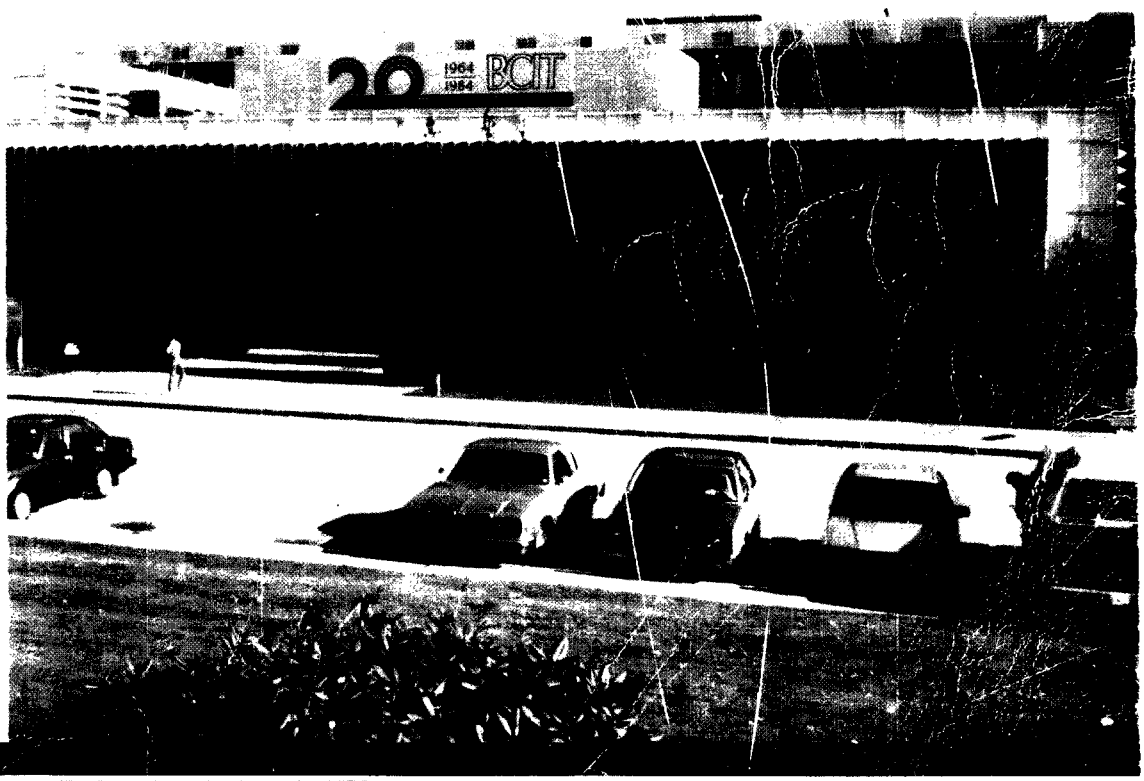
BCIT

# 1985-86 Calendar

BCIT

BRITISH COLUMBIA
INSTITUTE OF
TECHNOLOGY






BRITISH COLUMBIA
INSTITUTE OF
TECHNOLOGY

This prospectus presents detailed information about all Diploma and Certificate programs offered by the British Columbia Institute of Technology on a full-time basis, as well as important general information about admissions, fees, housing, etc., and other items of interest to students considering attending BCIT.

Detailed program and course descriptions are grouped by technologies within the Schools of Engineering Technology, Health Sciences and Management - followed by a section describing third year, post-graduate programs.

Information about core courses offered by the Division of Academic Support is followed by the general information section.

For further information about programs and courses, facilities and services at BCIT, please contact the Office of the Registrar.



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BCIT

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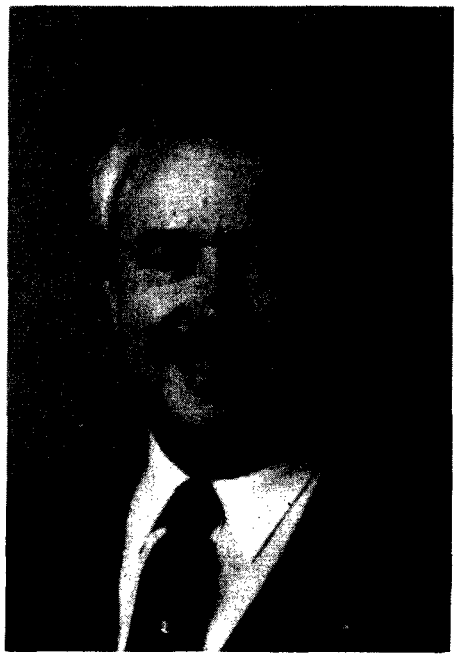
# President's Message





Your interest in the British Columbia Institute of Technology as a potential student, a parent, or a leader in industry is welcome.

This publication is designed as a guide to students who may wish to consider one of our many programs of studies, all of which lead to one of the most respected credentials in the work force - the BCIT Diploma of Technology.

The Calendar lists the faculty members who will provide the technological expertise and training that you require. These faculty members, with their industry and academic background, are the foundation of knowledge at this Institute, and they, along with the graduates, are responsible for the reputation of the BCIT Diploma.

The courses are intensive and the work demanding, but more than 20,000 graduates who have entered BCIT have proven the effort to be rewarding.

During the past year, BCIT has continued to keep abreast of new technological training developments, with the help of the Federal Government's "Skills Growth Fund". $4.4 million was received by the School of Engineering Technology for the Microelectronics, Robotics and CAD/CAM programs, and for equipment updating in other engineering technologies.

I welcome all prospective students to visit our campus to explore the many opportunities to prepare for a challenging career.

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

# 1985-86

# Contents



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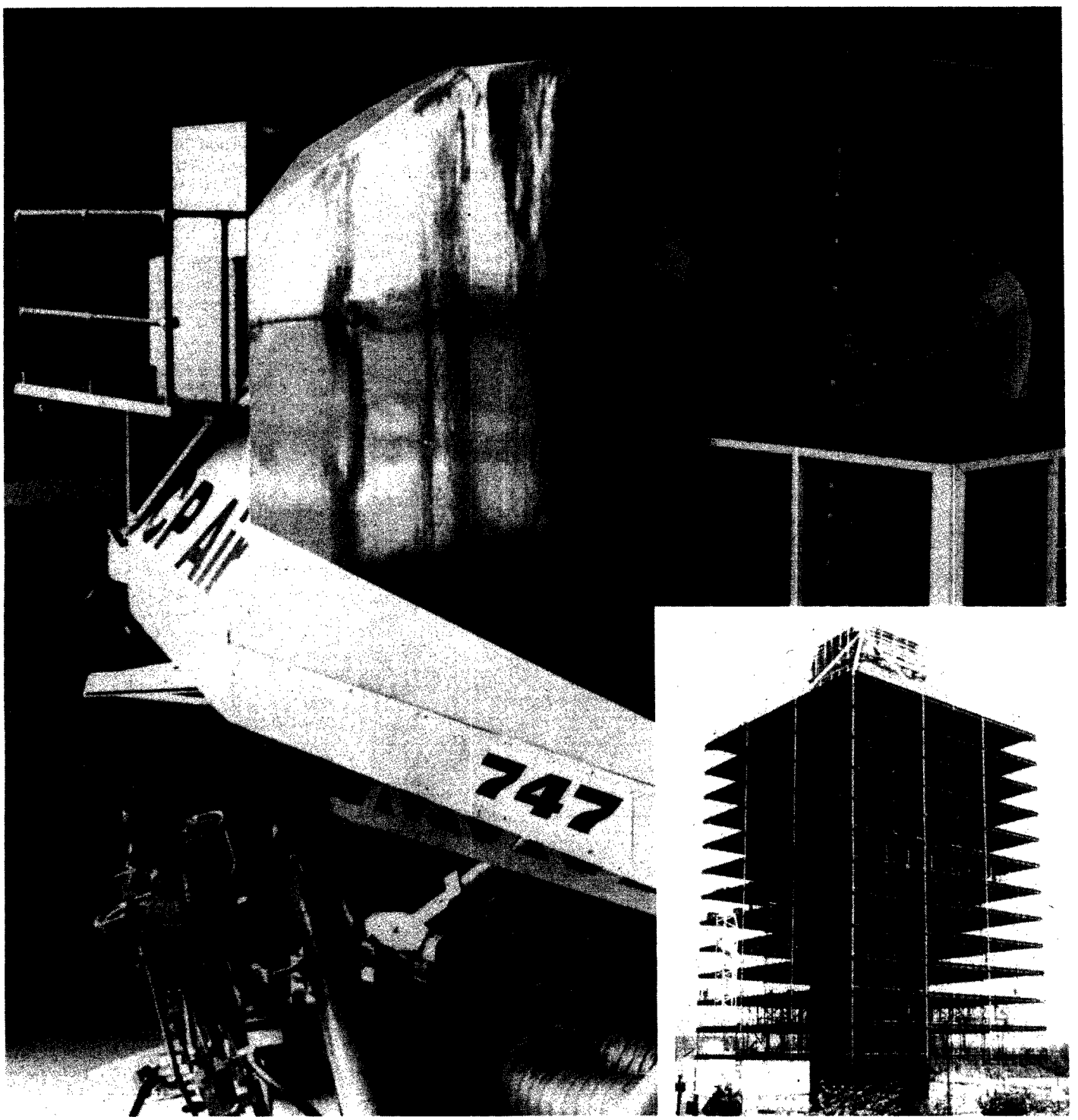
Chemistry

# School of Engineering Technology



# Biological Sciences

The Biological Sciences Technology, with its choices 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 offer 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.

### 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.

All programs and options in the Biological Sciences Technology are accredited by the Society of Engineering Technologists of B.C.

### Job Opportunities

Graduates in the **Food Processing Option** find employment in the food manufacturing industry, where they may perform chemical, physical and bacteriological tests on food materials during processing and on packaged goods, or they may supervise manufacturing processes within the plant. Other opportunities are found in government laboratories and inspection services.

**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, greenhouses, 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.

### Prerequisites

Algebra 12 and Chemistry 11 are course requirements for the Biological Sciences Program (Food Processing, Food Production, Landscape Horticulture), while Agri-Management Program students need Algebra 11 only.

## Course of Studies

| **Biological Sciences Program** | | | Clrm |
|---|---|---|---|
| **Year 1** | | **Term 1** | hrs/wk |
| BISC | 102 | Introductory Microbiology | 6 |
| BISC | 103 | Biology | 5 |
| CHEM | 103 | Applied Chemical Principles 1 | 6 |
| MATH | 144 | Basic Technical Mathematics | 6 |
| PHYS | 102 | Physics for Biological Sciences | 5 |
| TCOM | 105 | Technical Communication | 3 |
| | | Library and Research | 4 |
| | | | 35 |

**Food Processing Option**

| **Year 1** | | **Term 2** | **2A** | **2B** |
|---|---|---|---|---|
| BISC | 201 | Food Processing | 6 | 6 |
| BISC | 202 | Microbiology for Food Processing | 5 | 5 |
| CHEM | 203 | Applied Chemical Principles 2 | 6 | 6 |
| MATH | 244 | Statistics 1 & 2 | 5 | 5 |
| PHYS | 202 | Physics for Biological Sciences | 5 | 5 |
| TCOM | 205 | Technical Communication | 3 | 3 |
| | | Library and Research | 5 | 5 |
| | | | 35 | 35 |

| **Year 2** | | **Term 3** | |
|---|---|---|---|
| BISC | 301 | Food Processing | 5 |
| BISC | 302 | Nutrition for Food Processing | 2 |
| BISC | 303 | Quality Control | 4 |
| BISC | 304 | Introductory Food Analysis | 5 |
| BISC | 305 | Mechanics of Machines | 5 |
| CHEM | 381 | Instrumental Analytical Methods | 5 |
| OPMT | 162 | Management Engineering 1 | 3 |
| TCOM | 303 | Advanced Technical Communication | 2 |
| | | Library and Research | 5 |
| | | | 36 |

| **Year 2** | | **Term 4** | **4A** | **4B** |
|---|---|---|---|---|
| ADMN | 110 | Management 1 | 4 | - |
| BISC | 401 | Food Processing | 5 | 5 |
| BISC | 402 | Process Analysis | 5 | 5 |
| BISC | 403 | Quality Control | 4 | - |
| BISC | 404 | Food Analysis | 5 | 5 |
| BISC | 405 | Enzymatic Analysis | - | 4 |
| BISC | 406 | Sanitation | 4 | 4 |
| ELEC | 253 | Instrumentation | - | 6 |
| MATH | 444 | Introduction to Computing | 4 | - |
| | | Library and Research | 5 | 5 |
| | | | 36 | 34 |

**Food Processing** students acquire a thorough knowledge of food preservation techniques — 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 plant, animal and soil sciences and, in addition, subjects which stress the analytical and mechanical principles of food production.

The **Management in Agriculture** (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.

**Food Production Option**

| Year 1 | Term 2 | Clrm hrs/wk 2A | 2B |
|---|---|---|---|
| BISC 203 | Microbiology for Food Production | 5 | 5 |
| BISC 204 | Food Production | 6 | 6 |
| CHEM 203 | Applied Chemical Principles 2 | 6 | 6 |
| MATH 244 | Statistics 1 & 2 | 5 | 5 |
| PHYS 202 | Physics | 5 | 5 |
| TCOM 205 | Technical Communication | 3 | 3 |
| | Library and Research | 5 | 5 |
| | | 35 | 35 |

| Year 2 | Term 3 | |
|---|---|---|
| BISC 304 | Introductory Food Analysis | 5 |
| BISC 305 | Mechanics of Machines | 4 |
| BISC 307 | Applied Genetics | 4 |
| BISC 308 | Plant Technology | 6 |
| BISC 309 | Animal Technology | 4 |
| CHEM 311 | Instrumental Analytical Methods | 5 |
| TCOM 303 | Advanced Technical Communication | 2 |
| | Library and Research | 5 |
| | | 35 |

| Year 2 | Term 4 | 4A | 4B |
|---|---|---|---|
| BISC 407 | Agricultural Analysis | 5 | 5 |
| BISC 408 | Experimental Techniques | 4 | 4 |
| BISC 409 | Agricultural Mechanics | 5 | 5 |
| BISC 410 | Plant Protection | 6 | 6 |
| BISC 411 | Soil Technology | 5 | 5 |
| MATH 444 | Introduction to Computing | - | 4 |
| MKTG 419 | Agricultural Product Marketing | 6 | - |
| | Library and Research | 5 | 5 |
| | | 36 | 34 |

**Landscape Horticulture Option**

| Year 1 | Term 2 | Clrm hrs/wk 2A | 2B |
|---|---|---|---|
| ADMN110 | Management 1 | - | 4 |
| BISC 205 | Introductory Botany and Soils | 6 | 6 |
| BISC 206 | Horticulture 1 | 4 | 5 |
| BLDG 117 | Landscape Drafting | 3 | 3 |
| CHEM 217 | Applied Chemical Principles | 6 | - |
| PHYS 202 | Physics for Biological Sciences | 5 | 5 |
| SURV 125 | Introduction to Survey - Landscape | 3 | 3 |
| TCOM 205 | Technical Communication | 3 | 3 |
| | Library and Research | 5 | 5 |
| | | 35 | 34 |

| Year 2 | Term 3 | |
|---|---|---|
| BISC 306 | Horticulture 2 | 6 |
| BISC 310 | Landscape Mechanics | 5 |
| BISC 311 | Nursery Crop Production | 6 |
| BISC 312 | Landscape Techniques | 5 |
| BISC 313 | Advanced Plant Identification | 3 |
| BLDG 217 | Landscape Drafting | 3 |
| TCOM 303 | Advanced Technical Communication | 2 |
| | Library and Research | 5 |
| | | 35 |

| Year 2 | Term 4 | 4A | 4B |
|---|---|---|---|
| BISC 410 | Plant Protection | 6 | 6 |
| BISC 411 | Soil Technology | 5 | 5 |
| BISC 412 | Landscape Techniques | 6 | 6 |
| BISC 413 | Landscape Field Practices | 6 | 6 |
| BISC 414 | Supervisory Practices | 4 | - |
| BISC 417 | Silviculture and Forest Nurseries | - | 4 |
| CIVL 442 | Land Engineering | 3 | 3 |
| | Library and Research | 5 | 5 |
| | | 35 | 35 |

**Management in Agriculture (Agri-Management Program)**

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| ADMN100 | Economics 1 | 3 |
| ADMN110 | Management 1 | 3 |
| BISC 100 | Agricultural Concepts | 2 |
| BISC 103 | Biology | 5 |
| FMGT 101 | Accounting 1 | 5 |
| OPMT 110 | Business Mathematics | 4 |
| PHYS 102 | Physics for Biological Sciences | 5 |
| TCOM 105 | Technical Communication | 3 |
| | Library and Research | 5 |
| | | 35 |

| Year 1 | Term 2 | 2A | 2B |
|---|---|---|---|
| ADMN200 | Economics 2 | 3 | 3 |
| BISC 204 | Food Production | 6 | 6 |
| BISC 207 | Agricultural Marketing | 3 | 3 |
| FMGT 201 | Accounting 2 | 5 | 5 |
| OPMT 130 | Business Statistics | 4 | 4 |
| PHYS 202 | Physics for Biological Sciences | 5 | 5 |
| TCOM 105 | Technical Communication | 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 | |
|---|---|---|
| BISC 305 | Mechanics of Machines | 4 |
| BISC 307 | Applied Genetics | 4 |
| BISC 308 | Plant Technology | 6 |
| BISC 309 | Animal Technology | 4 |
| BISC 314 | Agri-Business Law & Taxes | 3 |
| BISC 315 | Agri-Business Organization & Management | 5 |
| BISC 316 | Agri-Business Finance & Appraisal | 3 |
| BISC 317 | Summer Technical Report | 1 |
| | Library and Research | 5 |
| | | 35 |

| Year 2 | Term 4 | 4A | 4B |
|---|---|---|---|
| ADMN340 | Personnel Administration | 3 | 3 |
| BISC 409 | Agricultural Mechanics | 5 | 5 |
| BISC 410 | Plant Protection | 6 | 6 |
| BISC 411 | Soil Technology | 5 | 5 |
| BISC 415 | Agri-Business Organization & Management | 5 | 5 |
| BISC 416 | Crop and Livestock Management | 4 | 4 |
| OPMT 163 | Management Engineering 1 | 2 | 2 |
| | Library and Research | 5 | 5 |
| | | 35 | 35 |

## Subject Outlines

**ADMN 100/200 Economics 1 & 2** — Develops 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.

**ADMN 110 Management 1** — 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.

**ADMN 200** see **ADMN 100**

**ADMN 340 Personnel Administration** — An introduction to the major personnel and industrial relations programs applicable to the workplace with emphasis on the value of the worker and the overall effectiveness of modern human resource management. Develops understanding of the skills required for selection interviews, performance appraisals, compensation reviews, labour contract negotiations, training and development programs, grievance and collective agreement administration and reviews relevant employment law.

**BISC 100 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.

**BISC 102 Introductory Microbiology** — Designed to train students in the basic microbiological procedures employed in a laboratory: use and care of the microscope, staining methods, aseptic techniques, methods of identifying micro-organisms.

**BISC 103 Biology** — A study of the principles underlying living phenomena, including the organizational attributes of living matter. Evolutionary development is traced from one-celled organisms to higher plants and animals. The economic importance of various classes of plants and animals is included.

**BISC 201 Food Processing 1** — An introduction to the principles and processes of canning, freezing, dehydrating and fermentation of foods. The use of salt, sugar, and additives to preserve food. The importance of packaging of foods. Experimental portions of food will be preserved by various methods during lab periods.

**BISC 202 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.

**BISC 203 Microbiology for Food Production** — The application of microbiology to agricultural food production. An introduction to plant and animal pathology and immunology. Seminar project. Assessing and reporting microbiological test results.

**BISC 204 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.

**BISC 206/306 Horticulture 1 & 2** — 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.

**BISC 207 Agricultural Marketing** — 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.

**BISC 253 Introductory Botany and Soils** — Plant morphology and physiology, with particular reference to ornamental and horticultural plants, soil types and introduction to soil testing. Culture and management of ornamental and recreational turfgrass.

**BISC 301/401 Food Processing 2 & 3** — The study of food manufacturing processes in the fish, meat, fruit and vegetable, cereal, dairy, beverage, and confectionery industries. Principles and techniques of proper handling and preservation of products in these industries will be emphasized. The use of ingredients such as sweeteners, flavorings, colors, and preservatives will be discussed.

**BISC 302 Nutrition for Food Processing** — A study of the nutrients found in food, their importance, metabolic function and dietary requirements. The selection of diets to meet varied nutritional needs. The relationship of nutrition and health. Nutritional labelling. The effect of processing on the nutritional quality of foods.

**BISC 303 Quality Control** — An assessment of food quality. Responsibilities and organization of a quality control department in the food industry. Statistical procedures for sampling. Federal and provincial government regulations. An introduction to tri-stimulus colorimetry and the measurement of color in foods.

**BISC 304 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.

**BISC 305 Mechanics of Machines** — Basic mechanical principles of food processing and agricultural equipment including mechanical power transmission, electrical power, fluid systems, and heat transfer. Materials of construction and equipment lubrication. The application of microcomputers to food processing and agriculture systems.

**BISC 306** see **BISC 206**

**BISC 307 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.

**BISC 308 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.

**BISC 309 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.

**BISC 310 Landscape Mechanics** — A study of basic engineering principles as applied to landscape construction and maintenance equipment, irrigation and drainage systems, nursery and greenhouse systems. The application of microcomputers to landscape and greenhouse systems.

**BISC 311 Nursery Crop Production** — Field and container culture of nursery plants. Nursery stock specifications. Site selection and layout. Growing structures and equipment.

**BISC 312/412 Landscape Techniques** — History and principles of landscape design. Inventory of client requirements. Site analysis. Preparation of working drawings, bidding and contract documents.

**BISC 313 Advanced Plant Identification** — A continuation of the plant identification studies begun in Horticulture 1 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.

**BISC 314 Agri-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.

**BISC 315/415 Agri-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.

**BISC 316 Agri-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.

**BISC 317 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.

**BISC 401** see **BISC 301**

**BISC 402 Process Analysis** — An analysis of the unit operations and equipment encountered in food processing. Operations involving raw and processed material are covered, as are plant systems including materials handling, waste management, plant layout and design, packaging equipment.

**BISC 403 Quality Control** — The sensory evaluation of food; facility design; selection of taste panels; statistical analysis of data; laboratory measurement of consistency and texture of foods; recording and reporting with control charts; and evolutionary operations.

**BISC 404 Food Analysis** — An introduction to the chemistry of fats and oils. Practical laboratory analysis of lipids, vitamins and minerals using the latest equipment available.

**BISC 405 Enzymatic Analysis** — An introduction to the use of enzymes to perform 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.

**BISC 406 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.

**BISC 407 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.

**BISC 408 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.

**BISC 409 Agricultural Mechanics** — An analysis of the unit operations and equipment encountered in agriculture. Various systems including irrigation, drainage, field operations, crop protection, harvesting and animal systems will be discussed. Equipment components and selection of equipment will be analyzed.

**BISC 410 Plant Protection** — The morphology and identification of weeds, diseases and insects. Life histories of representative species. Strategy of control by cultural, biological and chemical means. Currently recommended pesticides are reviewed. Pesticide safety, pest and pesticide legislation. Students are examined under the provisions of the "Pesticides Control Act" for pesticide Applicator and Pesticide Dispenser certificates.

**BISC 411 Soil Technology** — The origin, formation and classification of soils; use of survey reports, map interpretation. Components of soils, soil colloids, cation exchange, reactions, soil acidity, phosphorus, nitrogen, the crop as an indicator of fertility, soil organic matters, fertilizers. Soil-sampling procedures, extraction methods used in soil analysis.

**BISC 412** see **BISC 312**

**BISC 413 Landscape Field Practices** — Maintenance practices, estimating, project programming. Landscape construction, planting procedures and use of materials.

**BISC 414 Supervisory Practices** — This course provides an understanding of effective supervisory practices and of organizational behavior. Knowledge of labor laws, legal and tax information and government regulations is gained as well as management of resources for improved performance.

**BISC 415** see **BISC 315**

**BISC 416 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.

**BISC 417 Silviculture and Forest Nurseries** — An introduction to silviculture as practised in B.C., with emphasis on artificial regeneration of disturbed sites using planting stock. A review of stock types used in the regeneration process, their characteristics and methods of production, and an analysis of the field conditions under which each might be used.

**BLDG 117 Landscape Drafting** — Fundamentals of drafting. Development of drafting skills, using projects based on landscape structural details, such as concrete slabs, steps, retaining walls and planters, as well as wood benches, fences, and walls.

**BLDG 217 Landscape Drafting** — Continuation of BLDG 117. Further development of drafting skills, using projects based on masonry, post and beam, and concrete deck construction.

**CHEM 103 Applied Chemical Principles 1** — An 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 qualitative analysis. Good lab techniques are emphasized.

**CHEM 203 Applied Chemical Principles 2** — A continuation of CHEM 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.

**CHEM 217 Applied Chemical Principles** — A continuation of CHEM 203 emphasising 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.

**CHEM 311 Instrumental Analytical Methods** — 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.

**CIVL 442 Land Engineering** — An introduction to the behavior of earth and land surfaces, and engineering materials under various natural conditions and the action of both static and dynamic forces commonly occurring in engineering 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.

**ELEC 253 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.

**FMGT 101/201 Accounting 1 & 2** — Basic accounting procedures; closing the books; adjustments; working papers; merchandise operations; statement and ledger organization; special journals; forms of business organization; accounting principles; introduction to cost accounting; analysis of financial data; working capital; departmental and branch operations; consolidations.

**FMGT 201** see **FMGT 101**

**MATH 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, power of a function, curve sketching, applied maximum and minimum, differentials, the indefinite integral, the definite integral, areas under a curve and other applications.

**MATH 244 Statistics 1 & 2** — An introduction to computing using the BASIC language. 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 distibutions; sampling distributions, estimation of the mean - large and small sample methods; type 1 and type 2 errors; correlation, linear regression with estimation, and hypothesis testing of parameters.

**MATH 444 Introduction to Computing** — Further programming using the BASIC language: formatted output, data files, matrix commands; applications from the Biological Sciences Technology.

**MKTG 419 Agricultural Product Marketing** — Introduces the application of business skills to agri-business and studies in particular, 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.

**OPMT 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 to business administration.

**OPMT 130 Business Statistics** — Major emphasis is on descriptive statistics including numerical and graphical presentation of data, measures of central tendency and dispersion, elementary probability, index numbers and time series. Introduction to inferential statistics through selected topics: sampling, confidence limits of the mean, hypotheses testing and simple linear regression.

**OPMT 163 Management Engineering 1** — The techniques of management problem-solving and work simplification, with particular application to engineering and industrial organization. Includes method study, some measurement techniques, layout, planning and scheduling. The course emphasizes practical applications to the field of biological sciences.

**PHYS 102/202 Physics for Biological Sciences** — An introductory level course covering a wide range of physical principles, with emphasis on areas of popular interest and 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.

**PHYS 202** see **PHYS 102**

**SURV 125 Introduction to Survey Landscape** — Introduction to the theory of engineering survey; practical application of linear measurements; introduction to and theory of the theodolite; bearings and traverse computations, introduction to and theory of levelling; computation of areas and volume.

**TCOM 105/205 Technical Communication** — Will 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, resumes and memos, and will give at least one oral presentation each term.

**TCOM 205** see **TCOM 105**

**TCOM 303 Advanced Technical Communication** — In two hours of lab sessions each week, under supervision, students practice 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.

## 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., Chief Instructor
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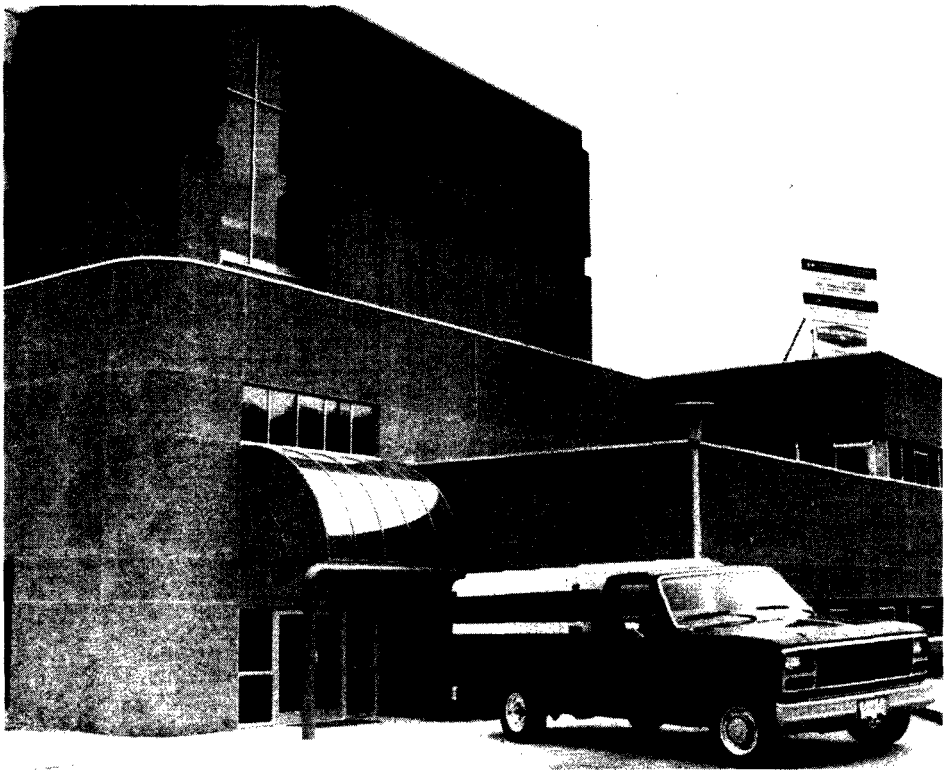
J.H. Muir, B.S.A., P.Ag.
S.M. Murray, B.Sc. (Agr.), P.Ag.
B.E. Rothe
J.K. Soutter, H.D.F.T.



# 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, financial efficiency and user satisfaction. The construction industry is one of the major employment fields in Canada, turning over a large proportion of the total 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 any 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 of Building Technology become senior drafting personnel, job captains, specification writers, estimators or contracts managers, building inspectors, officials in property management departments, appraisers and assessors, partners in construction organizations and technical representatives for building supplies and equipment manufacturers. Many graduates will become estimators with general and sub-trade contractors, preparing bids and checking job costs and progress. Instruction is also given in appraisal and assessment, leading to employment 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.

### The Program

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

First year courses are common to all students and in addition to English, math and physics, include various basic technological subjects. Lecture instruction, drafting room practice and field trips are part of the program, and students are often able to further their education through summer jobs with architects, engineers, contractors or by doing inspection work for public and private agencies. In their second year, students (subject to their demonstrated ability and departmental approval) will be placed in one of two specialized majors; information on these two professional development possibilities is available from the Program Head.

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

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

The entire Building Technology program is presently under review which may result in some restructuring.

### Post-graduation

The Architectural Institute of British Columbia offers graduates credit for some of the examinations in their syllabus of studies for articled students.

The Canadian Institute of Quantity Surveyors will accept graduates as Probationer Members, and give credit in a similar manner.

Information on these two professional development possibilities is available from the Program Head.

### Prerequisites

English 12, Algebra 12, Physics 11, all with C+ are course requirements for this program. Related work experience or skills will strengthen an application.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| BLDG 101 | Drafting | 4 |
| BLDG 102 | Building Construction 1 | 6 |
| BLDG 103 | Materials and Methods | 4 |
| BLDG 104 | Construction Site Processes | 3 |
| CIVL 135 | Building Structures 1 | 3 |
| MATH 140 | Basic Technical Mathematics | 5 |
| MSYS 101 | Plumbing | 3 |
| TCOM 101 | Technical Communication | 4 |
| | Library and Research | 3 |
| | | 35 |

| Year 1 | Term 2 | 2A | 2B |
|---|---|---|---|
| BLDG 105 | Construction Contracts 1 | 2 | - |
| BLDG 201 | Planning | 4 | 4 |
| BLDG 202 | Building Construction 2 | 6 | 6 |
| BLDG 206 | Construction Estimating 1 | - | 4 |
| CIVL 236 | Building Structures 2 | 3 | 3 |
| ELEC 150 | Illumination | - | 3 |
| MATH 240 | Calculus 1 and Analytic Geometry | 5 | 5 |
| MSYS 202 | Heating & Ventilating | 4 | - |
| OPMT 185 | Project Management | 2 | - |
| PHYS 219 | Physics | 4 | 4 |
| TCOM 201 | Technical Communication | - | 3 |
| | Library and Research | 5 | 3 |
| | | 35 | 35 |

| Year 2 | Term 3 | Arch | Econ Clrm hrs/wk |
|---|---|---|---|
| BLDG 302 | Building Construction 3 | 6 | - |
| BLDG 306 | Construction Estimating 2 | 4 | 4 |
| BLDG 309 | Architectural Major 1 | 6 | - |
| BLDG 312 | Construction 3 for Economics 1 | - | 6 |
| BLDG 316 | Economics Major | - | 6 |
| CIVL 337 | Building Structures 3 | 3 | 3 |
| ELEC 250 | Electrical Systems | 4 | 4 |
| OPMT 260 | Management Engineering 1 | 2 | 2 |
| PHYS 319 | Physics | 4 | 4 |
| | Library and Research | 6 | 6 |
| | | 35 | 35 |

| Year 2 | Term 4A | | |
|---|---|---|---|
| BLDG 305 | Construction Specifications | 2 | 2 |
| BLDG 402 | Construction 4 for Architectural Major 2 | 6 | - |
| BLDG 406 | Estimating 3 | 4 | 4 |
| BLDG 409 | Architectural Major 2 | 6 | - |
| BLDG 412 | Construction 4 for Economics 2 | - | 6 |
| BLDG 413 | Codes and Regulations | 2 | - |
| BLDG 416 | Economics Major 2 | - | 6 |
| BLDG 419 | Building Acoustics | 3 | - |
| CIVL 438 | Building Structures 4 | 3 | 3 |
| MATH 440 | Statistics/Computers | - | 4 |
| OPMT 360 | Management Engineering 2 | 2 | 2 |
| TCOM 301 | Advanced Technical Communication | 2 | 2 |
| | Library and Research | 5 | 6 |
| | | 35 | 35 |

| Year 2 | Term 4B | | |
|---|---|---|---|
| ADMN 311 | Industrial Management | - | 4 |
| BLDG 205 | Construction Contracts 2 | 2 | 2 |
| BLDG 305 | Construction Specifications | 2 | 2 |
| BLDG 402 | Construction 4 for Architectural Major 2 | 6 | - |
| BLDG 406 | Estimating 3 | 4 | 4 |
| BLDG 409 | Architectural Major 2 | 6 | - |
| BLDG 412 | Construction 4 for Economics 2 | - | 6 |
| BLDG 413 | Codes and Regulations | - | 2 |
| BLDG 416 | Economics Major 2 | - | 6 |
| CIVL 438 | Building Structures 4 | 3 | - |
| SURV 120 | Introduction to Survey | 3 | 3 |
| | Library and Research | 6 | 6 |
| | | 32 | 35 |

## Subject Outlines

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

**BLDG 101 Drafting** — Elementary drafting techniques; lettering and symbols; orthographic, isometric and axonometric projections; perspective; shades and shadows. Drawing board practice of foregoing components.

