and calibration, and biological effects.

73.101 Applied Sonography — This course encompasses an in-depth study of echocardiography, abdominal sonography, and obstetrical and gynecological sonography. An introduction to opthalmic, neonatal head, and doppler ultrasound will be presented.

73.105 Clinical Experience — Time is spent in hospital Ultrasound Departments to obtain clinical and practical experience in support of classroom studies.

73.206 Clinical Experience in Echocardiography — The student will acquire the skills to carry out sonographic examinations and the ability to recognize normal and abnormal sonographic patterns in the heart.

73.306 Clinical Experience in Abdominal Sonography — The student will acquire the skills to carry out sonographic examinations and the ability to recognize normal and abnormal sonographic patterns in the abdomen.

73.307 Clinical Experience in Obstetrical and Gynecological Sonography — The student will acquire the skills to carry out sonographic examinations and the ability to recognize normal and abnormal sonographic patterns in the female pelvis.

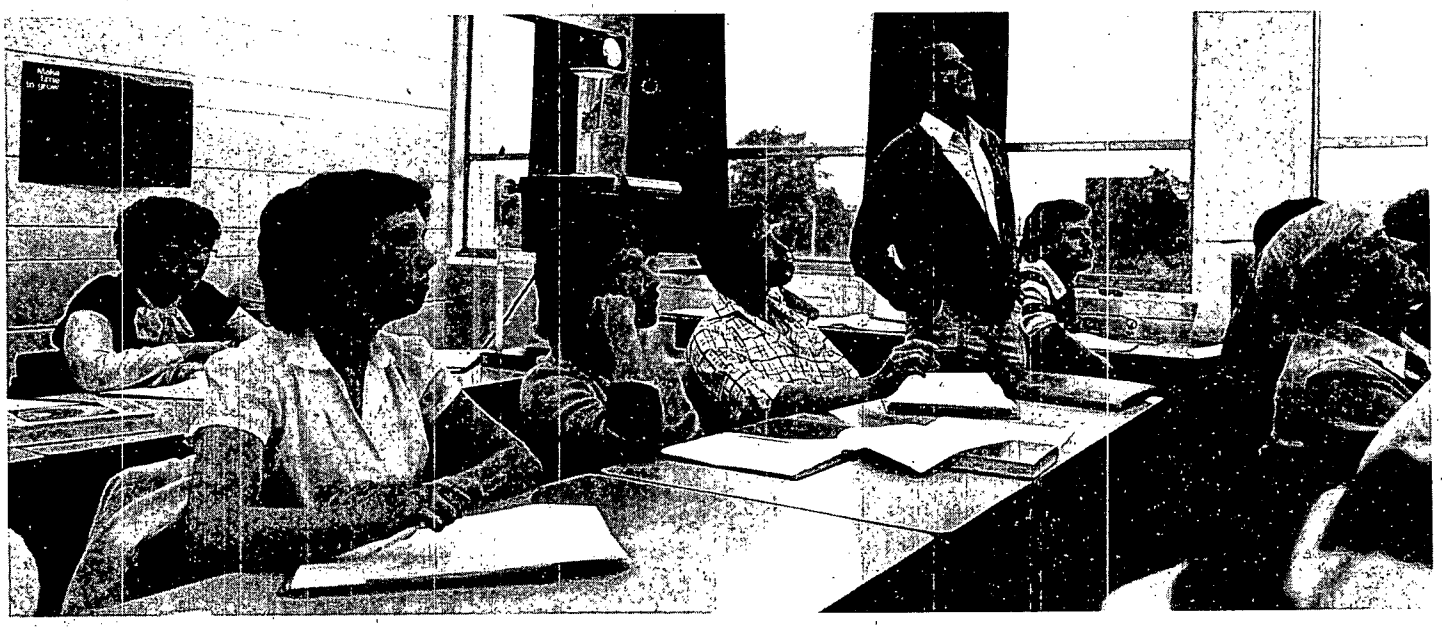
98.108 Anatomy and Physiology — This course provides an overview of the organ systems of particular clinical interest to sonographers. Special emphasis is placed on the genitourinary, digestive (including liver, gall bladder, and pancreas) and cardiovascular systems. In addition, longitudinal foetal development is discussed and cross-sectional anatomy of the abdominopelvic cavity is examined.

98.109 Pathophysiology — An outline of the etiology and pathogenesis of those diseases commonly investigated by ultrasonography. The course is divided into three equal sections: obstetric and gynecologic pathology, abdominopelvic organ pathology and cardiography. General principles of the disease process and complex syndromes will also be discussed.

Faculty and Staff

W.E. Noel, R.T.&N., *Department Head*
Ms. K.A. McDiarmid, R.T., R.D.M.S.

Core Division



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

R. Sterne, B.A.Sc., P.Eng., Dean

Department of Chemistry

C. Barnetson, B.Sc., *Department Head*
N. Abdurahman, B.Sc., M.Sc., Ph.D.
G.C. Anderson, M.I.S.T. (U.K.)
D.W. Conder, B.Sc., M.Sc.
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.
J. Salvo, B.Sc., B.Ed.
R. Tam
E.E. Tang, B.Sc.
L.V. Tolani, B.Sc., M.Sc., D.I.C., C.Chem. M.R.I.C.
P.W. Van Ameyde, H.L.S. (Neth.), Ir.N.I.R.I.A.
J.C. Walker, B.Sc.

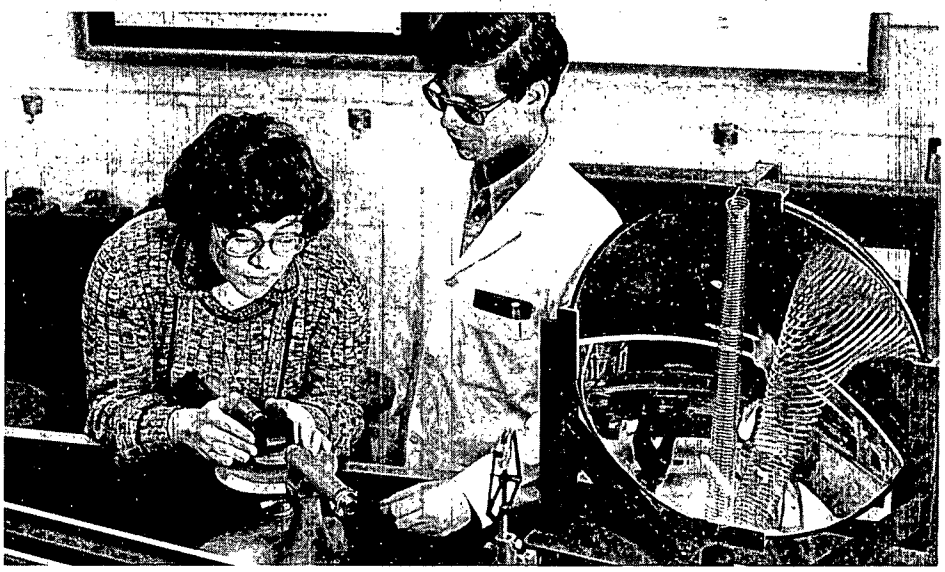
Department of English

Henry Arthur, B.A.(Hons.), M.A., *Department Head*
Robert Allin
Ken Brambleby
Patrick Burns, B.A., M.A.
Hugh Challans, B.A.
Rita Clarke, Ph.M.B., M.A.
Jean Compton
Rider Cooey, B.A.(Hons.)
Grant Douglas
Tristan Easton, B.A., M.A.
Sue Fahey, B.A.
Brendan Frain
David Hamilton, B.Sc.
Terry Harding
Davie Helgesen, B.A., M.B.A.
Douglas Horan, B.Journ., B.A.(Hons.)
Valda Johnston, B.A., B.Ed.
Glen Kask
Wayne Kean, B.A., M.A.
David Kipling
Ron Knott, B.A.(Hons.), M.Ed.
Greg Layton, B.A.
Richard Lund
David McNeal, B.A., M.A., Ph.D.
Maureen Moore, B.A., M.A.
Bill Oaksford, B.A., M.A.
Michael Otte, B.A.(Hons.), M.A.
Trudy Ramsay, B.A.
Barbara Schillinger, B.A., M.A.
Jean Scribner, B.A., M.A.
Judy Segal, B.A.(Hons.), M.A.
Rudy Spence, B.Comm., B.A.
Don Steele

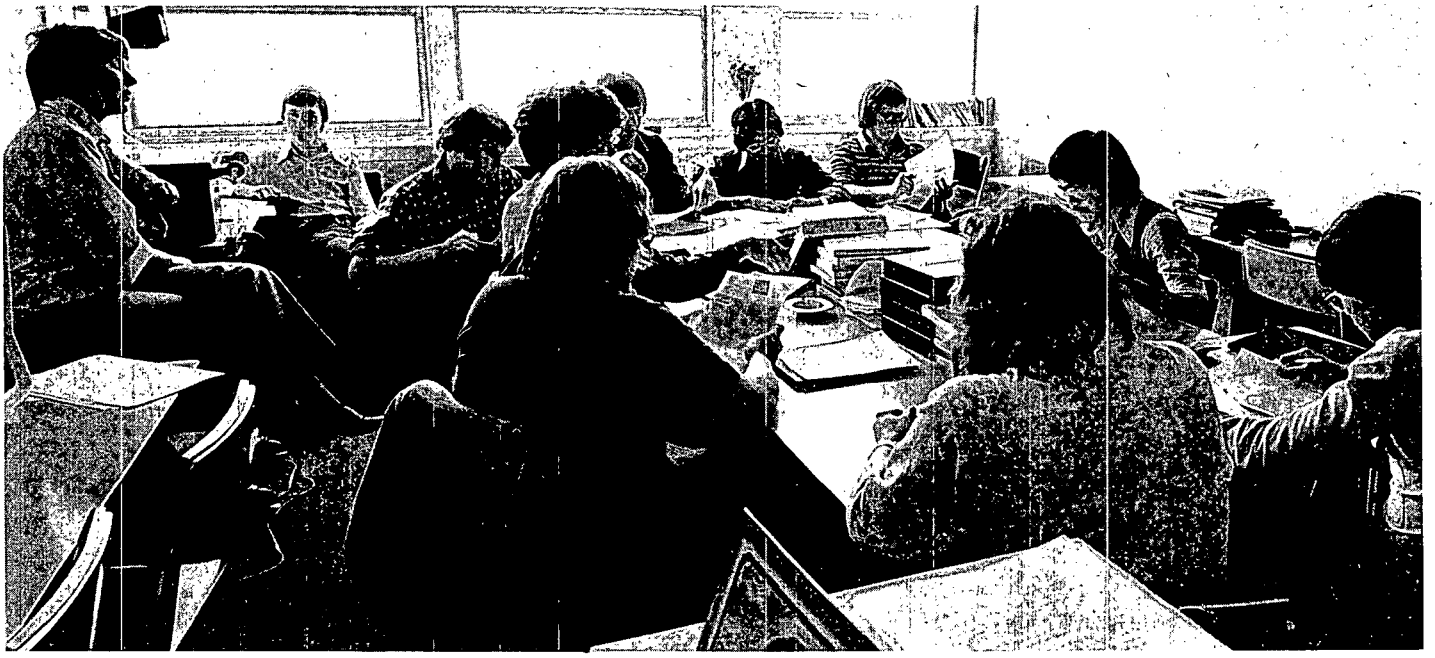
Eileen Stephens, B.A., M.A.
Dixie Stockmayer, B.A.
Eunice Stronach, B.A., B.Ed., M.A.
Patrick Thomas, B.A., B.Ed., M.A.
David Vale, B.A., B.Ed., M.Ed.
Leonard Walker, Ph.D.
Anita Willson, B.A., M.A.
May Archer Young, B.A.(Hons.), M.A.

Department of Mathematics
E.R. Martin, B.Sc., M.Ed.
Department Head (Acting)
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.
J. Meisen, B.Sc., M.S., Ph.D.
A.P. Paris, B.A.Sc., M.A.Sc., P.Eng.
V. Sawadsky, B.A., 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.

Department of Physics
F. Reader, B.A.Sc., P.Eng.,
Department Head
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.
D. MacDuff, B.Sc.
R.C. MacDuff, B.Sc., M.Sc.
G. Olive, B.Sc.(Hons.), M.A.Sc., Ph.D.
W.V. Olson, B.Sc., M.Sc.
G.R. Paulson
R. Peters, B.Sc., M.Sc.
J.R. Saunders, B.Sc., M.Sc.
G. Schellenberg, Dipl.Tech.
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
R.J. Woods, B.Sc., M.Sc., M.A.Sc.
K.A. Yakel, B.Sc.(Hons.), M.Sc.



Pre-Entry Courses and Technology Fundamentals Program



Through the Division of Continuing Education, BCIT offers pre-entry courses and the Technology Fundamentals Program to individuals seeking entrance to full-time or part-time technology programs. This academic upgrading provides students with the opportunity to meet BCIT entrance requirements. By taking one or more pre-entry courses students are eligible to submit their admission application for consideration. The Technology Fundamentals Program is a non-credit upgrading program to assist the applicant who lacks at least three prerequisites for admission to a technology, but who is otherwise a suitable candidate. It offers chemistry, English, mathematics and physics courses. Successful completion of this program guarantees admission into the mutually agreed upon technology. Pre-entry courses and the Technology Fundamentals Program are for mature students, students who are missing specific prerequisites and students who have weak backgrounds or who 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
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.