**BLDG 102 Building Construction 1** — Principles of building construction in terms of the assembly of materials. Examination of typical systems of wood and masonry construction. Study of architectural detailing and the origins and purposes of building and zoning by-laws. Application of the above components to the preparation of working drawings.

**BLDG 103 Materials and Methods** — Physical and chemical properties of common construction materials. Standards and gradings for materials. Construction methods and building procedures. Field studies and examination of sample products. Filing and retrieval of technical literature.

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

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

**BLDG 201 Planning** — Fundamentals of functional building design. Planning and organization of residential spaces. Design of simple utilitarian objects. Elementary architectural design problems and presentation techniques

**BLDG 202 Building Construction 2** — Continuation of BLDG 102.

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

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

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

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

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

**BLDG 309 Architectural Major 1** — Short history of contemporary architecture and building. Conceptualization and planning. Theory, aesthetics and structure as integral parts of design.

**BLDG 312 Construction 3 for Economics Major** — Same as BLDG 302, but with less emphasis on drawing board skills and more emphasis on construction implementation procedures.

**BLDG 316 Economics Major 1** — Principles of land development, use and title. Appraisal and assessment of property values for purchase, sale, taxation and other purposes. Techniques of analysis and synthethis of construction project costs. Sources of cost information and data.

**BLDG 402 Building Construction 4** — Continuation of BLDG 302, for Architectural Major.

**BLDG 406 Construction Estimating 3** — Continuation of BLDG 306. Measurement and unit pricing of specific construction trades. Preparation of estimate summaries and bids or proposals to owners or clients. Construction cost accounting. Documentation used in estimating and cost accounting processes. Bid strategies, bid depositories, bid procedures in general.

**BLDG 409 Architectural Major 2** — Continuation of BLDG 309. Graphics and freehand drawing of architectural subject matter. Advanced perspective drawing in a variety of media. Architectural model making. Extensive seminar discussions, guest lecturers and field trips

**BLDG 412 Construction 4 for Economics Major** — Continuation of BLDG 312, for Economics Major.

**BLDG 413 Codes and Regulations** — Building Law in Canada. A general survey of codes and regulations affecting design and construction, including zoning and professional practice. Specific study of the National Building Code, with particular reference to use and occupancy, and the control of fire hazards.

**BLDG 416 Economics Major 2** — Continuation of BLDG 316. Financial management; contract management. Cost accounting and budget control methods. Bid strategies and procedures. Development of feasibility studies. Presentation of reports on construction economic affairs and jobsite controls. Techniques of costing, pricing and analysis of economic data.

**BLDG 419 Building Acoustics** — Theory and principles of sound, including properties, propagation, sources and measurement techniques. Noise criteria and control of noise in buildings. Selection of materials having appropriate acoustical and aesthetic qualities for buildings. Calculations encountered in acoustical considerations.

**CIVL 135 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 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.

**CIVL 236 Building Structures 2** — Introduction to physical properties of materials used in structural sections, performance capability of these sections under loading and their structural limitations. Laboratory testing of concrete, steel and timber sections; correct design and placing of concrete.

**CIVL 337 Building Structures 3** — The distribution of forces within building structures and the laterial 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.

**CIVL 438 Building Structures 4** — Emphasis is 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.

**ELEC 150 Illumination** — Deals with the types and characteristics of lighting sources; quantity and quality of light; lighting units, terminology and calucaltions.

**ELEC 250 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 factors on energy utilization and cost.

**MATH 140 Basic Technical Mathematics** — Topics in algebra, matrices, logarithms, trigonometry, vectors, functions and linear programming, with emphasis on problems specific to the Building Technology.

**MATH 240 Calculus and Analytic Geometry** — Analytic geometry and differential calculus with ordinary and partial derivatives. Integral calculus. Applications from the Building Technology.

**MATH 440 Statistics/Computer** — Linear programming (simplex), the transportation problem and computing related to the the technology.

**MSYS 101 Plumbing** — The 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.

**MSYS 301 Heating and Ventilating** — 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.

**OPMT 185 Project Management** — An introduction to the fundamentals of Critical Path Method (CPM) as it applies to project planning, scheduling and control, and project management. The course includes arrow, precedence and time logic diagrams; resource allocation, time cost analysis and the role of the computer.

**OPMT 260 Management Engineering 1** — Applies the systematic problem solving and decision-making approach to construction industry problems. The course includes computerized facilities planning; work study, using recognized method study techniques to examine and improve the way in which a job is accomplished; recognized work measurement techniques for estimating, planning and cost control and engineering economics.

**OPMT 360 Management Engineering 2** — Techniques of work innovation and management problem solving. Goal setting, agreement creation, work measurement and documentation. Uses computer software for project management with emphasis on the manager's perspective.

**PHYS 219/319 Physics** — 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.

**PHYS 319** see **PHYS 219**

**SURV 120 Introduction to Survey** — An introduction to engineering survey; linear distance; the theory and use of theodolite; direction, bearing and angles; use of traverses in site engineering; elevations, use and theory of the level, how to use the plane table.

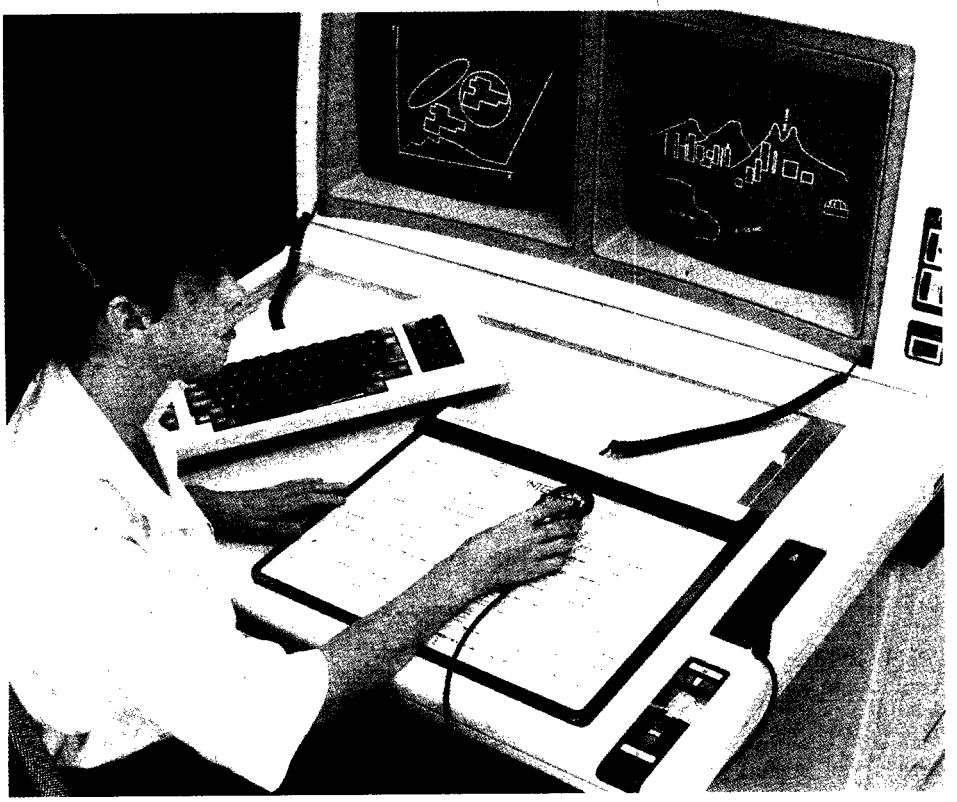
**TCOM 101/102 Technical Communication** — An applied industrial communication course that concentrates on the techniques and applications of written and spoken communication. Discussion topics, explanations, illustrations and assignments are related as closely as possible to the vocational futures of Building Technology students.

**TCOM 102** see **TCOM 101**

**TCOM 301 Advanced Technical Communication** — 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.

## Faculty and Staff

R.I. McNeil, B.Surv., B.C.L.S., D.L.S., Dipl. Adult. Ed., P.Eng,
*Acting Department Head*
F.A.A. Alfeld, Dipl.Eng.
G. Berkenpas, Senior Instructor
F. Chan, B.Sc. (Arch.), B.Arch., M.R.A.I.C.
R Guerin
D.C. Hale, Dipl.T.
G.M. Hardie, M.Ed., F.R.I.C.S., Program Head
D.A.D. Hickman, M.A.I.B.C., F.R.A.I.C. (on leave)
H.E. Kuckein, M.R.A.I.C., Senior Instructor
J. Lancaster, B.Comm., M.C.I.Q.S.
A. Maharajh, Dipl.T., C.E.T., M.C.I.Q.S.
J.A. McInnes, P.Eng.
M. Stepler, Dipl.T., C.E.T., Dipl. Adult Ed.
D.D. Workman



# CAD/CAM

Computer Aided Design and Manufacturing Proficiency in CAD/CAM techniques is being demanded more and more by industry. In the immediate future, almost all aspects of engineering will include some CAD/CAM component.

The most important applications of CAD/CAM are in the field of production, supervision, distribution and storage of computerized drawings. Other possibilities are design of machines, buildings and structures; computer assisted manufacturing; computer linked robotics; and hardware/software development.

**Job Opportunities**

CAD/CAM Technologists will work in engineering offices, such as surveying, civil and structural, mining and forestry; architectural practices, manufacturing industries and computer companies. Some may start their own consulting businesses. Oil companies, municipalities, government agencies are looking at or implementing CAD/CAM. Finally, many opportunities exist in technical sales and training.

**The Program**

All students have the same curriculum of studies in Math, Technical Communications, Drafting, Computer Sciences, Programming Languages and applications. In the second year, emphasis is placed on the hands-on use of Graphic Terminals, with many projects taken from the student's field of interest. Most of the application software packages will be used. Data base and systems management concepts will be developed and applied.

The possibility to enter directly at the second year level is offered to graduate students with the proper prerequisites (see below).

It is anticipated that this program will be accredited by the Society of Engineering Technologists.

**Prerequisites**

For first year applicants: Algebra 12, Physics 11 and Drafting 11.

For second year, direct entry applicants: a diploma of Technology equivalent to BCIT or better and Departmental approval.

Applicants should have good communication and engineering skills, ability to reason in a logical manner and good disposition towards team work.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| CDCM 100 | Drafting 1 | 6 |
| CDCM 101 | Computer Sciences 1 | 3 |
| CHSC 105 | Engineering Materials | 4 |
| MATH 149 | Basic Technical Mathematics | 5 |
| MECH 104 | Statics | 4 |
| MECH 106 | Manufacturing Processes | 1 |
| TCOM 109 | Technical Communication | 4 |
| | Library, Research and Field Trips | 5 |
| | | 35 |

| Year 1 | Term 2 | |
|---|---|---|
| CDCM 200 | Drafting 2 | 4 |
| CDCM 201 | Cadraft 1 | 5 |
| ELEC 209 | Electrical Principles and Application | 4 |
| MATH 249 | Calculus 1 | 4 |
| MECH 206 | Mechanics of Materials | 4 |
| MECH 209 | Manufacturing Processes 2 | 4 |
| TCOM 210 | Technical Communication | 4 |
| | Library, Research and Field Trips | 6 |
| | | 35 |

| Year 2 | Term 3 | |
|---|---|---|
| CDCM 301 | Cadraft 2 | 9 |
| CDCM 302 | Computer Science 2 | 6 |
| CDCM 303 | CAM | 4 |
| CDCM 304 | Engineering Design | 4 |
| MATH 349 | Numerical Methods with BASIC | 4 |
| MECH 320 | Fluid Power 1 | 3 |
| | Library Research and Field Trips | 5 |
| | | 35 |

| Year 2 | Term 4 | |
|---|---|---|
| CDCM 400 | CAD/CAM Projects | 9 |
| CDCM 401 | CAD/CAM Management | 4 |
| CDCM 404 | Cadesign | 3 |
| CDCM 406 | Computer Systems | 4 |
| ELEC 470 | Robotics and CNC Languages | 4 |
| MATH 460 | CAD Mathematics | 4 |
| | Library Research and Field Trips | 7 |
| | | 35 |

## Subject Outlines

**CDCM 100 Drafting 1** — Basic techniques of drafting with emphasis on Orthographic, Isometric and Auxiliary projections. Links between traditional drafting and computer drafting will be part of this course, with exposure to computer techniques.

**CDCM 101 Computer Science 1** — Introduction to Computer Science and Programming, BASIC language. Emphasis will be on engineering problems and elementary computer graphics.

**CDCM 200 Drafting 2** — The emphasis is on working drawings dimensioning and parts lists. Applications will be multi-disciplined.

**CDCM 201 Cadraft 1** — Rudiments of Computer Aided Drafting. Machine Log-on procedures, simple 2-D drawings, orthographic projections, dimensioning, annotations.

**CDCM 301 Cadraft 2** — A continuation of Cadraft 1. Basic 3-D drawings. Auxiliary, isometric and perspective projections by machine algorithms. Symbol library creation and use. Attribute procedures. Bill of material and specification writing.

**CDCM 302 Computer Science 2** — Advanced BASIC. Introduction to FORTRAN. WATFIV and FORTRAN 77 Compilers. Special computer graphic languages. Emphasis will be on engineering design and analysis.

**CDCM 303 CAM** — Introduction to Computer Numerical Control (CNC). APT and COMPAC II Languages. Post processing techniques. Tape interfaces and direct links via RS 232 interfaces.

**CDCM 304 Engineering Design** — An introductory course in engineering design. The emphasis is on mechanical and structural applications through analysis and conceptual drawing and design.

**CDCM 400 CAD/CAM Projects** — A collection of projects, with possible applications to the student's field of interest. Extensive independent study and project research are emphasized.

**CDCM 401 CAD/CAM Management** — An introduction to Data Base and Computer Systems Management. Management Science Techniques. Queuing theory, inventory modelling, simulations. System selection and evaluation techniques.

**CDCM 404 CAD Design** — The objective here is to understand how computers can help in the design process. Interaction with software packages will be emphasized. Finite Element Analysis (F.E.M.) will be introduced.

**CDCM 406 Computer Systems** — An introduction to integrated computer aided design systems. File structure and data base systems. Emphasis will be on CAD/CAM systems, their implementation and optimization. Programming exercises will be in BASIC and FORTRAN. This course involves extensive lab work.

**CHSC 105 Engineering Materials** — A study of comparative properties of all classes of engineering materials. Common causes of service failures.

**ELEC 209 Electrical Principles and Applications** — Power, resistance, capacitance, inductance circuit theory and load analysis. Concepts of integrated circuits, component identification and application. AC and DC drives, stepping motors, encoders resolvers and induction scates.

**ELEC 470 Robotics and CNC Languages** — Introduces the student to current CNC and Robot languages such as APT and VAL. Investigates the integrated manufacturing centre.

**MATH 149 Basic Technical Mathematics** — Introduction to differential and integral calculus with appropriate support topics from geometry and algebra. There will be a strong emphasis on applications to the physical sciences and mechnical engineering.

**MATH 249 Calculus 1** — Continuation of differential and integral calculus with applications. Functions of several variables, partial derivatives and introduction to differential equations.

**MATH 349 Numerical Methods with BASIC** — Numerical methods, elementary matrix methods, 2 and 3 dimensional transformations, linear programming. These topics have an overall emphasis on the analytic and manipulative needs of Computer Aided Design (CAD).

**MATH 460 Mathematics for CAD/CAM** — Introduction to probability theory. Algorithms of computer graphics. Introduction to geometric modelling and finite element method.

**MECH 104 Statics** — Vectors, force systems, equilibrium. Analysis of trusses and frames. Friction. Centroids and inertia, analysis of beams and fluid statics.

**MECH 106 Manufacturing Processes 1** — A basic orientation course which provides the student with practice in metal removal and a study of related theory.

**MECH 206 Mechanics of Materials** — Stress, strain and deflection. Tension, compression, shear, torsion, deflection and buckling of material under load. Beams, columns, shafts, thin and thick walled cylinders, riveted and welded joints.

**MECH 209 Manufacturing Processes 2** — Application of tool materials, tool life, cutting speed, metal removal rates and power requirements topics, with experimental work to demonstrate these principles. Costs and economics related to metal removal.

**MECH 320 Fluid Power 1** — Introduction to fluid power, symbols and circuits. Boolean algebra and logic states pneumatic circuits. Applications.

**TCOM 109 Technical Communication** — Prepares the student for writing technical material relevant to the CAD/CAM industry. Students study and practice the principles of clear, concise and precise writing and apply those principles to instruction writing, field trips reports, process descriptions, memos and description of hardware. In addition, students practice oral skills.

**TCOM 210 Technical Communication** — Further prepares students for writing typical of the CAD/CAM industry. Students write letters, job applications, resumes, proposals, information and assessment reports. Students also learn Word Processing and how to remain current in a rapdily developing industry.

## Faculty and Staff

S.C. Todd, M.I. Mech.E., C.Eng., F.I.E.D., P.Eng., *Department Head*

A.P. Adamo, B.Sc., Program Head

# Chemical Sciences

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

### Job Opportunities

Graduates are employed as chemists and analysts in research facilities and commercial and industrial labs; engineering assistants in consulting firms; production supervisor trainees in production plants; analysts in environmental and chemical laboratories; assayers or mineral processing technicians in extractive metallurgy plants; process technologists in pulp mills and as 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, Unit Operations and Unit projects 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, Environmental Science and Pollution Control, Pulp and Paper, Extractive Metallurgy, Physical Metallurgy.**

### Prerequisites

Chemistry 11 and Algebra 12 are course requirements for this program.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| CHEM 101 | Applied Chemical Principles | 6 |
| CHSC 103 | Engineering Materials | 3.5 |
| CHSC 119 | Environmental Science | 4.5 |
| MATH 141 | Basic Technical Mathematics | 5 |
| MECH 104 | Drafting Fundamentals | 4 |
| PHYS 114 | Physics | 5 |
| TCOM 102 | Technical Communication | 3 |
| | Library and Research | 4 |
| | | 35 |

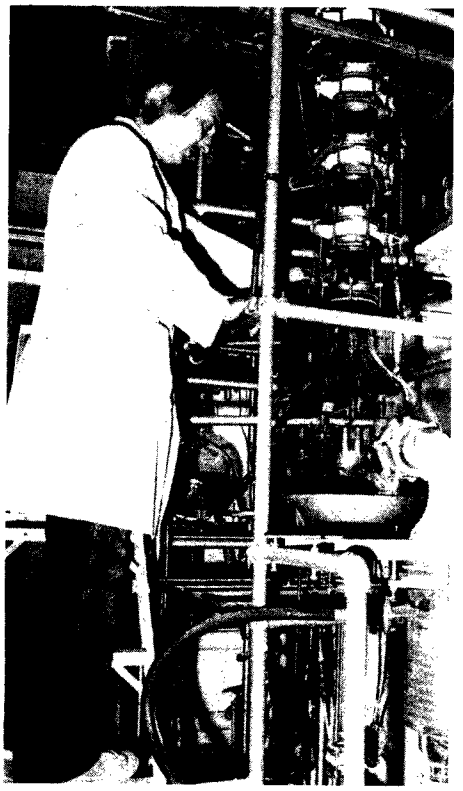
| Year 1 | Term 2 | Clrm hrs/wk |
|---|---|---|
| CHEM 201 | Applied Chemical Principles | 6 |
| CHEM 204 | Chemical Laboratory Techniques | 3 |
| CHSC 202 | Laboratory Workshop | 1.5 |
| CHSC 203 | Engineering Materials | 3.5 |
| CHSC 246 | Industrial Chemical Processes | 4 |
| MATH 241 | Statistics and Calculus | 5 |
| PHYS 214 | Physics | 5 |
| TCOM 202 | Technical Communication | 3 |
| | Library and Research | 4 |
| | | 35 |

| Year 2 | Term 3 | |
|---|---|---|
| | **Common** | |
| CHEM 310 | Physical Chemistry | 5 |
| CHEM 314 | Analytical Chemistry | 6 |
| CHSC 320 | Unit Project | 2 |
| CHSC 341 | Unit Operations | 6 |
| MATH 341 | Numerical Methods and BASIC | 5 |
| | Library and Research | 5 |
| | **Electives** | |
| CHEM 309 | Organic Chemistry | 6 |
| CHSC 304 | Physical Metallurgy | 6 |
| CHSC 307 | Extractive Metallurgy | 6 |
| CHSC 311 | Pollution Science and Organic Chemistry | 6 |
| CHSC 346 | Pulp and Paper Technology | 6 |
| | | 35 |

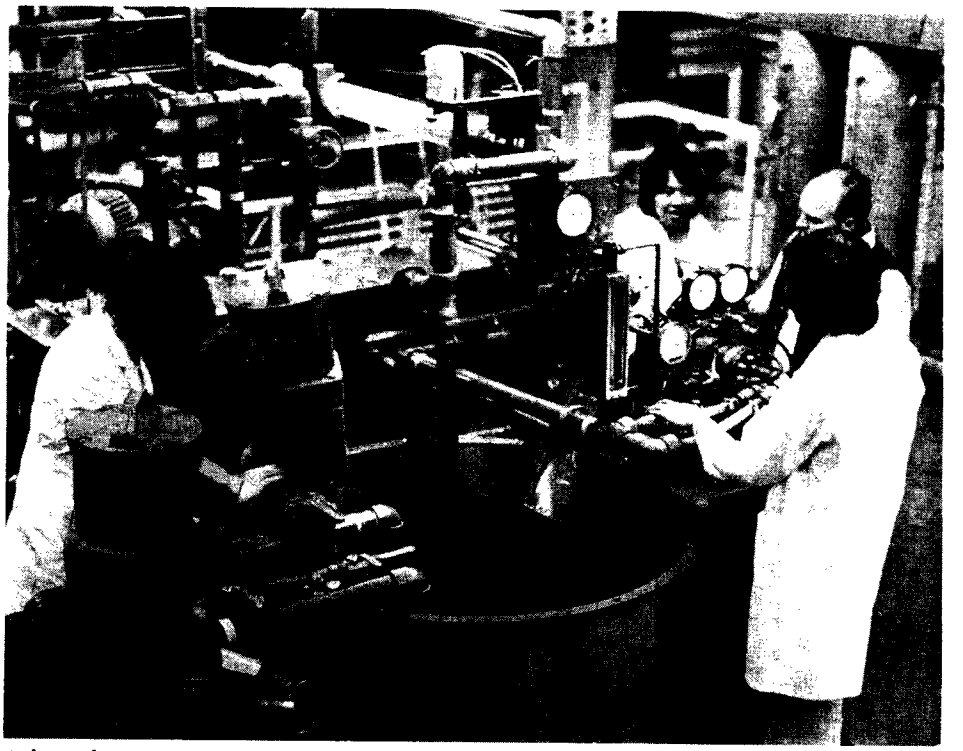
Students must take all the common courses listed for term 4, plus one course from each of the elective groups 1 to 5.

| Year 2 | Term 4 | Clrm hrs/wk |
|---|---|---|
| | **Common** | |
| CHEM 414 | Analytical Chemistry | 6 |
| CHSC 420 | Unit Projects | 3 |
| CHSC 441 | Unit Operations | 6 |
| | Library and Research | 4 |
| | **Elective 1** | |
| CHEM 409 | Organic Chemistry | 6 |
| CHSC 404 | Physical Metallurgy | 6 |
| CHSC 407 | Extractive Metallurgy | 6 |
| CHSC 411 | Pollution Science and Microbiology | 6 |
| CHSC 446 | Pulp and Paper Technology | 6 |
| | **Elective 2** | |
| CHSC 408 | Ore Analysis | 3 |
| CHSC 412 | Waste Management | 3 |
| | **Elective 3** | |
| CHSC 413 | Environmental Analytical Methods | 3 |
| NGAS 403 | Process Dynamics | 3 |
| | **Elective 4** | |
| CHEM 416 | Analytical Instrumentation | 2 |
| ELEC 412 | Process Measurements | 2 |
| | **Elective 5** | |
| CHSC 438 | Coal Chemistry | 2 |
| CHSC 448 | Industrial Chemistry | 2 |
| MATH 441 | Calculus & Computer Applications | 2 |
| | | 35 |

**Laboratory Chemistry** includes Organic Chemistry, Environmental Analytical Methods, Ore Analysis, and Analytical Instrumentation. Together with Analytical Chemistry, it provides students with a 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.

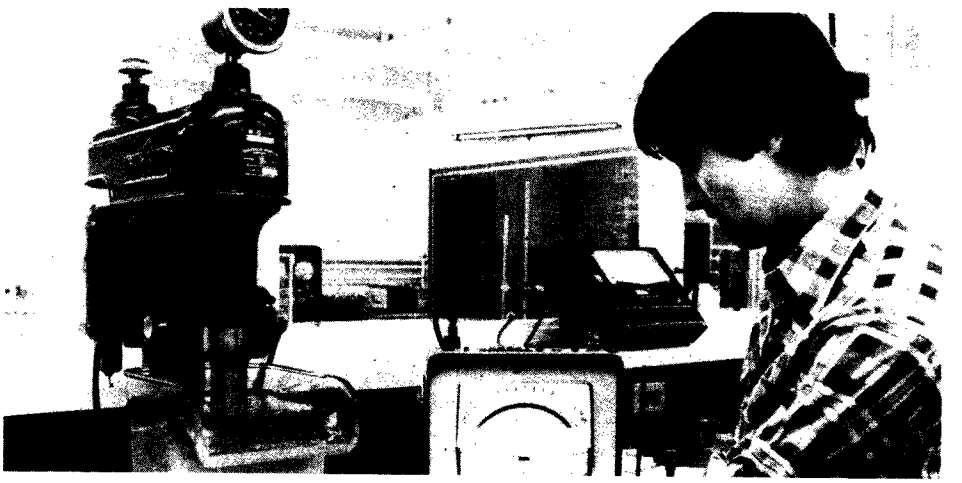


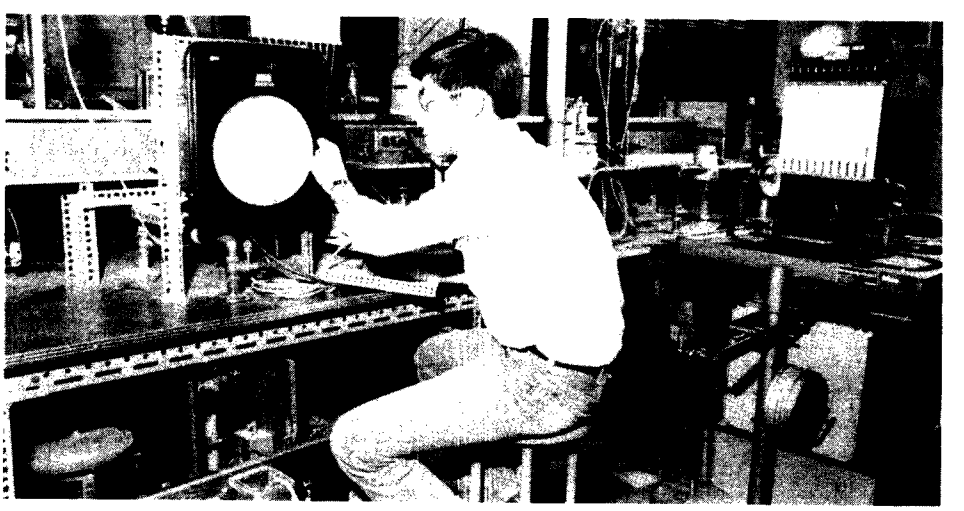
**Industrial Chemistry Electives** include Organic Chemistry, Unit Operations, Process Instrumentation, Process Dynamics and Pollution Control. They qualify the graduate to work as a process technologist in a great variety of chemical process industries.



**Pulp and Paper** Technology includes Process Instrumentation, Process Dynamics and Waste Management. It provides 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** 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,** which includes Physical Metallurgy and Engineering Materials, leads to specialization in physical testing of materials, microscopy and non-destructive testing.

## Subject Outlines

**CHEM 101 Applied Chemical Principles** — Provides the necessary background for chemical calculations and analysis. Included are stoichiometry, atomic structure, bonding, solution preparation and acid-base and oxidation-reduction reactions and titrations. Study of chemical equilibrium leads to a good working knowledge of pH, buffer solutions, solubility product, selective precipitation and industrial processes involving equilibria. Lab work consists of qualitative and quantitative analysis using good lab technique.

**CHEM 201 Applied Chemical Principles** — A continuation of CHEM 101 which includes theory of gravimetric and volumetric analysis, and qualitative analysis of cations and anions. Electrochemistry includes cells, electroplating and corrosion. Study of physical chemistry provides theory of solids, liquids and gases leading to fractional distillation and colligative properties. The Periodic Table is used to correlate many properties of elements and compounds. Names and properties of some organic compounds are taught and lab work covers qualitative and quantitative analysis and physio-chemical separations. Throughout CHEM 101/201 attention is given to industrial and every-day applications.

**CHEM 204 Chemical Laboratory Techniques** — 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.

**CHEM 309/409 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 of qualitative chemical analysis and instrumental methods, infra-red, ultra-violet and gas chromatography.

**CHEM 310 Physical Chemistry** — Presents the kinetic theory of gases, the first and second laws of thermodynamics, phase equilibria, chemical kinetics and catalysis. Lab work consolidates lecture material and gives experience in practical physio-chemical measurements.

**CHEM 314 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.

**CHEM 409** see CHEM 309

**CHEM 414 Analytical Chemistry** — Advanced analytical techniques using various instruments such as the polarograph, spectrophotometer, coloriometer, gas chromatograph, spectrograph, X-ray scintillometer and X-ray diffractometer.

**CHEM 416 Analytical Instrumentation** — 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.

**CHSC 103/203 Engineering Materials** — Physical testing of materials including metals, plastics, wood and wood products, concrete, ceramics and soils. Non-destructive testing. Microscopy, photomicrography and photography.

**CHSC 119 Environmental Science** — An introductory course in environmental chemistry and pollution control. The course examines the major air and water pollutants, including measurement techniques and engineering control methods. Laboratory sessions cover sampling methods now used by industry in B.C.

**CHSC 202 Laboratory Workshop** — Instruction in basic workshop techniques including glass blowing, soldering, brazing and gas welding. Use of hand and bench tools.

**CHSC 203** see **CHSC 103**

**CHSC 246 Industrial Chemical Processes** — A description of the chemical processes involved in major industrial chemical plants in B.C. Emphasis is placed on chemical operations associated with the pulp and paper industry including chemical pulping, water treatment. Lab sessions involve the testing and control procedures utilized in industrial applications.

**CHSC 304/404 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.

**CHSC 307/407 Extractive Metallurgy** — Is concerned with the unit operations of coal and nonferrous metals recovery and upgrading, and with the unit processes of nonferrous and previous 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.

**CHSC 311 Pollution Science and Organic Chemistry** — An introduction to organic chemistry, with applications to industrial pollution problems.

**CHSC 320/420 Unit Projects** — Projects relating to the student's chosen specialty are assigned each term. Regular progress reports and a final term report are required. Industrial and laboratory training is emphasized.

**CHSC 341/441 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.

**CHSC 346/446 Pulp and Paper Technology** — Pulp and paper technology is concerned with mechanical and kraft pulping, chemical and heat recovery, bleaching, papermaking, newsprint manufacture, process control and product testing. The lab portion of this course is designed to equip students with basic testing skills and provide "hands-on" experience with typical mill unit operations. Projects are undertaken in term 4 to involve students in planning and carrying out practical project work.

**CHSC 404** see **CHSC 304**

**CHSC 407** see **CHSC 307**

**CHSC 408 Ore Analysis** — A survey of analytical methods to determine the elemental constituents of ores, concentrates, alloys and metal products. Laboratory work includes principles and practice of gravimetric, volumetric, complexometric and spectrophotometric methods of analysis.

**CHSC 411 Pollution Science** — Discusses air pollution meteorology, air pollution chemistry, air sampling methods, classical and instrumental techniques for measuring atmospheric and indoor contaminants (e.g. hydrogen sulfide, mercaptan, sulfur oxides, carbon monoxide, ozone, nitrogen oxides, various organic contaminants and lead, mercury, cadmium and zinc in air, etc.), particulate counting and sizing, stack sampling and some of the principles and techniques used in water pollution microbiology. Laboratory sessions include standard methods used by industrial and government laboratories.

**CHSC 412 Waste Management** — Physical, biological and chemical methods used in treating municipal and industrial waste waters. The major industrial techniques for control of air pollutants are also discussed.

**CHSC 413 Environmental Analytical Methods** — Surveys suitable methods of examining many types of water, waste water and materials related to control of water quality. Typical industrial pollution problems related to local industry are discussed during lab periods and special attention is given to proper sampling techniques. A selection is made from the following analysis of field samples; cyanide, pesticides, arsenic, mercury, nitrogen (ammonia, nitrate, organic), oxygen (D.O., B.O.D., C.O.D.), surfactants, phosphates, sulphates, chlorides, proteins, carbohydrates, lignins, phenols and heavy metals. Two field trips are included.

**CHSC 420** see **CHSC 320**

**CHSC 438 Coal Chemistry** — An introduction to coal chemistry with emphasis on coal preparation and coal testing techniques.

**CHSC 441** see **CHSC 341**

**CHSC 446** see **CHSC 346**

**CHSC 448 Industrial Chemistry** — A survey course covering the major chemical process industries. Lecture material is selected from the following topics; chlorine and caustic production, aluminum production, petroleum refining, metal refining, plastics, phenol and resins, coal hydrogenation, nuclear energy and other sources of energy.

**ELEC 412 Process Measurements** — An orientation course with emphasis on lab exposure to industrial equipment. Standard methods of applying commercial instruments to measure pressure, level, flow and temperature variables are included. The course ends with an introduction to the principles of regulators and controllers.

**MATH 141 Basic Technical Mathematics** — Topics in algebra, logarithms and trigonometry, including graphical linear programming.

**MATH 241 Statistics and Calculus** — 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.

**MATH 341 Numerical Methods and BASIC** — Elements of BASIC computer language up to and including arrays and sub-programs. 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.

**MATH 441 Calculus and Computer Applications** — Logarithmic and exponential calculus, then differential equations (first order only). Euler and Runge-Kutta methods for solving differential equations on the computer. Solving simultaneous equations by matrix inversion methods. The use of these on the computer.

**MECH 104 Drafting Fundamentals** — Students learn techniques for 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.

**NGAS 403 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.

**PHYS 114/214 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, atomic and nuclear phenomena. The lab program stresses measurement, data analysis, experimental technique and report writing. Mathematical treatment requires algebra and trigonometry.

**PHYS 214** see **PHYS 114**

**TCOM 102/202 Technical Communication** — 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 able to analyze information and design an information package report, proposal and letter or memo for business or industrial audiences.

**TCOM 202** see **TCOM 102**

## Faculty and Staff

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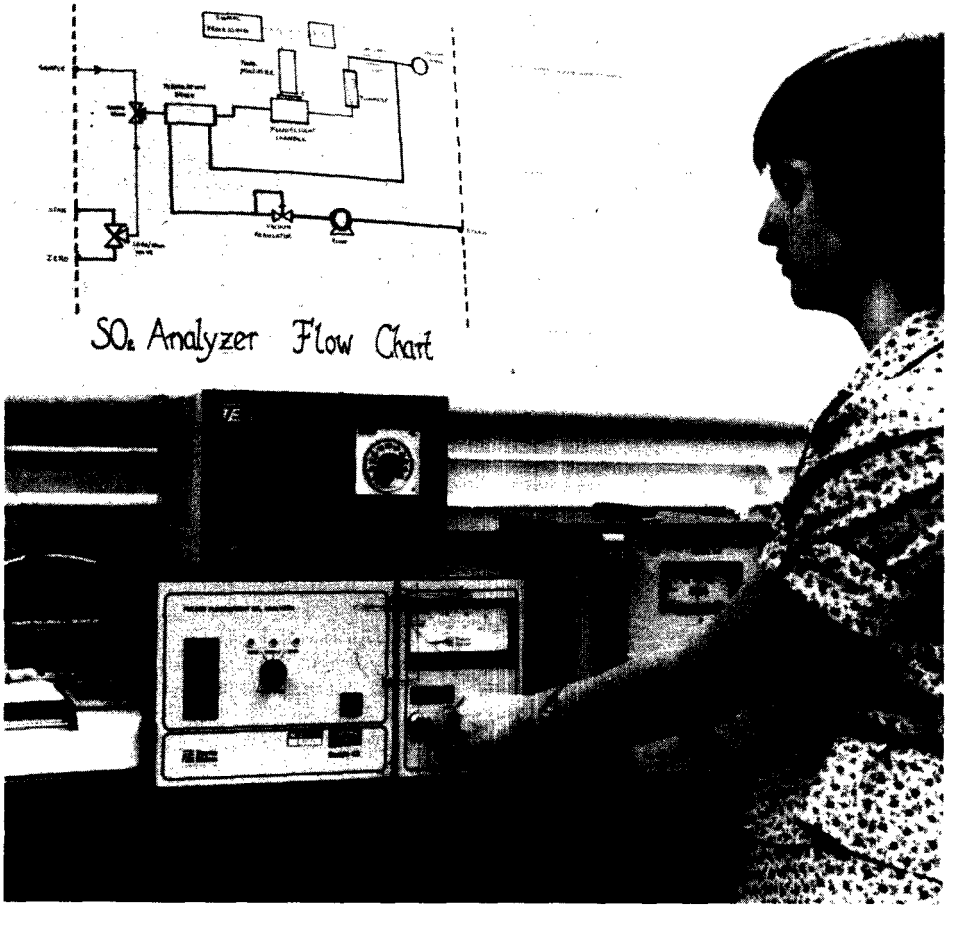
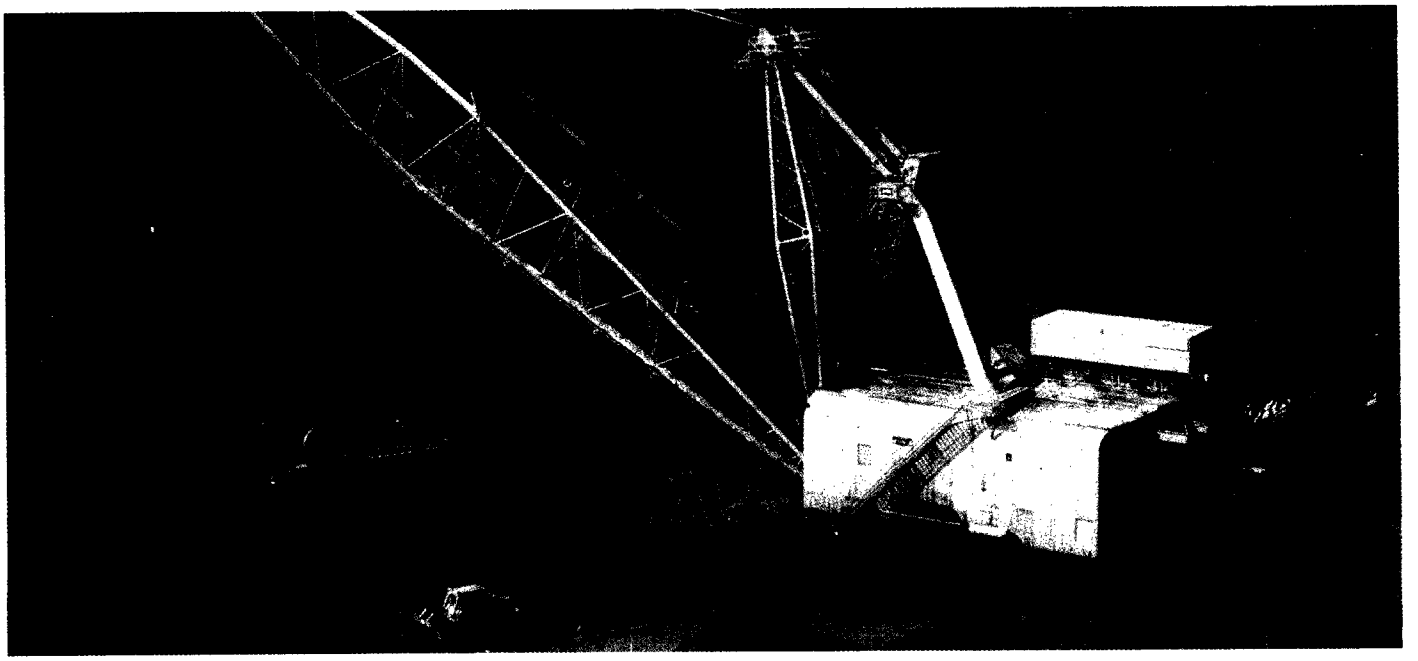



**Environmental Science and Pollution Control** includes Pollution Science, Industrial Chemistry, Environmental Analytical Methods, Waste Management and Organic Chemistry. It deals with the environmental problems of modern industrial society and provides specialization in chemical detection methods and engineering techniques for control of 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, and to conduct general laboratory analyses in areas such as analytical chemistry, general organic chemistry, food, petrochemicals, pharmaceuticals and ore assays.



# Mining

Technologists have an important role to play in the mining industry in exploration, mine development and operation and 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 Opportunites**
Graduates enter a wide field of mining occupations spanning the field from exploration to production: geology, geophysics, geochemistry, surveying, sampling, assaying, mine planning, production, services, concentrator operations and data processing. 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 of British Columbia.

There are good transfer arrangements with several universities.

BCIT Mining students enjoy an unusually high level of student financial assistance.

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

**Prerequisites**
Algebra 12, Physics 11 and Chemistry 11 are course requirements for this program. A medical exam and chest x-ray are important if applicants plan to work in or near a mine.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| CHEM 101 | Applied Chemical Principles 1 | 6 |
| MATH 150 | Basic Technical Mathematics for Mining | 5 |
| MECH 101 | Drafting Fundamentals | 2 |
| MINE 101 | Geology | 3 |
| MINE 102 | Mining | 2 |
| PHYS 101 | General Physics | 6 |
| SURV 140 | Basic Surveying Applications | 3 |
| SURV 142 | Introduction to Computers | 1 |
| TCOM 110 | Technical Communication for Mining | 3 |
| | Library and Research | 4 |
| | | 35 |

| Year 1 | Term 2 | |
|---|---|---|
| CHEM 201 | Applied Chemical Principles 2 | 6 |
| MATH 250 | Calculus 1 & 2 for Mining | 5 |
| MECH 201 | Drafting | 2 |
| MINE 201 | Geology | 3 |
| MINE 202 | Mining | 2 |
| PHYS 201 | Physics for Mining | 3 |
| PHYS 204 | Exploration Geophysics | 3 |
| SURV 240 | Basic Surveying Applications | 3 |
| TCOM 211 | Technical Communication for Mining | 3 |
| | Library and Research | 5 |
| | | 35 |

| Year 2 | Term 3 | |
|---|---|---|
| CHSC 305 | Assaying | 4 |
| CHSC 314 | Mineral Processing Part 1 | 3.5 |
| CIVL 339 | Statics and Strength of Materials | 3 |
| MATH 350 | Numerical Methods for Mining | 5 |
| MINE 301 | Structural Geology | 3.5 |
| MINE 302 | Mining | 4 |
| PHYS 304 | Mining Geophysics | 1.5 |
| SURV 340 | Mine Surveying | 3 |
| TCOM 306 | Advanced Technical Communication for Mining | 2 |
| | Library and Research | 5.5 |
| | | 35 |

| Year 2 | Term 4 | |
|---|---|---|
| CHSC 405 | Assaying | 4 |
| CHSC 414 | Mineral Processing Part 2 | 3.5 |
| CIVL 440 | Strength of Materials | 3 |
| CIVL 441 | Hydraulics | 3 |
| MATH 450 | Statistics for Mining | 5 |
| MINE 401 | Geology - Mineral Deposits | 3.5 |
| MINE 402 | Mining | 4 |
| SURV 440 | Mine Surveying | 3 |
| TCOM 404 | Advanced Technical Communication for Mining | 2 |
| | Library and Research | 4 |
| | | 35 |

## Subject Outlines

**CHEM 101 Applied Chemical Principles 1 for Mining** — Provides the necessary background for chemical calculations and analysis. Included are stoichiometry, atomic structure, bonding, solution preparation and acid-base and oxidation-reduction reactions and titrations. Simple chemical equilibrium leads to a good working knowledge of pH, buffer solutions, solubility product, selective precipitation and industrial processes involving equilibria. Lab work consists of simple qualitative and quantitative analysis and good lab technique is taught.

**CHEM 201 Applied Chemical Principles 2 for Mining** — A continuation of CHEM 101 giving detailed coverage of gravimetric and columetric analysis and qualitative analysis of cations and iminos. Electrochemistry includes cells, electroplating and corrosion. Simple physical chemistry provides theory of solids, liquids and gases leading to fractional distillation and colligative properties. The Periodic Table is used to correlate many properties of elements and compounds. Names and properties of some organic compounds are covered and lab work covers qualitative and quantitative analysis and physio-chemical separations. Throughout CHEM 101/201 attention is given to industrial and everyday applications.

**CHSC 305/405 Assaying** — The first part of the course includes volumetric and gravimetric analysis as applied to minerals. Proximate analysis of coal will also be carried out. Special attention will be given to fire assaying for gold and silver. The second part involves the study of the theory and applications of modern methods of analysis. The topics to be covered include absorption, emission and fluorescent spectroscopy, polarography, electrodeposition, x-ray diffraction and fluorescence, and gas chromatography. This part of the course includes introduction to neutron activation and induced coupled plasma emission.

**CHSC 314/414 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 previous metals and nonferrous ores. The course emphasizes the numerical solution of operating-type problems.

**CHSC 405** see **CHSC 305**

**CHSC 414** see **CHSC 314**

**CIVL 339 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.

**CIVL 440 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. Geotechnical engineering and its role in mining. General soil and rock properties. Effective stress. Earth pressures. Elementary rock slope analysis, tailings disposal systems, design, operation and maintenance. Environmental considerations, including drainage and reclamation of tailings disposal sites.

**CIVL 441 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.

**MATH 150 Basic Technical Mathematics for Mining** — The application of methods of algebra, logarithms, geometry and trigonometry to technical problems in mining and engineering fields.

**MATH 250 Calculus 1 & 2 for Mining** — 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.

**MATH 350 Numerical Methods for Mining** — An introduction to computer programming and operations research techniques illustrating the use of mathematics in decision-making. The course includes topics selected from classical numerical analysis, a detailed introduction to linear programming, transportation, assignment, inventory models and queuing theory. Computer programming techniques and the FORTRAN programming language are emphasized.

**MATH 450 Statistics for Mining** — An in-depth introduction to probability and statistics, including descriptive statistics, discrete and continuous probability distributions, estimation, hypothesis testing, regression, correlation, decision theory, and an introduction to geostatistical ore grade estimation techniques. The course also includes a detailed introduction to network-based project scheduling and management techniques.

**MECH 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 and dimensioning.

**MECH 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 MECH 101.

**MINE 101/201 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.

**MINE 102 Mining** — The objective: an introduction to the general sphere of mining and, more particularly, mining exploration. 10 hrs. on identifying the factors important to mine profitability; 20 hrs. giving a unified picture of modern prospecting techniques: geochemistry in some detail, geology, geophysics, geostatistics, sampling and diamond drilling. Maps, photos, reports and references; economics, planning and management.

**MINE 201** see **MINE 101**

**MINE 202 Mining** — A full description of mining methods; brief subjective descriptions of rock mechanics, fragmentation and mine services which receive detailed treatment elsewhere. Unit operations of drilling, blasting, loading and hauling are discussed in the context of organization, equipment, labor and supplies.

**MINE 301 Structural Geology** — Brief review of mechanical principles of rock deformation and of the primary structures of sedimentary, igneous and metamorphic rocks. The origin, nature and classification of joints, folds and faults, with emphasis on their relation to mineral resources. Lab work includes examinations of specimens, methods of recording structural data, mapping and solution of structural problems, with emphasis on economic aspects.

**MINE 302 Mining** — Two objectives: Rock Mechanics and Mine Services. Rock mass classification and field observations, data storage and retrieval (stereonet), stress field description and modes of failure, ground water effects, ground control methods (pit slope stability design, pillars, subsidence, and underground support systems) and ground movement monitoring. Electrical power, compressed air, water control ventilation, underground development, materials handling systems not otherwise covered, reclamation and pollution control, safety, management. Guest lecturers used extensively.

**MINE 401 Geology — Mineral Deposits** — The terminology, classification, manner of occurrence, distribution and economics of mineral resources, with emphasis on typical Canadian occurrences. Ways of recognizing, discovering, and developing mineral deposits. Lab work illustrates and develops techniques in megascopic study and identification of hand specimens; valuation of mineral deposits, computer data storage and retrieval. Field trips are correlated with all classroom work in geology.

**MINE 402 Mining** — Two objectives: Mine Planning and Fragmentation. Economics: cost estimating both capital and operating, accounting and records, taxation, marketing (smelter and coal contracts and specifications), balance sheets, financial statements, cash flows and present values, equipment selection. Sampling, cutoffs, waste/ore ratios, geostatistics and mine modelling, largely computerized. Fragmentation subjects include drilling systems, explosive properties and products, safety, field application design. Field labs include high speed photography of students' full scale tests.

**PHYS 101 Physics for Mining** — A general level course covering mechanics dynamics, and the properties of solids and fluids. The associated laboratory covers the principle of measurement and the experimental method of acquiring knowledge.

**PHYS 201 Physics for Mining** — A general level course of lectures only covering wave phenomena, electricity, magnetism, electromagnetism and atomic and nuclear physics.

**PHYS 204 Exploration Geophysics** — Utilizing concepts covered in PHYS 201, the course is an introduction to the uses of geophysics in the search for ore deposits. The course consists of lectures, case study exercises and some field exercises covering the gravity, magnetic, resistivity, self-potential and seismic method of analyzing the physical properties of the earth.

**PHYS 304 Mining Geophysics** — Consists of field work and some lectures on geophysical methods of mineral exploration. Emphasis is on the operation of geophysical instruments, the method of conducting geophysical surveys and the presentation and interpretation of data.

**SURV 140/240 Mine Surveying** — Substance of course on ground points, sighting devices; measurement of distances and angles with a variety of instruments, tapes, etc., under a variety of conditions; compass; accuracy and precision; planetable; errors and mistakes; direction; stadia, profiling; topography; line production offsets; interlining and intersection; random lines and physical feature ties; computations - traverses, coordinate systems; triangulation; areas and volumes; special engineering survey problems and curves.

**SURV 240** see **SURV 140**

**SURV 340/440 Mine Surveying** — Application of survey methods to underground and surface mines. Underground surveying in shaft sinking, development control (level and inclined) and production areas. Elementary astronomy, establishing azimuth by solar and pole star observations. Mine quantities in development areas, pickup of tunnels, cross sectioning, stopes (including tonnage calculations). Construction of mine plans and sections. Field projects include tunnel surveys and open-pit triangulation, tri-lateration and bench pickup. Mining acts applied to surveying.

**SURV 440** see **SURV 340**

**TCOM 110/211 Technical Communication for Mining** — In the one-hour lecture each week, students cover basic writing skills, technical correspondence, resumes 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.

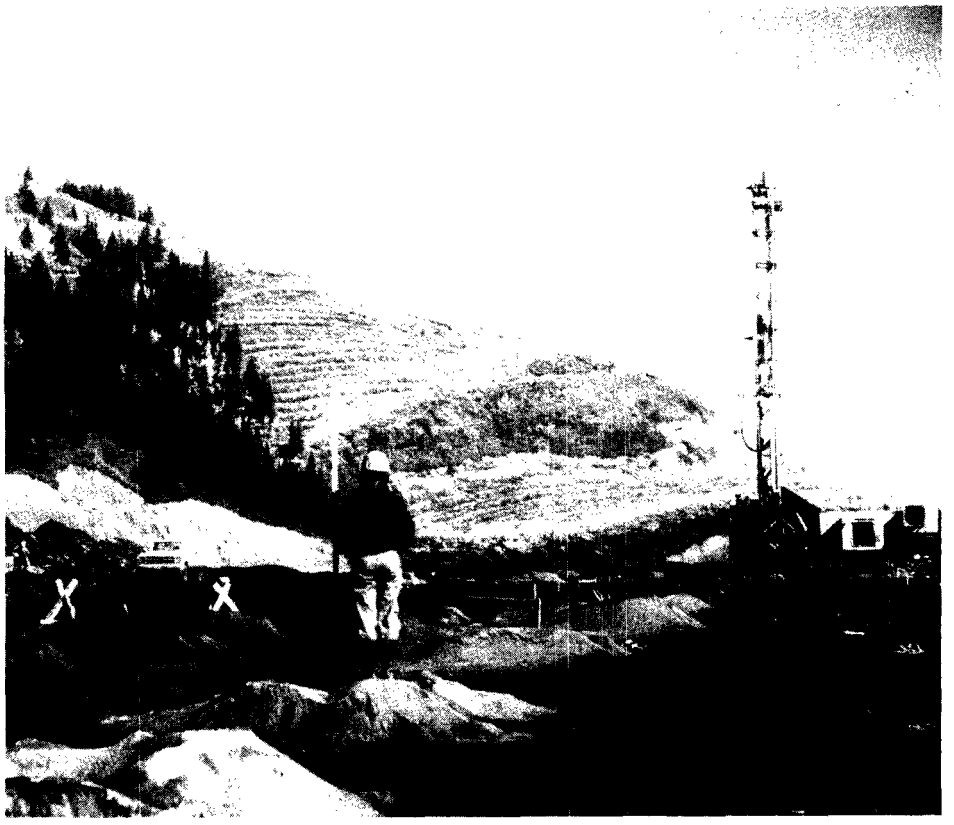
**TCOM 211** see **TCOM 110**

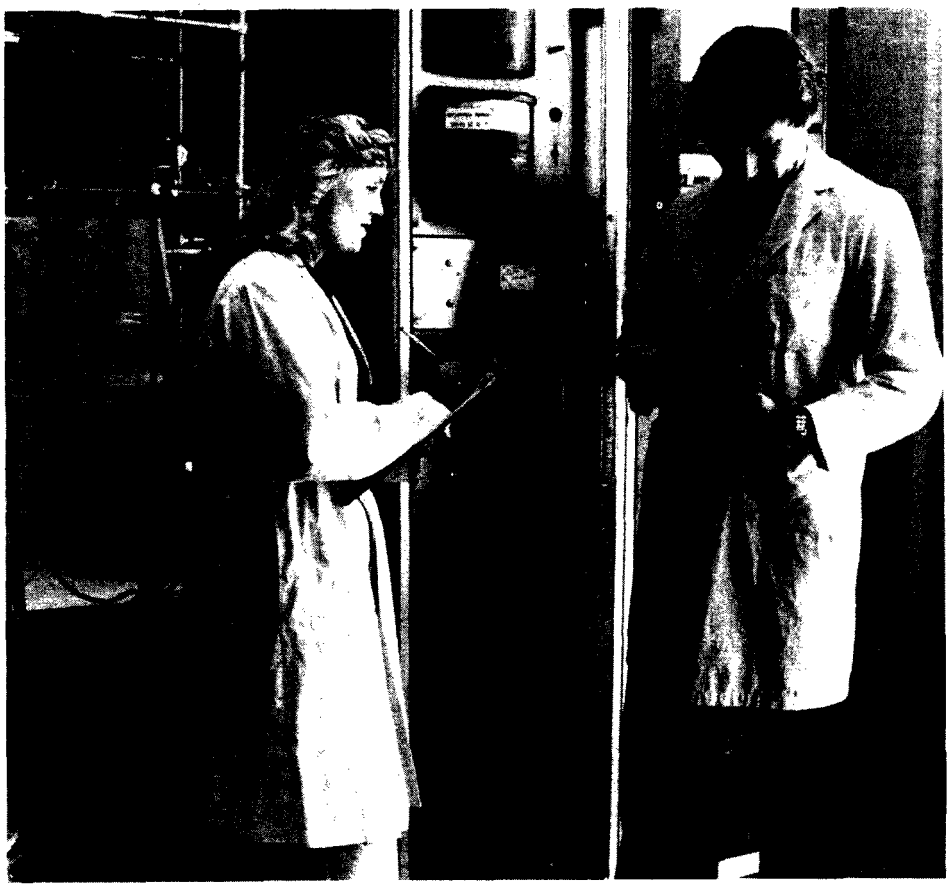
**TCOM 306/404 Advanced Technical Communication for Mining** — Includes brief reviews of memoranda writing, oral reports and discussions, write-ups of field trips and lab reports. Note taking from oral reports or articles as used at conferences, abstract writing from technical articles, information retrieval and the technical roots of English are also integrated with the other courses in mining, geology and chemistry.

**TCOM 404** see **TCOM 306**

## Faculty and Staff

R. B. Hyde, B.S.A., M.Sc., P.Ag., *Department Head*
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 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 servicing.

**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 petroleum geology, reservoir studies and the production and field handling of oil and gas. Emphasis is also given to the basic sciences - chemistry, physics and mathematics - necessary for the scientific and engineering principles involved in studies throughout the course.

The second year covers pipeline transmission, oil refining and products utilization and gas distribution. Alternate fuels are also examined. Computer applications in all areas of studies will be emphasised.

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

This program is accredited by the Society of Engineering Technologists of B.C.

**Prerequisites**
Algebra 12, Physics 11 or Chemistry 11 are course requirements for this program. 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.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| CHEM 101 | Applied Chemical Principles 1 | 6 |
| CHSC 106 | Engineering Materials | 3.5 |
| MATH 147 | Basic Technical Mathematics | 5 |
| NGAS 102 | Petroleum Geology | 4 |
| NGAS 103 | Properties of Reservoir Fluids | 3 |
| PHYS 101 | Physics | 6 |
| TCOM 108 | Technical Communication | 3 |
| | Library and Research | 4.5 |
| | | 35 |

| Year 1 | Term 2 | |
|---|---|---|
| CHEM 201 | Applied Chemical Principles 2 | 6 |
| COMP 122 | Computer Applications | 2 |
| MATH 247 | Calculus 1 & 2 | 5 |
| NGAS 201 | Field Production of Gas & Oil | 3 |
| NGAS 202 | Field Handling of Gas & Oil & Gas Processing | 2 |
| PHYS 201 | Physics | 3 |
| PHYS 204 | Introductory Geophysics | 3 |
| SURV 128 | Introduction to Surveying | 3 |
| TCOM 208 | Technical Communication | 3 |
| | Library and Research | 5 |
| | | 35 |

| Year 2 | Term 3 | |
|---|---|---|
| CHEM 310 | Physical Chemistry | 5 |
| CHSC 341 | Unit Operations | 6 |
| CHSC 351 | Pollution Control | 3 |
| MATH 347 | Differential Equations | 5 |
| NGAS 306 | Oil Refining | 4 |
| NGAS 307 | Pipeline Transmission | 6 |
| NGAS 308 | Fuels | 2 |
| | Library and Research | 4 |
| | | 35 |

| Year 2 | Term 4 | |
|---|---|---|
| CHEM 415 | Petroleum Chemistry | 5 |
| CHSC 441 | Unit Operations | 6 |
| MATH 447 | Numerical Methods and Statistics | 5 |
| NGAS 401 | Gas Distribution and Utilization | 4 |
| NGAS 402 | Petroleum Products: Testing & Utilization | 5 |
| NGAS 403 | Process Dynamics | 3 |
| NGAS 404 | Computer Simulation and Control | 2 |
| | Library and Research | 5 |
| | | 35 |

## Subject Outlines

**CHEM 101 Applied Chemical Principles 1** — Provides the necessary background for chemical calculations and analysis. Included are stoichiometry, atomic structure, bonding, solution preparation and acid-base and oxidation-reduction reactions and titrations. Simple chemical equilibrium leads to a good working knowledge of pH, buffer solutions, solubility product, selective precipitation and industrial processes involving equilibria. Lab work consists of

simple qualitative and quantitative analysis and good lab technique is taught.

**CHEM 201 Applied Chemical Principles 2** — A continuation of CHEM 101 giving detailed coverage of gravimetric and columetric analysis, and qualitative analysis of cations and iminos. Electrochemistry includes cells, electroplating and corrosion. Simple physical chemistry provides theory of solids, liquids and gases leading to fractional distillation and colligative properties. The Periodic Table is used to correlate many properties of elements and compounds. Names and properties of some organic compounds are covered, and lab work covers qualitative and quantitative analysis and physio-chemical separations. Throughout CHEM 101/201 attention is given to industrial and everyday applications.

**CHEM 310 Physical Chemistry** — Presents the kinetic theory of gases, the first and second laws of thermodynamics, phase equilibria, chemical kinetics and catalysis. Lab work consolidates lecture material and gives experience in practical physical chemical measurements.

**CHEM 415 Petroleum Chemistry** — 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.

**CHSC 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.

**CHSC 341/441 Unit Operations** — First and second law of thermodynamics; enthalpy, entropy, phase rule, thermodynamic diagrams and tables; fluid flow and measurement in pipes and channels, piping, pipe fittings and valves; solid handling, grinding, crushing, screening, mixing, settling, sedimentation, filtration, flotation; flow of heat, conduction, convection, radiation, film and over-all transfer coefficients, heat exchangers; principles and application of equipment for evaporation, distillation, absorption, extraction; humidification and dehumidification; drying, crystallization; ion exchange.

**CHSC 351 Pollution Control** — Fundamentals of waste treatment and management systems. Basic sampling and testing techniques

**CHSC 441** see **CHSC 341**

**COMP 122 Computer Applications** — Introduction to the components of a computer. Introduction to "BASIC" on a microcomputer. Relationship of data to input/output. Introduction to "FORTRAN" and "WATFIV" on the IBM mainframe computer. The problems solved via programming are in the natural gas & petroleum field.

**MATH 147 Basic Technical Mathematics** — Topics in algebra, logarithms and trigonometry, with emphasis on technological applications and problem solving.

**MATH 247 Calculus 1 and 2** — Conic sections; differential calculus with ordinary and partial derivatives; integral calculus; applications from gas and oil technology.

**MATH 347 Differential Equations** — Differential equations, their analytic and numerical solutions.

**MATH 447 Numerical Methods & 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.

**NGAS 102 Petroleum Geology** — Covers topics in petroleum geology and rotary drilling. Petroleum geology topics include: historical geology, composition of the earth's crust, origin of petroleum, petroleum migration, geology of reservoirs, structural and stratigraphic traps, sedimentary formations, carbonate formations, basic reservoir production calculations, and construction of isochore and isopach subsurface maps. Rotary drilling topics include: drilling rigs, the drill string, drilling, drilling fluids, well control, down-hole equipment, and an introduction to well testing and servicing.

**NGAS 103 Properties of Reservoir Fluids** — Introduces the student to the chemical composition and physical properties of natural gas and crude oil, and the phase behavior these fluids exhibit during production from a reservoir. Some elementary applications of reservoir flow characteristics are considered.

**NGAS 201 Field Production of Gas & Oil** — Covers oil field tests and services and basic oil field economics. Topics include: drilling programs, well logging, fracturing, acidizing, perforating, flooding, enhanced recovery techniques, in-situ production techniques, drill stem testing, and directional drilling. Computer applications will be utilized whenever possible,

**NGAS 202 Field Handling of Oil & Gas & Gas Processing** — Covers the handling of crude oil and natural gas from the well head to the transmission pipeline. Field handling to include: fluid stabilization, gas separation, hydrate control, emulsion treating, well effluent recombination calculations. Gas processing covers: sweetening, sulfur recovery, dehydration, natural gas liquids recovery. A technical report with oral presentation is required.

**NGAS 306 Oil Refining** — Petroleum refining is a very complex operation due mainly to the multitude of products that are made. This course covers the refining processes involved in the production of these products. Processes considered include: atmospheric and vacuum distillation; thermal, catalytic, and hydro cracking; catalytic reforming; alkylation; polymerization; hydrotreating; chemical treating; lubricating oil refining; process and effluent water treating; air quality control. A term paper with oral presentation is required.

**NGAS 307 Pipeline Transmission** — An introduction to Natural Gas Transmission. Topics covered include: natural gas quality, large volume natural gas measurement, pipeline flow and design calculations, pipeline construction, design and operating codes, corrosion control, pipeline control and compressor stations.

**NGAS 308 Fuels** — Examines alternate uses of conventional fossil fuels. Utilization, availability and production techniques of gaseous, liquid and solid fuels are discussed. Alternate fuel sources and alternate fuel applications are then examined. Topics include: natural gas, manufactured (coal) gas, LNG, LPG, gasolines, diesel fuel, fuel oils and types of coal. Alternate fuel topics include: simulated fuels, supplemental fuels and synthetic fuels. The use of compressed natural gas, propane and or gasoline/alcohol as a motor fuel will also be examined.

**NGAS 401 Gas Distribution & Utilization** — An introduction to the distribution and utilization of natural gas. Topics covered include: gas measurement, pressure regulation, design and construction of distribution systems, corrosion control, leak surveys, maintenance, gas contract control, peak shaving, burner design, customer relations, system design and operational codes.

**NGAS 402 Petroleum Products Testing & Utilization** — Many different products are produced in an oil refinery. Each product has its own individual requirements depending on the use to which it is to be put. The lecture part of the course examines the desired properties and specifications of these products and the equipment in which the products are used. Laboratory periods cover the testing of various products obtained from a typical crude oil. Supplementing these studies are field trips to local refineries. A major term paper and oral presentation is required.

**NGAS 403 Process Dynamics** — Introduces a practical and effective computer based approach for studying and evaluating 'real time' process control situations. The student is required to produce interim progress reports during the course and a final, formal technical report at the end of the course. Topics include: system dynamics, response time, control strategies, system optimization, system modelling, flow charting, transducer and control valve evaluation.

**NGAS 404 Computer Simulation & Control** — A course in basic computer simulation and control techniques. Emphasis will be on practical input-output applications utilizing an inexpensive 8 BIT microprocessor. Topics include: concept of computer control, input-output software and hardware, interfacing, analog-digital conversions and practical applications.

**PHYS 101 Physics** — A general level course covering mechanics, dynamics and the properties of solids and fluids.

**PHYS 201 Physics** — A general level course covering thermal properties of matter, waves, electricity, magnetism, electromagnetism and atomic and nuclear physics.

**PHYS 204 Introductory Geophysics** — A combined lecture and laboratory course covering the elements of gravity, resistivity, seismic and magnetic methods of geophysical surveying.

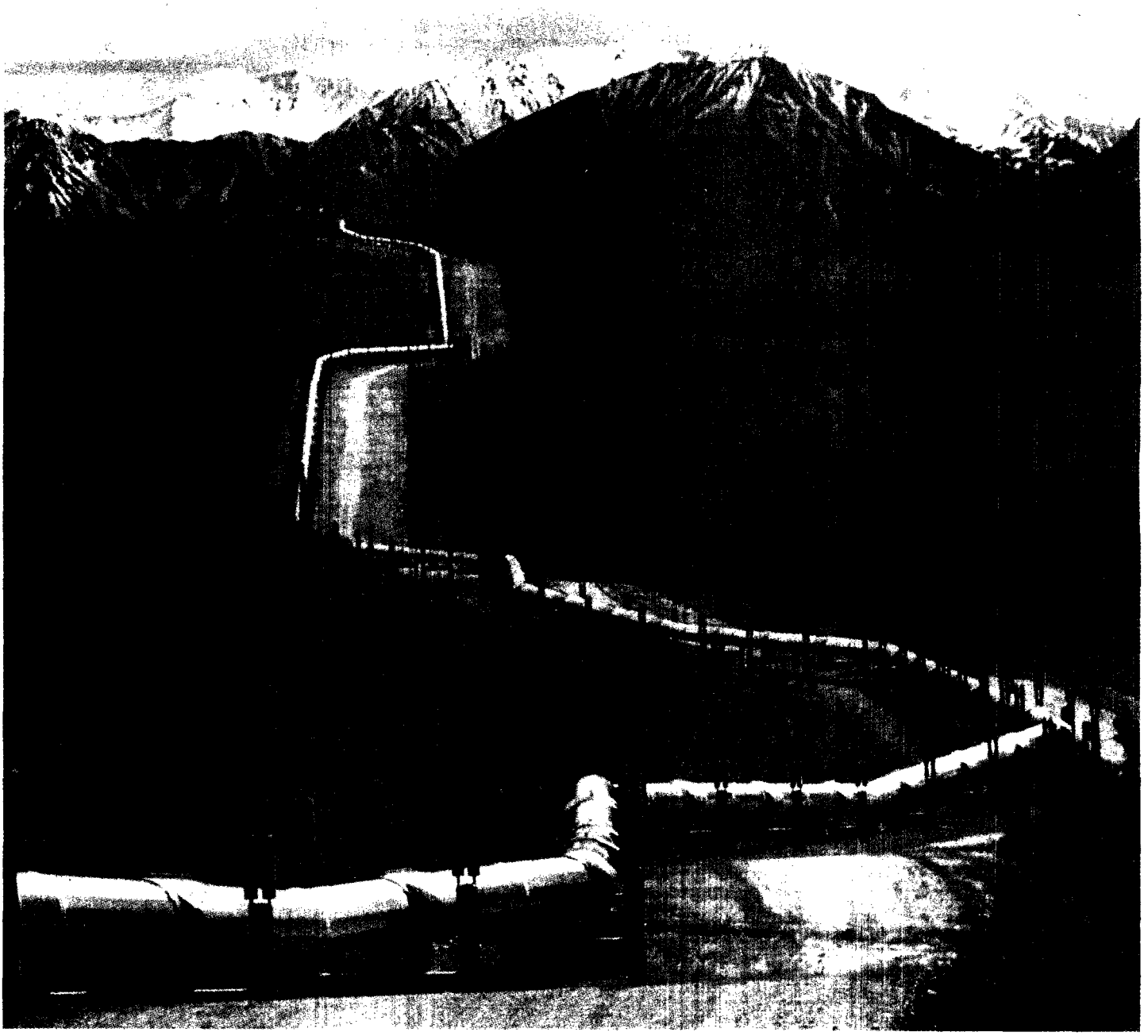
**SURV 128 Introduction to Surveying** — The theory of engineering survey. Practical application of linear measurements. Introduction to and theory of the theodolite. Bearings and traverse computations. Introduction to and theory of levelling. Computation of areas and volume.