COMBINED WRITING AND STUDY SKILLS

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 and career programs. Covers all topics listed in 31.997 and 31.998, plus additional reading techniques for increased speed and comprehension.

WRITING

31.997 Effective Writing — This course develops the basic skills of effective writing with emphasis on business and technical applications, and is especially suitable for those who are uncertain of their skill in business and technical writing. Covers organization, paragraph development and effective sentences in letter and memo writing.

STUDY SKILLS

31.998 Textbook Reading and Study Skills — This course develops the skills necessary for success in learning, with particular emphasis on technology and career studies. Covers reading textbooks, taking notes, writing exams and managing time.

MATHEMATICS FOR ENGINEERING PROGRAMS

32.950 Pre-Entry Mathematics — An upgrading and/or refresher course for students who have not completed high school math or have completed it more than three years previously, or whose math background is otherwise weak. Satisfies Algebra 12 entrance requirements. Students intending to enter a technology which requires an Algebra 12 grade of C+ or better, must achieve a final mark of 65% or higher in 32.950. Prerequisite: Algebra 11 or approved equivalent math course.

32.X95 Remedial Mathematics (Self-Study) — A self-study version of 32.950 for those unable to attend classes. Satisfies Algebra

12 entrance requirements. Students intending to enter a technology which requires an Algebra 12 grade of C+ or better, must achieve a final mark of 65% or higher in 32.X95. Prerequisite: Algebra 11 or approved equivalent math course. **Note:** students who experience difficulty with math or who have been away from school for several years, are advised to take Pre-Entry Mathematics 32.950.

MATHEMATICS FOR BUSINESS PROGRAMS

22.900 Preparatory Mathematics for Business — An upgrading and refresher course for students entering Business programs. Includes arithmetic, elementary algebra, graphical techniques and an introduction to business applications. This course provides students with a suitable prerequisite for programs in the business division and satisfies Math 11 or Algebra 11 entrance requirements.

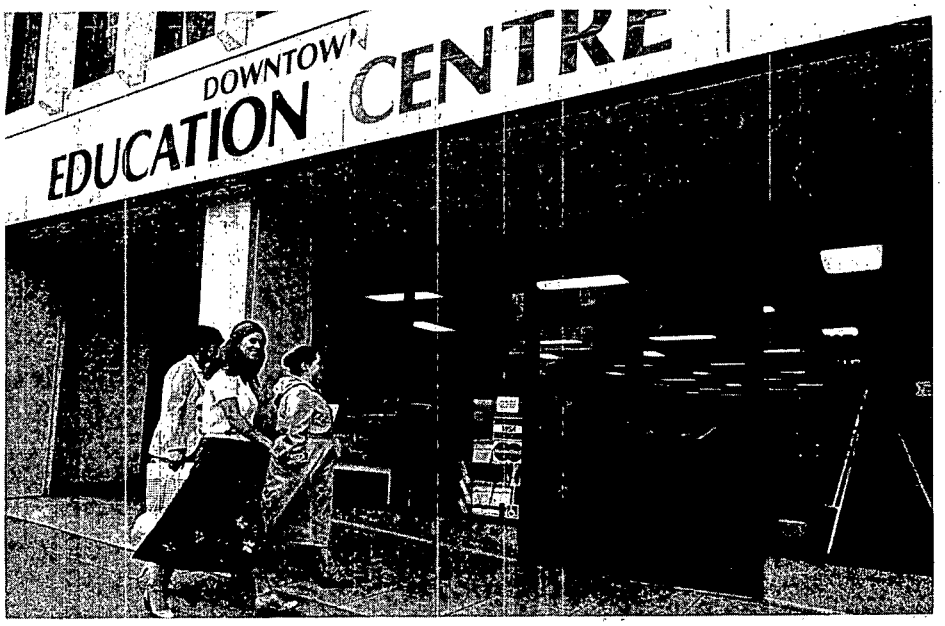
CHEMISTRY

30.909 Pre-Entry Chemistry — An upgrading course for individuals whose background in chemistry is weak and a refresher course for those who have not studied chemistry for several years. This course satisfies Chemistry 11 entrance requirements.

PHYSICS

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

Continuing Education and Industry Services



BCIT's Division of Continuing Education and Industry Services (CE&IS) offers a variety of credit and non credit part-time courses, seminars, workshops and conferences on the Burnaby campus and at various off-campus locations.

CE&IS also operates the Downtown Education Centre at 549 Howe Street in cooperation with Capilano College and Simon Fraser University. Seven floors of classrooms are used daily from 8:30 a.m. until 11 p.m by educational institutions and organizations which rent space in this central downtown location. BCIT's downtown course offerings are mainly in the area of business management and non-credit seminars.

The Downtown Education Centre also houses the Educational Information Centre, a consortium of the Greater Vancouver School Districts, Vancouver Community College, Open Learning Institute, Pacific Vocational Institute, Simon Fraser University, University of British Columbia, Capilano College and BCIT, offering information on all post-secondary education in the Lower Mainland.

The Business Continuing Education Department of CE&IS offers all BCIT day school business technology programs in various time frames for students interested in gaining a BCIT certificate or diploma, and for those who wish to upgrade their skills in specific areas.

Engineering and Core Continuing Education offers engineering-oriented courses in all BCIT day-school technologies. Pre-entry and remedial courses from Core programs in English, Mathematics, Physics and Chemistry are also available.

Health Continuing Education provides a service to workers in the health care delivery system and to those wishing to re-enter the health care field. All courses are offered in the Lower Mainland and some are available throughout the province. Through CE&IS, students can take a part-time diploma program in General Nursing (equivalent to the day-school diploma program) as well as the Health Care Management Program and the BCIT Health Care Certificate. Numerous credit and non-credit nursing update and refresher courses are available through Health Continuing Education.

The Distance Education Department offers credit and non-credit correspondence courses adapted to the schedules of working adults. These may be preparatory or advanced, structured or unstructured, of general interest or career-oriented. The Department also operates BCIT's televised instruction facilities, which produce recorded and live classroom instruction for distribution via cable and satellite systems to individual homes and special receiving classrooms around the province. Distance Education courses are designed by the Program Development Group for schools, industry, business and government.

Industry Services offers a unique, national employee-training resource for industry —including government agencies, private and public operations, professional and volunteer organizations and individuals. It provides a variety of courses and programs, in flexible formats, throughout Canada with emphasis on joint participation between industry and BCIT to determine training needs and establish a curriculum to meet those needs. Industry Services are provided on the BCIT campus, on business or industry premises, or wherever convenient.

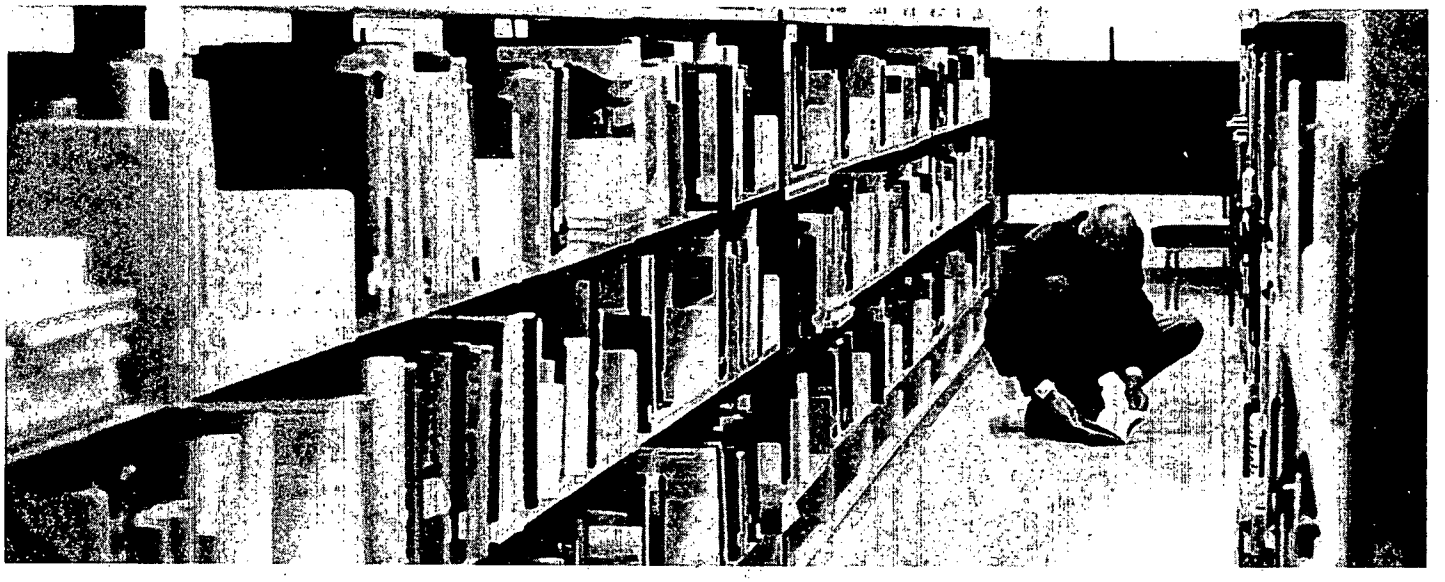
The Training and Development Centre offers high quality seminars, conferences and workshops in business, management, computer systems, engineering, technology and instructor training for the general business and professional community, industry, educational and government organizations. Speakers are experts in their fields and subjects are presented in a practical, pragmatic fashion

Those interested in exploring career alternatives and professional development through part-time education should contact the Division of Continuing Education and Industry Services, BCIT, 3700 Willingdon Avenue, Burnaby, B.C., V5G 3H2. Telephone 434-5734 local 204/205, or the Downtown Education Centre. Telephone 687-4666.

Continuing Education and Industry Services Administration

David M. Brousson, B.A.Sc., P.Eng., Dean
Stewart McGill, Department Head, Business Continuing Education
Allan Willcox, B.A.Sc., P.Eng., Department Head, Engineering and Core Continuing Education
Patricia D. Wolczuk, B.H.E., M.Sc., Department Head, Health Continuing Education
William D. Robertson, B.Ed., M.A., Department Head, Distance Education
R.C. (Rob) MacGregor, A.S.L.A.E.T., T.Eng., Department Head, Industry Services
Robert I. Jamieson, B.A., Manager, Training and Development Centre
C.J. Dukowski, B.A., M.Ed., Manager, Downtown Education Centre

Library Services Division



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 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 and Equipment: Research methods, seminars, media production courses, equipment training, typewriters, photocopiers, computer-assisted instruction terminals, inter-library loans, film preview booths, film screening room, popular music and paperback collection.

Faculty and Staff

Administration

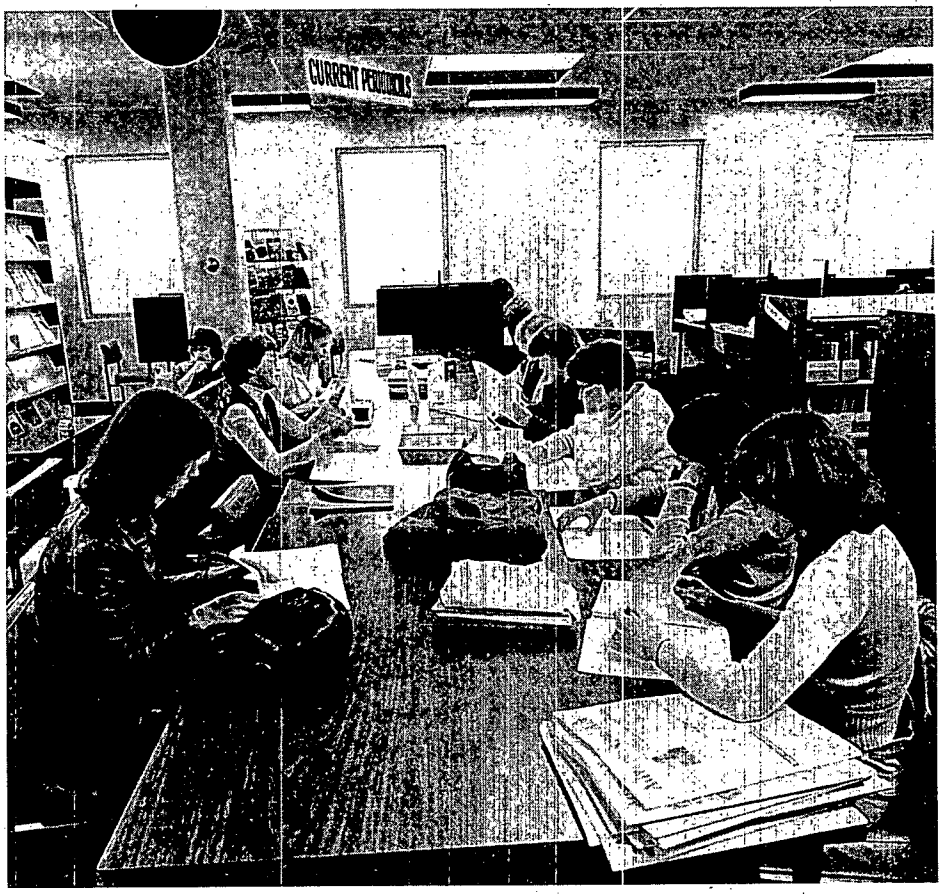
Jos. E. Carver, C.D., B.A., B.L.S., Dean
Joyce McEwan, Secretary to the Dean
Wendy Oliver, Budget Expediter