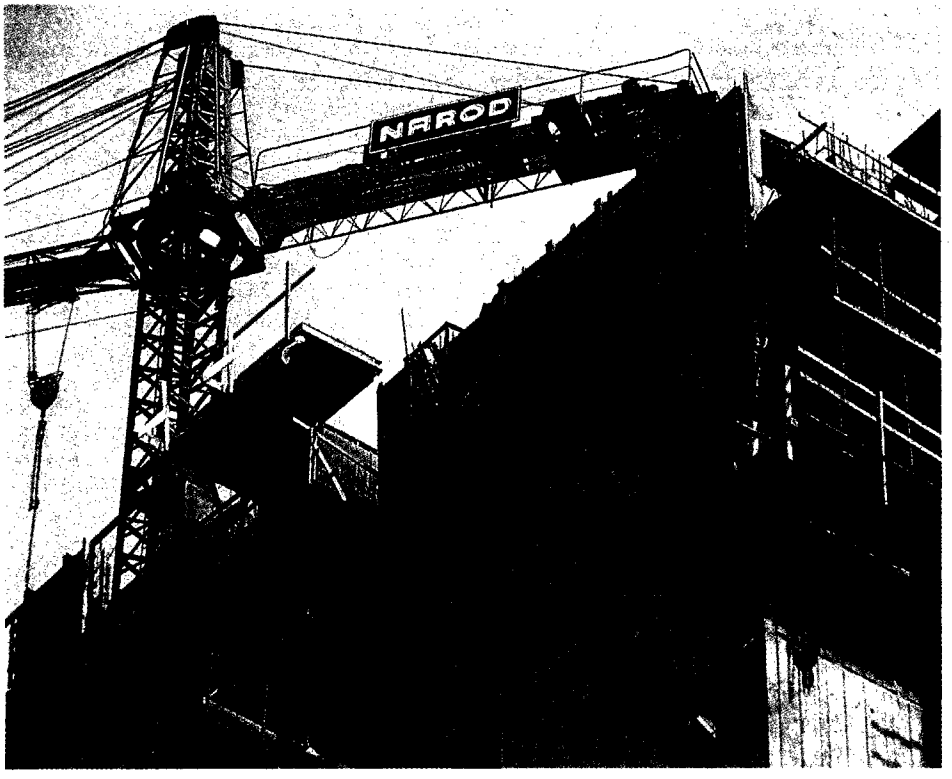
**TCOM 108/208 Technical Communication** — An applied industrial communication course that concentrates on the techniques and applications of written and spoken communication. The discussion topics, explanations, illustrations and assignments are related as closely as possible to the vocational futures of natural gas and petroleum students. The intent of this course is to prepare students with the skills necessary for on-the-job communication.

**TCOM 208** see **TCOM 108**

## Faculty and Staff

R. B. Hyde, B.S.A., M.Sc., P.Ag., *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 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 options to provide a degree of specialization in varying areas of the civil or structural technology. These include Geotechnical, Highways Traffic, Water Resources, Construction and Structures.

The 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**
Algebra 12 and Physics 11 are course requirements for this program. 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.

Exemption from the academic requirements may be made in the case of mature applicants with applicable practical experience.

An optional two week pre-entry course is available to assist those students who would like some orientation and upgrading prior to starting the Civil and Structural program.

## Course of Studies

*Course continued in the following term(s).

| Year 1 | | Term 1 | Clrm hrs/wk |
|---|---|---|---|
| CIVL | 101 | Statics | 6 |
| CIVL | 105 | Civil Technology 1 | 3 |
| CIVL | 109 | Construction Materials 1 | 3 |
| MATH | 142* | Basic Technical Maths | 5 |
| MECH | 101* | Drafting Fundamentals | 2 |
| PHYS | 107* | Physics | 5 |
| SURV | 130* | Survey | 3 |
| TCOM | 103* | Technical Communication | 3 |
| | | | 30 |

| Year 1 | | Terms 2A, 2B | 2A | 2B |
|---|---|---|---|---|
| MATH | 242 | Calculus 1 & 2 | 5 | 5 |
| PHYS | 207 | Physics | 5 | 5 |
| TCOM | 203 | Technical Communication | 3 | 3 |

| Mandatory Technical Subjects | | | | |
|---|---|---|---|---|
| CIVL | 202 | Strength of Materials | 6 | - |
| CIVL | 203 | Elementary Structural Design | - | 6 |
| CIVL | 206 | Civil Technology 2 | 3 | - |
| CIVL | 207 | Hydraulics 1 | 3 | 3 |
| CIVL | 211 | Computer Applications | - | 3 |
| MECH | 202 | Drafting | 2 | 2 |
| SURV | 230 | Survey | 3 | 3 |
| | | | 30 | 30 |

## SECOND YEAR PROGRAM

**Options**

Set A — Geotechnical
Set B — Highways/Traffic
Set C — Water Resources
Set D — Construction
Set E — Structures

| **SET A — Geotechnical** / **SET B — Highways/Traffic** | | | Clrm hrs/wk | |
|---|---|---|---|---|
| **Term 3 (15 weeks)** | | | **A** | **B** |
| CIVL | 304 | Structural Design General | 6 | 6 |
| CIVL | 308 | Hydraulics 2 | 3 | 3 |
| CIVL | 313 | Subdivision Planning & Street Design | 6 | 6 |
| CIVL | 325 | Soil Mechanics 1 | 6 | 6 |
| MATH | 342 | Matrix Methods | 3 | 3 |
| SURV | 330 | Survey | 3 | 3 |
| TCOM | 302 | Advanced Technical Communication | 2 | 2 |
| | | | 30 | 30 |
| **Term 4A (10 weeks)** | | | **A** | **B** |
| CIVL | 412 | Municipal Services | 6 | 6 |
| CIVL | 425 | Soil Mechanics 2 | 6 | 6 |
| CIVL | 432 | Construction Estimating | 3 | 3 |
| MATH | 442 | Statistics | 4 | 4 |
| OPMT | 180 | Construction Management 1 | 3 | 3 |
| PHOT | 127 | Photo Interpretation | 3 | 3 |
| SURV | 430 | Survey | 3 | 3 |
| TCOM | 401 | Advanced Technical Communication | 2 | 2 |
| | | | 30 | 30 |
| **Term 4B (10 weeks)** | | | **A** | **B** |
| CIVL | 410 | Construction Materials 2 | 3 | 3 |
| CIVL | 419 | Basic Highway Design | 3 | 3 |
| CIVL | 436 | Construction Planning | 3 | 3 |
| MATH | 442 | Statistics | 4 | 4 |
| OPMT | 280 | Construction Management 2 | 3 | 3 |
| PHOT | 127 | Photo Interpretation | 3 | 3 |
| SURV | 430 | Survey | 3 | 3 |
| TCOM | 401 | Advanced Technical Communication | 2 | 2 |
| **Options** | | | | |
| CIVL | 418 | Traffic Technology | - | 6 |
| CIVL | 427 | Soil Mechanics 3 | 6 | - |
| | | | 30 | 30 |

| **SET C — Water Resources** / **SET D — Construction** | | | Clrm hrs/wk | |
|---|---|---|---|---|
| **Term 3 (15 weeks)** | | | **C** | **D** |
| CIVL | 304 | Structural Design General | 6 | 6 |
| CIVL | 308 | Hydraulics 2 | 3 | 3 |
| CIVL | 313 | Subdivision Planning & Street Design | 6 | 6 |
| CIVL | 319 | Transportation | 3 | 3 |
| CIVL | 328 | Soil Mechanics 1A | 3 | 3 |
| MATH | 342 | Matrix Methods | 4 | 4 |
| SURV | 330 | Survey | 3 | 3 |
| TCOM | 302 | Advanced Technical Communication | 2 | 2 |
| | | | 30 | 30 |
| **Term 4A (10 weeks)** | | | **C** | **D** |
| CIVL | 412 | Municipal Services | 6 | 6 |
| CIVL | 429 | Soil Mechanics 1B/ 2A | 6 | 6 |
| CIVL | 432 | Construction Estimating | 3 | 3 |
| MATH | 442 | Statistics | 4 | 4 |
| OPMT | 180 | Construction Management 1 | 3 | 3 |
| SURV | 430 | Survey | 3 | 3 |
| TCOM | 401 | Advanced Technical Communication | 2 | 2 |
| **Options** | | | | |
| CIVL | 416 | Water Resources | 3 | - |
| CIVL | 433 | Construction Detailing | - | 3 |
| | | | 30 | 30 |
| **Term 4B (10 weeks)** | | | **A** | **B** |
| CIVL | 410 | Construction Materials 2 | 3 | 3 |
| CIVL | 417 | Highway Design | 6 | 6 |
| CIVL | 430 | Soil Mechanics 2B | 3 | 3 |
| CIVL | 436 | Construction Planning | 3 | 3 |
| MATH | 442 | Statistics | 4 | 4 |
| OPMT | 280 | Construction Management 2 | 3 | 3 |
| SURV | 430 | Survey | 3 | 3 |
| TCOM | 401 | Advanced Technical Communication | 2 | 2 |
| **Options** | | | | |
| CIVL | 416 | Water Resources | 3 | - |
| MINE | 410 | Commercial Explosives | - | 3 |
| | | | 30 | 30 |

| **SET E Structures** | | | Clrm hrs/wk |
|---|---|---|---|
| **Term 3 (15 weeks)** | | | **E** |
| CIVL | 308 | Hydraulics 2 | 3 |
| CIVL | 320 | Highway Design and Structures | 6 |
| CIVL | 321 | Municipal Services General 1 | 3 |
| CIVL | 322 | Structures 1 | 6 |
| CIVL | 328 | Soil Mechanics 1A | 3 |
| MATH | 342 | Matrix Methods | 4 |
| SURV | 330 | Survey | 3 |
| TCOM | 302 | Advanced Technical Communication | 2 |
| | | | 30 |
| **Term 4A (10 weeks)** | | | **E** |
| CIVL | 414 | Municipal Services General 2 | 6 |
| CIVL | 423 | Structures | 6 |
| CIVL | 429 | Soil Mechanics 1A/2B | 6 |
| MATH | 442 | Statistics | 4 |
| OPMT | 180 | Construction Management 1 | 3 |
| SURV | 430 | Survey | 3 |
| TCOM | 401 | Advanced Technical Communication | 2 |
| | | | 30 |
| **Term 4B (10 weeks)** | | | **E** |
| CIVL | 410 | Construction Materials 2 | 3 |
| CIVL | 424 | Structures 3 | 6 |
| CIVL | 432 | Construction Estimating | 3 |
| CIVL | 434 | Structural Detailing | 3 |
| CIVL | 436 | Construction Planning | 3 |
| MATH | 442 | Statistics | 4 |
| OPMT | 280 | Construction Management 2 | 3 |
| SURV | 430 | Survey | 3 |
| TCOM | 401 | Advanced Technical Communication | 2 |
| | | | 30 |

## Subject Outlines

**CIVL 101 Statics** — Vectors, force systems, graphical analysis, resultants, components, moments, equilibrium laws, force polygons, funicular polygons, frames and trusses, stress diagrams, Bowes' notation, flexible tension members, load shear and bending moment curves. Closely supervised problem sessions are used to provide the student with practice in common analytical and graphical solutions to problems of static load on statically determinate structures.

**CIVL 105 Civil Technology 1** — Introduction to basic procedures, terminology and technical skills associated with the civil industry. Basic procedures include use of scales, planimeter and topographic plan for determining data necessary for earthwork cross-sections and drainage analysis; preparation of working drawings, a design brief, a bill of quantities and referencing standards. Technical skills include preparation of a design profile and a construction cost estimate, computation of end areas from earthwork volumes and use of rational equation to size a culvert. These skills and procedures are applied to the realignment of a road section. Throughout the course, an engineering approach is adopted towards problem solving with emphasis on data collection and presentation rather than computation.

**CIVL 109 Construction Materials 1** — Introduces the fundamentals of construction materials - concrete, asphalt, and aggregates. Students learn to perform basic tests on these materials in accordance with established standards and recommended industry laboratory procedures. In addition, students learn to sample, inspect and test these materials under civil project conditions.

**CIVL 202 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; 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.

**CIVL 203 Elementary Structural Design** — Having previously studied forces and material properties, students learn to apply these to the analysis of real structures. They also study the effects of wind, snow and earthquake loads as determined by national standards. Design and analysis of steel and timber beams, columns and trusses and their connections are used as examples.

**CIVL 206 Civil Technology 2** — Further develops some of the technical theory associated with civil design as introduced in Civil Technology 1. With reference to the project used in Civil Technology 1, students are introduced to computation of vertical curves; simple circular curves; distribution of pressure through pavement structure; theory of super elevation; open channel flow; hydrographs, peak flow estimation and flood control. Problem sheets give practical applications of problem solving requiring extensive algebraic and trigonometric computation.

**CIVL 207 Hydraulics 1** — Through problem sessions and lectures, the student learns to determine the hydrostatic forces exerted by water on a variety of structures, gates, tanks and dams. As part of a project, the student analyzes a complex tank full of water to determine the forces and centres of pressure. Special problems 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.

**CIVL 211 Computer Applications** — Designed to make students aware of the uses (and misuses) of computers in solving design and construction problems. Flow charting is practised through the logic 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.

**CIVL 304 Structural Design General** — Designed for students taking Civil options. Through analysis and design projects, students are introduced to reinforced concrete as a structural material. The effects of continuity within structures are discussed in lectures, and connection details for all structural components in basic building materials are developed.

**CIVL 308 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.

**CIVL 313 Subdivision Planning and Street Design** — Through this introduction to the physical layout of urbanization, the student learns to systematically subdivide a piece of land in accordance with recommended standards using imagination and creativity; design a major street to recommended standards including geometrics, elevation tables, catch basin locations and rotation of crown; and to design a minor street complete with intersection, curb returns and appropriate drainage. The topic is viewed from the range of planner, engineer, developer, consumer and resident, and the knowledge could be used working for a developer, municipal planner or engineer, or a consulting engineer or contractor. This course offers the opportunity to make decisions and to actually design a civil works projects. Briefs are produced and there is exposure to designing an office environment as well.

**CIVL 319 Transportation** — An overview of the various aspects of transportation engineering including some traffic theory, comparison of alternative transportation modes and associated socio-economic issues. Elements of traffic theory are introduced including simple traffic flow theory; signalized intersection capacity analyses; signal timing; data collection techniques; shopping centre layout, signs and marking. Student teams research some topical transportation issue and give an oral and audiovisual presentation to the class. At the end of the course an extensive technical report is submitted.

**CIVL 322 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.

**CIVL 325/425 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, sub-surface 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.

**CIVL 328 Soil Mechanics 1A** — This course is the lst half of of CIVL 325, Soil Mechanics 1.

**CIVL 410 Construction Materials 2** — Introduction to the design of portland cement and asphaltic concrete as materials. Students learn to design concrete to specified strength and perform marshall design on asphalt. The course also includes an introduction to cement chemistry and manufac-

turing, non-destructive testing and statistical analysis of concrete; the analysis and interpretation of marshall designs of asphalt. Inspection techniques of construction material in general and specific emphasis on inspection procedures, reporting and safety for civil engineering will be covered in this course. As per CIVL 417 with additional topics relevant to highway structures such as bridge abutments, multiplate culverts, etc.

**CIVL 412 Municipal Services** — Students plan a residential subdivision for a piece of accessible raw land and design an arterial street bordering the subdivision and specific minor streets and intersections within the subdivision. The instructor acts as supervisor and consultant to students. Some lectures on the basics of neighborhood planning and on design standards and methods are given as needed. The plan includes the waterworks distribution system, sanitary sewers and storm sewers and their design with full plans and profile drawings for each service. Through preparatory lectures and discussions, the student is introduced to municipal road standards, crown and drainage, street geometry, street appurtenances, paving methods, domestic fire and industrial water demands, water distribution design methods, distribution reservoirs and pressure control, pumping, sewer flows and sewer design, sewage pumping stations and loads on buried conduits. Field trips are made to municipal operations.

**CIVL 414 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.

**CIVL 416 Water Resources** — Lectures and problem sessions present the analysis of surface runoff by the rational formula and unit hydrograph, mass curves for water supply storage, flood routing and detention storage. The use of the computer in predicting water resources and quality (mathematics modelling) is covered.

**CIVL 417 Highway Design** — This course simulates the role of a design technologist as part of a highway design team. Student teams design a section of highway under minimal supervision. Following a conceptual design, spiralled curves are designed and suitably superelevated. A typical section is established and an initial vertical alignment drawn up on a working drawing. Students then input template, ground data and superelevation files into the "SEPS" earthwork computer program and subsequently manipulate their files to obtain an earthwork balance. Culvert and ditches are then added and preliminary drawings prepared showing culvert peoples, horizontal alignment, vertical alignment, superelevation and mass-haul. Throughout the project, design decisions and computations are recorded in a design brief. A progress report is also prepared similar to that often required on a highway design project.

**CIVL 418 Traffic Technology** — Introduces basic traffic engineering concepts associated with large scale highway projects (as opposed to municipal applications) of a type that the B.C. Ministry of Highways would be engaged in. Topics include simple traffic flow theory; data collection techniques for volume and speed studies; traffic assignment; highway capacity; signs and markings; intersection layout; auxiliary lanes and channelization; access; design vehicles. Part of the course includes the layout of an intersection complete with all channelization, signs and markings.

**CIVL 419 Basic Highway Design** — A less comprehensive version of CIVL 417.

**CIVL 423 Structures 2** — The stiffness matrix method of structural analysis is studied and the student analyses structures using an interactive computer program. The formwork design project is a practical application of timber design using plywood, sawn timber, bracing and timber fasteners. Other optional topics may include prestressed concrete, reinforced masonry, or additional timber design. Field trips and/or guest lecturers will relate to above course content.

**CIVL 424 Structures 3** — An existing bridge is chosen in consultation with the instructor, and the student designs, aligns and details an alternative crossing to the original. The student learns about layout, moving loads, influence lines, continuous girders, trusses, arches, deflections of spans, bridge deck floor systems, sway bracing, deck slabs, joint details, piers and abutments and piling.

**CIVL 425** see **CIVL 325**

**CIVL 427 Soil Mechanics 3** — Lectures, laboratory and project work and guest lectures, geotechnical aspects of tailing dam design, construction and maintenance; triaxial soil testing; maintenance and operation of laboratory/field electronic equipment; subsurface investigation techniques; elementary rock mechanics; permafrost and northern construction; reinforced earth; and grouts and grouting techniques.

**CIVL 429 Soil Mechanics 1B/2A** — This course is the 2nd half of CIVL 325 and the lst half of CIVL 426, Soil Mechanics 2.

**CIVL 430 Soil Mechanics 2B** — This course is the 2nd half of CIVL 426

**CIVL 432 Construction Estimating** — The student is involved in construction estimate preparation both as an individual and as a member of a team. Lectures illustrate the procedures for taking off quantities; establishing productivity forecasts and unit costs; and accounting and job control methods.

**CIVL 433 Construction Detailing** — Introduction to the practical aspects of taking-off, fabrication, and the placing and inspecting of reinforcing steel in concrete structures. Field trips to fabricating plants and construction sites augment classroom instruction.

**CIVL 434 Structural Detailing** — Students are required to design and detail connections, and draw solutions to detailing problems taken from structures used in other related courses, i.e. timber, steel and reinforced concrete. Includes bill of materials and reinforcing bar lists.

**CIVL 436 Construction Planning** — Introduction to the time-value of money and the application of sound economic principles to comparison of construction alternatives and acquisition and maintenance of equipment. A major construction project is analyzed by the student emphasizing critical path planning and the optimum use of resources. Planning for construction projects involving repetitive operations is demonstrated by worked examples. Construction industry guests lecture on current projects and the responsibility of the technologist.

**MATH 142 Basic Technical Mathematics** — Topics in algebra, logarithms, trigonometry and analytic geometry.

**MATH 242 Calculus 1 & 2** — 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.

**MATH 342 Matrix Methods** — An introduction to matrix algebra; basic operations; determinants; solution of simultaneous equations; eigenvalue problems. Applications of matrix algebra to technological problems.

**MATH 442 Statistics and Numerical Methods** — An introduction to statistics: organization and presentation of data, measures of central tendency and dispersion, frequency distributions; sampling, estimation and hypothesis testing. An introduction to operations research techniques and the uses of mathematics in business decision-making. Linear programming; transportation; assignment; inventory models.

**MECH 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, sketching, sections and dimensioning.

**MECH 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.

**MINE 410 Commercial Explosives** — Blasting theory, experiments, drilling and safety are covered in this course. Theory covers fragmentation principles (explosive varia-

bles, material variables, and the loading geometry), explosive products and their properties, and field systems. Experiments are "hands-on" field detonations and safety discussion is largely Workers' Compensation Board regulations.

**OPMT 180 Construction Management 1** — An introduction to the fundamentals of the Critical Path Method (C.P.M.) as it applies to project planning, scheduling, control and management. This course includes arrow diagrams, precedence diagrams, Resource Allocation, time-cost analysis, P.E.R.T., bid determination, project management and the role of the computer. The course is designed to meet the needs of the civil engineering student.

**OPMT 280 Construction Management 2 — Civil** — The study of problem solving in industry, with particular emphasis on heavy construction and manufacturing problems. The course includes method study, process charting, activity-sampling, work measurement, motion economy and productivity. Special emphasis is placed on the human problems associated with change. The course is particularly slanted towards civil engineering..

**PHOT 127 Aerial Photo Interpretation in Highway Planning** — Covers the fundamentals of aerial photo interpretation, basic photo interpretation equipment, geologic and soil mapping, air photo interpretation for terrain evaluation and engineering applications of aerial photo interpretation including site evaluation and route location. The fundamentals of photogrammetry and the applications of photogrammetric equipment to highway engineering are also covered.

**PHYS 107/207 Physics** — This is a general level physics course emphasizing the application of physical principles to the Civil and Structural Technology. A section on the application of geophysical exploration techniques used in the technology is included. Topics 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, instrumentation, optics and atomic and nuclear phenomena. The lab program stresses measurements, data analysis and experimental techniques.

**PHYS 207** see **PHYS 107**

**SURV 130/230/330/430 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.

**SURV 230** see **SURV 130**

**SURV 330** see **SURV 130**

**SURV 430** see **SURV 130**

**TCOM 103/203 Technical Communication** — In weekly lecture students receive information on basic writing skills, technical correspondence and related technical writing tasks, video-taping and other audiovisual techniques, oral presentations and informal and formal reports. Two labs per week are devoted to practicing writing and speaking skills. Students are expected to complete approximately ten assignments per term. Shorter assignments are done in the labs, while 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.

**TCOM 203** see **TCOM 103**

**TCOM 302/401 Advanced 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.

**TCOM 401** see **TCOM 302**

## Faculty and Staff

R.I. McNeil, B.Surv., B.C.L.S., Dipl. Adult Ed., P.Eng., *Department Head*
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T. Abbuhl, Dipl.T., C.E.T.
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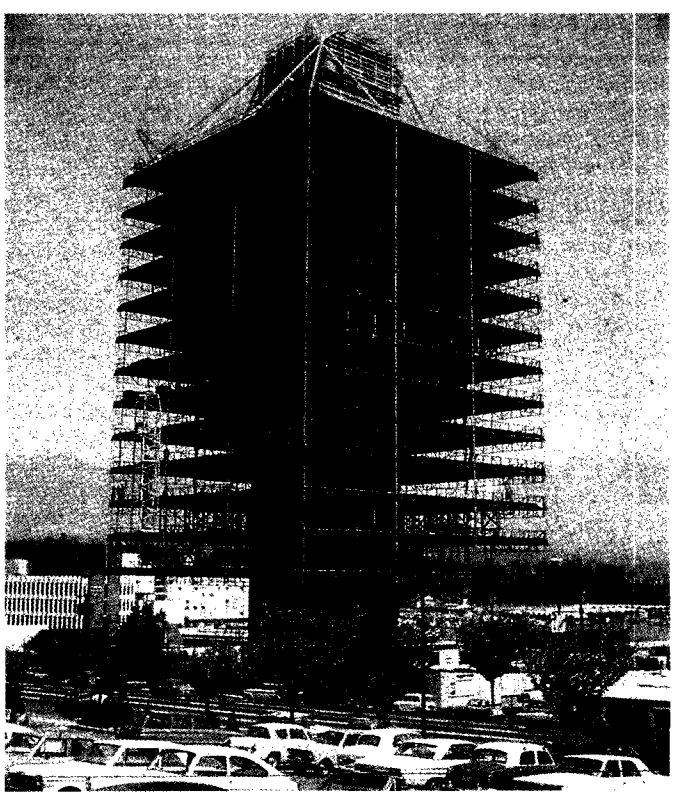

# Electrical/Electronics

Electrical energy, electronic systems, industrial automation and control, and telecommunications form the base of modern high technology. These disciplines and the related systems and equipment are essential to the factory, the industrial process, the office, the small business, the hospital and the home. Modern transportation could not function without electronic systems.

There is a need for persons trained in the principles and applications of electronic 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 Electronics group is the anchor of this team.

The Electrical/Electronics program is accredited by the Society of Engineering Technologists.

### The Program

Five options are offered in the Technology; Control Electronics, Instrumentation and Process Control, Power, Telecommunications, Microelectronics and Robotics.

The first three levels of the technology program are common to all five options. Levels 4 and 5, for all five options, are practically oriented, being primarily related to the specific industrial practices.

Throughout the program, students spend a good portion of their time in laboratories and workshops carrying out practical, applied assignments.

The **Power Option** is concerned primarily with the generation, transmission, distribution, 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.

The **Instrumentation and Process Control Option** is concerned with the application of automation and control systems to industrial processes. It is a multidisciplinary program combining analog and digital electronics, computer systems and software development, applied physics (mechanics, fluid mechanics and thermodynamics), and feedback techniques. Emphasis is placed on the application of modern measurement and control strategies to a wide range of manufacturing and processing industries.

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.

The **Control Electronics Option**, which might well be called the Computer Control Option, presents a broad-based electronics program of study designed to provide the student with the background necessary for entry into a wide variety of areas in the electronics career field. Emphasis is on digital electronics, industrial electronics and digital computers, since the techniques involved are common to all modern electronic systems.

The **Microelectronics Option** deals with the miniaturization and integration of electronic circuitry and with the application of computer tools, both hardware workstations and software programs, to the design (CAD) and engineering (CAE) of electronic circuitry. Integration involves the partitioning of the overall system design into functional subunits and the subsequent design, manufacture and testing of these subunits. The subunits may be designed as hybrid integrated circuits (for example, thick-film hybrids and thin-film hybrids) or as monolithic integrated circuits (usually silicon chips) depending on their intended function. Miniaturization and integration lead to reduced system cost, improved reliability, and improved performance as well as extended functional capability. The curriculum will include instruction in hands-on usage of CAD/CAE systems. Students will learn the uses of simulation techniques in the design of digital and analog circuitry. Basic training will be given in the layout of both hybrid and monolithic custom integrated circuits using CAD methods. Students will also learn about circuit manufacturing technology insofar as this affects design choices. Design projects, circuit assembly and circuit testing will be carried out by students to emphasize practical applications wherever possible.

The **Robotics Option**. This 5-semester technology will provide the student with competency in the applications, programming, installation and maintenance of robots and associated equipment. Emphasis will be on artificial intelligence, microprocessors, programming and CAD/CAM.

**The Robotics (Automation) Technology** program will provide the student with knowledge of the applications of flexible automation equipment, the various mechanical systems used and the electronics incorporated for their control. Gaining "hands on experience" with a variety of industrial robots and machinery in a modern, well equipped lab will be emphasized. Particular attention will be given to applying automation techniques to British Columbia industries. The graduate will be competent in plant layout and in the installation of automated systems, in the design of ancillary equipment required for an efficient work flow, in the programming of automatic machinery and in assisting with the maintenance of the electro-mechancial systems used by robots. The program includes 5 academic study levels and 3 salaried cooperative work terms during which the student can gain invaluable experience working in associated industries.

### SEMESTER SYSTEM

The Electrical/Electronics Technology operates on the semester system. That is, there are three study periods of 15 weeks each per year. Students are admitted three times

each year in January, May and September. The Robotics option is available in September only. All levels (it takes five levels to complete the program) run concurrently. The adjacent chart explains the typical progress of a student through the system. Co-operative Education is an integral part of the Electrical/Electronics Technology. During this portion of the program, the student is placed in an electronics related work setting in consultation with BCIT and industry, on a paid basis.

Some benefits to students are:

1. The student will receive more training in the classroom and in the workplace, a need expressed by industry due to the accelerating changes occurring in the electronics technologies.
2. There is more flexibility as to program entry and graduation.
3. Should there be a need to repeat a Level, that Level is available in each semester.
4. If a seat is not available in the September semester, the applicant can apply for the January or May semesters.
5. Valuable experience is gained in the electronics industries, making the student instantly employable upon graduation.

Transfer credits of the Electrical/Electronics Technology program, to British Columbia universities are possible on an individual basis.

**Prerequisites**

Algebra 12, Physics 11 and Chemistry 11, all with a C+ standing. Note that Chemistry 11 is not required for applicants to the Robotics option.

## Course of Studies

| | | Level 1 | Clrm hrs/wk |
|---|---|---|---|
| ELEC | 100 | Circuit Analysis 1 | 6 |
| ELEC | 101 | Shop Practice | 5 |
| ELEC | 102 | Programming 1 | 3 |
| MATH | 143 | Basic Technical Mathematics | 7 |
| PHYS | 105 | Physics 1 | 6 |
| TCOM | 104 | Technical Writing | 3 |
| | | Library and Research | 5 |
| | | | 35 |
| | | **Level 2** | |
| ELEC | 200 | Circuit Analysis 2 | 5 |
| ELEC | 201 | Fabrication | 4 |
| ELEC | 202 | Digital Logic | 3 |
| ELEC | 203 | Electronic Circuits 1 | 6 |
| MATH | 243 | Calculus | 7 |
| PHYS | 206 | Physics 2 | 5 |
| | | Library and Research | 5 |
| | | | 35 |
| | | **Level 3** | |
| ELEC | 302 | Digital Techniques 2 | 5 |
| ELEC | 303 | Electronic Circuits 2 | 5 |
| ELEC | 304 | Telecommunications 1 | 5 |
| ELEC | 305 | Electrical Equipment 1 | 5 |
| ELEC | 306 | Transducer Applications | 5 |
| ELEC | 307 | Pulse Techniques | 5 |
| | | Library and Research | 5 |
| | | | 35 |

| | 1985 | | | 1986 | | | 1987 | |
|---|---|---|---|---|---|---|---|---|
| | Jan | May | Sept | Jan | May | Sept | Jan | May |
| Level 1 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| Level 2 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| Level 3 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| Co-op 1 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| Level 4 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| Co-op 2 | — | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| Level 5 | — | 120 | 120 | 120 | 120 | 120 | 120 | 120 |

| | | Level 4 | Control Electronics | Instrumentation | Microelectronics | Power | Telecommunication |
|---|---|---|---|---|---|---|---|
| CHSC | 341 | Unit Operations | - | 4 | - | - | - |
| ELEC | 402 | Digital Systems | 6 | - | 6 | 6 | 6 |
| ELEC | 403 | Industrial Electronics | 5 | - | - | 5 | - |
| ELEC | 404 | Telecommunications 2 | - | - | - | - | 6 |
| ELEC | 405 | Electrical Equipment 2 | - | - | - | 6 | - |
| ELEC | 406 | Data Communications 1 | 6 | - | - | - | 6 |
| ELEC | 407 | Feedback 1 | 6 | - | - | - | - |
| ELEC | 408 | Antennas & Transmission Lines | - | - | - | - | 5 |
| ELEC | 410 | Real Time Programming | - | 5 | - | - | - |
| ELEC | 411 | Interface Electronics | - | 5 | - | - | - |
| ELEC | 412 | Process Measurements | - | 6 | - | - | - |
| ELEC | 413 | Process Control | - | 7 | - | - | - |
| ELEC | 414 | Power Systems 1 | - | - | - | 6 | - |
| ELEC | 432 | CAD for Electronics | - | - | 6 | - | - |
| ELEC | 433 | Introduction to Microelectronics | - | - | 6 | - | - |
| ELEC | 434 | Programming 2 | - | - | 5 | - | - |
| MATH | 343 | Mathematics 3 | 4 | - | 4 | 4 | 4 |
| TCOM | 204 | Technical Communications 2 | 3 | 3 | 3 | 3 | 3 |
| | | **Level 5** | | | | | |
| CHEM | 302 | Chemical Instrumentation | - | 3 | - | - | - |
| ELEC | 406 | Data Communications 1 | - | - | 6 | - | - |
| ELEC | 415 | Computer Systems | 6 | - | 6 | - | 6 |
| ELEC | 416 | Communications Networks | - | - | - | - | 5 |
| ELEC | 417 | Telecommunications 3 | - | - | - | - | 5 |
| ELEC | 418 | Radio Frequency Circuit Design | - | - | - | - | 6 |
| ELEC | 419 | Microwave Principles | - | - | - | - | 5 |
| ELEC | 420 | Feedback & Robotics | 6 | - | - | 6 | - |
| ELEC | 421 | Data Communications 2 | 4 | - | - | - | - |
| ELEC | 423 | Video Graphics | 6 | - | - | - | - |
| ELEC | 424 | Industrial Processes 2 | - | 4 | - | - | - |
| ELEC | 425 | Control Systems Process Computer Systems | - | 5 | - | - | - |
| ELEC | 426 | Digital Controllers | - | 6 | - | - | - |
| ELEC | 427 | Analytic Process Measurements | - | 6 | - | - | - |
| ELEC | 428 | Instrument Engineering Practices | - | 6 | - | - | - |
| ELEC | 429 | Power Systems 2 | - | - | - | 9 | - |
| ELEC | 430 | Systems Design | - | - | - | 4 | - |
| ELEC | 431 | Industrial Systems | - | - | - | 8 | - |
| ELEC | 434 | Programming | 5 | - | - | - | - |
| ELEC | 435 | Microcomputer Architecture | - | - | - | - | - |
| ELEC | 436 | Custom VLSI Design | - | - | 5 | - | - |
| ELEC | 437 | Semi-Custom Circuit Design | - | - | 5 | - | - |
| ELEC | 438 | Thick & Thin Film Applications | - | - | 5 | - | - |

| Level 5 cont'd | | Control Electronics | Instrumen-tation | Micro-electronics | Power | Telecom-munication |
|---|---|---|---|---|---|---|
| ELEC 439 | CE Course/ 3 Phase Power | - | - | - | - | - |
| TCOM 307 | Technical Communications 3 | 3 | - | 3 | 3 | 3 |

## Subject Outlines

### Level 1

**ELEC 100 Circuit Analysis 1** — Teaches the principles and methods of analysis related to DC circuits. Topics include work, energy, voltage current, power, resistance, inductance, capacitance, impedance, SI units and terminology. Methods of analysis include loop, superposition, Nodal, Thevenin and Norton. The lab portion of the course provides practice in the use of power supplies, function generators, multimeters and components. The labs are synchronized with the lectures so that theory is studied and confirmed by application.

**ELEC 101 Shop Practice** — Through the design and manufacture of a specific electronic project, students learn the basic skills required in the field of electronics including basic electronic drafting, preparation of detailed drawings, sheet metal cutting and folding, soldering, selection and mounting of connectors such as phono and BNC, basic printed circuit layout and manufacture. Introduces students to the basic discrete passive components used in electronics and to the techniques of layout and fabrication of electronic equipment. Upon successful completion, the student should have a good understanding of the characteristics of components used in electronic equipment, chassis and metal cabinet design, electronic drafting conventions, preparation of detailed drawings, sheet metal cutting and folding, as well as the tools and measurement techniques used in electronic fabrication.

**ELEC 102 Programming 1** — Teaches structured computer programming. Top down programming is used with BASIC computer language. Topics include the operation of the BASIC interpreter and compiler, BASIC as an operating system, linking BASIC with ASSEMBLER language programs, modularizing programs into sub-routines. A short overview of basic commands will be included for those students with no prior programming experience. Lab projects will include comprehensive graphics development related to electronics problems. Software documentation is emphasised with all projects.

**MATH 143 Basic Technical Mathematics** — A section on linear equations includes determinants, matrices, elimination methods, method of least squares. 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.

**PHYS 106 PHYSICS** — A general level course about physical quantities, their properties, relationships, how they affect each other and their connecting principles. Motion, force, mechanical energy and power are studied concerning translational and rotational motion. Then follows basic electricity, atomic physics and the band theory of solids and its application to semiconductor devices. The lab program emphasizes measurements, data analysis and experimental techniques while confirming and expanding the lecture concepts. Math treatment requires algebra, trigonometry and vectors.

**TCOM 104 Technical Writing** — The basics of English communication theory 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.

### Level 2

**ELEC 200 Circuit Analysis 2** — Introduces the behavior of electrical circuits and networks when driven by a single-phase alternating current (AC) source; preparation for courses in electronics and power systems. The course includes the sine wave, average and effective values, power and power factor; resistance, capacitance and inductance as elements in single-phase AC circuits; phasor diagrams, impedance, admittance, voltage, current and power diagrams; analysis of AC circuits with complex algebra; resonance and resonant circuits, high and low pass filters; the application of circuit laws and theorems to single-phase AC circuits, the analysis of two-part networks; coupled circuits. The circuit theory is verified using multimeters, sine wave generators, amplifiers and dual trace oscilloscopes.

**ELEC 201 Fabrication** — The first 4 weeks of this continuation of Shop Practice, deal with printed circuit board repair and reworking. Topics and work include materials, manufacturing methods, tools used for repair, high reliability soldering, repair of heat damaged and mechanically damaged boards, boards with plated holes and multilayer boards. The last 8 weeks cover the design and fabrication of single side printed circuit boards. Topics and work include material and equipment requirements, artwork layout from schematic, board processing (etching, drilling and compoment mounting).

**ELEC 202 Digital Logic** — Covers logic gates from the TTL and CMOS families wth study of their specifications and data sheets. Noise and loading considerations are introduced. Schematic symbology and development of logic systems are studied. Sequential logic, flip flops (RS, JK, D Type, Master-slave), simple counters, shift registers and timing diagrams are all covered. Emphasis is on thorough understanding of characteristics like propogation delay, clock synchronization and timing sequences.

**ELEC 203 Electronic Circuits 1** — Explains how electronic circuits work, how to analyse them and how to design, modify and combine them to perform complex functions. Topics include interpretation of bipolar and field-effect transistor characteristic curves; voltage and current amplifying circuits; the transistor as a switch; loadline analysis; choice of Q-point; bias circuits; as equivalent circuits; frequency response, feedback, oscillation response; oscillator circuits; power amplifiers of various types; heat sink calculations; characteristics and application of switching devices including the unijunction.

**MATH 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.

**PHYS 206 Physics 2** — Topics include sound, light and optics, basic electricity and magnetism, basic semi-conductor theory, and atomic and nuclear phenomena. Mathematical treatment requires algebra and trigonometry, and possibly some calculus.

**Level 3**

**CHEM 302 Chemical Instrumentation** — Teaches the student the principles and applications of electronics 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.

**CHSC 341 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.

**ELEC 302 Digital Techniques** — Persons with a knowledge of solid state electronics and basic digital techniques become familiar with digital subsystems and their applications to industry, and learn to use MSI and LSI devices to implement, analyze and troubleshoot digital subsystems. Topics include interfacing of digital logic families to FET and bipolar devices; the nature of electrical noise and measures that must be taken to minimize its effect upon digital systems; circuit layout and by-passing strategies; interfacing to the analog world; digital to analog and digital multi-plexing; frequency sources, frequency and time measurement; memories and memory systems including RAM and ROM: ASCII keyboard and the keyboard encoder; organization of a video character display; state diagrams, state variables and their applications to logic design. Students are required to obtain a Universal Component Strip (Circuit Board EL SK-10 or equivalent) plus a complete set of hand tools for the laboratory sessions.

**ELEC 303 Electronic Circuits 2** — A continuation of ELEC 203 Electronic Circuits 1. One-half of the course deals with circuit applications not previously covered including: DC power supplies, including voltage and current regulation; small-signal tuned amplifiers, including neutralising and the cascode configuration; wide band amplifiers; DC amplifiers; differential amplifiers. The remaining half of the course gives an introduction to linear integrated circuits, particularly the operational amplifier and some of its circuit applications, including an introduction to active filters.

**ELEC 304 Telecommunications 1** — 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 filer circuits.

**ELEC 305 Electrical Equipment 1** — Begins as a continuation of circuit analysis then moves on to the study of motors, generators, transformers and rectifiers. Topics include a review of phasor diagrams, power factors, three phase power and circuit analysis, single and three phase power distribution systems, DC motors and generators, induction motors, synchronous motors and generators, stepper motors, motor control circuits, transformers single and three phase, and three phase rectification.

**ELEC 306 Transducer Applications** — Introduces the student to the electrical and electronic transducers used to interface systems to the real world. Methods used to measure strain, force, position, acceleration, vibration, temperature and pressure will be discussed, and the circuitry used will be described and evaluated. The application of feedback to control a process variable will also be discussed. Theory will be supported by laboratory exercises applying typical industrial equipment to measure the variables studied.

**ELEC 307 Pulse Techniques** — Introduces pulse signal circuits such as clippers and clamps; transistor switches; astable and monostable multivibrators; Schmitt triggers; ramp generators; DC to DC convertors and phase lock loops. Both discrete transistors (Bipolar and Fet) and CMOS integrated circuits are used in building these circuits. Each circuit is analysed in detail and its practical application is considered. A video raster project is introduced as one application of pulse and ramp generator circuits.

**ELEC 402 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. 8080 and 6800 microprocessors are used as the training vehicles for this course. The second half of the course is project-oriented. Topics include magnetic storage, CRT terminal, interfacing, real time systems and applications in industrial and communications systems.

**ELEC 403 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. DC power supplies and DC series, shunt and switching regulations are reviewed. Switching circuits, including relay logic, timing, sequential detection, photo transistor switches and stepper motor applications are also discussed.

**ELEC 404 Telecommunications 2** — Continues the development of circuits and techniques into transmitters and receivers. Typical AM, FM and SSB transmitters are examined in detail including 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. Noise, emphasis, distortion and other transmitter and receiver performance criteria are discussed. The video signal and receiver are also studied.

**ELEC 405 Electrical Equipment 2** — 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 DC and AC motors and generators (types, losses, efficiences, load requirements, running characteristics); induction motors and starters, industry ratings and standards.

**ELEC 406 Data Communications 1** — Introduces the systems and techniques used to link computer-based systems. 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.

**ELEC 407 Feedback 1** — 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.

**ELEC 408 Antennas & Transmission Lines** — Provides practical knowledge of the methods and devices used for the transmission of radio frequency and energy. Topics include the characteristics 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).

**ELEC 410 Real Time Programming** — Examines operations systems and the programming of computer systems for monitoring and controlling industrial processes. Topics include communications protocols, operating systems concepts and high level language programming techniques. Programming considerations include program structure and functional decomposition, real-time keyboard input and data display using character graphics. Analog data acquisition will be examined with attention to the specification of I/O subsystems, programmed and interrupt-driven I/O techniques, the sampling theorum and frequency response.

**ELEC 411 Interface Electronics** — Deals with the application of linear electronics to process automation and control systems. Topics include the specification, design and evaluation of amplifier circuits commonly used in applications such as: interfacing to industrial transducers, signal conditioning, non-linear function generators, analog multiplexers and signal transmission with emphasis on the industrial 2-wire current loop. Strong practical emphasis is ensured by lab exercises.

**ELEC 412 Process Measurements** — Teaches students the principles and techniques used for the measurement of pressure, flow and level in various processes. 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.

**ELEC 413 Process Control** — Introduces the student to the basic principles and practices common to many types of industrial automatic process control systems. Topics will include automatic control principles; feedback circuit design principles and devices and systems; block diagrams and transfer functions; pneumatic and hydraulic amplifier circuits applied to transmitters, signal converters, power amplifiers, computing circuits and position servo-mechanisms; control valve characteristics influencing automatic control. Lab exercises will be done with commercial control equipment on several types of processes.

**ELEC 414 Power Systems 1** — Reviews R, L and C circuits in parallel and series combinations and AC 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 distributions 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.

**ELEC 415 Computer Systems** — Applies the principles of digital techniques to the subsystems used in industrial communication systems and the digital computer. Topics include analog-digital interfacing, digital instruments, analog digital multiplexing, tri-state bus structures, large scale binary storage devices (RAM-ROM-DIODE MATRIX), introduction to mini and microcomputers (hardware organization) and use of computer input/output structures to accomplish various tasks in the communications industry.

**ELEC 416 Communication Networks** — Topics include the telephone instrument; external plant; introduction to switching systems; basic trunking and call routing through a step by step local end office; power and signalling systems; the sequence and operation of linefinder, selector connector repeater; the directorized step-by-step system; traffic appreciation, introduction to common control switching using crossbar and electronic stored program control and call processing; related power systems; the toll network and data sets and future trends in the industry.

**ELEC 417 Telecommunications 3** — Introduces students to the modes of propagation of electromagnetic energy and the types of equipment used to establish telecommunication links. Topics include ground, sky and spacewave propagation; microwave paths; environmental factors; site considerations; point-to-point communications and noise performance of communication systems.

**ELEC 418 Radio Frequency Circuit Design** — Teaches the design of HF/VHF electronic circuits, and introduces the student to proper layout schemes and fabrication of such circuits. Topics include wide-band transformer design; characteristics of wide-band amplifiers; effects of loud feedback forms on amplifier input/output and transfer characteristics; high frequency small signal modelling of bipolar and field effect transistors; design of wideband power amplifiers; computer modelling and computer aided design; practical suggestions for discrete component layout; introduction to thick film circuitry.

**ELEC 419 Microwave Principles** — Introduces 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.

**ELEC 420 Feedback and Robotics** — 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, wideband 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.

**ELEC 423 Video Graphics** — Introduces practical industrial applications of video for acquisition and display of data. The fundamentals of video raster scan and vector scan are reviewed and several examples are covered of the use of a video camera as input to an electronic control of measurement system. Image generation on a video monitor is discussed and simple digital circuits are used to generate pictures. The light pen, image storage in RAM, alphanumeric ROM character generators and CRT controllers are all introduced in lectures and in lab projects. Software programming is introduced as another method of image generation.

**ELEC 424 Industrial Processes & Control Systems** — A continuation of ELEC 413 Process Control. It deals with the principles and practices used in the design, operation and application of common industrial process control systems to common industrial processes. Topics include process control strategies and hardware used for single variable, multi variable, and total feed forward control systems. These will be studied in conjunction with the principles of many process operations. Lab work will consist of analyzing manufacturers equipment and process control systems applied to actual steam and liquid processes.

**ELEC 425 Process Computer Systems** — Deals with the applications of mini and microcomputer systems to real time monitoring and control of industrial processes. Topics will include Assembler and high level language programming techniques, configuration of typical process interfaces and implementation of appropriate software drivers. Programming considerations will include accuracy, input scan rates, digital filtering and real time display updating. Other topics discussed will be analog back-up, distributed processing, direct digital control and supervisory control. Lab work will include hands-on operation in an actual process environment.

**ELEC 426 Digital Controllers** — Investigates the application of analog and digital electronics to industrial process controllers. Topics include circuit design and algorithms used to implement two position, proportional, integral and derivative modes. These

will be complemented by a review of the latest commercial products. The main focus of the course is on the application of microcomputers to industrial control systems.

**ELEC 427 Analytic Process Measurements** — A continuation of ELEC 412 Process Measurements, develops skills in psychrometry, hygrometry and industrial pH measurement. Gas analysis techniques such as chemical absorption, direct and indirect thermal conductivity and paramagnetic heat of combustion are studied. Lab exercises include the operation, calibration, application and analysis of various measurement systems including gas analyzers and pH measuring systems.

**ELEC 428 Instrument Engineering Practices** — 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.

**ELEC 429 Power Systems 2** — Study of third harmonic distortion to wave shapes as caused by transformer saturation; three winding transformers and associated reactances; development of the per unit computation method as applicable to voltage regulation of industrial and utility type three-phase power systems under steady state and transient conditions; short circuit studies of power systems and techniques used 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, 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.

**ELEC 430 Systems Design** — Deals with organization of an electrical utility and the characteristics of its equipment. Topics include utility system organization; system operation; generating sources, hydro and thermal; synchronizing; load sharing; transmission systems; substations; protective relaying and rate structures.

**ELEC 431 Industrial Systems** — Teaches design of electrical systems for industrial plants and commercial buildings. Topics include electrical system organization; feeder calculations and ratings; demand factors' motor feeders, motor control centres; switchboards' voltage levels; grounding, ground fault protection, system protection coordination together with the appropriate sections of the Canadian Electrical Code.

**ELEC 432 CAD for Electronics** — Deals with the materials, components and processes associated with the design, manufacture and testing of hybrid microelectronic circuits, that is, circuits comprising discrete components bonded to a substrate on which are integrated the interconnection paths and at least some of the required resistors and/or capacitors. Design methods will be taught using CAD techniques. Applications may include the design and testing of thick film networks, analog filters, etc.

**ELEC 433 (CAD/CAE For Microelectronics 1) Introduction to Microelectronics** — Introduces students to current computer-aided design and drafting (CAD) and computer-aided engineering (CAE) methods in electronic circuit development. In particular, the principles of computer-aided schematic generation, netlisting, and circuit performance simulation will be taught. Students will gain hands-on experience with a commercial CAD/CAE system. In addition, the course will include an introduction to the characteristics of some of the various microelectronic technologies with emphasis on the MOS families.

**ELEC 434 Programming 2** — An overview of microcomputer operating systems, programming languages and compilers and interpreters. The IBM personal computer is used throughout the course for interactive student training. The main part of the course covers PASCAL language programming and emphasizes structured programming techniques. Students will gain reasonable proficiency at writing short PASCAL programs and calling external subroutines or BIOS function. An introduction to numerical methods: solution of systems of linear equations; solution of algebraic and transcendental equations; numerical differentiation and integration; numerical solution of simple differential equations; flow-charting, algorithms; elements of a higher level computer language such as FORTRAN, WATFIV and PASCAL. Students write computer programs with applications to the Electrical/Electronics Technology.

**ELEC 436 Custom VLSI Design** — Deals in considerable detail with the materials used in semiconductor devices, fabrication processes, and the procedures necessary to develop a full-custom or semi-custom integrated circuit design with detailed specifications for its possible manufacture by a contractor. The course emphasis will be to provide an understanding of devices and integrated circuit layout. The concepts of design rules will be taught using current computer graphics tools. The student will gain an understanding of device characteristics and design limitations through the use of simulation programs used in industry (e.g. SPICE).

**ELEC 437 (CAD/CAE For Microelectronics 2) Semi-Custom Circuit Design** — (Prerequisites: ELEC 433, ELEC 415; Corequisite: ELEC 436). The concepts and methods introduced in ELEC 433 will be further developed in this course. Advanced computer-aided design problems will be dealt with by extending student skills in using commercial logic simulation and timing verification programs on electronic design work stations. Students will undertake major design projects and produce relevant documentation for the designs. These may include examples of logic design, layout design, PLA design, the use of RAMS and ROMs, etc.

**ELEC 438 Thick & Thin Film Fabrication (Microelectronic Applications)** — (Prerequisites: ELEC 432, ELEC 433). Applications of microelectronic devices, circuits, and processes will be further explored in this course. Teaching examples may be selected from some of the following or from other relevant areas: thick film circuitry, thin film circuits, microwave devices and circuits, R.F. design, digital signal processing, analog signal processing, switched-capacitor filters.

**TCOM 307 Advanced Technical Communication** — This course is a 3-hour report writing seminar.

## Robotics — Subject Outlines

### Level 1

**ELEC 103 AC/DC Circuits** — Definition of common electrical variables (potential, current, charge, power, etc.) and electrical circuit parameters (resistance, inductance and capacitance). Introduction to circuit analysis techniques applicable to DC and AC circuits.

**MATH 143 Basic Technical Mathematics** — Same as Level 1 Electrical Technology Math, see page 34.

**MECH 106 Manufacturing Processes 1** — A basic orientation course which provides the student with practice in metal joining and metal removal, and a study of related theory.

**MECH 320 Fluid Power 1** — TBA

### Level 2

**ELEC 202 Digital Logic** — Boolean logic and minimization of Boolean equations. Standard and alternate logic symbols for AND, OR, NANA, NOR gating. Creating and interpreting electronic logic diagrams. Noise and loading considerations in solid state logic (TTL, MOS, CMOS).

**ELEC 203 Electronic Circuits 1** — How electronic circuits work, how to analyze them and how to design, modify and combine them to perform more complex operations. Topics include interpretation of transistor characteristic curves; voltage and current amplification; loadline analysis; choice of Q-point; bias circuits, AC equivalent circuits; interstage coupling and frequency response, oscillation and oscillator

circuits; power supplies, including voltage and current regulating circuits in discrete and integrated form, characteristics and application of other devices such as unijunction transistors, thyristors and field-effect transistors.

**MECH 206 Mechanics of Materials** — 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 experiental work to demonstrate these principles, costs and economics related to metal removal.

**MECH 303 Fluid Mechanics** — ISO symbols and pneumatic equipment in industrial circuits; hydraulic pump construction; differences between hydraulic and pneumatic power; design of circuits; fluid statics, pressure measurement, stability; the energy equation, continuity, flow measurement; losses in piping systems; series and parallel flow in piping systems; hydrodynamic forces.

**PHYS 206 Physics 2** — A general level course covering magnetism and magnetic materials, fluids, thermal energy, vibrations and waves, optics and electromagnetic radiation, and modern physics. Application of principles in the electrical engineering field is stressed. The lab program emphasizes measurements, data analysis and experimental techniques while confirming and extending the lecture concepts. Prerequisite: Physics 106. Math treatment requires algebra, trigonometry, and some calculus.

**Level 3**

**ELEC 302 Digital Techniques** — A continuation of solid state logic with introduction of 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.

**ELEC 303 Electronic Circuits 2** — Provides 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 IC. Detailed linear circuits analysis is applied to each topic.

**ELEC 305 Electrical Equipment 1** — Covers the electrical equipment associated with robot systems. Topics include industrial plant power distribution, single and three-phase induction motors (industrial types, starting, overload protection); three-phase synchronous motors and their control; electromagnetic control circuits; and DC generator and motors.

**ELEC 315 Robot Fundamentals** — Discusses the types of robots and the coordinate systems under which they operate. Investigates accuracy, repeatability in relation to load capability. Investigates various programming options and considers human factors and safety in robot deployment.

**MECH 404 Thermal Engineering 2** — Energy input and output devices; energy control devices; fluid power auxiliaries; fluid power control; dimensional analysis; model testing; fan, pump and systems curves; duty point control; duct sizing and pressure losses; specific pump speed and pump types; pump selection.

**Level 4**

**ELEC 406 Data Communications 1** — Investigates data communication methods and their associated protocols. Discusses noise immunity and shielding procedures.

**ELEC 407 Feedback 1** — Investigates the concepts of feedback and analytic approaches to feedback discussing such topics as steady-state error and transient error. Introduces PID (proportional, integral, and differential) controllers and the adjustment of these controllers.

**ELEC 467 Robot Applications & Gripper Design** — Discusses applications of robots in automated manufacturing centres and the corresponding gripper design required for these applications.

**ELEC 470 CNC & Robot Languages** — Introduces the student to current CNC & Robot languages such as APT and VAL. Investigates the integrated manufacturing centre.

**OPMT 382 Flexible Manufacturing Systems** — A course designed to relate materials handling to plant layout through detailed analysis of alternative handling systems normally encountered in manufacturing plants.

**Level 5**

**ELEC 468 Robot Servicing & Maintenance** — Discusses maintenance, strategies and procedures for the various kinds of robots (pneumatic, hydraulic and electric.)

**ELEC 471 Digital Control Using Microcomputers** — A continuation of ELEC 407 Feedback 1 where a microcomputer now replaces the analog PID controller.

**ELEC 472 Robot Sensors** — Investigates techniques and applications where robots are enhanced by the capability of vision and touch.

**ELEC 473 Integrated Manufacturing Cell Design** — Investigates the integration of NC machine tools with robots for machine loading/unloading. Discusses the complete integrated manufacturing centre with the addition of CAD/CAM down loading to the CNC/Robot controller.

**ELEC 474 Design Project** — A graduation paper researched and presented by the student on some aspect of robot design, programming or application.

## Faculty and Staff

J.E. Warkentin, Dipl. Adult Ed., M.A. (Ed), C.E.T., *Department Head*
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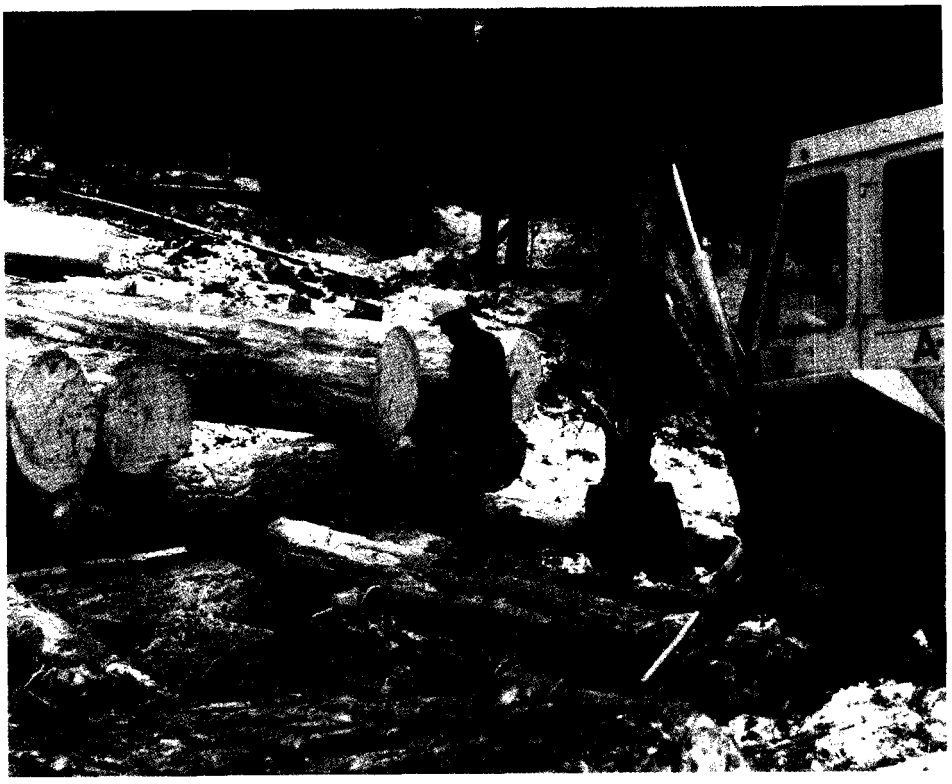

# Forest Resource

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 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 and includes habitat ecology, environmental inventory techniques and law enforcement with respect to the above-mentioned resources.

### Prerequisites

Algebra 11 with C+ and a science 11 (Biology required for Fish, Wildlife and Recreation; preferred for Forestry); one of Algebra 12, Geometry 12, Probability and Statistics 12, Computer Science 12 or Physics 12 with a C, or Physics 11 with a C+. 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.

### 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 $300 for first year and $400 for second year.

## Course of Studies

| Year 1 | | Term 1 | Clrm hrs/wk Forestry | FWR |
|---|---|---|---|---|
| BISC | 104 | Zoology | - | 5 |
| FSTR | 101 | Forest Measurements 1 | 5 | 5 |
| FSTR | 103 | Plant Identification | 5 | 5 |
| FSTR | 104 | Photo Interpretation & Mapping 1 | 4 | 4 |
| FSTR | 105 | Fire Management 1 | 3 | - |
| FSTR | 108 | Natural Resource Uses | 4 | 4 |
| MATH | 145 | Basic Technical Mathematics | 6 | - |
| MATH | 154 | Mathematics for FWR 1 | - | 4 |
| TCOM | 106 | Technical Communication | 3 | - |
| TCOM | 209 | Technical Communication | - | 4 |
| | | Library and Research | 5 | 4 |
| | | | 35 | 35 |

| Year 1 | | Term 2 | Forestry | FWR |
|---|---|---|---|---|
| FSTR | 201 | Forest Measurements 2 | 8 | - |
| FSTR | 202 | Soils Introduction | 4 | 4 |
| FSTR | 203 | Ecology | 5 | 5 |
| FSTR | 204 | Photo Interpretation & Mapping 2 | 4 | 4 |
| FSTR | 206 | Microcomputer Applications | 3 | 3 |
| FSTR | 207 | Introduction to FWR | - | 4 |
| MATH | 245 | Mathematics for Forestry 2 | 4 | - |
| MATH | 254 | Statistics for FWR | - | 6 |
| TCOM | 206 | Technical Communication — Forestry | 3 | - |
| TCOM | 209 | Technical Communication — FWR | - | 4 |
| | | Library and Research | 4 | 5 |
| | | | 35 | 35 |

| Year 2 | | Term 3 | Forestry | FWR |
|---|---|---|---|---|
| ADMN | 342 | Human Resource Management | - | 3 |
| FSTR | 301 | Forest Measurements 3 | 6 | - |
| FSTR | 302 | Timber Harvesting | 5 | - |
| FSTR | 303 | Roads and Transportation 1 | 6 | - |
| FSTR | 304 | Forest Pestology | 4 | - |
| FSTR | 305 | Silviculture 1 | 4 | - |
| FSTR | 306 | Forest Admin stration | 3 | - |
| FSTR | 307 | Recreational Land Managememt | - | 7 |
| FSTR | 308 | Wildlife Management 1 | - | 7 |
| FSTR | 309 | Fish Management 1 | - | 7 |
| FSTR | 310 | Projects | - | 6 |
| FSTR | 311 | Summer Technical Report | 1 | 1 |
| TCOM | 304 | Advanced Technical Communication | 2 | 2 |
| | | Library and Research | 4 | 2 |
| | | | 35 | 35 |

| Year 2 | | Term 4 | Forestry | Clrm hrs/wk FWR |
|---|---|---|---|---|
| FSTR | 401 | Forest Measurements 4 | 5 | - |
| FSTR | 402 | Timber Harvesting 2 | 4 | - |
| FSTR | 403 | Roads and Transportation 2 | 5 | - |
| FSTR | 404 | Forest Pestology | 4 | - |
| FSTR | 405 | Silviculture 2 | 5 | - |
| FSTR | 406 | Forest Management | 4 | - |
| FSTR | 407 | Recreational Land Management 2 | - | 7 |
| FSTR | 408 | Wildlife Management 2 | - | 7 |
| FSTR | 409 | Fish Management 2 | - | 7 |
| FSTR | 410 | Projects | - | 5 |
| FSTR | 412 | Law Enforcement | - | 2 |
| FSTR | 415 | Fire Management 2 | 1 | - |
| TCOM | 402 | Advanced Technical Communication | 2 | 2 |
| | | Library and Research | 5 | 6 |
| | | | 35 | 35 |
| FSTR | 413 | Independent Studies | - | - |

## Subject Outlines

**ADMN 342 Human Resource Management** — An introduction to the major personnel and industrial relations programs applicable to the British Columbia workplace with emphasis on the value of the worker and the overall effectiveness of modern human resource management. It develops understanding of the skills required for selection interviews, performance appraisals, compensation reviews, labor contract negotiations, training and development programs, grievance and collective agreement administration and reviews relevant employment law.

**BISC 104 Zoology** — General classification of the animal kingdom. Basic vertebrate zoology. The development of the vertebrate from embryo to adult. The study of the vertebrate body, including the skeletal, muscular, digestive, circulatory, urogenital and endocrine systems.

**FSTR 101 Forest Measurements 1** — 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.

**FSTR 103 Plant Identification** — The structure, physiology, taxonomy and uses of plants, with emphasis on those having important biological and economic significance in the biotic zones of 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.

**FSTR 104/204 Photo Interpretation and Mapping 1 and 2** — 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.

**FSTR 105/415 Fire Management 1 and 2** — Historical review of fire behavior simulated to show the effects of topography, fuel and weather conditions. Pre-suppression, including fire-danger ratings, detection, reporting and general preorganization of industrial and government agencies. "Forest Act", Part XI. Fire suppression techniques through fire simulation andd prescribed burning training in initial action and problem-solving.

**FSTR 108 Natural Resource Uses** — The importance of the uses and management of the renewable resources of B.C. in a professional and technically competent way. The importance of forest land use to the economy of British Columbia. The importance and complexity of integrated land use. Awareness of the effects of natural environment and forest practices and the increasing demands upon natural resources. The mechanical and non-mechanical properties of wood and the Forest Industry of B.C. which is so important to the provincial economy.

**FSTR 201 Forest Measurements 2** — Methods of measuring standing and felled timber. Direct measurement of tree diameters, heights and ages. Characteristics and uses 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.

**FSTR 202 Soils Introduction** — A study of the geology, landforms and development of soils in British Columbia. Physical and chemical nature of soils. Soil erosion and preventative measures. Soil surveys and land use studies.

**FSTR 203 Ecology** — 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 principle 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.

**FSTR 204** see **FSTR 104**

**FSTR 206 Microcomputer Applications** — Introduction to computers and their applications to various forestry, fish, wildlife and recreation requirements.

**FSTR 207 Introduction to Fish, Wildlife, Recreation** — Basic identification of various fish and wildlife, and their importance and interaction with other natural resources.

**FSTR 301/401 Forest Measurements 3 and 4** — 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.

**FSTR 302 Timber Harvesting 1** — 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.

**FSTR 303/403 Roads and Transportation 1 and 2** — 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.

**FSTR 304/404 Forest Pestology 1 and 2** — 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.

**FSTR 305 Silviculture 1** — Foundations of forest management: site, stocking, spacing, forest yield, forest growth and regulation. Introduction to silviculture: forest regeneration, seed and stock procurement, principles of seed production and cone collection.

**FSTR 306/406 Forest Administration & 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.

**FSTR 307/407 Recreational Land Management 1 and 2** — 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 natu-

ral 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.

**FSTR 308/408 Wildlife Management 1 and 2** — 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.

**FSTR 309/409 Fish Management 1 and 2** — 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.

**FSTR 311 Summer Technical Report** — A detailed report on a phase of resource management from first-hand experience or from approved library research.

**FSTR 401** see **FSTR 301**

**FSTR 402 Timber Harvesting 2** — Log production planning and scheduling. Production and cost control. Cost analysis. Contracts and contract logging. Woods organization. Industry and government relationships in logging particularly as related to development and management of the related resources. Logging research reports studied.

**FSTR 403** see **FSTR 303**

**FSTR 404** see **FSTR 304**

**FSTR 405 Silviculture 2** — Site examination, analysis and prescriptions; site preparation, planning methods, evaluating artificial regeneration, methods application, contract, planting, costing and inspection; brush control methods and application; spacing methods and evaluation; conifer release, application; fertilization, methods and application.

**FSTR 406** see **FSTR 306**

**FSTR 407** see **FSTR 307**

**FSTR 408** see **FSTR 308**

**FSTR 409** see **FSTR 309**

**FSTR 410 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.

**FSTR 412 Law Enforcement** — 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".

**FSTR 415** see **FSTR 105**

**MATH 145/154 Basic Technical Mathematics** — Topics in algebra, trigonometry, logarithms, analytical geometry and vectors, with emphasis on application to the forest industry.

**MATH 154** see **MATH 145**

**MATH 245/254 Mathematics for Forestry 2 & Statistics for FWR** — 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.

**MATH 254** see **MATH 245**

**TCOM 106/206 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.

**TCOM 206** see **TCOM 106**

**TCOM 209 Technical Communication** — A continuation of TCOM 106, covering job-finding techniques; letters and memos and long, formal reports. The course is presented through one lecture and two labs per week.

**TCOM 402 Advanced Technical Communication (Forestry)** — Covers reports, proposals, briefs, funding requests and other more complicated or sophisticated communication skills required on the job. Two hours of lab each week.

**TCOM 402 Advanced Technical Communication (F.W.R.) — Public speaking**: oral communication techniques, graphics and audiovisual techniques, answering questions. **Media communication**: interview techniques, press releases, using radio and telephones. **Information packages**: organizing tours and training sessions, designing brochures and public announcements. Two labs per week.

## Faculty and Staff

H.R. Chisholm, B.A.Sc., P Eng., *Department Head*
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P. Yanciw, B.A.Sc.

# Lumber and Plywood

British Columbia's leading industry is rapidly adopting advanced technology for the production of lumber and plywood. New plants use computerization with automated processes to convert raw material into end products which are in demand on local and world markets.

### Job Opportunities

Young men and women with management skills are needed in B.C.'s largest industry to fill positions in supervisory, technical, marketing and sales jobs.

Graduates from this technology are found in key jobs throughout B.C.'s wood products industries. Most are employed where management skills are needed as supervisors, foremen, mill managers, sales people and sales managers, traders and quality control technicians or supervisors. Graduates are also employed in many other areas where their management-oriented training is valued.

### The Program

First-year students in the Lumber and Plywood Program study basic sciences and introductory courses including wood science, log utilization, and lumber tallying and grading. In the second year there is increased emphasis on manufacturing techniques, process control and economics. Second-year courses also emphasize management skills in such applications as computers, mill supervision, sales and distribution, and business communications. Classroom instruction is heavily augmented by field trips to coastal and interior operations.