Library

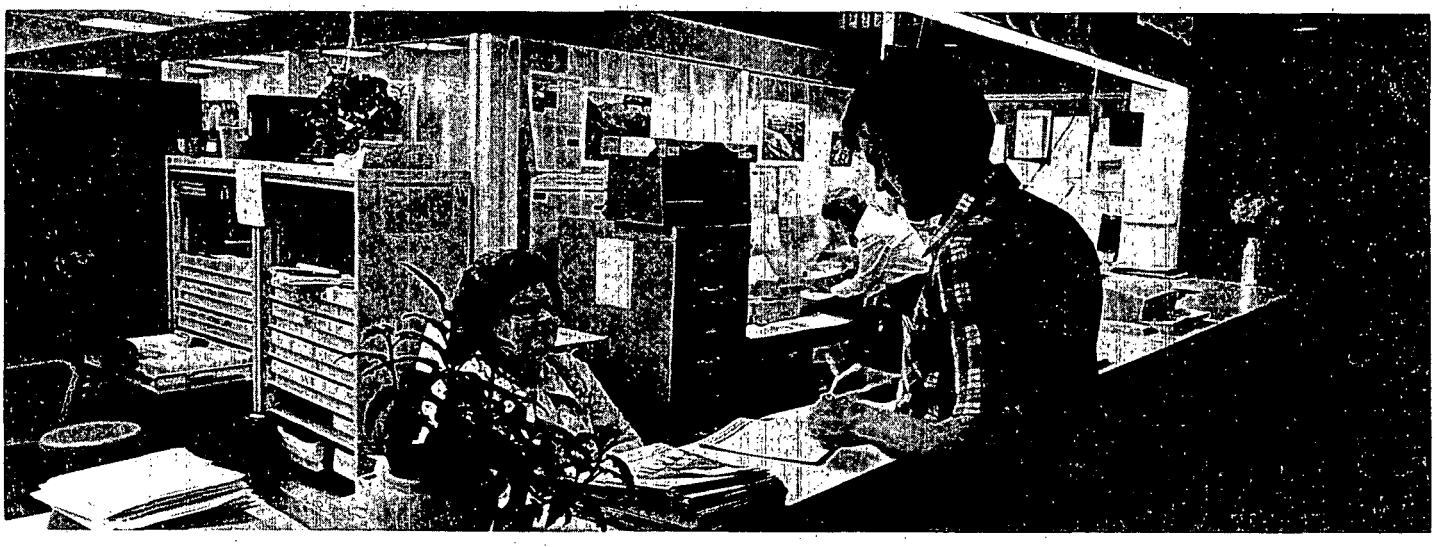
Robert A. Roy, B.A, M.A., B.L.S., *Library Department Head*
Margot Allingham, B.A., M.L.S., Reference Librarian, Engineering
Sheila Ferry, B.A., B.L.S., Reference Coordinator
Tony Kelly, B.A., M.L.S., Reference Librarian, Business
Frank Knor, Dipl.T., B.Ed., B.L.S., Reference Media Librarian
Trish Labonte, B.Sc., M.L.S., Reference Librarian, Facilities Planning
Merilee MacKinnon, B.A., M.L.S., Cataloguer
Marj McLeod, B.A., B.L.S., Reference Librarian, Health
Paula Pick, B.A., M.L.S., Head Cataloguer
Gerry Weeks, B.A., M.L.S., Reference Librarian, Forestry and CEIS
Robert Young, B.Sc., B.L.S., Reference Librarian, Core and Administration

Audiovisual

Christopher Wilson, Dipl.T., B.A., M.A., *Audiovisual Department Head*
John Borseth, Special Maintenance
John Boyle, Audio Maintenance
Maureen Brooks, Equipment Circulation
Leslie Chan, Dipl.T., Video Maintenance and Distribution Systems
Trudy Handel, Dipl.T., Media Training, Health and CEIS
Cecil Paris, Equipment Circulation
Larry Porter, Equipment Circulation
Josephine Rix, Media Preparation
Charles Saunders, Dipl.T., Audiovisual
Egon Steinebach, Photographic Production
Ray Young, Media Graphic Production



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, provided the applicant meets the necessary Institute and technology prerequisites.

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 admission to Biological Sciences, Chemical Sciences, 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 on visitor's visas.

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

Academic Requirements for Admission

Graduation from a senior secondary school 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 equivalents,* 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 from recognized regional colleges within British Columbia. Further information may be obtained by directing your inquiry to the Office of the Registrar at BCIT.

Direct Entry

Those persons who have successfully completed one or more years of study at a level equal to, or higher than, that of a BCIT 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, Math 11 or Business and Consumer Math 11 with a C+ standing

Broadcast Communications — Graduation from the Selected or Combined Studies Program is a general prerequisite

Broadcast Engineering — Graduation with a National Diploma of Technology

in Electronics, or equivalent work experience

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

Computer Systems — At least a B- average in English, Mathematics and at least five other grade 11 or 12 academic courses such as sciences, languages and history. Students taking the Management Systems Option must complete Algebra 12 or Math 12 prior to second year

Financial Management — Algebra 11 or Math 11

Hospitality and Tourism Administration — English 12, Algebra 11 or Business and Consumer Math 11 (all with a C+ standing)

Marketing Management — Algebra 11 or Math 11 (Graduation with a C+ standing or better)

Operations Management — Algebra 11 or Math 11

Engineering Division

Biological Sciences

Biological Sciences Program — Algebra 12 or Math 12 and Chemistry 11

Management in Agriculture Program — Algebra 11 or Math 11

Building — English 12, Algebra 12 or Math 12 plus Physics 11 (all with a C+ standing or better)

Chemical Sciences — Algebra 12 or Math 12

Civil and Structural — Algebra 12 or Math 12 and Physics 11

Electrical — Algebra 12 or Math 12, Physics 11 and Chemistry 11 (all with a C+ standing)

Forest Products — Algebra 12 or Math 12 and one science 11 (Biology, Chemistry or Physics)

Forest Resource

Forestry Program — Algebra 12 with a C+ standing and a science 11 (Biology preferred)

Fish, Wildlife and Recreation — Algebra 12 as above and Biology 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

Health Division

Biomedical Electronics — Algebra 12, Physics 11, Chemistry 11

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

Electrophysiology — Algebra 12, Physics 11, Chemistry 11

Environmental Health — Algebra 12, or Math 12, Physics 11 and Chemistry 12

General Nursing (R.N.) — Chemistry 11 and either Chemistry 12 or Biology 12, Algebra 11 and English 12. The St. John Ambulance Standard First-Aid certificate is required by the end of term 1

Health Information

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

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

Medical Laboratory — Algebra 12 or Math 12 (if completed before 1978), Chemistry 11 and 12 and Physics 11

Medical Radiography — Math 12, Algebra 12 or Algebra 12 (honors), two science 11s and a science 12 (Physics 11 preferable). (Graduation with a C+ standing or better)

Nuclear Medicine — Math 12 (pre June 1978), Algebra 12 or Algebra 12, honors (post June 1978), Chemistry 11 and 12 and one science 11. (Graduation with a C+ standing or better)

Occupational Health and Safety — Algebra 12, Chemistry 11 and Physics 11, or equivalents

Prosthetics and Orthotics — Algebra 12 and Physics 11. Courses in metalwork and woodwork are recommended

Psychiatric Nursing (R.P.N.) — Chemistry 11 and either Chemistry 12 or Biology 12. (C+ standing preferred). The St. John Ambulance Safety-Oriented First-Aid certificate or equivalent is required by the end of term 1.

Important

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 prerequisite.

The only acceptable math prerequisite courses are Math 12, successfully completed in 1978 or earlier, or Algebra 12.

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 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

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

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

How to Make up Course Deficiencies

Summer and spring preparatory programs are available through the BCIT Continuing Education Division for those students who lack specific prerequisites or who 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 Office of the Registrar, BCIT, 3700 Willingdon Avenue, Burnaby, B.C., V5G 3H2, phone 434-5734, local 216. These forms should be completed and returned with the necessary **official** documents attached. See Document Requirements.

When to Apply

Applications for classes commencing in September will be accepted by the Registrar's Office from January 1 to the second week of September.

Applications for Psychiatric and General Nursing:

August Session

Applications for the August session will be accepted from January 1 to 14 days after the commencement of classes.

January Session

Applications for the January session will be accepted from May 1 to 14 days after the commencement of classes.

Applicant Status Categories

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

Acceptance — The applicant who meets the requirements of the Institute and the 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 by 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 chosen program.

Acceptance 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 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 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 statements 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 Medical 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 other recognized post-secondary institutions when the courses are equivalent in content to a selected program of studies at BCIT.

Policy Guidelines

a) first year students may only apply for course credit after they have been fully accepted and paid their commitment fee.
b) second and third year students, who are direct entries to BCIT, may apply for course credit upon receiving full acceptance.
c) students who are presently enrolled at BCIT may apply 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 the chief instructor.

If course credit is granted, students will not be eligible for BCIT scholarships. However, BCIT bursaries and government grants are available to students carrying at least a 75% class workload. Each student must carry a 75% class workload in order to be registered as a full-time day school student. If a second year student, while carrying a 100% class workload, receives course credit in one or more subjects during second year, he/she will not be eligible to receive an honors diploma.

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

Mail-In Method

A course credit application must be completed by the student and forwarded to the Office of the Registrar for processing. This method is only operative up to ten days prior to the commencement of classes. Applications made after this date must be routed by the student through the "direct" application method.

Direct Method

The student takes the completed course credit application form to the Office of the Registrar 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 Office of the Registrar.

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

Readmissions

Students may interrupt their studies after the completion of any term. However, an application form must be completed and submitted to the Office of the Registrar. Acceptance is based on the availability of seats in the technology and applications should be submitted at least one month prior to the date of the commencement of the term.

Change of Program

After a student has 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 approval and signatures from the appropriate department head, Dean and Registrar: Permission must be granted by the Board of Admissions before a change in program can be affected.

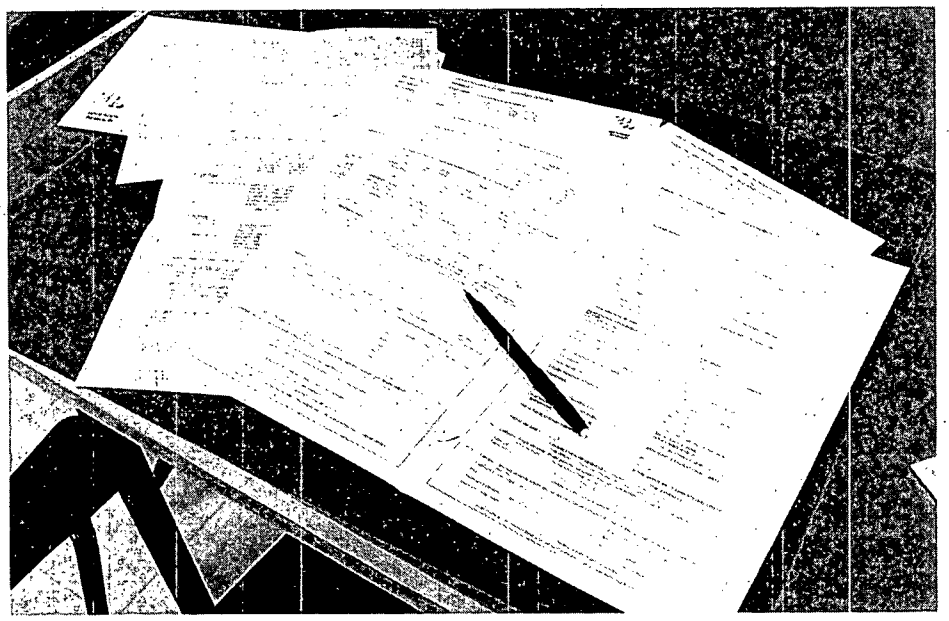
Changes in Curricula and Regulations

Although it is proposed to adhere to the programs 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.

Staff — Office of the Registrar

E. Del Gobbo, Registrar
Cindy Boire, Registrar's Secretary
John Carswell, Supervisor of Student Records and Information
Janet Robertson, Supervisor of Admissions

Fees and Expenses



Fees For 1982/83 Academic Year

Annual Fees

Please note that fees are subject to increase by action of the British Columbia Institute of Technology Board of Governors.

Based on 1981/82 fee structure, the following will be the minimum fees for 1982/83 academic year:

General tuition	$690
Convocation fee (2nd year only)	10
Student activity fee	59
Total payment	$759

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)	$350
Student activity fee	59
	$409

Second term fees (due first week of the term)

General tuition	$340
Total payment	$749

Second year students

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

First term fees (due 30 days before commencement of classes)

General tuition	$350
Student activity fee	59
	$409

Second term fees (due first week of the term)

General tuition	$340	
Convocation fee	10	$350
Total payment		$759

Third year students

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

General tuition	$350
Student activity fee	30
Total payment	$380

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 part of the program. These expenses are the responsibility of the student. Accommodation and food costs vary from $25 to $100.

Tuition Policy

First year students

1. A non-refundable commitment fee of $75 is due and payable upon an applicant's full or provisional 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. Reinstatement of admission will only be considered if seats remain available in the technology. 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 insufficient funds or for other reasons. Payments may also be made by Chargex (Visa) or Mastercharge credit cards.

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

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

Student Activity Fee: complete refund.

Refunds of fees for first year students who withdraw 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's ID card(s) turned in on receipt of the refund. Withdrawal verification will be made by the BCIT Student Association before processing the claim.

How to withdraw

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).

Applications should be made through the Office of the Registrar.

Student Financial Services

The most important
when considering ec
to plan ahead. For
urged to investigate
tance programs ava
other options well b
new school year.

Student Financial Se
different programs a
students to adequat
and educational ex
grams and services
For more detailed in
the *Student Financia*
may be obtained fro
cial Services office.
available to answer

The Student Financ
located in Trailer 2
Institute of Technol
Avenue, Burnaby, B
phone 434-5734, loc
hours are from 8 a.r
through Friday.

How Much Wi

The first step in de
financial picture is t
and expenses. A sin
with his/her parents
approximately $4,00
expenses, $690 for
least another $250 fo
It is important that
and board, transp
laundry and entertai

oint to remember
ational finances is
s reason you are
e financial assis-
ble, and explore
ore the start of a

ces offers several
l services to assist
meet their living
nses. These pro-
e outlined below.
rmation, a copy of
ervices Handbook
he Student Finan-
unsellors are also
estions.

Services office is
British Columbia
, 3700 Willingdon
. V5G 3H2. Tele-
886 or 890. Office
to 4 p.m. Monday

It Cost

mining your total
alculate resources
student not living
n expect to spend
o $4,500 on living
ition fees and at
ooks and supplies.
sts such as room
tation, clothing,
nent are taken into account. Each student's expenses will vary depending on their individual circumstances. For instance, a married student with dependents will have higher living costs than a single student living at home. To estimate total resources, you should take into account such income generating sources as summer employment, savings, parental contribution, and part-time earnings while attending school.

If your estimated expenses exceed your total resources, please consider the following programs and services available at BCIT. Individualized financial counselling and assistance with budgeting are also available upon request.

B.C. Student Assistance Program

This government-sponsored program is the major source of financial assistance for post-secondary students. The maximum assistance a student is eligible for varies according to program length and whether a student is single, married or has dependents. Based on 1981/82 guidelines, a single student enrolled in the average 35 week BCIT program is eligible for up to $3,970 in assistance ($1,970 in loan and $2,000 in non-repayable grant). Single parents or married students enrolled in a 35 week BCIT program are eligible for up to $4,370 in assistance ($1,970 in loan and $2,400 in non-repayable grant). Please note, these figures are maximums; the amount actually received is determined by a need assessment of each applicant's circumstances.

Students should apply **at least** two months before the start of classes to allow adequate time for application processing.

Ministry of Health Bursaries

Students entering a Health Division Program (excluding Environmental Health), may be eligible for a Health Bursary. If financial need is assessed as greater than the maximum available through the B.C. Student Assistance Program, the Ministry of Health with provide additional funds to a maximum of $50 for each week of the educational year.

Please note, **no separate application** is required. Students are automatically considered for a Health Bursary when applying to the B.C. Student Assistance Program.

Work Study Program

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

Positions are posted in the BCIT Student Financial Services Office beginning in mid-August.

BCIT Bursaries

BCIT Bursaries are non-repayable awards ranging from $50 to $1000. These bursaries are made possible through contributions from private companies, organizations and individuals to the BCIT Scholarship and Bursary Fund. See page 144 for a list of contributors.

Bursaries are awarded to those students who demonstrate financial need and who have a clear pass in all subjects with an overall average of no less than 60%. Consideration may be given to high academic standing and to a student's involvement in the Institute and in community affairs, but the major criterion is financial need. Students are requested to exhaust other sources of financial assistance, such as the B.C. Student Assistance Program, before applying for a bursary.

BCIT students are eligible to apply for bursaries only after successful completion of at least one term. For instance, a first year student entering BCIT in September will not be eligible for a bursary until January. Students may apply for bursaries in the fall (application deadline October 31) and in the spring (application deadline January 31).

BCIT Scholarships

Scholarships are awarded to students on the basis of academic achievement and are annually presented to students in October. They are made available through contributions from private companies, organizations and individuals. See page 144 for a list of contributors.

Entrance Scholarships

A number of two year entrance scholarships ranging from $500 to $1,200 are available to students entering BCIT programs related to the forest industry. These scholarships are industry-sponsored and may include a summer employment program as well as a monetary award.

One Marketing Entrance Scholarship of $700 is awarded to a marketing student upon completion of term 1.

First Year Scholarships — These scholarships are awarded to students entering second year, based on academic performance in their first year of studies at BCIT. Students must carry a full course load. Therefore students who have received a course credit will not be eligible for a scholarship.

Students are not required to make application for first year scholarships or the Marketing Entrance Scholarship. Successful students will be contacted by Student Financial Services. Application forms for the forest industry entrance scholarships are either sent to students following their acceptance into the applicable program, or made available through the eligible department during the first week of classes.

Private Scholarships and Bursaries

A number of bursaries and scholarships made possible by private companies and organizations are available to BCIT students. Many of these scholarships and bursaries are listed in the *Student Financial Services Handbook*. Students should also check to see if any funds are available through their past employers, or employers of their families.

Emergency Services

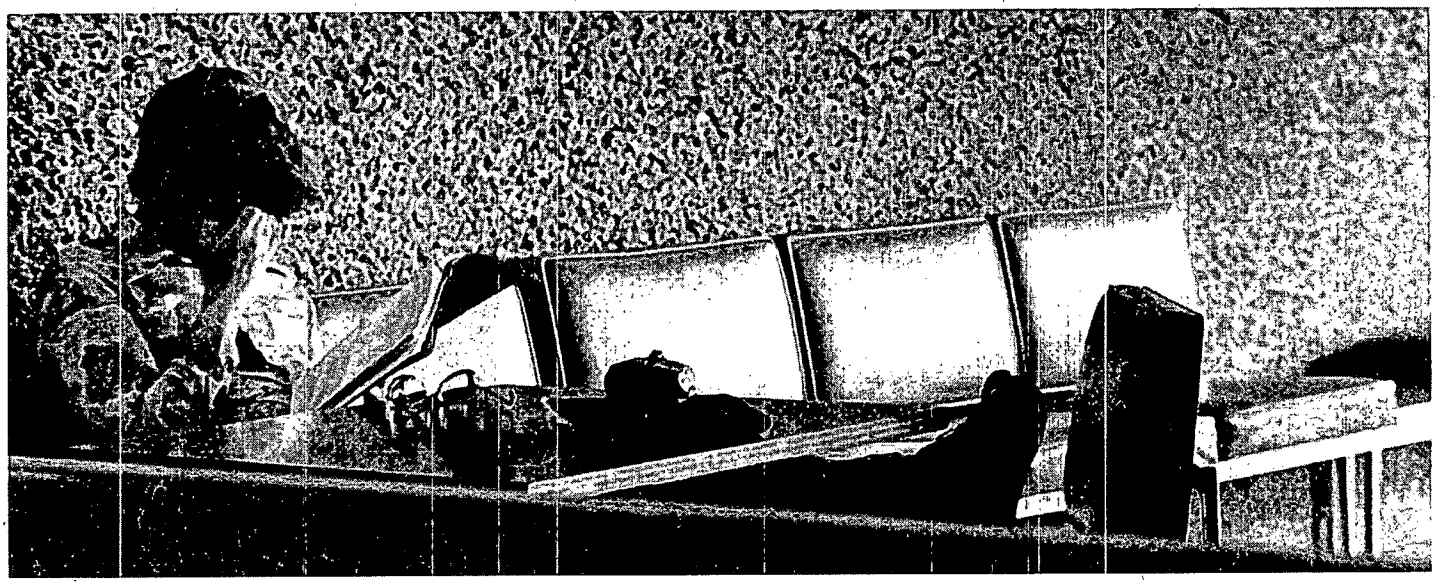
Short-term interest-free emergency loans are available from Student Financial Services to assist students in meeting essential living and educational expenses. Students are expected to have exhausted all other possible financial resources, including family loans, before being considered for an emergency loan. These loans (maximum $300) are **only** loaned to students who are able to repay them from a specified source within a short time period.

In certain circumstances, a student may be referred to one of the private foundations which make interest-free loans to qualifying students.

Other Services

Other services offered by Student Financial Services include individualized financial planning, budgeting, and workshops on a variety of topics.

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 ten school days after the official Institute distribution schedule for the statement of marks. Only those examinations designated as "restricted exams" by the Dean shall not be returned.

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

When an "F" appears beside the "average of current term" marks, it connotes a failure of the entire term. Therefore, a student whose transcript bears such an overall subject standing (i.e. "F") is generally not permitted to proceed to the next term unless granted special permission by letter from the Registrar, after approval of the Divisional Marks Review Committee.

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 or other designated course.

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 course, no credit given.

W - Withdrawal
Approved withdrawal from a program or a course within a program.

Withdrawal from Program Courses
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 "W" 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.

A 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 by the Deans' offices.

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.

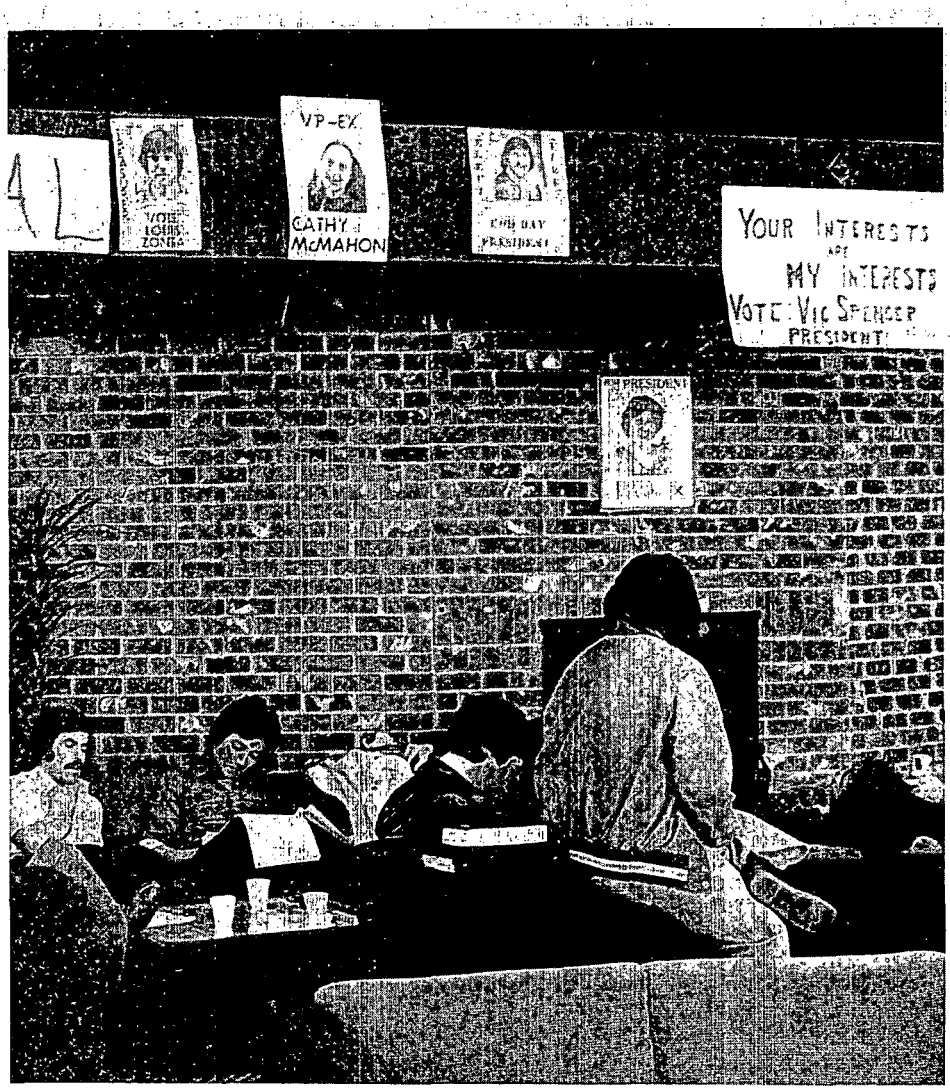
Rereads or Appeals

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.

Failures 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/her program or studies, to present evidence of successful completion of the failed subject(s) to the Office of the Registrar prior to the end of the next term or before a Diploma of Technology is awarded, whichever condition is specified at the time or subsequent to the failure.



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 of studies (100% course load) within an official BCIT day school program and whose average of all courses, that constitute a second year program of studies, is 80% or greater. Students who have been granted course credit or advanced standing for second year courses 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 Office of the Registrar. 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.

Graduating Awards

Honor Awards

Four 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.

The **Dean's Award** is presented to the most outstanding academic student in each of the three divisions, Business, Health and Engineering.

Academic Awards

Academic Awards, sponsored by private organizations, are presented annually to students who achieve the highest academic standing in his or her program of studies. The following awards were presented at the 1981 Graduating Awards Ceremony:

BUSINESS MANAGEMENT DIVISION

Administrative Management

The Bank of British Columbia Award in Administration ($250)

The Finning Tractor & Equipment Co. Ltd. Award in Personnel and Industrial Relations ($250)

The Municipal Officers' Association of British Columbia ($100)

Broadcast Communications

The British Columbia Association of Broadcasters' Award CKVU Television Award in Journalism ($1,000)

Computer Systems

The Canadian Data Processing Corporation Award ($300)

Financial Management

The Canadian Life Insurance Association Award in Insurance ($200)

Kadar Construction Limited Award in Finance ($100)

The Society of Management Accountants of British Columbia Award in Accounting ($100)

Hospitality and Tourism Administration

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

The Travel and Tourism Award ($100)

Marketing Management

The Bank of British Columbia Award in International Business ($250)

The Real Estate Council of British Columbia Award in Real Estate ($300)

The Vancouver Sun Award in Marketing ($250)

Walker, Leonard Advertising Ltd. Award in Advertising and Sales ($300)

Operations Management

The Vancouver Transportation Club Award in Transportation and Distribution Management.