### Prerequisites

Algebra 12 and one Science 11 are course requirements for this program. Applicants are sought who possess initiative, a sense of responsibility, and an interest in leadership and teamwork within industry. Industrial experience lends strength to an application.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| LUPL 101 | Wood Science 1 | 7 |
| LUPL 102 | Lumber Grading 1 | 2 |
| LUPL 103 | Lumber Tallying* | 2 |
| LUPL 104 | Log Utilization | 5 |
| MATH 146 | Basic Technical Mathematics | 5 |
| MECH 101 | Drafting Fundamentals | 2 |
| PHYS 118 | Physics | 5 |
| TCOM 107 | Technical Communication | 3 |
| | Library and Research | 4 |
| | | 35 |

| Year 1 | Term 2A | |
|---|---|---|
| CHSC 208 | Engineering Materials | 3 |
| LUPL 108 | Lumber Grading 2* | 8 |
| LUPL 201 | Wood Science 2 | 4 |
| MATH 246 | Statistics and Quality Control | 5 |
| MECH 204 | Drafting | 2 |
| PHYS 218 | Physics | 5 |

| Year 1 | Term 2A cont'd | Clrm hrs/wk |
|---|---|---|
| TCOM 207 | Technical Communication | 3 |
| | Library and Research | 5 |
| | | 35 |

| Year 1 | Term 2B | |
|---|---|---|
| CHSC 208 | Engineering Materials | 3 |
| LUPL 108 | Lumber Grading 2* | 8 |
| LUPL 201 | Wood Science 2 | 4 |
| MATH 246 | Statistics and Quality Control | 5 |
| MECH 204 | Drafting | 2 |
| PHYS 218 | Physics | 5 |
| TCOM 207 | Technical Communication | 3 |
| | Library and Research | 5 |
| | | 35 |

LUPL 202 A summer technical report will be required for students continuing into second year.

| Year 2 | Term 3 | Clrm hrs/wk |
|---|---|---|
| COMP 121 | Computer Applications | 3 |
| ELEC 305 | Electrical Equipment Applications | 4 |
| LUPL 105 | Lumber Manufacture | 10 |
| LUPL 106 | Plywood Manufacture | 6 |
| LUPL 107 | Mill Management 1 | 2 |
| LUPL 202 | Summer Technical Report | 1 |
| OPMT 164 | Management Engineering 1 | 3 |
| TCOM 305 | Advanced Technical Communication | 2 |
| | Library and Research | 4 |
| | | 35 |

| Year 2 | Term 4A | |
|---|---|---|
| COMP 283 | Linear Programming | 3 |
| LUPL 109 | Mill Management 2 | 11 |
| LUPL 203 | Mill Audit & Quality Control | 4 |
| MECH 416 | Mechanical Equipment | 3 |
| MKTG 420 | Wood Products Sales and Distribution | 4 |
| OPMT 264 | Management Engineering 2 | 4 |
| TCOM 403 | Advanced Technical Communication | 2 |
| | Library and Research | 4 |
| | | 35 |

| Year 2 | Term 4B | |
|---|---|---|
| COMP 283 | Linear Programming | 3 |
| LUPL 109 | Mill Management 2 | 11 |
| LUPL 203 | Mill Audit & Quality Control | 4 |
| MECH 416 | Mechanical Equipment | 3 |
| MKTG 420 | Wood Products Sales and Distribution | 4 |
| OPMT 264 | Management Engineering 2 | 4 |
| TCOM 403 | Advanced Technical Communication | 2 |
| | Library and Research | 4 |
| | | 35 |

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

## Subject Outlines

**CHSC 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 and non-destructive testing.

**COMP 121 Computer Applications** — Computer applications in engineering technologies; how a computer works, recognizing problems suitable for computer solution, flow-charting and communicating with computer personnel. Emphasis is on the use of computers to solve problems related to the technology. Where available, "package" programs are demonstrated and used by students. FORTRAN or BASIC programming language is taught.

**COMP 283 Linear Programming** — Graphical method; algebraic method; simplex method; analysis of simplex results; LKP problem formulation; use of computer to solve problems; analysis of computer solution; use of reduced costs and shadow prices; sensitivity analysis; practical applications and limitations of LP; implementation of results.

**ELEC 305 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.

**LUPL 101 Wood Science 1** — An introduction to the manufacture of forest products. Topics include elementary botany, identification of British Columbia commercial tree species, macro- and micro-analysis of wood and the study of wood properties. Topics in wood processing include debarking and chip manufacture, conveyance and storage.

**LUPL 102 Lumber Grading 1** — Given in term 1 in preparation for Lumber Grading 2. The course covers information fundamental to the grading of western softwood lumber, including tree growth and wood structure, species identification, classification of products and the recognition of characteristics found naturally and caused in manufacture.

**LUPL 103 Lumber Tallying** — A full course on lumber tallying and shipping, including; understanding Foot Board Measure; converting order data to specified lengths, pieces, bundles and packages; calculating wood moisture content and shrinkage; metric conversion and lumber pricing. Final examinations for certification are by the Council of Forest Industries (COFI) during which the student must achieve 70%. A COFI Certificate in Tallying is required to obtain the BCIT Diploma of Technology. Students must also obtain 50% marks during the term of the course given at BCIT.

**LUPL 104 Log Utilization** — Basic forest management and logging procedures are studied, followed by practice in log scaling techniques on selected coastal log booms. Other topics include primary log sorting and calculations used by industry to measure recovery of lumber and plywood.

**LUPL 105 Lumber Manufacture** — Methods and equipment used in the manufacture of lumber in the B.C. Coast and Interior are examined. Processes discussed include log preparation, initial and secondary breakdown, kiln drying and planing. Saw feeds, speeds and filing practices are also examined. Field trips augment material given in lectures.

**LUPL 106 Plywood Manufacture** — Methods and equipment used in the manufacture of plywood in the B.C. Coast and Interior are examined. Processes discussed include peeling, driving, lay-up and finishing. Some time is spent discussing other types of panel boards and related coatings and overlays. Field trips augment material given in lectures.

**LUPL 107/109 Mill Management 1 & 2** — Designed to supplement material covered in courses on lumber and plywood manufacture. Topics include cost analysis, principles of supervision, accident prevention, fire prevention, industrial relations, maintenance organization, maintenance trades, mobile equipment, materials handling and pollution abatement. A large portion of time is spent on specific assignments in various manufacturing plants.

**LUPL 108 Lumber Grading 2** — Students attend industry lumber grading classes sponsored by the Council of Forest Industries (COFI) and receive further instruction at BCIT. Final examinations for certification are given by COFI, at which time the student must achieve a 70% pass mark as a requisite to obtaining the BCIT Diploma of Technology. Students must also obtain the required 50% term marks for the in-school portion of the course.

**LUPL 109** see **LUPL 107**

**LUPL 201 Wood Science 2** — Topics covered include wood and chip units and conversion factors, mechanical and rheological properties, micro- and ultra-structure, wood protection and preservation. The lab section of the course is largely made up of a research project, with emphasis on reporting of methods and results.

**LUPL 202 Summer Technical Report** — Students make a detailed report on one phase of the technical operation of a forest products plant, from first-hand experience or from approved research sources.

**LUPL 203 Mill Audit & Quality Control** — Lectures and labs complement material given in Lumber and Plywood Manufacture courses and provide the student with the capability to set up and manage a quality control program in a sawmill and plywood plant. Besides being able to identify and correct problems related to quality, the student will be capable of sampling, analyzing and reporting on size accuracy, fibre usage, product dryness and adherence to standards.

**MATH 146 Basic Technical Mathematics** — Topics in algebra, logarithms and trigonometry with emphasis on technical applications, including linear programming.

**MATH 246 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.

**MECH 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.

**MECH 204 Drafting** — Covers topics on intersections, developments, descriptive geometry, isometrics and piping, drawings and mechanical equipment detail, and layout projects associated with lumber production. *Prerequisite: MECH 101 Drafting Fundamentals.*

**MECH 416 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.

**MKTG 420 Wood Products Sales and Distribution** — Examines the major domestic and export markets for lumber and plywood, including ongoing changes in all types of distribution and transportation systems used by the forest products industry. The sales process, from telephone solicitation to complete documentation of FOB and CIF orders, is covered in detail.

**OPMT 164 Management Engineering 1** — An organized approach to problem-solving, with emphasis on the forest products industry. Method study techniques such as problem selection, process charting, multiple activity charting, activity sampling, motion economy and critical examination and development of alternatives are covered. The course also includes an introduction to work measurement. The importance of establishing good human relations with employees is stressed throughout.

**OPMT 264 Management Engineering 2** — 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 OPMT 164 and the first part of this course to the solution of his plant project and submits a written report on his findings, including conclusions and recommendations.

**PHYS 118/218 Physics** — An introductory 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.

**PHYS 218** see **PHYS 118**

**TCOM 107/207 Technical Communication** — 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 — descriptions of hardware and processes, directions, summaries, letters, memos and technical reports.

**TCOM 207** see **TCOM 107**

**TCOM 305/403 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 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 the principles of logical reasoning.

**TCOM 403** see **TCOM 305**

## Faculty and Staff

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*Department Head*
H. Kettner
J.T. Neilson, B.A.Sc., P.Eng.,
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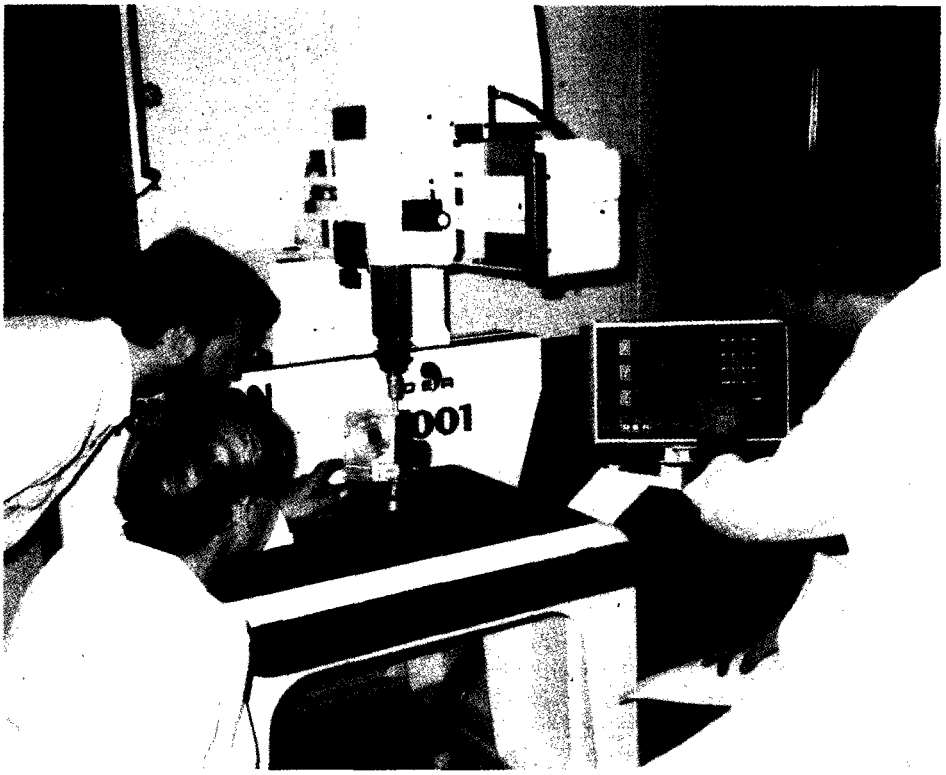

# Mechanical

## Design & Production Options

The mechanical technologist may be involved in the design, construction and installation of machines and mechanical devices, or in the production side of manufacturing. It is a field of tremendous scope in that specialists must be able to analyze problems, propose efficient technical solutions, implement these solutions and evaluate the results.

### Job Opportunities

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

### The Program

In the first three terms, all students in the technology have the same curriculum which includes math, physics and specialized studies in mechanical engineering, production and materials. Lecture material is given practical application in problem solving and design sessions, and in lab and shop assignments. Field trips to industrial settings are an important adjunct to the classroom and lab and are also useful in helping students decide on an area of speciality. In the final term of their second year, students stream into one of two options: **Design or Production**.

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

This program is accredited by the Society of Engineering Technologists.

### Prerequisites

Algebra 12 and Physics 11 are course requirements for this program. Applicants should have a solid academic background and good communications skills, be able to apply ideas in practical situations and be able to work effectively with people in a team situation.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| CDCM 101 | Computer Science | 3 |
| CHSC 105 | Engineering Materials | 4 |
| COMP 109 | Technical Communication | 4 |
| MATH 149 | Basic Technical Mathematics | 5 |
| MECH 100 | Mechanical Drafting 1 | 3 |
| MECH 104 | Statics | 4 |
| MECH 105 | Engineering Economics | 3 |
| MECH 106 | Manufacturing Processes 1 | 4 |
| | Library, Research and Field Trips | 5 |
| | | 35 |

| Year 1 | Term 2 | Clrm hrs/wk |
|---|---|---|
| CHSC 205 | Engineering Materials | 4 |
| MATH 249 | Calculus | 4 |
| MECH 200 | Mechanical Drafting 2 | 3 |
| MECH 205 | Dynamics and Thermal Processes | 4 |
| MECH 206 | Mechanics of Materials | 4 |
| MECH 209 | Manufacturing Processes 2 | 4 |
| PHYS 216 | Physics | 4 |
| TCOM 210 | Technical Communication | 4 |
| | Library, Research and Field Trips | 4 |
| | | 35 |

| Year 2 | Term 3 | |
|---|---|---|
| ELEC 305 | Electrical Equipment Applications | 4 |
| MATH 349 | Numerical Methods with BASIC | 4 |
| MECH 300 | Mechanical Drafting 3 | 2 |
| MECH 301 | Machine Design 1 | 5 |
| MECH 302 | Thermal Engineering 1 | 5 |
| MECH 303 | Fluid Mechanics | 3 |
| MECH 304 | Manufacturing Processes 3 | 4 |
| MECH 320 | Fluid Power 1 | 3 |
| | Library, Research and Field Trips | 5 |
| | | 35 |

**Design**

| Year 2 | Term 4 | |
|---|---|---|
| ELEC 255 | Instrumentation | 4 |
| MATH 494 | Computer Graphics | 3 |
| MECH 401 | Machine Design 2 | 5 |
| MECH 402 | Theory of Mechanisms | 4 |
| MECH 403 | Drawing and Design | 3 |
| MECH 404 | Thermal Engineering 2 | 4 |
| MECH 406 | Fluid Systems | 3 |
| MECH 420 | Fluid Power 2 | 3 |
| | Library, Research and Field Trips | 6 |
| | | 35 |

**Production**

| Year 2 | Term 4 | |
|---|---|---|
| ELEC 470 | CNC and Robotic Languages | 4 |
| MATH 449 | Statistics and Quality Control | 4 |
| MECH 406 | Fluid Systems | 3 |
| MECH 411 | Production Engineering Management | 4 |
| MECH 413 | Tool Design | 3 |
| MECH 414 | Metrology and CNC | 5 |
| MECH 420 | Fluid Power 2 | 3 |
| OPMT 460 | Industrial Engineering | 4 |
| | Library, Research and Field Trips | 4 |
| | | 35 |

## Subject Outlines

**CDCM 101 Computer Science** — Introduction to Computer Science and Programming. BASIC language. Emphasis is on engineering problems and elementary computer graphics.

**CHSC 105 Engineering Materials** — Comparative properties of all classes of engineering materials including metals, alloys, polymers, concrete, wood and ceramics. Common causes of failure in service including fatigue, weathering, embrittlement and corrosion.

**CHSC 205** Continuation of **CHSC 105**

**ELEC 255 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.

**ELEC 305 Electrical Equipment Applications** — An introduction to industrial electrical equipment. Topics include AC and DC motors and their application to electro-mechanical drive systems; protecting and controlling motors; industrial electrical power systems and related equipment; sources of energy; utility rate structures, transformation into primary and secondary voltage levels, distribution of power throughout the plant; switching; voltage control; power-factor correction.

**ELEC 470 CNC and Robotic Languages** — Introduces the student to current CNC and Robotic languages such as APT and V.A.L. Investigates the integrated manufacturing centre.

**MATH 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 MATH 249.

**MATH 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.

**MATH 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.

**MATH 443 Special Topics for Electrical/Electronics** — A further course in calculus and its technical applications. Topics include integration techniques, Fourier series, 1st and 2nd order linear differential equations and Laplace transforms.

**MATH 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 and topics in quality control.

**MATH 494 Computer Graphics** — Introduces students to interactive BASIC, and concepts of programming in two and three dimensions. Students experience "hands-on" practice with computer graphics systems.

**MECH 100 Mechanical Drafting 1** — Techniques of producing and reading mechanical drawings using standard format and the development of basic skills in applying these techniques. Use of instruments, line work, lettering, geometric construction isometrics, with emphasis placed on orthograhic projection, auxiliary views, sections, dimensions and working drawings.

**MECH 104 Statics** — Vectors, force systems, concurrent and coplanar, nonconcurrent and coplanar. Graphical representation and solutions. Ideas of equilibrium. Mathematical representation of equilibrium. Analysis of frames. Statically determined structures. Redundancies. Beams, principles of moments and centroids. Second moment of area.

**MECH 105 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.

**MECH 106 Manufacturing Processes 1** — A basic orientation course which provides the student with practice in metal removal, and a study of related theory.

**MECH 200 Mechanical Drafting 2** — Advanced techniques including limits and fits, isometric and orthographic single line piping diagrams, descriptive geometry, intersections, development, gears, threads and fasteners, weld symbols and working drawings and projects.

**MECH 205 Dynamics and Thermal Processes** — Kinematics: basic equation of motion, motion diagrams, trajectories. Kinetics: Newton's Laws, inertia, rectilinear and rotational kinetics, systems of bodies. Work, energy power, efficiency. Introduction to heat and fluid processes; steam tables, first law of thermodynamics. Basic steam power and refrigeration cycles.

**MECH 206 Mechanics of Materials** — Study of stresses, strains and deflections resulting from actions of tensile, compressive, shear and torsion forces on simple types of structural and machine elements. Consideration of beams, columns, shafts, thin-walled cylinders, riveted and welded joints. Lab testing of engineering materials and common machine elements.

**MECH 209 Manufacturing Processes 2** — Detailed knowledge of basic machine tools, evaluation of design and production features. Organized processing, break even points, equal cost quantities, estimating production costs, machine tool specification, installation and maintenance systems.

**MECH 300 Mechanical Drafting 3** — Advance practices in geometric tolerances, cams, structural steel conveyors are studied.

**MECH 301 Machine Design 1** — Studies the basic principles of machine design. Topics include 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, chaindrivers and gearing.

**MECH 302 Thermal Engineering 1** — First and second law of thermodynamics. Steady and non-flow energy equations, specific heats of gases, vapor tables, gas and vapor processes. Carnot, Rankine and basic I.C. engine cycles. Air compressors. Heat transfer.

**MECH 303 Fluid Mechanics** — Basic principles of fluid properties, energy losses, Reynold's number, Moody diagram, flow measuring devices, dynamics of flow lift and drag. Fluid statics.

**MECH 304 Manufacturing Processes 3** — In this course the student makes a detailed study of processes such as casting hot and cold forming, extruding, forging, stamping, pressing and material joining, including machines and materials. Quantities/costs will be investigated. Manufacturing processes recently introduced will be discussed in oral presentations by the student. Visits to local industries will be arranged.

**MECH 320 Fluid Power 1** — 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.

**MECH 401 Machine Design 2** — Basic principles derived in MECH 301 are applied to various design elements. Topics include springs, roller bearings, power screws, spur and helical gearing, level and worm gearing, couplings, brakes, clutches.

**MECH 402 Theory of Mechanisms** — Designed to provide a study of motion in machines. Topics include velocity and acceleration diagrams and cams.

**MECH 403 Drawing and Design** — A course to encourage design decision-making as regards selection of materials, proportion and function of parts, drawings, dimensions, specifications and economy.

**MECH 404 Thermal Engineering 2** — Mixtures of gases and vapors, Gibbs-Dalton

Law, psychrometry, air conditioning, combustion processes and nozzle flow; analysis of steam and gas turbines and jet propulsion. Practical lab investigations by students will reinforce theoretical work during the course. Aspects of energy management.

**MECH 406 Fluid Systems** — Dimensionless parameters. Pump characteristics, operation and maintenance. Cavitation. Air movement and supply, fan performance and characteristics, duct sizing and networks.

**MECH 411 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.

**MECH 413 Tool Design** — Design of special purpose tooling as related to manufacturing. Consideration of design principles for jigs, fixtures, blank and pierce, bend and draw dies, gauging practices and standard parts.

**MECH 414 Metrology and C.N.C.** — Measurement of surface texture and flatness. Optical and electrical comparators. Metrology of screw threads. Precision measuring instruments. Fundamentals of inspection. Mass production gauging. Computer Numerical Control programming. Program verification on a 3-axis CNC Mill.

**MECH 420 Fluid Power 2** — Hydraulic circuits; valves, pressure control valves; rotating actuators, industrial use of fluid power circuits, fluid couplings and torque convertors, motors.

**OPMT 460 Industrial Engineering** — Planning for and conducting productivity improvement studies in a manufacturing environment. Included in the course are the major topics of CPM and Method Study. Both of these topic areas are supported with commercial and student written microcomputer application.

**PHYS 216 Physics** — A general level course covering the elements of wave motion, sound, light and basic electricity and magnetism.

**TCOM 109 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. 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.

**TCOM 210 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.

## Faculty and Staff

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E.H. Labounty, M.A.S.H.R.A.E.
V.M. Strijack, B.Sc., P.Eng.. Assistant Department Head
J.P. Sullivan, B.Sc., P.Eng., M.A.S.H.R.A.E.

85-86

# Mechanical Systems

The graduate of this program will be able to pursue a career in the field of Mechanical Systems for residential, commercial, institutional and industrial buildings. Graduates will be prepared for the design and installation of water supply, drainage, fire protection, refrigeration, heating, ventilating and air conditioning.

**Job Opportunities**

Mechanical engineers, working in liaison with architects, structural engineers and electrical engineers, oversee design work on systems for most large buildings. As support staff, trained mechanical systems technologists who can function with a minimum of supervision as designers, specification writers, field inspectors, and drafting personnel are required.

Mechanical contractors bid competitively for mechanical systems work, and require trained systems technologists as estimators and project management assistants.

Systems in newly completed and existing buildings have been receiving more attention in recent years. Services in this area include system management programs to optimize energy efficiency; testing and balancing of new systems; and physical changes to existing systems to realize greater fuel economy.

**The Program**

Course material encompasses water supply, drainage, fire protection, refrigeration, heating, ventilating and air conditioning, backed by support courses which include fluid engineering, thermodynamics, engineering economy and computer science. In recent years, the pursuit of greater energy efficiency and safety in buildings has placed new demands on the systems technologist. This program recognizes the need for a specialized technological base from which the graduate can effectively participate in achieving these objectives.

It is anticipated that this program will be accredited by the Society of Engineering Technologists of British Columbia.

**Prerequisites**

Algebra 12 and Physics 11 are course requirements for this program. Applicants should have a solid academic background and good communications skills, be able to apply ideas to practical situations and be able to work effectively with people in a team situation. Supervisory posts may be assumed after appropriate job experience.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| CDCM 101 | Computer Science | 3 |
| CHSC 105 | Engineering Materials | 4 |
| MATH 149 | Basic Technical Mathematics | 5 |
| MECH 104 | Statics | 4 |
| MECH 105 | Engineering Economics | 3 |
| MSYS 100 | Systems Drafting 1 | 3 |
| MSYS 101 | Plumbing | 3 |
| TCOM 109 | Technical Communication | 4 |
| | Library, Research and Field Trips | 6 |
| | | 35 |

| Year 1 | Term 2 | |
|---|---|---|
| CHSC 205 | Engineering Materials | 4 |
| ELEC 150 | Illumination (Term 2B) | 3 |
| MATH 249 | Calculus | 4 |
| MECH 205 | Dynamics and Thermal Processes | 4 |
| MECH 206 | Mechanics of Materials | 4 |
| MSYS 200 | Systems Drafting 2 | 3 |
| MSYS 202 | Heating & Ventilation 1 (Term 2A) | 3 |
| PHYS 216 | Physics | 4 |
| TCOM 210 | Technical Communication | 4 |
| | Library, Research and Field Trips | 5 |
| | | 35 |

| Year 2 | Term 3 | |
|---|---|---|
| ELEC 255 | Instrumentation | 5 |
| ELEC 305 | Electrical Equipment Applications | 4 |
| MATH 349 | Numerical Methods with BASIC | 4 |
| MECH 302 | Thermal Engineering 1 | 5 |
| MECH 303 | Fluid Mechanics | 3 |
| MECH 320 | Fluid Power 1 | 3 |
| BLDG 102 | Building Construction 1 | 3 |
| MSYS 301 | Heating & Ventilating 2 | 3 |
| | Library, Research and Field Trips | 5 |
| | | 35 |

| Year 2 | Term 4 | |
|---|---|---|
| MECH 404 | Thermal Engineering 2 | 4 |
| MECH 406 | Fluid Systems | 3 |
| MECH 410 | Mechanical Estimating (Term 4B) | 4 |
| MSYS 400 | Air Conditioning Systems | 6 |
| MSYS 403 | System Noise Control (Term 4A) | 4 |
| MSYS 404 | Mechanical Equipment | 4 |
| MSYS 405 | Maintenance (Term 4B) | 4 |
| MSYS 406 | Fire Protection (Term 4A) | 4 |
| OPMT 460 | Project Management | 4 |
| | Library, Research and Field Trips | 6 |
| | | 43 |

## Subject Outlines

**BLDG 102 Building Construction 1** — Principles of building construction, terms of the assembly of materials, examination of typical systems in wood, masonery, steel and reinforced concrete construction. National Building Code, other Acts, codes and by-laws.

**CDCM 101 Computer Science** — Introduction to Computer Science and Programming. BASIC language. Emphasis is on engineering problems and elementary computer graphics.

**CHSC 105 Engineering Materials** — Comparative properties of all classes of engineering materials including metals, alloys, polymers, concrete, wood and ceramics. Common causes of failure in service including fatigue, weathering, embrittlement and corrosion.

**CHSC 205** Continuation of **CHSC 105**

**ELEC 150 Illumination** — Introduction to illumination services in buildings. Topics will include fixtures, circuit layout and control.

**ELEC 255 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.

**ELEC 305 Electrical Equipment Applications** — An introduction to industrial electrical equipment. Topics include AC and DC motors and their application to electro-mechanical drive systems; protecting and controlling motors; industrial electrical power systems and related equipment; sources of energy; utility rate structures, transformation into primary and secondary voltage levels, distribution of power throughout the plant; switching; voltage control; power-factor correction.

**MATH 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 MATH 249.

**MATH 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.

**MATH 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.

**MECH 104 Statics** — Vectors, force systems, concurrent and coplanar, nonconcurrent and coplanar. Graphical representation and solutions. Ideas of equilibrium. Mathematical representation of equilibrium. Analysis of frames. Statically determined structures. Redundancies. Beams, principles of moments and centroids. Second moment of area.

**MECH 105 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.

**MECH 205 Dynamics and Thermal Processes** — Kinematics: basic equation of motion, motion diagrams, trajectories. Kinetics: Newton's Laws, inertia, rectilinear and rotational kinetics, systems of bodies. Work, energy power, efficiency. Introduction to heat and fluid processes; steam tables, first law of thermodynamics. Basic steam power and refrigeration cycles.

**MECH 206 Mechanics of Materials** — Study of stresses, strains and deflections resulting from actions of tensile, compressive, shear and torsion forces on simple types of structural and machine elements. Consideration of beams, columns, shafts, thin-walled cylinders, riveted and welded joints. Lab testing of engineering materials and common machine elements.

**MECH 302 Thermal Engineering 1** — First and second law of thermodynamics. Steady and non-flow energy equations, specific heats of gases, vapor tables, gas and vapor processes. Carnot, Rankine and basic I.C. engine cycles. Air compressors. Heat transfer.

**MECH 303 Fluid Mechanics** — Basic principles of fluid properties, energy losses, Reynold's number, Moody diagram, flow measuring devices, dynamics of flow lift and drag.

**MECH 320 Fluid Power 1** — 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.

**MECH 404 Thermal Engineering 2** — Mixtures of gases and vapors, Gibbs-Dalton Law, psychrometry, air conditioning, combustion processes and nozzle flow; analysis of steam and gas turbines and jet propulsion. Practical lab investigations by students will reinforce theoretical work during the course.

**MECH 406 Fluid Systems** — Dimensionless parameters, pump characteristics, operation and maintenance. Cavitation. Air movement and supply, fan performance and characteristics, duct sizing and networks.

**MECH 410 Mechanical Estimating** — Basic theories and principles of estimating construction costs and direction for organizing facts from bidding documents. Measurement and pricing using "price master" and "labor calculator", for ventilation, domestic hot water heating and sanitary drainage systems.

**MSYS 100 Systems Drafting 1** — Basic techniques for development of drawing skills and reading simple drawings related to building mechanical services, use of scales and instruments producing lettering and linework, geometric constructions, dimensioning, orthographic projection, descriptive geometry, and pictorial drawings in the form of drawing assignments.

**MSYS 101 Plumbing 1** — This course is divided into a series of labs and lectures to give the student a fundamental understanding of piping, plumbing fixtures, and their application in storm and sanitary drainage systems. The B.C. Plumbing code will be applied to prepare working drawings for drainage systems and portable water systems.

**MSYS 200 Systems Drafting 2** — Further topics in mechanical drafting practices and projects on systems in buildings and plants.

**MSYS 202 Heating and Ventilating 1** — Covers the principles involved with heat loss in buildings, and practises of heating and ventilating, encompassing a study of system components and design procedures. These will then be applied to the preparation of heat loss calculations and working drawings for a heating/ventilating system.

**MSYS 301 Heating and Ventilating 2** — Principles and practices of heating and ventilating for residential, commercial and institutional buildings. Instructional material encompasses fuel oil, gas and solar heat energy sources; fuel handling heating boilers; solar collectors; building heat loss evaluation; building ventilation, load evaluation; space air distribution; ducted air distributions; warm air heating.

**MSYS 400 Air Conditioning Systems** — Principles and practices of air conditioning embodying instructional material on comfort parameters; cooling load evaluation; properties of air; air conditioning processes referred to the psychrometric chart; zone requirements; constant volume equipment and systems; variable volume equipment and systems; and system control planning for handling seasonal load variations. The student will apply practical design techniques to establish design requirements for specific buildings in the form of working drawings and performance specifications.

**MSYS 403 System Noise Control** — Lab assignments are arranged to solve fundamental problems of sound propagation; use mechanical equipment sound performance data to select equipment to satisfy acceptable noise levels; and to recognize and arrive at solutions to potential mechanical system noise problems in the design stage.

**MSYS 404 Mechanical Equipment** — A study of drive configurations, prime movers, fans, pumps, heat exchangers, pressure vessels from an application, specifications, maintenance and safety point of view.

**MSYS 405 Maintenance** — The elements of this course are: basic systems, preventative maintenance and budget costs, maintenance planning, estimating, scheduling, measurement and inventory.

**MSYS 406 Fire Protection** — Will include mechanical fire protection systems; regulations and codes of practice; building hazard classification; stand pipe and sprinkler systems; systems components and design to NFPA 13.

**OPMT 460 Project Management** — Covers problem solving and decision making approaches to a project installation. Topics include: PERT Networks, CPM barcharts, work measuring techniques in planning and project installations, method study techniques, acceptable management principles in labor supervision.

**PHYS 216 Physics** — A general level course covering the elements of wave motion, sound, light and basic electricity and magnetism.

**TCOM 109 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. 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.

**TCOM 210 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.

## Faculty and Staff

S.C. Todd, M.I.Mech.E., C.Eng., F.I.E.D., P.Eng., *Department Head*
D.K. Bannerman, B.A.Sc., S.M., P.Eng., M.A.S.M.E.
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M. Fairburn, H.N.C.
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E. Graham, C.E.T., M.A.S.M.E., H.N.C.
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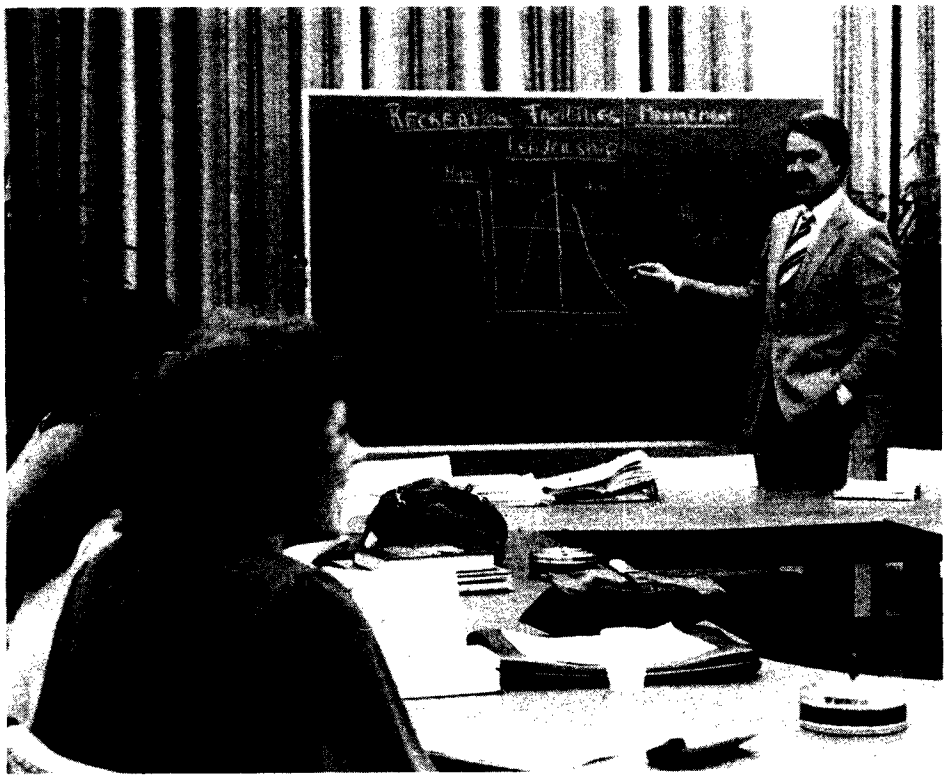


# Recreation Facilities Management

This program has been designed to appeal to students who have a predominant interest in the management of recreational facilities. Aptitude for and appreciation of sports and leisure activities is both desirable and 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, responsible management practices.

Graduates 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 clubs, golf facilities, health spas, recreation complexes, joint private and government complexes, aquatic centres, indoor winter sport centres, ski resorts; or starting their own commercial facility.

Graduates may begin employment at different levels, depending upon experience, including part-time experience gained during the two-year program. It is expected that most graduates will reach the supervisory level as assistant managers, facilities coordinators or managers of single purpose facilities — squash courts, arenas or pools.

In general, initial placement will be in positions that fall between those that are specifically program-oriented and those involving senior administration of recreational facilities. With experience, graduates may become managers, superintendents, supervisors, coordinators or directors of any one of a variety of recreational facilites, public or private. Success depends upon acquired "hands on" expertise and program aptitude and interest.

### The Program

Recreation facilities management personnel must be equipped with understanding of accounting processes and theories; plant maintenance and operations; food and beverage management; marketing; basic management practices including human relations, and personnel management, and standard engineering and architectural practices related to facilities development. Ability to communicate ideas and concepts effectively, verbally and in writing, is also important. The program stresses current 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 includes some fieldwork projects and career guidance.