ENGINEERING DIVISION

Biological Sciences

The British Columbia Federation of Agriculture R.B. Stocks Award in Agricultural Management ($200)

The Canadian Agricultural Chemical Association, B.C. Council Award in Food Production ($100)

The Fisheries Association of British Columbia Award in Food Processing ($100)

Building

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

Chemical Sciences

The Canadian Institute of Mining and Metallurgy (Vancouver Branch) Award in Extractive Metallurgy ($300)

The Chemical Institute of Canada Award in Organic Chemistry

The Pressed Metal Products Award in Pollution Science ($50)

The Wire Rope Industries Limited Award in Physical Metallurgy, on behalf of Harold and Joseph Dutton ($100)

Civil and Structural
The Swan Wooster Engineering Company Limited, Col. W.G. Swan Award ($200)
The Dillingham Corporation Canada Limited Award ($500)
Dominion Construction Company Limited ($1000)

Electrical
The AEL Microtel Limited Award in Telecommunications ($200)
Microtel Pacific Research Award in Telecommunications ($200)
Electro-Tec Marketers Limited Award in Control Electronics ($100)
The Federal Pioneer Limited Award in Power ($200)

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

Forest Resource
The Council of Forest Industries of British Columbia Award in Forestry ($200)

Mechanical
The Canadian Manufacturers Association Award in Production ($100)
The Canadian Society for Mechanical Engineering Award in Design
The Mechanical Contractors Association of British Columbia Award in Systems and Services

Mining
The Canadian Institute of Mining and Metallurgy (Vancouver Branch) Award ($300)

HEALTH DIVISION
Biomedical Electronics
The Biomedical Electronics Graduating Award ($200)

Health Information
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 ($250)

Nuclear Medicine
The Charles E. Frosst and Company Ralph Jamieson Award ($100)

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

Psychiatric Nursing
The Registered Psychiatric Nurses Association of British Columbia, Richard Strang Memorial Award ($250)

Achievement Awards

Achievement Awards are awarded for outstanding achievement in specific courses, special projects or for a combination of academic ability and leadership. The following awards were presented at the 1981 Graduating Awards Ceremony:

BUSINESS MANAGEMENT DIVISION
Administrative Management
The Westcoast Transmission Company Limited Award in Management ($100)
The Administrative Management Students' Award ($105)
Block Brothers Industries Limited Award in Real Estate Management ($250)

Broadcast Communications
The British Columbia Film Industry Association, Jack Gettles Memorial Fund for Creativity in Television ($150)
Canadian Broadcast Corporation Award in Television

Computer Systems
Canadian Data Processing Corporation Award ($350)

Financial Management
The Certified General Accountants of British Columbia Awards in Accounting ($1,000)
The Financial Executives Institute, Vancouver Chapter Award ($300)
The Dow Jones and Company Incorporated Award

Hospitality and Tourism Administration
The Hotel Georgia Award ($125)
The Inflight Food Services Award ($300)
The Bayshore Inn Award ($150)
The Hotel Vancouver Award ($300)
The Prairie Hospitality Consultants Limited, Operating Renard International Hospitality Consultants Award ($100)
The Restaurant and Food Services Association of British Columbia Award ($100)
Sunsational Vacations Limited Award in Travel and Tourism ($100)
The White Spot Limited Awards ($300 and $200)

Marketing Management
The Block Brothers Industries Limited Award ($125)

Operations Management
The Margery A. Smylie Memorial Award ($100)
The Vancouver Transportation Club Award in Transportation and Distribution Management ($150)

ENGINEERING DIVISION
Building
The Clay Brick Association of Canada Award ($100)
The P.B. Ford and Company Award ($200)
The Royal Institution of Chartered Surveyors, British Columbia Group, Award in Specifications and Estimating ($100)

Civil and Structural
The Jackson Scaffolding Award ($1,000)
The Wright Engineers Limited Award ($250)
The G & H Steel Western Award (2 x $500)

Electrical
The MacDonald Dettwiler and Associates Limited Award in Control Electronics ($100)

Forest Products
The Ralph S. Plant Limited Award in Forest Products ($250)
The Canadian Pulp and Paper Award ($200)

Forest Resource
The Canadian Institute of Forestry Award

Mechanical
The Bingham-Willamette Limited Award ($200)
The Institution of Mechanical Engineers, Western Canada Branch, Commander S.M. Terry Memorial Award
The H.A. Simons (International) Limited Award ($250)
The Versatile Environmental Products Award ($50)
The Wright Engineers Limited Award ($250)

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

HEALTH DIVISION
Medical Laboratory
The Coulter Electronics of Canada Limited Award in Hematology
The Warner-Chilcott General Diagnostics Award for General Proficiency ($100)
The Metropolitan Clinical Laboratories Limited Awards in Bacteriology ($100) and in Biochemistry ($100)
The Ortho Diagnostics Award in Immunohematology ($50)
The Lancer Division of Sherwood Medical Industries Award ($100)

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

General Nursing
The Department Head's Award for Bedside Nursing

General Awards

The BCIT Mathematics Department Award for outstanding academic excellence in Mathematics
The Society of Engineering Technologists of the Province of B.C. Award

Contributors to 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.

1979/80/81 CONTRIBUTORS

ABN Canada Limited, contributed $350 for deserving students at the Institute in the Marketing Management Technology, International Business Option.

Acres Consulting Services Limited contributed a $50 bursary for a needy student, to be awarded at the discretion of the Financial Awards Committee.

Active Chemicals Limited contribute $400 for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Akhurst Machinery Limited contributed a $200 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, 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 Sciences Technology.

The Amoco Foundation, Incorporated, contributed $1,000 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 $100 to be awarded to a deserving student in the Building Technology.

Associated Engineering Services Limited contributed $500 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 Technology.

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.

Gordon Bell Scholarship Memorial Fund, established by various donors in 1980 in memory of Gordon Bell, Chief Instructor of the Personnel and Industrial Relations Option in Administrative Management. The annual interest on the $2,000 trust fund will be awarded to a deserving student in the Personnel and Industrial Relations Option.

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 Sciences Technology.

Tom Birkenhead Memorial Award contributed by Scott Paper Limited in memory of past employee Tom Birkenhead. $500 is to be awarded annually to a first year Financial Management student moving into second year, preferably in the Accounting Option.

The Birks Family Foundation contributed $250 for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Borden Chemical Western contributed a $300 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Commitee.

Brinco Limited contributed $1,500 for deserving students at the Institute, to be awarded at the discretion of the Financial Awards Committee.

The British Columbia Association of Broadcasters contributed a $700 scholarship for a deserving student in the Broadcast Communications Technology.

The British Columbia Association of Medical Radiation Technologists contribute two $250 scholarships to be awarded to deserving students in the first year of the Medical Radiography and Nuclear Medicine technologies.

British Columbia Bio-Medical Laboratories contributed a $300 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

B.C. Chapter of American Foundrymen's Society contributed a $500 bursary to be awarded to a needy student in the Mining Technology.

B.C. Coal Limited (formerly Kaiser Resources Limited) contributed a $500 bursary and a $500 scholarship to needy and deserving students in the Mining Technology.

The British Columbia Council of Garden Clubs contributed a $300 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 bursaries to deserving students in the Biological Sciences Technology.

The British Columbia Floral Art Club contributed a $285 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 Personnel and Industrial Relations Administration Option; Financial Management — Accounting Option and Finance Option; Marketing Management — Marketing Option; Operations Management and the Transportation Management and Distribution Option.

B.C. Forest Products Limited also contributed three entrance scholarships of $1,100 each to students entering the first year of the Instrumentation Option of the Forest Products Technology-Lumber and Plywood Option; Chemical Sciences Technology—Pulp and Paper Option; and the Forest Resource Technology—Forestry Option.

British Columbia Fruit Growers' Association contributed a $500 bursary for a deserving student in the Biological Sciences 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 BCIT Staff Society contributed $400 in the memory of Jack Woodward, former Department Head in the Chemical Sciences Technology. To be awarded as four prizes of $100 each to the top first year students in Chemistry, English, Mathematics and Physics.

The BCIT 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 awardd 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 $250 to be presented as a first year prize to a student in Marketing Management.

B.C. Society of Landscape Architects contributed a $50 scholarship to a deserving student in the Biological Sciences Technology.

The British Columbia Sugar Refining Company Limited contributed $500 for deserving students at the Institute, 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 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 in Broadcast Communications.

British Columbia Wharf Operations' Association contributed $400 to be awarded to students, who are sons or daughters of members of B.C. Wharf Operations Association, who demonstrate financial need and are involved in a transportation-related technology.

Ernie Brown Memorial Fund in the amount of $2,000 was established in 1979 by various donors in memory of the late E.W.H. Brown. Annual interest from the fund is awarded to a deserving student at the discretion of the Financial Awards Committee.

Mr. R. Marie Bula contributed a $500 bursary in memory of Mr. John Bula. To be awarded to needy and deserving students at the Institute, at the discretion of the Financial Awards Committee.

The **Dr. W.K. Burwell** Memorial Bursary has been established through an estate donation of $25,000. Bursaries are to be awarded from the annual interest to students studying in the Health Technologies, specifically Radiological Technical Services.

Caesar Canning Limited contributed $250 to be awarded as a scholarship to a student at the Institute in the Marketing Management Technology.

Charles Calder Memorial Scholarship in the amount of $5,000 was donated to BCIT by the beneficiaries of the estate of Charles Cummings Calder in 1978. Annual interest from the trust fund is to be awarded to a deserving student in the Mechanical Technology.

Canada Cement LaFarge Limited contributed to $500 the scholarship fund for deserving students at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Canada Packers Limited contributed $200 for a scholarship to be awarded to a student in the Agricultural Management Program of the Biological Sciences Technology.

Canada Safety Limited contributed $300 for bursaries to be awarded to deserving students in the Marketing 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 Lumber and Plywood Program of the Forest Products Technology and the Pulp and Paper Option of the Chemical Sciences 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 of $1,000 each to students entering the Pulp and Paper Option of the Chemical Sciences 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.

Canadian Information Processing Society contributed a $230 bursary to be awarded to a needy student in Computer Systems Technology.

The Canadian Institute of Mining and Metallurgy, South Central B.C. Branch, contributed two $500 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 Institute of Surveying contributed $450 to the Hans Klikenberg Memorial Fund to be awarded to a deserving student in the Surveying Technology.

Canadian Kenworth Limited contributed $100 for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Canadian Occidental Petroleum Limited contributed $200 for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

The Canadian Pulp and Paper Association contributed two $175 bursaries to be awarded to deserving students in the Pulp and Paper Option of the Chemical Sciences Technology.

The Canadian Stevedoring Company Limited contributed $300 for a deserving student at the Institute to be awarded at the discretion of the Financial Awards Committee.

Canadian Telephones and Supplies Limited contributed $150 for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Capilano Timber Co. Limited contributed $100 to a deserving student at the Institute, 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 $700 for two $350 scholarships; one to be awarded to a student in the Chemical Sciences Technology, and one to be awarded to a student in the Mining Technology.

Commonwealth Construction Limited contributed a $400 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Cosmopolitan Importers Limited contributed a $250 scholarship to a deserving student at the Institute, to be awarded to a student in Operations Management, Transportation and Distribution Management Option.

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 Lumber and Plywood Program of the Forest Products Technology who receives the highest marks in the lumber grading examination.

Craigmont Mines Limited contributed $1,000 for two $500 scholarships to be awarded to students in any of the following technologies: Chemical Sciences, Mining and Surveying.

The Credit Union Foundation of British Columbia contributed a $400 bursary fund for deserving students at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Crossman Machinery Company Limited contributed a $500 bursary for a deserving student at the Institute, 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, 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 $600 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 Limited contributed a $250 bursary to be awarded to students in any of the following technologies: Chemical Sciences, Mining or Surveying.

Dominion Bridge Company Limited contributed a $450 bursary to be awarded to a deserving student at the Institute at the discretion of the Financial Awards Committee.

Domtar Construction Material Limited contributed $350 for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Doorman Agencies Limited contributed $200 for a deserving student in the Hospitality and Tourism Administration Technology at the Institute on behalf of Marnier Lapostolle, Paris, France (Grand Marnier).

Dow Chemical of Canada contributed $150 scholarship for a deserving student in the Operations Management Technology, Transportation and Distribution Management Option.

The Durand Machine Company Limited contributed a $300 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

The East Asiatic Company (Canada) Limited contributed $100 for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

A scholarship of $500, the gift of the **Eaton Foundation**, will be available to a student in the Marketing Option of the Marketing Management Technology.

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.

Electronics for Medicine Canada Limited (formerly Overseas Monitor Corporation Limited) contributed a $100 scholarship for a deserving student in the Biomedical Electronics Technology.

Empire Stevedoring Company Limited contributed a $100 bursary for a deserving student in the Technology—Transportation and Distribution Management Option.