### Prerequisites

Algebra 12 and Physics 11 are course requirements for this program. Related work experience or skills will strengthen applications. Admission may also be granted to mature students who can provide evidence of probable success in the program.

## Course of Studies

| | | Clrm |
|---|---|---|
| **Year 1** | **Term 1** | hrs/wk |
| BLDG 127 | Landscape Construction | 3 |
| MECH 118 | Plant Equipment 1 | 5 |
| OPMT 114 | Business Mathematics | 5 |
| OPMT 184 | Introduction to Business | 5 |
| PHYS 122 | Physics | 3 |
| RECR 100 | Recreation Facilities Management | 7 |
| TCOM 112 | Technical Communication | 3 |
| | Library and Research | 4 |
| | | 35 |

| | | |
|---|---|---|
| **Year 1** | **Term 2** | |
| MECH 108 | Plumbing | 2 |
| MECH 210 | Plant Equipment 2 | 5 |
| MKTG 102 | Introduction to Marketing | 3 |
| OPMT 134 | Applied Statistics | 4 |
| OPMT 167 | Basic Management Engineering | 3 |
| PHYS 222 | Physics | 3 |
| RECR 200 | Recreation Facilities Management | 7 |
| TCOM 213 | Technical Communication | 3 |
| | Library and Research | 5 |
| | | 35 |

| | | |
|---|---|---|
| **Year 2** | **Term 3** | |
| ADMN330 | Industrial Relations | 4 |
| ADMN340 | Personnel Administration | 2 |
| COMP 100 | Data Processing Introduction | 4 |
| HOSP 354 | Food Operations | 5 |
| MECH 306 | Heating and Ventilating | 5 |
| MKTG 309 | Marketing Research 1 | 3 |
| RECR 300 | Recreation Facilities Management | 7 |
| | Library and Research | 4 |
| | | 34 |

| | | |
|---|---|---|
| **Year 2** | **Term 4** | |
| ADMN331 | Collective Bargaining | 3 |
| BLDG 122 | Building Construction | 3 |
| ELEC TBA | Building Services (Electrical Systems) | 3 |
| FMGT 103 | Introduction to Accounting | 4 |
| HOSP 354 | Food Operations | 5 |
| OPMT 155 | Supervision | 2 |
| RECR 400 | Recreation Facilities Management | 9 |
| | Library and Research | 6 |
| | | 35 |

## Subject Outlines

**ADMN 330 Industrial Relations** — A detailed analysis of selected labor-management problem areas with emphasis on the solution of practical, existing problems in industrial relations.

**ADMN 331 Collective Bargaining** — An introductory analysis of the fundamental issues and facts of labor-management relations. Special emphasis is given to collective agreement content and interpretation, bargaining and basic labor economics.

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

**BLDG 122 Building Construction** — Functional analysis of space planning. Study of construction materials and methods, public safety regulations and structural systems. Examination of maintenance problems. Development of standard drafting practices and interpretation of drawings.

**BLDG 127 Landscape Construction** — Introduction to recreational site development. Principles of landscape architecture. Soils and drainage. Materials and products utilized for landscape construction. Graphic representation of elements of landscape design. Study of appropriate terminology, texts, and equipment.

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

**ELEC TBA Building Services (Electrical Systems)** — An overview of the electrical system as used in a recreational facility. The course concentrates on the terminology that the graduate will run into in his or her dealings with those involved in planning, installing, modifying or maintaining electrical and lighting systems. Much discussion is directed towards a thorough understanding of the economics, and safety to personnel and equipment for recreation facilities.

**FMGT 103 Introduction to Accounting** — Includes a survey of the accounting process and a review of basic accounting theory. Preparation and analysis of financial statements and the reporting of financial information to outsiders is covered in depth. Also covered is accounting for assets, liabilities, owner's equity and payroll accounting.

**HOSP 102/202 Food Operations** — 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.

**HOSP 202** see **HOSP 102**

**MECH 108 Plumbing** — Provides the student with principles and practices of plumbing system design, encompassing a study of plumbing fixtures and materials, fundamental hydraulic principles, code interpretation and system design procedures. The proceeding is applied to term projects involving portable water supply and drainage for a selected building.

**MECH 118/210 Physical Plant 1 & 2** — 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.

**MECH 210** see **MECH 118**

**MECH 306 Heating and Ventilating** — Covers concepts of heating, cooling and ventilating requirements for the indoor environment. Student will participate in the planning, design, and drafting of H.V.A.C. systems under the general supervision of professional system designers. Specific subjects will include: interior comfort, ventilation requirements, air filtration, space air distribution, ducted air distribution, hot water space heating, outline of refrigeration for air conditioning and space cooling systems for recreation facilities.

**MKTG 102 Introduction to Marketing** — 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.

**MKTG 309 Marketing Research 1** — Examines the basic approaches to marketing research, discusses the technique tools and relates 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.

**OPMT 114 Business Mathematics** — Review of basic algebra 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 and techniques of evaluating investment alternatives.

**OPMT 134 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 inferential statistics through selected topics: sampling, confidence limits, hypothesis testing, and linear regression. A statistical research project applied to recreation facilities management, is a requirement of the course.

**OPMT 155 Supervision** — Introduces the student to some of the skills required to survive the initial period of promotion to a first line supervisory position. Topics include the role of the supervisor, functions of management, authority relationships and design and implementation of "on the job training" programs; how to lead, delegate, discipline and evaluate; dealing with day to day operations, including grievances.

**OPMT 167 Basic Management Engineering** — Approaches to problem-solving and work simplification, with particular application to hotel and restaurant operations. Includes system concept, productivity, measurement, productivity improvement techniques. Also budgeting and CPM are introduced as planning techniques. Students are introduced to spread sheet applications on micros.

**OPTM 184 Introduction to Business** — Working in small groups, participants will prepare a business plan for presentation to prospective investors for the start up and first year operation of a recreation facility. Time management and scheduling will form an integral part of the learning. Additional areas of interest will include business law and government regulation involving the work environment and community relations.

**PHYS 122/222 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 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.

**RECR 100 Recreation Facilities Management** — Areas of study include trends in recreation and leisure services management; theory and application of recreation and leisure services management; MBO philosophy; motivation; design of organizations; interpersonal managerial skills; marketing of leisure/recreation services; budgeting; policy making; personnel management for recreation managers.

**RECR 200 Recreation Facilities Management** — Includes personnel management, legal liability, labor and management, professional interaction under unionization, principals of organization and staffing for efficient maintenance and management of vandalism.

**RECR 300 Recreation Facilities Management** — Includes marketing and promotion of programs including fees and charges; community structure and development as it relates to determining program needs; leisure counselling and programming and marketing perspective; program development, leadership development and programming for the public; private agency and commercial facilities. Visits to local facilities will complement lecture and lab material.

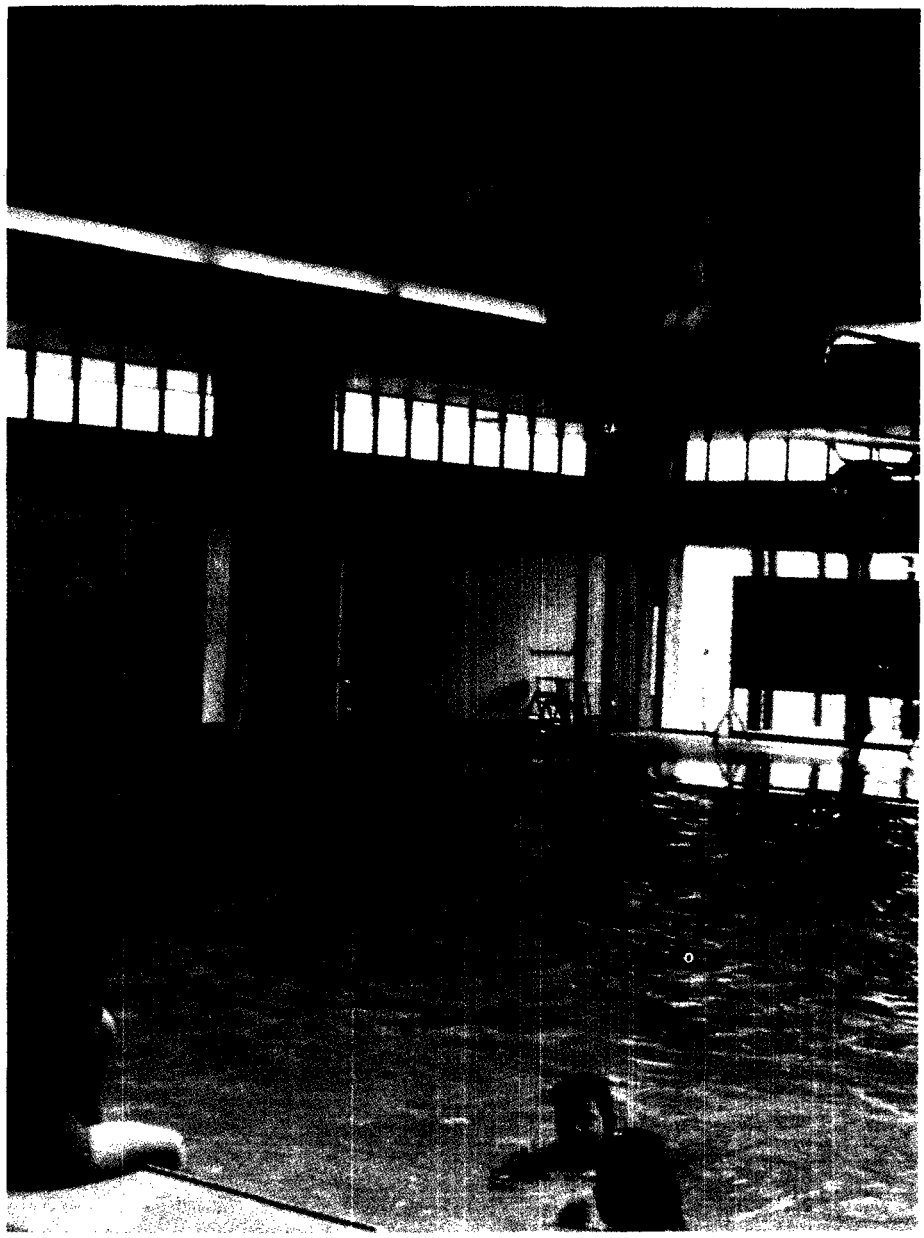
**RECR 400 Recreation Facilities Management** — A study of the field of recreation and leisure services including historical aspects to current and future trends and the development of a recreation and leisure service philosophy. This subject area will run concurrent with the fourth term directed studies field work program.

***TCOM 112/213 Technical Communication*** — The course is divided into a one-hour lecture and two-hour lab per week. In the lecture, students receive information on basic writing and communication 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. Approximately ten assignments each term are designed to develop a specific communication skill that the students will need in their fields.

**TCOM 213** see **TCOM 112**

## Faculty and Staff

S.C. Todd, M.I., Mech.E., C.Eng., F.I.E.D., P. Eng., *Department Head*
M.D. Powley, B.Ed., M.B.A., Program Head
E.W. Wilmink, B.Rec.



# 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. This program is accredited by the Society of Engineering Technologists.

**The Program**
BCIT offers both two year and specialized one year programs. In conjunction with Continuing Education, the Survey department presents a training program to the Technician level. The major surveying program is the two year course of studies leading to a National Diploma in Surveying. Students in this program acquire a solid background in math, physics, cartography, photogrammetry, plane and geodetic surveying and computers. The practical skills of note keeping, drafting, field operations and calculations are also covered. Prospective students should have a genuine interest in mathematics, computers, earth sciences and should enjoy a vigorous outdoor lifestyle.
Students desiring a less academic program may take advantage of the more field-oriented Junior Technician level program. Students who select this program will normally complete Term One of the General Survey program and then transfer into a specialized course of studies in applied survey techniques.
Students whose interests are centred in the areas of photography, computers and cartography, should consider the Photogrammetric Operators program. This program is a two term course of studies specializing in production photogrammetry. Employment in surveying during the summer break is considered desirable.

**Post-graduation**
Following completion of the two year diploma program, students are eligible for membership in the Society of Engineering Technologists. Graduates are also granted some course credits at the University of Calgary in the Survey Engineering Department and at the University of New Brunswick.

**Prerequisites**
Algebra 12 and Physics 11 are course requirements for this program. 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.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| MATH 151 | Basic Technical Mathematics | 7 |
| MECH 101 | Drafting | 3 |
| PHYS 123 | Physics | 5 |
| SURV 102 | Computer Methods for Small Portable Systems | 2 |
| SURV 161 | Plane Survey Computations 1 | 3 |
| SURV 164 | Field Survey 1 | 8 |
| TCOM 111 | Technical Communication | 3 |
| | Library and Research | 4 |
| | | 35 |

| Year 1 | Term 2<br>Technicians Program | |
|---|---|---|
| COMP 122 | Computer Applications 2 | 2 |
| PHOT 103 | Photogrammetry 1 | 3 |
| SURV 260 | Survey Computations for the Technician | 5 |
| SURV 265 | Survey Drafting | 4 |
| SURV 268 | Field Surveying for the Technician | 13 |
| TCOM 121 | Technical Communication | 3 |
| | Library and Research | 5 |
| | | 35 |

| Year 1 | Term 2 | |
|---|---|---|
| COMP 211 | Computer Applications 1 | 2 |
| MATH 251 | Calculus | 7 |
| MECH 203 | Drafting | 3 |
| PHOT 267 | Photogrammetry 2 | 3 |
| PHYS 223 | Physics | 3 |
| SURV 261 | Plane Survey Computations 2 | 3 |
| SURV 264 | Field Surveying 2 | 8 |
| TCOM 212 | Technical Communication | 3 |
| | Library and Research | 3 |
| | | 35 |

## Survey Option

| Year 2 | Term 3 | Clrm hrs/wk |
|---|---|---|
| COMP 223 | Computer Applications 2 | 2 |
| MATH 351 | Matrix Algebra & Numerical Methods | 4 |
| PHOT 367 | Photogrammetry 3 | 2 |
| SURV 361 | Plane Survey Computations 3 | 2 |
| SURV 362 | Geodetic Surveying 1 | 3 |
| SURV 363 | Adjustments of Surveying Measurements | 3 |
| SURV 364 | Field Surveying 3 | 7 |
| SURV 365 | Drafting & Computer Graphics — Applied | 2 |
| SURV 367 | Earth Sciences | 3 |
| SURV 368 | Description for Deeds & Legal "Acts" | 2 |
| | Library and Research | 5 |
| | | 35 |

| Year 2 | Term 4 | |
|---|---|---|
| MATH 451 | Statistics | 4 |
| PHOT 477 | Photogrammetry | 4 |
| SURV 461 | Plane Survey Computations 4 | 2 |
| SURV 462 | Geodetic Surveying 2 | 4 |
| SURV 463 | Mathematical Cartography | 3 |
| SURV 464 | Field Surveying 4 | 6 |
| SURV 465 | Computer Cartography | 3 |
| SURV 468 | Cadastral Surveying | 2 |
| SURV 469 | Planning and Land Utilization | 2 |
| | Library and Research | 5 |
| | | 35 |

## Photogrammetry Option

| Year 2 | Term 3 | |
|---|---|---|
| COMP 233 | Computer Applications 2 | 2 |
| MATH 351 | Matrix Algebra & Numerical Methods | 4 |
| SURV 361 | Plane Survey Computations 3 | 2 |
| SURV 362 | Geodetic Surveying 1 | 3 |
| SURV 363 | Adjustments of Survey Measurements | 3 |
| SURV 365 | Drafting & Computer Graphics — Applied | 2 |
| SURV 374 | Surveying | 2 |
| PHOT 365 | Cartography — Photo | 3 |
| PHOT 377 | Photogrammetry (Photo Option) | 11 |
| | Library and Research | 3 |
| | | 35 |

| Year 2 | Term 4 | |
|---|---|---|
| MATH 451 | Statistics | 4 |
| PHOT 465 | Computer Cartography | 3 |
| PHOT 477 | Photogrammetry | 11 |
| SURV 461 | Plane Survey Computations 4 | 2 |
| SURV 462 | Geodetic Surveying 2 | 4 |
| SURV 463 | Mathematical Cartography | 3 |
| SURV 469 | Planning and Land Utilization | 2 |
| SURV 474 | Surveying | 2 |
| | Library and Research | 4 |
| | | 35 |

## Subject Outlines

**COMP 211 Computer Applications** — Covers computer applications in engineering and medical technologies: how a computer works, recognizing problems suitable for computer solution, flowcharting and communicating with computer personnel. Emphasis is on the use of computers to solve problems related to the technology concerned. Where available, "package" programs will be demonstrated and used by students. FORTRAN or BASIC programming language is taught depending on the technology.

**COMP 223 Computer Applications 2** — 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.

**MATH 151 Basic Technical Mathematics** — Review of algebra; Euclidean and analytical geometry; applied plane trigonometry; spherical trigonometry.

**MATH 251 Calculus** — Derivatives, Taylor's and Maclaurin's series; partial derivatives; differential and total differential; radius of curvature for latitude and longitude; least square theory; integration applied to areas, volumes and length.

**MATH 351 Matrix Algebra and Numerical Methods** — Basic matrix algebra operations; least square theory; correlation; solution of normal equations.

**MATH 451 Statistics** — Descriptive statistics; probability and probability distributions; sampling and estimation; error theory; quality control.

**MECH 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.

**MECH 203 Drafting** — Techniques in ink; intersections and developments; contours; profiles; rights-of-way; survey problems and projects.

**PHOT 267 Photogrammetry 2** — Introduction to aerial photographs and other remote sensing acquired data; use of map and air photo; geometry of the air photo (scale, displacement and parallax); optics for photogrammetry (refraction, reflection, prisms and lenses); stereoscopy and stereoscopes; radial line triangulation and planimetric map compilation; aerial cameras.

**PHOT 365/465 Cartography** — Drafting principles as applied to photogrammetric compilation and cartography; inking and scribing techniques; surround detail, lettering and scales; production procedures.

**PHOT 367 Photogrammetry** — The compilation of a flight plan and detailed specifications for a photogrammetric project; photographic measurements and refinements using a comparator and other instruments; the elements of exterior orientation expressing the space position and angular orientation of a tilted photograph; use of direct optical projection sterioplotters; sterioplotters with mechanical or optical mechanical projection systems and automated stereo plotting instruments; application of on- and off-line projection systems and automatic contouring during orthophotoproduction; the location of points by intersection from two or more terrestrial photographs.

**PHOT 377 Photogrammetry** — The geometry and physical nature of the photograph; optics for photogrammetry; principles of photography; dark room procedures; aerial cameras; stereoscopy; the spatial model; comparator measurements of photocoordinates; planning aerial photography; plotting instruments; classification and operation of stereoplotters; aerial triangulation; photogrammetric control extension, coordinate tranformation; use of electronic computers; photo-interpretation; terrestrial and oblique photogrammetry; map compilation; cartography; remote sensing; photogrammetric refinement; general specifications.

**PHOT 465** see **PHOT 365**

**PHOT 477 Photogrammetry** — Coordinate transformations; colinearity and coplanarity equations; accuracy of coordinate determination; aerial triangulation — preparation, measuring, and adjustment, applications of photogrammetry to survey and mapping projects; introduction to digital mapping.

**PHYS 123/223 Physics** — 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 measurement, data analysis, experimental investigation of physical laws and technical report writing. Mathematical treatment requires only algebra and trigonometry. Applications of the general topics are relevant to the Surveying Technology.

**PHYS 223** see **PHYS 123**

**SURV 161/261 Plane Survey Computations 1 & 2** — Mathematical basics: geometry review; plane trigonometry; co-ordinate systems; systems of defining directions of survey lines; angle measurements and adjustments; bearing reductions; traverse computations and adjustments by Compass and Transit rules; area determinations by Co-ordinate and DMD methods and other methods; important theorems applied to surveying; geometry of the simple circular curve; computations of data for setting out circular curves by various methods; areas of cross-sections and earthwork volume calculations; symmetric vertical curve; missing parts; subdivision of land parcels based on various criteria; subdivision problems in cul-de-sacs; slope-staking; EDM measurements and reductions; intersection and resection; inaccessible base.

**SURV 162 Computer Methods for Small Portable Systems** — The student is oriented to the efficient use of the calculator/computer to solve various survey and mathematical problems through calculating and programming. It is assumed that the student has purchased an inexpensive, hand held, programmable calculator computer in BASIC. An introduction to BASIC language is taught, with structure and use of programs.

**SURV 164/264 Field Surveying 1 & 2** — 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.

**SURV 260 Survey Computations for the Technician** — Review of important geometry theorems and their application to survey. Computations of simple circular curves, and symmetric vertical curves. The solution of problems related to the subdivision of land. The reduction of field acquired measurements.

**SURV 261** see **SURV 161**

**SURV 264** see **SURV 164**

**SURV 265 Drafting** — Completion of this course will give students the ability to apply drafting fundamentals to the solution of survey problems. Students will acquire skills in: plotting cadastral survey data; in drafting plans, profiles and cross-sections; and in developing simple earth-work diagrams.

**SURV 268 Field Surveying for the Technician** — This is an intensified field oriented course. Successful completion will give students the ability to carry out routine survey tasks. These will include extensive practice in the use of surveyor's levels, theodolites and various types of EDMs.

**SURV 361/461 Plane Survey Computations 3 & 4** — Geometric spaces in surveying, surveying measurements, propagation of errors, computers and numerical approaches in surveying; computations of control surveys; triangulation, trilateration, traversing, reduction of eccentric measurements, intersection, resection, inaccessible base; transformation of coordinates, partitioning of land, horizontal and vertical curves; integrated surveying; deformations; three dimensional surveying systems.

**SURV 362/462 Geodetic Surveying 1 & 2** — A study of the size and shape of the earth, mathematics of the ellipsoid, computations on the ellipsoid, horizontal and vertical geodetic control surveys, coordinate systems and transformation of coordinates; physical geodesy, the gravity field of the earth, deviation of the geoid from the ellipsoid and the application of control surveys; inertial and satellite positioning; geodetic astronomy.

**SURV 363 Adjustments of Surveying Measurements** — Definitions and classification of errors, measures of precision; propagation law of standard errors; weights and propagation of weights; principle of least squares (in matrix notation); adjustment by variation of parameters; conditional observations; combined adjustments; adjustments of triangulation — trilateration nets — and of traversing.

**SURV 364/464 Field Survey 3 & 4** — This course consists of four modulae over the period of one year. The modulae are: Control, Legal, Municipal and Hydrographic. Control modulus: the use of electro-optical measuring devices, one-second theodolites, precision theodolites, and the gyro-theodolites. Legal modulus: interpretation of evidence, municipal act, subdivision posting, and mortgage certificate. Municipal modulus: preliminary surveys for municipal services, methods of controlling construction surveys, as-built surveys, and layout of a spiral curve section. Hydrographic modulus: establishing a chart datum, establishing control stations, use of echo-sounders, positioning soundings, measuring the depth and position of shoals, and construction of a field sheet.

**SURV 365/465 Drafting & Computer Grapahics — Applied** — Topics covered include sequential files, string manipulation, microcomputer graphics, role of CAD in surveying, BASIC and FORTRAN programming for plotters and digitizers, data collector transfers, reduction of field data, coordinate geometry programs, creation of plot files. Surveyor general requirements for survey plans, inking.

**SURV 367 Earth Sciences** — A study of the forest flora of British Columbia; the characteristics of native trees, their identifying features and common uses. Elementary geology, including the study of rocks and minerals, geologic structures, general location and uses of common ores. Soil classification and location.

**SURV 368 Description for Deeds & Legal "Acts"** — 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.

**SURV 374/474 Surveying Procedure** — Control surveys by triangulation, trilateration and traversing; indirect optical distance measurement; electro-magnetic distance measurements; the gyro-theodolite; trigonometrical and barometric levelling.

**SURV 461** see **SURV 361**

**SURV 462** see **SURV 362**

**SURV 463 Mathematical Cartography** — Concepts and properties of maps; classifications of maps; theory of distortions; conformality; equivalency; Tissot's indicatrix, conical projections; cylindrical projections; perspective projections; polyconic projection of British Columbia; UTM projection; stereographic projection of New Brunswick.

**SURV 464** see **SURV 364**

**SURV 465** see **SURV 365**

**SURV 468 Cadastral Surveying** — 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.

**SURV 469 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.

**SURV 474** see **SURV 374**

**TCOM 111/212 Technical Communication** — Emphasizes 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.

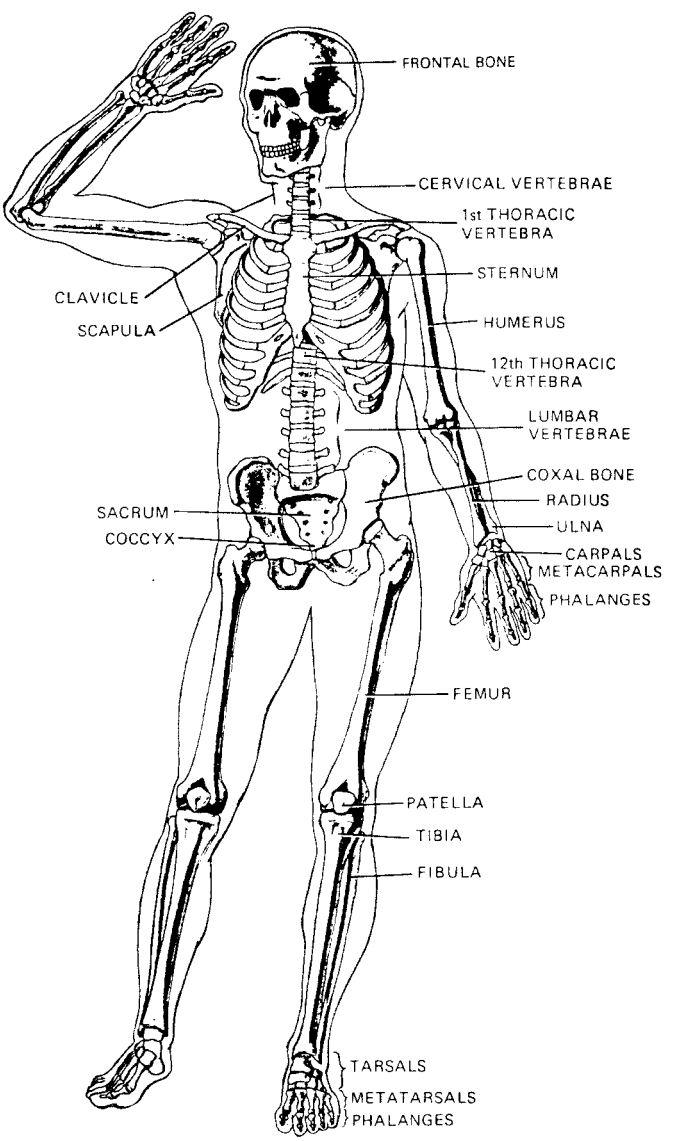
**TCOM 212** see **TCOM 111**

## 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
K. Bracewell, Dipl.T.
R. Bremner, Dipl.T.
J.S. Caldwell
D.C. Deans, B.A., Program Head
K. Errington, B.C.L.S., Cert.Min.Surv., Senior Instructor
K. Frankich, Dipl.Ing., M.A.Sc., Ph.D.
K. Gysler, B.Eng., M.Eng., D.L.S., P.Eng., Chief Instructor
D. Jarvos, Dipl.T.
G. Kehoe, B.A.Sc., B.C.L.S.
D.S. Martens, Dipl.T., B.C.L.S.
R.G. Miller, Dipl.T., B.A.
E.H. Schlegel
W.A. Tupper, Dipl.Ing.
N. Wong, Dipl.Ing., A.R.I.C.S.

# School of Health Sciences

# Basic Health Sciences

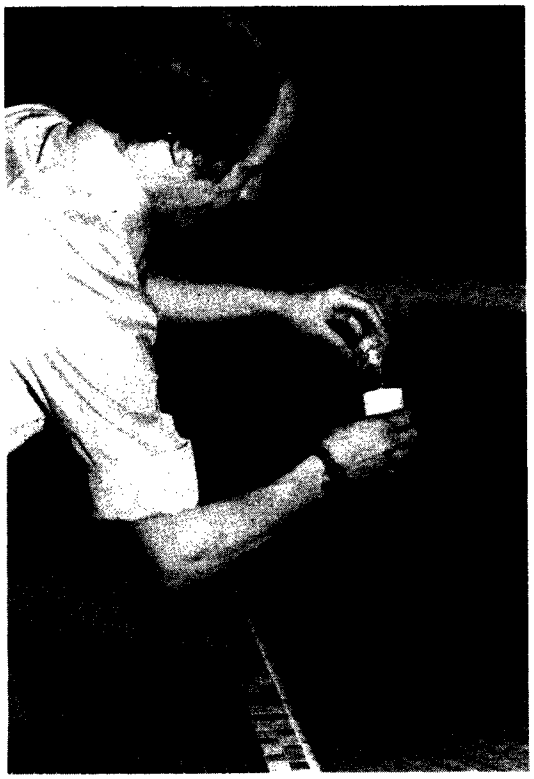



## Department of Basic Health Sciences

This department provides courses in human anatomy and physiology, immunology, microbiology, pathophysiology, sociology, organizational psychology, and human development for students enrolled in the School of Health Sciences. These courses are designated by the prefix BHSC and are listed and described in the following health technology entries. Each course is oriented towards a particular technology so that, although the material studied may be introductory in nature, the student quickly becomes aware of applications. In many cases these courses are the foundation upon which specific technology subjects are built. The department's responsibility, therefore, is to teach those concepts of biological and behavioral sciences which provide the student and graduate with the knowledge and comprehension to meet the present and the future challenges of the modern health worker.

## Faculty and Staff

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.,
J. H. Emes, B.Sc (Hons.), M.Sc., Ph.D.
A. G. Handford, B.A.
G. R. Marshall, B.Sc (Kines.), M.Sc. (Kines.)
T. J. Nowak, B.A., Dipl.Ed.
E. Shkurhan, B.Sc., M.Sc., Chief Instructor



# 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 such as food processing, catering and fisheries. Occasional openings occur in the teaching field. Employment opportunities exist in the industrial health and hygiene area for students who also possess an undergraduate degree.

### The Program

The cross-disciplinary curriculum includes general studies in health, 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 for these hazards. Instructional modes include lectures, labs and field experience.

### Prerequisites

Algebra 12, Physics 11 and Chemistry 12 are course requirements for this program. Applicants must be in good health. The nature of the work precludes individuals who are severely handicapped. Applicants should be able to show evidence of maturity, have a positive outlook and be interested in serving the community. Acceptance is dependent on a preselection interview.

### Post-graduation

After completing the requirements of the two-year program leading to a Diploma of Technology, graduates must complete six months of field training in a recognized health unit under the direction of a medical health officer and a public health inspector. Successful candidates may then sit a national 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** | |
| BHSC 123 | Public Health and Pollution Control Microbiology | 3 |
| CHEM 108 | Chemistry for Environmental Health 1 | 6 |
| ENVH 101 | Environmental Health and Engineering 1 | 4 |
| ENVH 102 | Food Hygiene 1 | 4 |
| ENVH 103 | Public Health Inspection 1 | 4 |
| ENVH 104 | Pest Control | 2.5 |
| HCOM106 | Communication | 3 |
| MATH 182 | Basic Mathematics | 4 |
| | Library and Research | 4.5 |
| | | 35 |
| **Year 1** | **Term 2** | |
| BHSC 204 | Basic Anatomy and Physiology | 2 |
| BHSC 223 | Public Health and Pollution Control Microbiology | 3 |
| CHEM 208 | Chemistry for Environmental Health 2 | 6 |
| ENVH 201 | Municipal & Private Water Supply, Waste Disposal Systems | 5 |
| ENVH 301 | Food Hygiene 2 | 2 |
| ENVH 302 | Public Health Inspection 2 | 2 |
| HCOM205 | Communication | 3 |
| MATH 282 | Statistics | 4 |
| PHYS 212 | Environmental Physics | 3.5 |
| | Library and Research | 4.5 |
| | | 35 |

| Year 2 | Term 3 | Clrm hrs/wk |
|---|---|---|
| CHEM 313 | Instrumental Analytical Methods | 4 |
| ENVH 202 | Technical Research Methods 1 | 7 |
| ENVH 203 | Environmental Health Relations | 5 |
| ENVH 204 | Environmental Noise | 4 |
| ENVH 303 | Public Health Administration 1 | 2 |
| ENVH 401 | Food Hygiene 3 | 2 |
| ENVH 402 | Public Health Inspection 3 | 2 |
| | Library and Research | 9 |
| | | 35 |

| Year 2 | Term 4 | |
|---|---|---|
| BHSC 424 | Communicable Disease Control | 4 |
| CHEM 418 | Industrial Chemical Processes | 2 |
| CHSC 413 | Environmental Analytical Methods | 3 |
| ENVH 304 | Technical Research Methods 2 | 3 |
| ENVH 403 | Public Health Administration 2 | 2 |
| ENVH 404 | Public Health Law | 3 |
| ENVH 405 | Environmental Health & Engineering 2 | 3 |
| ENVH 406 | Industrial Hygiene and Toxicology | 5 |
| ENVH 501 | Food Hygiene 4 | 5 |
| | Library and Research | 5 |
| | | 35 |

*Note: Curriculum subject to revision*

## Subject Outlines

**BHSC 123/223 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.

**BHSC 204 Basic Anatomy and Physiology** — Designed to provide a basic knowledge of human anatomy and physiology. Emphasis is placed on the physiology of human body systems and how environmental factors affect these systems.

**BHSC 223** see **BHSC 123**

**BHSC 424 Communicable Disease Control** — Provides the student with a sound knowledge of the natural history, spread and control of communicable diseases. Emphasis is placed on modes of transmission and control of diseases of provincial and national importance.

**CHEM 108/208 Chemistry for Environmental Health** — A special introductory course which covers general, organic biochemistry and a selection of topics of special interest to the environmental health field. General chemistry deals with stoichiometry; examples stress the calculations associated with water and waste water analysis. Structures of the most common organic functional groups and the physical properties of these are discussed. When organic chemicals are introduced, they are related to environmental problems that occur in oil refining, fuel combustion and pesticides. Biochemistry covers proteins, carbohydrates and fats with particular emphasis on the end-products of biological degradation. Special topics of alkalinity, hardness, water softening, colloids, swimming pool chemistry, volatile acids, biological oxygen demand and chemical oxygen demand are covered.

**CHEM 208** see **CHEM 108**

**CHEM 313 Instrumental Analytical Methods** — 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.

**CHEM 418 Industrial Chemical Processes for Environmental Health** — Gives 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.

**CHSC 413 Environmental Analytical Methods** — 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 "Standard 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.

**ENVH 101/405 Environmental Health and Engineering 1 and 2** — Covers a number of topics relevant to the field of environmental health including solid waste collection and disposal, emergency measures, camp and recreational sanitation, housing, community planning and swimming pools.