Endako Mines, Division of Canex Paper Limited, contributed $500 for two scholarships to be awarded to students in any of the following technologies: Chemical Sciences, Mining or Surveying.

Evans Products Company Limited contributed $1,500 for three $500 entrance scholarships for deserving students at the Institute in the Forest Products Technology, Lumber and Plywood Program.

Evergreen Press Limited contributed a $500 bursary for a needy student in one of the following business divisions: Financial Management, Accounting Option; Marketing Management; Operations Management.

Falconbridge Nickel Mines Limited (formerly 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.

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 $460 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 Operations 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 $200 scholarship for a deserving student in the Hotel, Motel and Food Services Option of the Hospitality and Tourism Technology.

Gibraltar Mines Limited contributed $1,000 for two $500 scholarships to be awarded to students in any of the following technologies: Chemical Sciences, Mining or Surveying.

Giroday Sawmills Limited contributed a $200 bursary for a deserving student at the Institute, 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 Canada Limited contributed a $300 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

"André Gutfreund Memorial Fund"—students and faculty of BCIT established a memorial scholarship and bursary fund in the memory of André Gutfreund, a second year Administrative Management Technology student who passed away in November 1978. One bursary and one scholarship will be awarded each year from the annual interest earned on the principal amount to deserving students in the Administrative Management Technology.

Hard Corps (Western International Hotels Scholarships Foundation) contributed a $750 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 Information Technology.

Hewlett Packard (Canada) Limited contributed a $100 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 $7,500 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, to be awarded to students in the Business Division at the discretion of the Financial Awards Committee.

Hyatt Regency Vancouver contributed a $560 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

I.C.L. Engineering Limited contributed $3200 for a bursary of bursaries to be awarded to a deserving student or students in the Mechanical Technology.

Imperial Oil Limited contributed $800 to deserving students at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Imperial Order Daughters of the Empire —Colonel Burnaby Chapter contributed a $500 bursary for a deserving student in the Health Division residing in Burnaby. The bursary is known as the Beatrice Pontifex Bursary.

Imperial Order Daughters of the Empire — Provisional Chapter of B.C. contributed a $300 bursary for a deserving student in the Health Division, Department of General Nursing.

Inflight Food Services Association contributed $3,000 for deserving students at the Institute to be awarded at the discretion of the Financial Awards Committee. A portion of the amount will be awarded as a graduating award to a student in the Hotel, Motel & Food Services Option of the Hospitality & Tourism Technology.

Inland Natural Gas Company Limited contributed a $350 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, including East and West Kootenay areas.

The Institute of Chartered Accountants of British Columbia has contributed a $200 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.

Institute of Chartered Secretaries and Administrators contributed $150 for two scholarships for students in the Administrative Management Technology; one Administration Option and one Public Administration.

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 Operations Management Technology.

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

Keen Engineering Company Limited contributed a $200 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 $300 scholarship to be awarded to a student in the Administrativ Management Technology.

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

Peter Kiewit Sons Co. Limited contributed $200 to a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

The Kiwanis Club of Vancouver has established a memorial fund to the late Honorable H. Stevens to provide bursaries to part-time stuents. 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, to be awarded at the discretion of the Financial Awards Committee.

Koffler Stores (Western) Limited contributed $300 to the "Shoppers Drug Mart Scholarship Prize" to be awarded to a deserving student in Marketing Management, whose interests are in the retail industry and who demonstrates an outstanding interest in the field of marketing.

Kraft Limited contributed a $100 bursary to be awarded to a deserving student at the Institute, 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.

Labatt Breweries of British Columbia Limited contributed a $500 bursary to a needy student at the Institute in Marketing Management.

The Lapidary Rock & Mineral Society of British Columbia contributed $275 for a bursary 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 $60 for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Mr. W. Lee contributed a $200 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee. This bursary was established by Mr. W. Lee in memory of his mother, Mrs. Sue Lee.

The Legislative Press Gallery contributed a $150 scholarship for a deserving student in the Broadcast Communications Technology.

Liquid Carbonic Canada Limited contributed a $560 bursary for a needy student, to be awarded at the discretion of the Financial Awards Committee.

McCarter, Nairne & Partners contributed a $150 scholarship to be awarded to a student in the Building Technology.

McKim Advertising Limited contributed a $100 bursary to a deserving student to be awarded at the discretion of the Financial Awards Committee.

Jim MacLaren Memorial Scholarship — In memory of his friend Jim MacLaren, P. Woolley contributed $50 to be awarded at the discretion of the Financial Awards Committee.

MacMillan Bloedel Limited contributed $700 for two $350 scholarships to be awarded to a student in both the Forest Products Technology and the Forest Resource Technology, Forestry Option. MacMillian 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.

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

Marathon Realty Company Limited contributed a $610 bursary to be awarded to a deserving student at the Institute at the discretion of the Financial Awards Committee.

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.

Memspec Computer Systems Incorporated established a trust fund in the amount of $2,000, annual interest to be awarded to a needy student in digital electronics, computers or microcomputers.

Mercantile Bank of Canada contributed a $500 bursary to a deserving student at the Institute, in the Administrative Management Technology.

Mill & Timber Products Limited, 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 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.

Molson Companies Donation Fun (Beaver Lumber Corporation) contributed $1,500 to be distributed as follows: one $700 entrance scholarship to a first year Marketing Management student, Marketing Option; one first year prize of $400 to a Marketing Management student, Marketing Option; and one $400 bursary to a Marketing Management student, Marketing Option.

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.

Newman Steel Limited contributed a $100 bursary to be awarded to a deserving student at the Institute at the discretion of the Financial Awards Committee.

Neptune Bulk Terminals Limited contributed a $560 bursary for a needy student to be awarded at the discretion of the Financial Awards Committee.

Netherlands Acceptance Corporation contributed $500 to a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

North American Women in Construction Association, Vancouver Chapter contributed five $100 bursaries for women in first year of the Building Technology.

North Shore Fish and Game Club contributed $300 to be known as the "North Shore Fish and Game's Club Bursary" to be awarded to a second year student in the Fish, Wildlife and Recreation Option of the Forest Resource Technology.

Northwood Pulp and Timber Limited awarded two entrance scholarships of $900 each to students entering the first year of the Pulp and Paper Option of the Chemical Sciences Technology and first year of the Lumber and Plywood Program of the Forest Products Technology.

Northern Construction Company contributed a $560 scholarship to be awarded to a deserving student in Administrative Management, Financial Management or Civil and Structural.

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.

Office Assistance (Canada) Limited contribued a $150 scholarship for a deserving student in the Administrative Management Technology.

Okanagan Helicopters Limited contributed a $125 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Pacific Forest Products contributed $1500 for deserving students at the Institute to be awarded at the discretion of the Financial Awards Committee.

Pacific Logging Company Limited contributed $1,250 for a deserving student at the Institute, to be awarded at the discretion of the Financial Wards Committee.

Pacific Press Limited contributed a $250 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Pacific Western Airlines contributed $610 for deserving students at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Pannell, Kerr, Forster, Campbell, Sharpe contributed a $250 first year prize to be awarded to a deserving student in the Hospitality and Tourism Administration Technology.

E.B. Peerless Limited contributed $20 for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

J.A. Pentland Limited contributed a $4,000 endowment fund. The annual interest is to be awarded to needy students in the Prosthetics and Orthotics Technology.

Philips Cables Limited contributed $300 for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Commitee.

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

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

Pitney Bowes of Canada Limited contributed $50 for a bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Placer Development Limited contributed $4,000 for scholarships to be awarded to students in the Mining Technology.

Ralph S. Plant Limited — Mr. P. Tindle contributed a $250 prize to be awarded to a deserving student in the Forest Products Technology.

Prince George Pulp and Paper Limited (Joint Ventures Companies) awarded entrance scholarships of $1,225 to students entering the first year of the Pulp and Paper Program of the Chemical Sciences Technology.

Quantity Surveyors Society of British Columbia contributed a $200 scholarship for a deserving student at the Institute in the Economics Option of the Building Technology.

Robert Quinn Associates contributed a $100 bursary for a deserving student at the Institute, to be awarded to a student in Marketing Management.

Rayonier Canada (B.C.) Limited contributed $1,050 for these $350 scholarships; one to be awarded to a student in the Lumber and Plywood program, one to a student in the Pulp and Paper Chemical Sciences 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.

Rogers Wholesome Foods Limited contributed a $200 scholarship to be awarded to a deserving student in the Biological Sciences Technology.

The Rotary Club of Vancouver contributed a $1,000 bursary fund for deserving students at the Institute, 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, to be awarded at the discretion of the Financial Awards Committee.

Sapperton Fish and Game Club contributed $100 for deserving students at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Sauder Industries Limited contributed $2,500 for deserving students at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Scott Paper Limited contributed a $400 scholarship for a deserving student in the Marketing Management Technology, Marketing Option; Financial Management Technology, Accounting Option; or in Computer Systems Technology.

Seaboard Lumber Sales Company Limited and **Seaboard Shipping Company Limited** contributed a $450 bursary for deserving students at the Institute, alternating each year. Seaboard Lumber Sales Company Limited contribute to a student in Marketing Management. Seaboard Shipping Company Limited contribute to a student in Operations Management, Transportation and Distribution Management Option.

Seaspan International Limited contributed a $500 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Sertoma Club, B.C., contributed a $200 bursary to a needy student, at the discretion of the Financial Awards Committee.

R.P. Shaflik Engineering Limited contributed $100 for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Shell Canada Limited contributed a $500 bursary for a deserving first year student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

H.A. Simons (International) Limited contributed $1,500 to be awarded as five $300 bursaries to students in the Civil and Structural Technology, the Electrical Technology, the Instrumentation Option of the Electrical Technology, the Mechanical Technology and the Forest Products Technology.

Smith Paper Limited contributed $500 to the bursary fund for deserving students at the Institute, 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.

South Burnaby Garden Club contributed a $100 bursary to be awarded to a needy student in the Biological Sciences Technology.

Steel Brothers Canada Limited contributed a $250 bursary to a needy student at the Institute to be awarded at the discretion of the Financial Awards Committee.

Mrs. Mabel Stringer, in memory of her late husband, contributed $3,000, the annual interst 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 $100 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Sun-Rype Products Limitd contributed $250 for a scholarship to be awarded to a deserving student in the Biological Sciences Technology.

Tahsis Company Limited contributed $1,000 for two $500 scholarships; one to be awarded to a student in the Forest Products Technology, and one to be awarded to student in the Forestry Program of the Forest Resource Technology.

Teck Corporation contributed $500 to be awarded to a needy and deserving student at the Institute in the Mining Technology.

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 Technology.

Thompson, Berwick, Pratt & Partners contributed a $100 scholarship to be awarded to a student in the Building Technology.

3M Canada Inc. contributed $1,000 for two $500 bursaries to be awarded to needy students in the Business Management and Engineering Divisions.

Trans Mountain Pipe Line Company Limited contributed $1,000 for four $250 bursaries for deserving students at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Truck Loggers Association contributed a $250 bursary to a needy student, to be awarded at the discretion of the Financial Awards Committee.

Utah Mines contributed a $500 scholarship to a student who is a graduate from Port Hardy, B.C. Senior Secondary School.

Vancouver Cablevision Limited contributed $250 each for a deserving student in the Television Option and the Journalism Option of the Broadcast Communications Technology.

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

Vancouver Foundation contributed a $1,700 bursary fund for deserving students at the Institute, to be awarded at the discretion of the Financial Awards Committee

Vancouver Horticultural Society established a $10,000 endowment fund in 1978. Annual interest is to be awarded to needy and deserving students in the Biological Sciences Technology.

Vancouver Municipal and Regional Employees' Union made a bursary of $200 available to members of the union, or to the sons, daughters or legal dependents of members of the union. The award, based on financial need and academic standing in previous studies, will be made by BCIT in consultation with the union, to a qualified applicant who is beginning or continuing full-time enrolment at BCIT.

Vancouver Transportation Club contributed a $300 bursary to a needy student to be awarded at the discretion of the Financial Awards Committee.

The Vancouver Women's Transporation Club contributed $500 for deserving students in second year in the Transportation and Distribution Option of the Operations Management Technology.

Van-Tel Credit Union have made two bursarires available to students who are proceeding from grade 12 into a full program of studies at BCIT:

"**The Leo Morris Memorial Bursary**", in the amount of $500, honors the memory of Leo Morris, late treasurer of Van-Tel Credit Union. The bursary will be awarded to residents of B.C. who are the sons, daughters and legal dependents of Van-Tel Credit Union members.

"**The Les King Memorial Bursary**", in the amount of $500 honors the memory of Les King, late president of Van-Tel

Credit Union. The bursary will be awarded to residents of B.C. who are the sons, daughters and legal dependents of Van-Tel Credit Union members. For further particulars contact the Financial Awards Department.

Van Waters & Rogers Limited contributed a $450 bursary for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

L.A. Varah Limited contributed $125 for a bursary to a deserving student in the Electrical Technology.

Versatile Cornat Corporation contributed $560 for a deserving student at the Institute, to be awarded at the discretion of the Financial Awards Committee.

Mr. and Mrs. Gordon Wagner established a $5,000 endowment fund in 1979 to be known as the "**Keith Wagner Memorial Bursary**", in memory of their son Keith. The mimimum amount of $500 is to provide a bursary for needy students in the Survey Technology. First priority is given to students from the Comox Valley, followed by Vancouver Island, and thirdly residents of B.C.

Wajax Limited contributed a $610 bursary to be awarded to a deserving student at the Institute at the discretion of the Financial Awards Committee.

Weldwood of Canada contributed $1,000 to be awarded to deserving students at the Institute in the Forest Resource 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

West Coast Cablevision Limited contributed a $300 bursary to a needy and deserving student in the media field.

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 Limited contributed a $200 scholarship for a deserving student in Administrative Management.

Weyerhaeurser Canada Limited contributed a $700 scholarship to be awarded to a deserving student in the Chemical Sciences Technology, Pulp and Paper Option.

Whonnock Industries Limited contributed two $250 prizes to deserving students in Forest Products and Forest Resource technologies.

Wilkinson Company Limited contributed $250 for deserving students at the Institute, to be awarded at the discretion of the Financial Awards Committee.

"George Raven Wood Bursary" — The late Mr. G. Wood, former owner of Carson Truck Lines named BCIT as a beneficiary in his will, establishing a trust fund in the amount of $200,000 in 1979. Annual interest income from the fund is to provide tuition fees and other related expenses for needy students who would not otherwise be able to attend BCIT.

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

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

Yorkshire Trust Company contributed a $500 bursary for needy students to be awarded at the discretion of the Financial Awards Committee.

Zephyr Ford Truck Centre Limited contributed $100 for a deserving student at the Institute. To be awarded at the discretion of the Financial Awards Committee.

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 President to exclude the student from further attendance. The President has the final power to suspend or expel a student for disciplinary reasons, subject to the student's right to appeal this decision to a committee designated by the Board of Governors. A student who has been expelled or suspended for misconduct will not be admitted to the Institute grounds or buildings.

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

3. If through 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 President or his delegate.

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

6. It is the policy of BCIT to rely on the 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

G.N. (Jerry) Lloyd is the Dean of Students and Head of the Campus Life Department. His overall responsibilities include admissions, student records, campus recreation, and housing. He ensures that all these student services are running efficiently.

If you are having a problem and are unable to get it resolved, feel free to make an appointment to see Mr. Lloyd. His door is always open to the students of BCIT. You can contact his secretary Joyce Payton for an appointment by calling 434-5734, local 214 or dropping in to the office on the main floor of the Administrative Building.

Leisure and Recreation

At BCIT a wide variety of activities are offered to help you relax and unwind. Every Wednesday there is a three-hour break from 11:30 a.m. to 2:30 p.m. during which you can enjoy intramural athletics, club meetings and special offerings such as fairs, guest speakers and live music.

Many other activities are scheduled before and after classes including non-credit workshops in jazz dancing, dancing, stress, martial arts, diving, surf-sailing, stained glass, or the activities of groups and clubs such as The Band, The Choir, The Outdoors Club and skiing, canoeing, hiking, scuba-diving and sky-diving clubs. To keep informed read the *Link* and watch the bulletin boards. The sign-up day for clubs and most workshops is the third Wednesday in September.

Intramural sports for men, women and co-ed teams start in late September. Team up with your friends and colleagues to play flag football, volleyball, curling, hockey, basketball or indoor soccer.

Casual sports and facilities include: jogging, tennis, badminton, table-tennis, a weight-lifting room and ticket sales to nearby pools. The Student Activity Centre (SAC) gym has complete locker, shower, towel and equipment services.

Join in co-ed fitness workouts, where the exercises are fun, the music fantastic and the feeling afterwards totally refreshing. For the more enthusiastic and artful, jazz dance classes are also offered.

Women's programs include: Wendo (women's self defense); Car Maintenance for Women; Massage and Skin Care Days; and Weight Training. New programs are added every year.

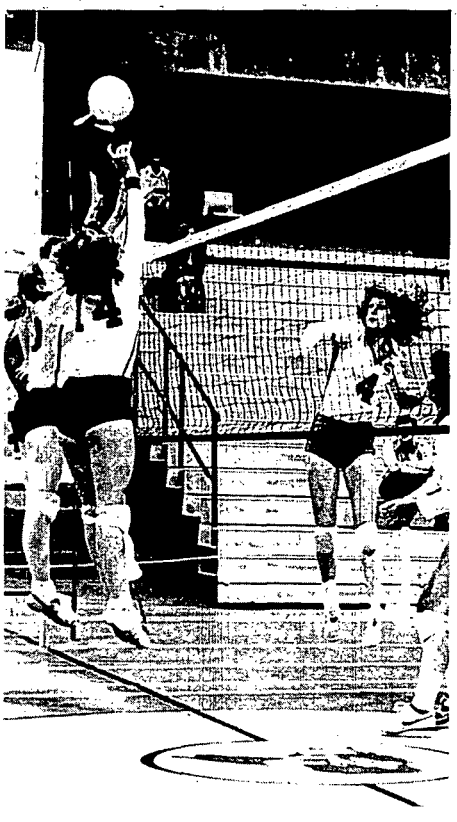
Campus Life Staff

In the Administration Building:
Jerry Lloyd, Dean of Students
Joyce Payton, Secretary, Dean of Students

In the Campus Life Trailer (next to Student Activity Centre):
Wally Rowan, Campus Recreation Coordinator
Tyrone Walls, International Student Advisor

In the Athletic Office (SAC building):
Jim Mitchell, Athletic Coordinator
Sherri Lee, Athletic Therapist
Earl Scott, Stockman

In the Maquinna Residence Office:
Val Karpinsky, Manager of Student Housing and Conferences
Helen Moore, Secretary



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 April 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 (SAC) is open from 8 a.m. to 8 p.m. weekdays. Our secretary, Janice Eden, will assist you with matters pertaining to the Association.

Our Student Publications Centre, managed by Donald Wright, produces the orientation newspaper, "BCIT Daze", the student newspaper, "The Link", and "The Almanac".

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 at 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 $120,000 for the cystic fibrosis campaign in the past eight 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 $100,000 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.

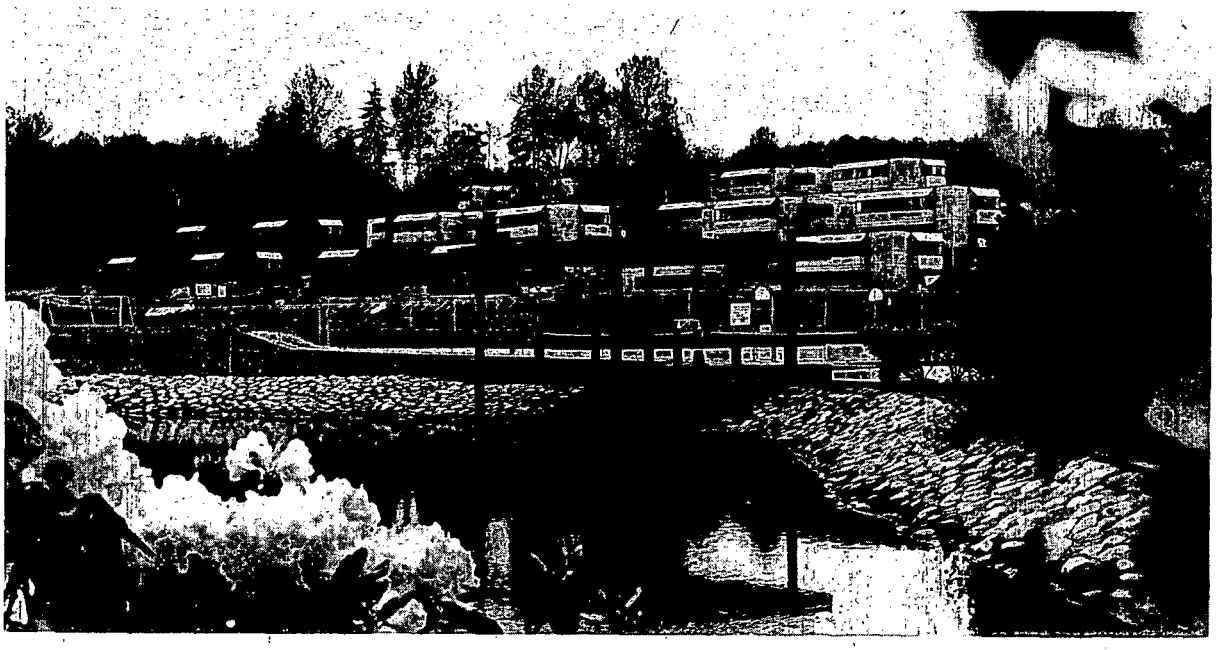
The Student Association operates a low-key pub in the SAC from Monday to Friday. Cheryl Ehrbrecht, Assistant Food and Beverage Manager, is in charge of this operation and is always on the lookout for students to work in the pub. Large dances, sponsored by the Student Association, are now held off-campus, usually in the Commodore Ballroom.

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 "This and That" campus shops and a used bookstore. See page 158 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 Maquinna Residence, which opened in September 1978, or you may prefer private housing.

Maquinna 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, and bureau are located on each floor and share individualized washroom facilities. Two floors share a kitchen, dining area and living room. The common kitchen area includes two refrigerators, two stoves, two sinks and adequate cupboard space. Each house has separate laundry and storage facilities.

Each house accommodates 50 people and has a Residence Adviser's apartment. Houses will accommodate students on an all-male, all-female or co-educational basis. BCIT does not currently have accommodation for married students, and/or students with dependents.

How to apply for residence accommodation

First priority for residence accommodation is given to students from outside the Lower Mainland who are attending BCIT for the first time. Every student receives an application for residence following notification of acceptance from the Admissions Department. The residence application form should be completed and returned to the Housing Office immediately. Applicants will be informed of their status by early July.

Off-campus housing

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

Medical Services

A five-bed **Medical Services** unit, 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 Burnaby General Hospital is ten minutes from campus.

An interview with a doctor is chargeable to the student's medical plan and students must either be covered under their parents' 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 Medical Services can usually assist with dental appointments.

No appointment is needed to visit Medical Services, except in the case of a complete physical examination. All visits are confidential.

Staff

Barbara E. Copping, B.Sc., M.Sc., M.D., Director-Physician
David Mullard, M.B., B.S., Physician
Jacqueline Hurst, B.Sc., M.D., Physician
Joyce Jamieson, R.N. Nurse
Shirley Tempest, R.N., Nurse
Joan Barrett, Receptionist

Counselling

The Counselling Centre is staffed by professional counsellors who offer career advice, information and referrals, and give assistance with just about any problem the average student at BCIT may encounter. The service is private and confidential.

Career Counselling is a major focus of the Centre and career planning workshops, using professional testing and resources are available throughout the school year. A Career/Life Resource area in the Centre offers students current information on vocational, educational and personal matters. This information includes audiovisual presentations on each technology, university and college calendars, occupational reference books and practical information on personal planning.

Students sometimes find their studies at BCIT become too demanding. When this pressure is compounded by external factors such as relationships or financial matters, students experience excessive stress. Counsellors have been assisting BCIT students over the years to cope with such dilemmas.

As part of the total program offered by the Counselling Centre a variety of workshops have been designed to meet student needs and interests. These workshops cover such topics as stress management, budgeting, and support systems for mature and single parent students.

BCIT students can drop in to the Centre, or make an appointment. Prospective students are recommended to make an appointment.

Counselling Centre Hours:

September to May: 8:30 a.m. to 4:30 p.m. Monday to Friday

June to August: 8 a.m. to 4 p.m. Monday to Friday

For further information, phone 434-5734, local 327 or contact the Counselling Centre in room D205, 2N building.

Placement

The **Canada Student Employment Centre**, a placement and career counselling centre staffed by federal government personnel, is located in room 204 of the 2N building. Hours are 8 a.m. to 4:30 p.m. Monday through Friday throughout the year.

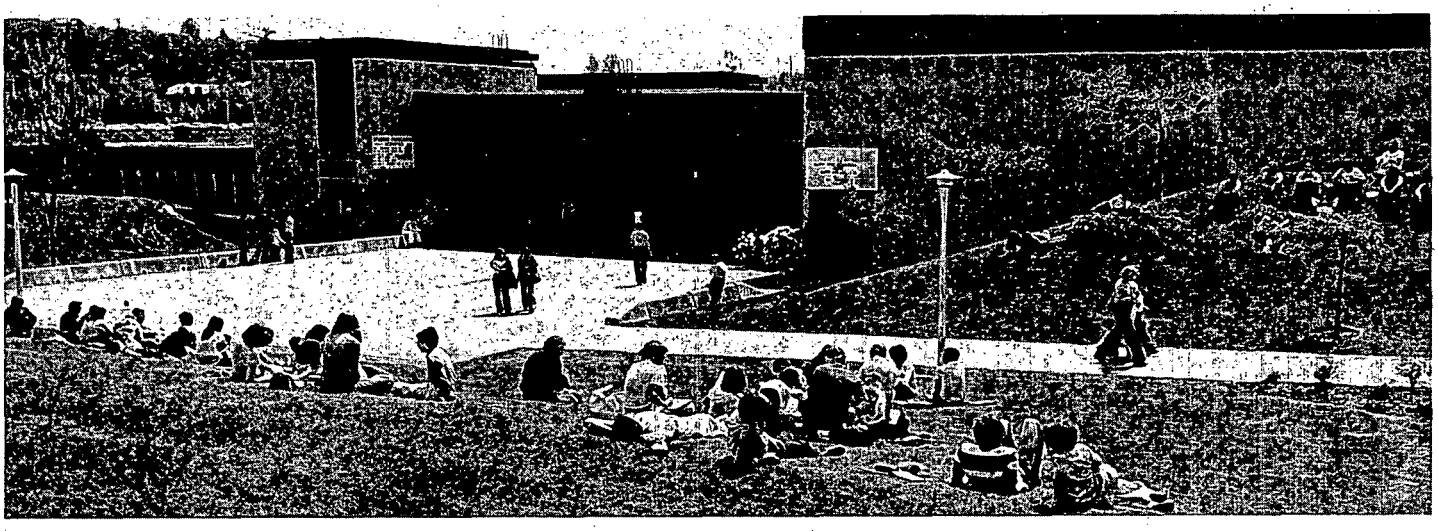
The Centre assists graduate and undergraduate students seeking employment by arranging on-campus seminars and interviews with employers for both career and summer jobs. Both full-time and part-time job opportunities are posted on the job information boards located inside the office.

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
Joan Flood, Dipl.T., Counsellor

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 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 non-profit basis by the BCIT Student Association, is located in the Student Activity Centre and 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 yellowlines 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 a No. 30 Willingdon, No. 820 Canada Way and a Special No. 39 Delta which leaves once per day, Monday - Friday at 7:25 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 (Office of the Registrar).
(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.

There are two "**This and That**" stores 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 confectionery. "This and That" stores are managed by Linda Hartnett and operated by the BCIT Student Association. 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

BCIT is governed by a fifteen member Board appointed by the Lieutenant-Governor in Council.

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

First Vice-Chairman
Marie Taylor
Chairman
British Columbia Utilities Commisssion

Second Vice-Chairman
Victor Burt
General Manager
Hotel Vancouver

Members
Dennis Barkman
President and General Manager
Fraser Valley Broadcasters Limited

Henry Bow
Senior Vice-President (International)
Bank of British Columbia

John Bruk
President
Cyprus Anvil Mining Corporation

Edward V. Hird
Executive Vice-President, Marketing
AEL Microtel Limited

E.H. Alan Emery,
Partner, Jones, Emery, Carfra, Barristers and Solicitors

Brian Leslie
Forest Products Technology
BCIT

Harold F. Shand, student
Administrative Management
BCIT

Robert Simons, Dipl.T.
Group Product Manager — Switching Systems
B.C. Telephone Company

Malcolm C.J. Wickson
President
Mal-Cam Properties

Keith Yorston
Chairman
Q.M. Industries

Two vacancies — to be appointed.

Secretary to the Board:
Patricia Maertz
434-5734 local 676

Academic and Administrative Personnel

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

Education

D.J. Svetic, B.A.Sc., P.Eng.,
Vice President

D.M. Brousson, B.Sc., P.Eng.,
Dean, Continuing Education and Industry Services

B. Gillespie, B.Sc., M.Sc.,
Dean, Health Division

J. Kyle, B.A., M.B.A., Ph.D.,
Dean, Business Management Division

R.C. Mason, B.A.Sc., P.Eng.,
Dean, Engineering Division

R. Sterne, B.Sc., P.Eng.,
Dean, Core Division

Institute Resources and Development

K. MacKeracher, B.A., M.Ed.
Vice President

Jos. E. Carver, C.D., B.A., B.L.S.,
Dean, Library Services

Barbara Copping, M.D., B.Sc., M.Sc.,
Director, Medical Services

E. Del Gobbo, B.A.,
Registrar

G.N. Lloyd, B.Sc., P.T.T.,
Dean of Students

A. McLean, B.A., B.S.W., M.S.W.,
Director, Counselling

D. Dickson Melville,
Director, Public Relations

R. Siddaway,
Director, Computer Resources

Vacant
Director, Personnel/Labor Relations

Craig Greenhill, Dipl.T., B.Sc., M.A., Ed.D.
Director, Institutional Planning

Administration and Finance

D.M. Macpherson, C.A.,
Vice President

W. Hepple,
Director, Purchasing

E. Schmutz,
Director, Campus Food Services

R.V. Skulski, C.A.,
Comptroller

R.C.W. Smyth, C.Eng., P.Eng.,
Director, Physical Plant

Calendar of Events

Business Management, Engineering and Health Divisions 1982/83 (proposed)

1982

July 9	Term 1 fees due for classes starting September 8.
August 9	Term 3 fees due
August 30	Orientation Day for Term 1 Medical Radiography students
Sept. 3	Hospitality and Tourism (Term 3) fees due
Sept. 6	**Labor Day**
Sept. 7	Orientation Day for new students (Term 1)
Sept. 8	Term 1 and 3 classes begin
Sept. 13	Registration for Term 1 Medical Radiography
Sept. 21	Last day to withdraw from classes in order to receive a full refund (minus $75 commitment fee)
Sept. 22	Shinerama, Staff Development Day
October 4	Hospitality and Tourism (Term 3) registration/ orientation and start of classes
Oct. 11	**Thanksgiving Day**
Nov. 11	**Remembrance Day**
Nov. 12	Last day to withdraw from program in order to receive a "W" (withdrawal) on transcript. If withdrawing after the deadline, the transcript will show "F" (failure) for all courses dropped
Dec. 13-17	Term 1 and 3 exams
Dec. 20-Jan. 3, 1983	**Christmas Break**

1983

Jan. 3	Terms 2 and 4 classes begin
Jan. 7	Deadline for Terms 2 and 4 fees
Mar. 7-11	**Spring Break**
April 1	**Good Friday**
April 4	**Easter Monday**
April 5	Last day to withdraw from program in order to receive a "W" (withdrawal) on transcript. If withdrawing after the deadline, the transcript will show "F" (failure) for all courses dropped.
May 16	**Victoria Day**
May 13-20	Terms 2 and 4 exams
June 10	Convocation

General and Psychiatric Nursing 1982/83 (proposed)

1982

June 18	Term 1 fees due for classes starting August 17
July 16	Terms 3 and 5 fees due
August 16	Registration Day for Terms 1, 3 and 5 students Terms 2, 3, 4 and 5 classes commence
August 17	Term 1 classes begin
August 20	Term 2 and 4 fees due for classes started August 16
Sept. 1	Last day to withdraw from classes in order to recieve full refund (minus $75 commitment fee)
Sept. 6	**Labor Day**
Sept. 22	Shinerama, Staff Development Day
Oct. 11	**Thanksgiving Day**
Nov. 5	Term 1 fees due for classes starting January 4, 1983
Nov. 10	Last day to withdraw from program in order to receive a "W" (withdrawal) on transcript. If withdrawing after the deadline, the transcript will show "F" (failure) for all courses dropped
Nov. 11	**Remembrance Day**
Dec. 3	Terms 3 and 5 fees due for classes starting January 3, 1983
Dec. 13-17	Terms 1, 2, 3, 4 and 5 exams

1983

January 3	Registration Day for Terms 1, 3 and 5 students. Terms 2, 3, 4 and 5 classes commence
January 4	Term 1 classes begin
January 7	Term 2 and 4 fees due for classes started January 3, 1983
Mar. 7-11	**Spring Break**
Mar. 29	Last day to withdraw from program in order to receive a "W" (withdrawal) on transcript. If withdrawing after the deadline, the transcript will show "F" (failure) for all courses dropped.
April 1	**Good Friday**
April 4	**Easter Monday**
May 9-13	Terms 1, 2, 3, 4 and 5 exams

***Diagnostic Medical Sonography 1982-83 (proposed)**

1982

July 9	Term 1 fees due for classes commencing September 8
August 30	Hospital Orientation
Sept. 6	**Labor Day**
Sept.7	Registration/Orientation Day for new students (Term 1)
Sept. 8	Classes begin
Sept. 21	Last day to withdraw from classes in order to receive a full refund (minus $75 commitment fee)
Sept. 22	Shinerama Day
Oct. 11	**Thanksgiving Day**
Oct. 25-29	Term 1 exams
Nov. 1	Commencement of Term 2 "Clinical"
Nov. 4	Deadline for Term 2 fees
Nov. 11	**Remembrance Day**
Dec. 20-Jan. 3, 1983	**Christmas Break**

1983

January 3	Return to class
Mar. 7-11	**Spring Break**
April 1	**Good Friday**
April 4	**Easter Monday**
May 16	**Victoria Day**
Aug. 22-26	Term 2 exams
TBA	Convocation

**Note: There is no summer break for students*

Calendar

1982

January

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

February

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

March

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

April

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

May

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

June

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

July

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

August

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

September

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

October

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

November

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

December

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

1983

January

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

February

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28					

March

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

April

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

May

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

June

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

July

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

August

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

October

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

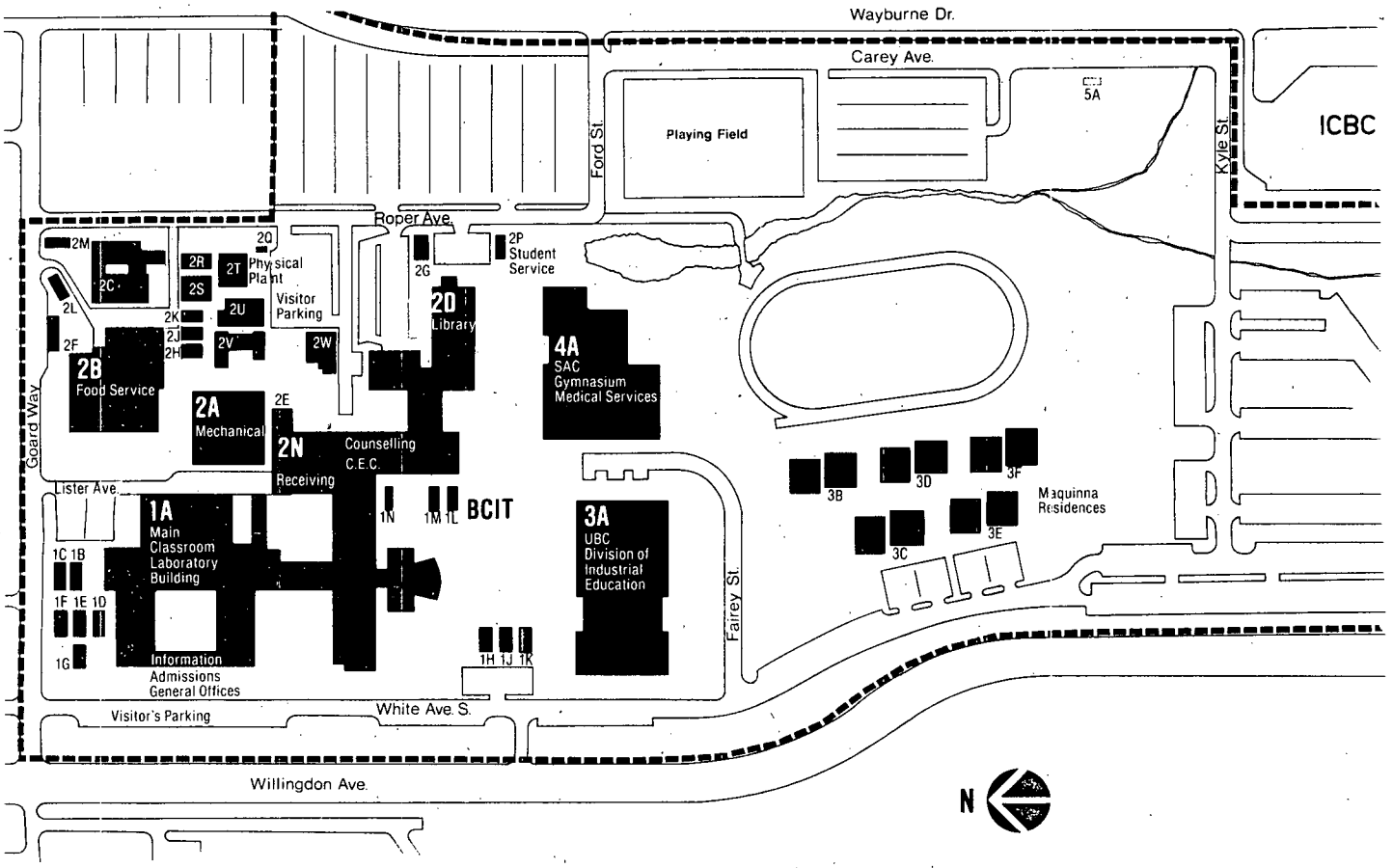
November

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

December

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Campus Map



Legend

1A Information
1962/1967 Classroom/Laboratory
Administration
Continuing Education
1B Continuing Education
1C Distance Education
1D Continuing Education
1E Mathematics
1F Mathematics
1G Industry Services
1H General Nursing
1J Psychiatric Nursing
1K RN & RPN Administration
1L Staff Offices
1M Staff Offices
1N Staff Offices

2A Mechanical
2B Food Service & Training
2C Biological Sciences
Greenhouse; Animal Holding
2D Library
Audio Visual
PEMC
2E Telephone Exchange
2F Electrical Substation
2G PEMC
2H Distance Education
2J Distance Education
2K Food Services
2L Food Services
2M Food Training (PVI)
2N 1976 Classroom/Laboratory
Computer Centre
Central Stores/Receiving
Counselling
Canada Employment Centre
2P Student Services
2Q Security/Parking
2R Staff Offices
2S Classrooms
Physical Plant
Parking Information
Security
Lost and Found

2U Classrooms
2V Staff Offices
Student Financial Aid
2W Classrooms

3A UBC: Division of Industrial Education
3B Maquinna Residences
3F

4A SAC: Gymnasium
Medical Services

5A Logger's Sports

Information

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