**ENVH 102/301/401/501 Food Hygiene 1, 2, 3 and 4** — These courses will examine the public health concerns associated with the food industry. Specific attention will be directed to legislative control and enforcement, inspection techniques, causes and investigation of food-borne illnesses, microbiological concerns and educational programs, as all of these are applied to the food industry in production, processing, handling, storage, service display, construction and materials.

**ENVH 103/302/402 Public Health Inspection 1, 2 and 3** — Provides 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.

**ENVH 104 Pest Control** — With primary emphasis on insects and rodents, this course will examine the identification and life cycles and habits of pests in order to understand the various measures for their control.

**ENVH 201 Municipal and Private Water Supplies and Waste Disposal Systems** — An introductory course which examines the means, methods, design and construction of facilities required to provide adequate potable water and sewage disposal. Associated health hazards, protective measures and how to solve problems encountered in individual systems will be considered. Further topics will include the characteristics of, and disposal methods for, agricultural wastes.

**ENVH 202/304 Technical Research Methods** — Provides for the development of the research methods and communication skills necessary to design technical research reports. Special emphasis will be placed on predicting trends in the field of public health. This course is designed to encourage the student to be self-assertive and creative.

**ENVH 203 Environmental Health Relations** — Examines the interrelationships and interactions between various government departments, agencies and corporations. Additionally, the forces which underly the social behavior of groups, large organizations and communities will be examined. Interpersonal relations will be exemplified through the practical application of public health education and the interaction of personnel in the environmental health field. Principles of public relations will also be examined with emphasis on problems peculiar to public health.

**ENVH 204 Environmental Noise** — Covers noise topics relevant to the field of environmental health with emphasis on occupational and community noise assessment and control. The lab course will emphasize audiometry, noise measurement and analysis and calibration techniques, utilizing state-of-the-art instrumentation.

**ENVH 301** see **ENVH 102**

**ENVH 302** see **ENVH 103**

**ENVH 303/403 Public Health Administration 1 and 2** — 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.

**ENVH 304** see **ENVH 202**

**ENVH 401** see **ENVH 102**

**ENVH 402** see **ENVH 103**

**ENVH 403** see **ENVH 303**

**ENVH 404 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.

**ENVH 405** see **ENVH 101**

**ENVH 406 Industrial Hygiene and Toxicology** — A survey course in occupational health. Given lectures, laboratory exercises and field situations, the student will be able to recognize common occupational health hazards, demonstrate how to use appropriate environmental sampling equipment and recommend control measures which may alleviate potential health hazards.

**ENVH 501** see **ENVH 102**

**HCOM 106/205 Communication** — 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.

**HCOM 205** see **HCOM 106**

**MATH 182 Basic Mathematics** — Measurement and conversions. Basic algebra and geometry applied to problems involving mixtures, dilutions, flow rates. Functions and graphing. Logarithms, with application to graphing and sound intensity. Exponential growth and decay.

**MATH 282 Statistics** — Descriptive and inferential statistics. Measures of central tendency and dispersion. Probability. Binomial and normal distributions. Sampling theory. Confidence limits and hypothesis testing. Correlation and regression. Chi square test.

**PHYS 212 Environmental Physics** — An introduction to the physical principles, properties and relationships of physical quantities and how they affect each other. Motion, force, energy, power, properties of matter, thermal energy, electricity, wave motion, sound light and radiation as they apply to environmental topics. The lab program emphasizes measurements, data analysis and experimental techniques while confirming and expanding the lecture concepts.

## Faculty and Staff

John M. Pelton, B.A., C.P.H.I. (C), *Department Head*
E. J. Borsky, Dipl.T.
A.A. Guite, B.Sc., M.P.M., C.P.H.I. (C)
C.L. Young, C.E.T, 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 labour officials on ways to improve productivity by implementing loss control programs.

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

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

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

### Job Opportunities

Career openings are found in industries and regulatory agencies where the health and safety of the workers is of concern.

### The Program

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

### Prerequisites

Algebra 12, Chemistry 11 and Physics 11 are course requirements for this program. 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 |
|---|---|---|
| CHEM 115 | General Chemistry 1 | 6 |
| HCOM106 | Communication | 3 |
| MATH 188 | Basic Mathematics | 4 |
| OH&S 101 | Principles of Accident Prevention 1 | 5 |
| OH&S 102 | Policies in Industrial Health & Safety | 3 |
| PHYS 114 | Physics | 5 |
| | Library and Research | 9 |
| | | 35 |

| Year 1 | Term 2 | |
|---|---|---|
| ADMN110 | Management 1 | 1 |
| ADMN221 | Organizational Behavior Fundamentals | 1 |
| BHSC 204 | Anatomy and Physiology | 2 |
| CHEM 215 | General Chemistry 2 | 5 |
| CHSC 288 | Engineering Concepts 1 | 4 |
| HCOM205 | Communication 2 | 3 |
| MATH 288 | Statistics | 4 |
| OH&S 201 | Principles of Accident Prevention 2 | 4.5 |
| PHYS 216 | Physics | 5 |
| | Library and Research | 5.5 |
| | | 35 |

| Year 2 | Term 3 | |
|---|---|---|
| ADMN342 | Human Resource Management | 2 |
| BLDG 121 | Drafting & Blueprint Reading | 3 |
| CHEM 315 | Organic Chemistry | 6 |
| CHSC 388 | Engineering Concepts 2 | 4 |
| OH&S 202 | Industrial Hygiene 1 — Noise & Vibration | 3 |
| OH&S 301 | Fire Protection | 5 |
| OPMT 181 | Ergonomics | 5 |
| | Library and Research | 7 |
| | | 35 |

| Year 2 | Term 4 | |
|---|---|---|
| ADMN331 | Industrial Relations | 1 |
| ADMN360 | Microcomputer Software Systems | 1 |
| BMET 488 | Electrical Power & Machinery | 4 |
| CHEM 418 | Industrial Chemical Processes | 3 |
| HCOM308 | Communication 3 | 2 |
| MECH 206 | Mechanics of Materials | 4 |
| OH&S 302 | Occupational Diseases | 2 |
| OH&S 303 | Security Systems | 2 |
| OH&S 401 | Loss Control and Auditing | 4 |
| OH&S 402 | Industrial Hygiene 2 — Toxicology | 5 |
| | Library and Research | 7 |
| | | 35 |

## Subject Outlines

**ADMN 110 Management 1** — Designed to give the student a basic understanding of management and accounting. It covers planning, directing, organizing, budgeting and accounting.

**ADMN 221 Organizational Behaviour Fundamentals** — Studies behaviour 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.

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

**ADMN 342 Human Resource Management** — An introduction to the fundamentals of personnel management including human resource planning; recruiting and selection techniques; job analysis, descriptions and evaluation; compensation administration; performance appraisal systems; training; employee safety and health. Current employment legislation is also reviewed.

**ADMN 360 Microcomputer Software Systems** — Gives students a basic understanding of the microcomputer and available software. It provides hands-on experience in using various software packages such as word processing and spread sheets as well as the application of software to the field of Occupational Health and Safety.

**BHSC 204 Anatomy and Physiology** — Provides basic knowledge of human anatomy and physiology with emphasis on the physiology of human body systems and how environmental factors affects these systems.

**BLDG 121 Drafting and Blueprint Reading** — Incorporation and interpretation of applicable safety regulations in construction drawings, with respect to plant design, lighting, heating, ventilating, air conditioning, fire control, machine details and guards.

**BMET 488 Electrical Power and Machinery** — An introductory course in electrical power and machinery with an emphasis on safety aspects. Topics include electrical technology, insulators, conductors, magnetism, capacitors, transformers, Canadian electrical code, motors, generators, high voltage, hazardous locations, overload, electrical injuries, grounding, transformers, lock-out procedures and limits of approach.

**CHEM 115/215 Chemistry 1 and 2** — An introductory course with emphasis on topics of primary importance to Occupational Health and Safety, including: flammable and explosive materials; fire and fire extinguishing materials; corrosive materials; mutagenic, carcinogenic and toxic materials. In dealing with more general topics, cases and examples are selected which are of particular interest to the student in this technology. Weekly laboratory exercises reinforce awareness of chemical hazards and develop basic chemical knowledge.

**CHEM 215** see **CHEM 115**

**CHEM 315 Organic Chemistry 1** — Includes a study of the major functional groups with emphasis on the nomenclature, structure, and physical and chemical properties of those compounds that are occupational health hazards within each functional group.

**CHEM 418 Industrial Chemical Processes** — Designed to give the student an understanding of the chemical processes involved in selected industries; the chemicals used, chemical reactions, products manufactured, waste products, pollutants produced and methods of emission control. Chemical aspects of air pollution and health effects of pollutants are also discussed. Guided tours to selected industries will be conducted. Attendance is compulsory.

**CHSC 288/388 Engineering Concepts 1 and 2** — Covers test procedures for mechanical properties; non-destructive testing and failure analysis; the basic concepts of engineering materials including metals, alloys, plastics, woods, ceramics and concrete.

**CHSC 388** see **CHSC 288**

**HCOM 106/205/308 Communication 1, 2 and 3** — Provides lectures in theory and lab sessions to practice writing skills. Content includes writing fundamentals, letter writing strategy, employment correspondence, memo writing strategy, construction and use of forms, writing the short report, library research techniques, oral communication skills, and efficient reading/listening techniques.

**HCOM 205** see **HCOM 106**

**HCOM 308** see **HCOM 106**

**MATH 188 Basic Mathematics** — Measurement and conversions. Basic algebra and geometry applied to problems involving mixtures, dilutions, flow rates. Functions and graphing. Logarithms, with application to graphing and sound intensity. Exponential growth and decay.

**MATH 288 Statistics** — Descriptive and inferential statistics. Measures of central tendency and dispersion. Probability. Binomial and normal distributions. Sampling theory. Confidence limits and hypothesis testing. Correlation and regression. Chi square test.

**MECH 206 Mechanics of Materials** — This course covers the basic concepts of properties of materials including direct tensile, compressive and shear stress, thermal stresses, torsion shear and bending in beams, centroids and inertia, stresses due to bending, vertical shear, combined stresses, definition of beams, columns, pressure vessels and connections.

**OH&S 101 Principles of Accident Prevention 1** — Covers the history of the safety movement, a management approach to accident prevention, the root causes and real costs of accidents, accident investigation, inspections, job safety analysis, maintaining interest in safety, special problem solutions, motivation, the problem employee, and off-the-job safety.

**OH&S 102 Policies in Industrial Health & Safety** — Deals with legislation relevant to the safety field. The various legislative requirements as well as the agencies enforcing them will be examined. Also covered are advisory and testing organizations.

**OH&S 201 Principles of Accident Prevention 2** — Covers accident prevention for industrial operations. The engineering and technology involved in the various operations is examined. Topics include industrial buildings and plant layouts; construction and maintenance; manual handling and material storage; hoisting apparatus and conveyors, ropes, chains and slings; powered industrial trucks; elevators; principles of guarding; woodworking and metal working machinery; cold forming of metals; hot working of metals; welding and cutting.

**OH&S 202 Industrial Hygiene 1-Noise & Vibration** — Reviews relevant topics in acoustics, audiometry, noise dosimetry and noise control within buildings. The student will be introduced to basic methods of sound measurement and the assessment of hearing loss. At the end of this course, the student will be able to estimate noise in the work environment and recommend simple sound control measures, associated with the use of enclosures, damping and absorbent materials. Prerequisites: Year 1 of the Occupational Health and Safety program, or permission of the instructor.

***OH&S 301 Fire Protection*** — The handling and storage of flammable and combustible liquids, chemical hazards, dust explosions, bleve, electrical hazards, construction features, chemistry of fire, fire detection, portable extinguishers, automatic sprinkler systems and inspection procedures.

**OH&S 302 Occupational Diseases** — Provides the student with an overview of occupational diseases in terms of their causes and prevalence, methods of spread and of their prevention. There is discussion of the responsibility of the worker and various professionals as well as the worker in the management of occupational diseases. Emphasis is placed on those diseases of the lungs which are commonly experienced by workers in B.C. There is discussion on a wide range of problems from contaminated water, food supplies, to scabies and causes of silicosis and "white fingers" disease.

**OH&S 303 Security Systems** — Gives the student a basic understanding of the security field. It covers threat analysis, physical and electronic barriers, risk management, alarm systems, identification methods and human factors.

**OH&S 401 Loss Control and Auditing** — Covers emergency planning, insurance aspects, computers in safety, auditing, design of a complete safety program, office safety and a study of the loss control aspects of typical B.C. industries.

**OH&S 402 Industrial Hygiene 2 — Toxicology** — This basic course allows the student to identify, monitor, evaluate and recommend control measures for common chemical and physical hazards in the work place. The first part of the course reviews the concepts of toxicity and hazard as they apply to the development of permissible levels. The toxicity of common gases, vapours, dusts and fumes is reviewed. The second part of the course discusses the hazards associated with excessive exposure to ionizing and non-ionizing radiation, temperature and pressure extremes.

**OPMT 181 Ergonomics** — Ergonomics concentrates on human factors in the scientific study of people at work, especially regarding worker safety, health, efficiency and comfort. The course explores recent trends in the ergonomics field in relation to the physical working environment, adaptation of tools and workplace to the worker, equipment design, impact on productivity and viewpoints of both workers and management.

**PHYS 114/216 Physics** — An introductory course emphasizing the application of physics to the health and safety field. 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 measurements, data analysis, experimental technique and report writing. Mathematical treatment requires algebra and trigonometry.

The laboratory portions of the course will teach the student to use equipment commonly used in surveying for industrial hazards. Ventilation control measures and respirators will also be reviewed. Prerequisites: Industrial Hygiene 1, or permission of the instructor.

**PHYS 216** see **PHYS 114**

**NOTE: Curriculum subject to revision.**

## Faculty and Staff

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

## 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 electronics apparatus for diagnostic and therapeutic purposes, and an awareness of the need for its safe use and maintenance, have further increased this demand.

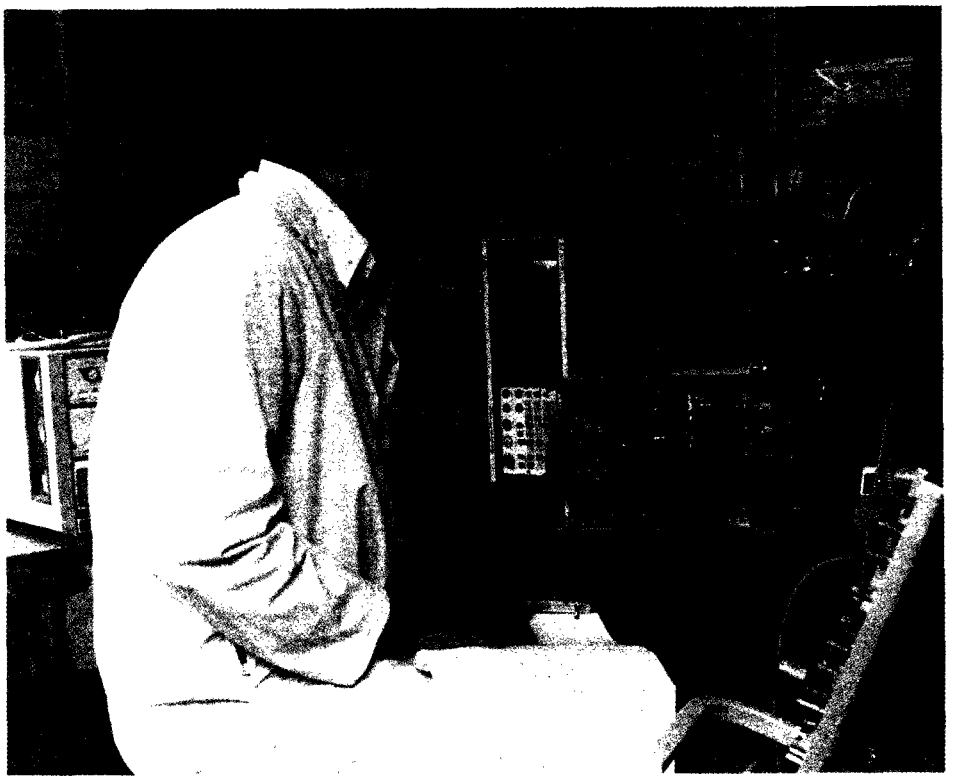
For students interested in medical technology, there are two program options available — Biomedical Electronics and Electrophysiology. While the two programs may appear similar in design, they do offer two alternative career opportunities.

The **Biomedical Electronics** option is a two year program designed to train students in the technical aspects of the equipment used in medical and biological applications.

The **Electrophysiology Clinical** advanced option is a two year program designed to train students in the use of electronic and electromechanical equipment to measure biomedical signals in a clinical environment. An example would be the measurement and processing of electroneurophysiological signals.

## Faculty and Staff

George Eisler, M.A.Sc., P.Eng.,
*Department Head*
M.J. Barrett, Dipl.T., C.E.T.
P.K. Chiu, B.Eng., M.Sc., Ph.D., P.Eng.
N. Fong, B.Sc., B.A.Sc., P.Eng., C.C.E.,
Program Head
M. Young, B.A., Dipl.T., R.E.T.



# Biomedical Electronics Programs

## Biomedical Electronics Option

### Job Opportunities

Biomedical electronics technologists may be employed in hospitals, clinics, research labs or industry. The technologists 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, defibrillators, 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; preventative maintenance programs; specification, evaluation and purchasing; instruction in operation and handling; safety inspection. 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 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**
Algebra 12, Physics 11, Chemistry 11 all with a C+ standing are course requirements and/or a selection/counselling interview with members of the department. Applicants who have special backgrounds and/or experience will also be considered on an individual basis.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| BMET 100 | Electronics Principles and Practice 1 | 7 |
| BMET 102 | Devices & Techniques 1 | 1 |
| CHEM 107 | Chemistry | 6 |
| ELEC 152 | Electrical Measurements | 4 |
| HCOM104 | Technical Writing | 3 |
| MATH 178 | Basic Technical Mathematics | 8 |
| | Library and Research | 6 |
| | | 35 |

| Year 1 | Term 2 | |
|---|---|---|
| BHSC 202 | Human Anatomy and Physiology | 5 |
| BMET 200 | Electronics Principles and Practice 2 | 8 |
| BMET 202 | Devices & Techniques 2 | 1 |
| CHEM 207 | Introduction to Organic Biochemistry | 6 |
| GNNU182 | Introduction to Patient Care | 1 |
| HCOM203 | Technical Writing | 2 |
| MATH 278 | Boolean Algebra and BASIC Programming | 8 |
| | Library and Research | 4 |
| | | 35 |

| Year 2 | Term 3 | |
|---|---|---|
| BMET 300 | Electronics Principles and Practice 3 | 6 |
| BMET 301 | Biomedical Electronics 1 | 7 |
| BMET 310 | Digital Electronics 1 | 8 |
| ELEC 252 | Measurement Principles and Techniques | 4 |
| MATH 378 | Statistics | 3 |
| PHYS 324 | Biophysics | 3 |
| | Library and Research | 4 |
| | | 35 |

| Year 2 | Term 4 | Clrm hrs/wk |
|---|---|---|
| BMET 401 | Biomedical Electronics 2 | 6 |
| BMET 402 | Biomedical Electronics Project | 3 |
| BMET 403 | Medical Imaging | 4 |
| BMET 410 | Digital Systems and Microprocessors | 7 |
| CHEM 411 | Instrumental Analysis | 4 |
| CHSC 478 | Materials Workshop | 4 |
| ELEC 399 | Video Fundamentals | 3 |
| HCOM301 | Advanced Communication | 1 |
| | Library and Research | 3 |
| | | 35 |
| BMET 420 | Practical Experience in Biomedical Electronics | 35 |

Most courses taken within the program require successful completion of certain prerequisites. For further information contact the Registrar's Office.

## Electrophysiology Clinical Option

Modern hospitals and health care clinics require the services of trained technologists to operate sophisticated electroneurophysiological testing equipment and other related biomedical equipment. In order to understand the operation of this equipment, the graduate will have studied 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 within the clinical environment. Extensive clinical experience is built into the program to ensure that the student develops necessary practical skills in the work environment.

**Job Opportunities**
Graduates 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 similar to the first year Biomedical Electronics.

In the fall term, special courses in Electrophysiology, Neuroanatomy and Neurophysiology will train students in the basics of biological signal measurement and clinical apparatus. In the spring term (20 weeks) different areas of clinical experience will be covered: electroencephalography; electromyography; audiology; opthamology (and other evoked potentials); cardiology; and other clinical areas that might include diagnostic vascular labs.

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, students will become eligible to write the National Certification Examinations of the appropriate certifying body of their chosen fields of interest.

It is expected that some 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**
Algebra 12, Physics 11 and Chemistry 11 all with a C+ standing are the course requirements for this program. Individuals wishing to enter this field should be interested in the welfare of people, and should have an aptitude for physics, electrical and mechanical apparatus. Applicants who have special background and/or experience will also be considered on an individual basis.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| BMET 100 | Electronics Principles and Practice 1 | 7 |
| BMET 102 | Devices & Techniques 1 | 1 |
| CHEM 107 | Chemistry | 6 |
| ELEC 152 | Electrical Measurements | 4 |
| HCOM104 | Technical Writing | 3 |
| MATH 178 | Basic Technical Mathematics | 8 |
| | Clinical Experience and Library Research | 6 |
| | | 35 |

| Year 1 | Term 2 | Clrm hrs/wk |
|---|---|---|
| BHSC 202 | Human Anatomy and Physiology | 6 |
| BMET 200 | Electronics Principles and Practice 2 | 8 |
| BMET 202 | Devices & Techniques 2 | 1 |
| CHEM 207 | Introduction to Organic Biochemistry | 6 |
| GNNU182 | Introduction to Patient Care | 1 |
| HCOM203 | Technical Writing | 2 |
| MATH 278 | Boolean Algebra and BASIC Programming | 8 |
| | Clinical Experience and Library Research | 3 |
| | | 35 |

| Year 2 | Term 3 | |
|---|---|---|
| BHSC 312 | Neuroanatomy and Physiology | 4 |
| BHSC 339 | Human Behavior | 3 |
| ENPY 300 | Electronics Principles and Practice 3 | 6 |
| ENPY 301 | Biomedical Electronics 1 | 7 |
| ENPY 350 | Electrophysiology | 10 |
| | Clinical Experience and Library Research | 5 |
| | | 35 |

| Year 2 | Term 4 | |
|---|---|---|
| ENPY 450 | Clinical Experience in Electrophysiology | 35 |

Most courses taken within the program require successful completion of certain prerequisites. For further information contact the Registrar's Office.

## Subject Outlines

**BHSC 202 Human Anatomy and Physiology** — The basic structure and function of the human body is discussed using the systems approach. The cell's role as the unit of structure and function is emphasised. Emphasis is also placed on the regulation of body functions and the role of control systems in homeostasis. Examples of the uses of biomedical instrumentation in diagnosis and treatment are given.

**BHSC 312 Neuroanatomy and Neurophysiology** — Reviews the normal anatomy and functions of the brain and disease states encountered in EEG practice. Also includes 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.

**BHSC 339 Human Behavior** — Basic considerations of behavioral science relevant to the Electrophysiology Technologists' concerns will be explored. Theory and research findings dealing with stress and illness behavior will be presented. Professional and ethical considerations and ways of dealing with common hospital events will be explored. Emphasis will be on human relations skills in dealing with patients and staff.

**BMET 100 Electronics Principles and Practice 1** — Provides students with basic knowledge of electrical quantities, their units and relationships. The course includes DC circuit analysis technqiues 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.

**BMET 102/202 Devices and Techniques 1 and 2** — A lab/lecture course designed to introduce the student to various electrical/electronic devices. In addition, various techniques in circuit construction, fabrication, operation, testing and troubleshooting are explained. Course includes an introduction to the varieties of test equipment in the program.

**BMET 200 Electronics Principles and Practice 2** — Analyzes the properties of passive RLC circuits and introduces basic active devices and integrated circuits. Topics include RLC resonant circuits, bipolar transistor and FET fundamentals, discrete amplifier circuits (single and multistage), amplifier stability, Miller effect, power amplifiers, oscillators, power supplies, regulators, IC regulators, differential amplifiers and operational amplifiers.

**BMET 202** see **BMET 102**

**BMET 300 Electronics Principles and Practice 3** — Covers topics such as integrated circuit components and the uses of various other semiconductor components, e.g. Op Amp, FET, SCR, opto-electronics components, timers, etc. Lab exercises are coordinated with course content.

**BMET 301 Biomedical Electronics 1** — Introduces students to 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.

**BMET 310 Digital Electronics 1** — A study of basic digital techniques. Topics include switch and relay control; numbering systems; Boolean algebra; codes and coding; solid state logic (TTL, CMOS, HCOMS); noise and loading; encoders, decoders, display generators, relay drivers and delay devices; counters, shift registers and arithmetic systems; NMOS, CMOS, ECL, Schottky, IIL circuits, A/D and D/A conversion, multiplexing, time and frequency measurement and frequency synthesis.

**BMET 401 Biomedical Electronics 2** — Introduces students to various types of electronic equipment used in the biomedical environment. Selected types are covered in detail e.g.: patient monitoring, cardiac resuscitation, EEG, infusion devices, electrosurgical, telemetry and nuclear medicine equipment. Electrical safety, equipment control and working environment considerations are included. Lab exercises are coordinated with course content.

**BMET 402 Biomedical Electronics Project** — Students will build a device such as an ECG simulator using the latest technology and design techniques. Students will gain experience regarding the actual implementation of a project such as planning, designing, material acquisition, prototyping, Printed Circuit designing, construction, testing, calibration, commissioning and evaluation. A technical report for the project is also required.

**BMET 403 Medical Imaging** — Introduces the concepts involved in imaging systems used in medicine. Equipment examined includes X-ray, nuclear medicine, ultrasound, etc.

**BMET 410 Digital Systems and Microprocessors** — An introduction to microprocessor hardware and software. Topics to be covered: digital arithmetic, memories and mass storage devices, microprocessor architectures, memory and I/O decoding, I/O techniques, interrupts, DMA, LSI/VSLI peripheral chips, data communications, memory management and virtual memory, instruction sets, software development methods, subroutines, data types, operating systems, editors, assemblers, linking loaders, and introduction to a high level language (Pascal/C/Modular-2) as a microprocessor development tool.

**BMET 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. The seminar week may include short course work (for credit).

**CHEM 107/207 General Chemistry** — 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.

**CHEM 207** see **CHEM 107**

**CHEM 411 Instrumental Analysis** — 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.

**CHSC 478 Materials 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.

**ELEC 152 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.

**ELEC 252 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.

**ELEC 399 Video Fundamentals** — An introductory course covering the basic principles of video display. Topics include raster scan, industrial composite video signals, character generation, video projects.

**ENPY 350 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 to equipment; related important clinical tests for the above equipment; ultrasonics.

**ENPY 450 Clinical Experience in Electrophysiology** — An appropriate amount of time is spent in each of the following clinical areas: EEG; EMG; cardiovascular laboratory; audiology; opthalmology. Program will be tailored to the specific student. Clinical work may be out-of-town.

**GNNU 182 Introduction to Patient Care** — Introduces students to the hospital environment and the basic safety concepts of patient care. It includes observation and communication skills, body mechanics, fire safety and medical and surgical asepsis.

**HCOM 104/203 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.

**HCOM 203** see **HCOM 104**

**HCOM 301 Advanced Communication** — A seminar based course which applies the fundamentals of technical writing to student technical papers for Term 4 courses.

**MATH 178 Basic Technical 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 uses in AC circuit analysis.

**MATH 278 Boolean Algebra and BASIC Programming** — A course in Boolean algebra, BASIC programming and calculus with applications throughout the biomedical electronics fields. Boolean algebra can be applied to digital circuit simplification and design. BASIC programming is an introduction to computer programming. The calculus portion of this course is to be taught to Biomedical Electronics option students only and consists of differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions, integration techniques, partial differentiation, first and second order differential equations.

**MATH 378 Statistics** — Provides students with basic knowledge of statistics. Topics include random sampling, measurement and rounding, frequency distributions, measures of central tendency, measures of dispersion, normal distribution, ranks and percentiles. Estimation, central limit theorem, standard errors, confidence intervals, hypothesis testing, null and alternate hypothesis, large sample hypothesis testing, t distribution, small sample hypothesis testing and non-parametric testing will also be covered. Computer packages will be discussed.

**PHYS 324 Biophysics** — 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.

# Health Information Technology

## Department of Health Engineering Services

Health Information Technology offers interested students the advantage of two program options — a one year health record technician option and a two year health record administrator option. The two options have essentially an equivalent first year curriculum and are designed to meet the requirements of prospective employers. Both options are open to female and male candidates. Applicants are advised to discuss the nature of the work with health record administrators or technicians currently working in the field.

Health record professionals make a valuable contribution to the health care system. They provide a very special service to the administrative and treatment teams in a health facility, a service that provides the information necessary to manage the facility to its best advantage while giving patients the best possible care. The major source of health information is the health or medical record which summarizes the information about the patient's care.

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

The Health Information Technology program is fully accredited by the Canadian College of Health Record Administrators (CCHRA). Successful completion of the national examination qualifies the graduate to work anywhere in Canada.

## Faculty and Staff

George Eisler, P.Eng., *Department Head*
Elaine Gibson, CCRHA(C), Program Head
Laurie Montgomery, BHRS, CCHRA(C)
Betty Nelson, CCHRA(C)

## Health Record Administrator Option

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

Health record departments of hospitals and health agencies require the specialized services of health record administrators to develop, manage and utilize health information systems.

**Job Opportunities**

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

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

**The Program**

In collaboration with the Health Record Association of British Columbia and health care agencies, BCIT has designed the Health Record Administrator option to provide two years of instruction in the form of lectures, lab exercises and practical experience. In the first year, students concentrate on the basic health sciences and acquire a fundamental knowledge of health record science. Two weeks of introductory practical experience in hospital health record departments will be provided during term 2. In the second year, health record administration, management, labor relations, organizational theory and computer applications will be stressed. During the last term of the program, a ten week practicum in health record departments of local hospitals and various health agencies will take place. Students incur the costs of travel and living expenses during practicum sessions.

Students are expected to become members of the HRABC while attending the program. To be recognized by the CCRHA, graduates will successfully write the national examination thus becoming Certificant members of the CCHRA.

Graduates will possess the skills required to meet current and future demands for technologists trained in health record procedures and managerial skills.

**Prerequisites**

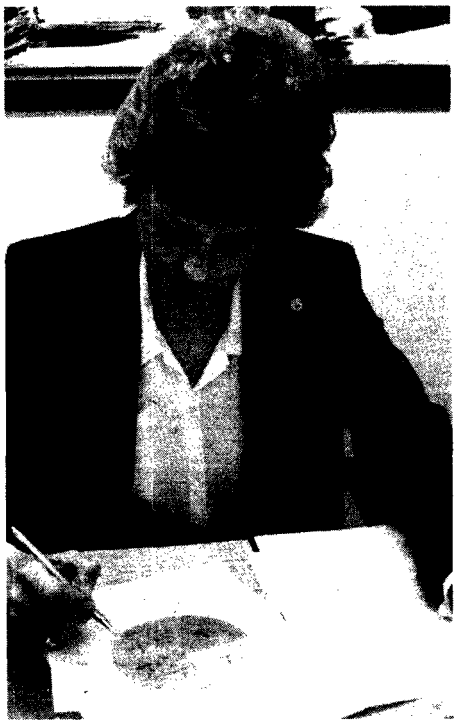
Algebra 12, Biology 12, and proficiency in typing (approximately 50 wpm) are course requirements for this program. Maturity, responsibility and an interest in health care and information management are essential. The work involved demands attention to detail, accuracy, initiative and effective interpersonal skills.

Applicants are required to have a successful personal interview with HIT faculty following a visit to an acute care general hospital health record department.

## Course of Studies

| Year 1 | Term 1, Set 80A1 | Clrm hrs/wk | Credits |
|---|---|---|---|
| BHSC 103 | Human Anatomy and Physiology | 4 | 4 |
| BHSC 122 | Microbiology | 3 | 3 |
| HCOM105 | Communication | 4 | 4 |
| HITA 100 | Health Record Science | 6 | 6 |
| HITA 101 | Medical Terminology | 4 | 4 |
| HITA 102 | Health Record Laboratory | 3 | 2 |
| MATH 180 | Statistics 1 | 4 | 4 |
| MLAB 107 | Introduction to Clinical Laboratory | 3 | 3 |
| | | 31 | 30 |

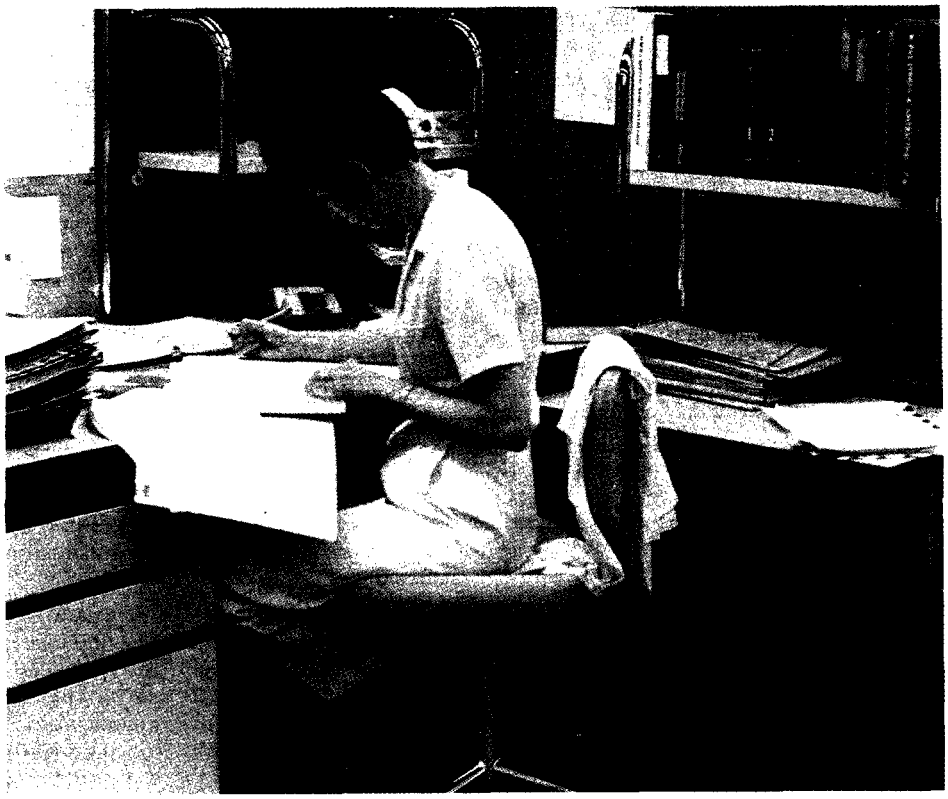
| Year 1 | Term 2, Set 80A2 | | |
|---|---|---|---|
| BHSC 203 | Human Anatomy and Physiology | 3 | 4.5 |
| COMP 111 | Data Processing Introduction | 3 | 4 |
| HCOM204 | Communication | 3 | 4.5 |
| HITA 103 | Medical and Surgical Transcription 1 | 2 | 1 |
| HITA 200 | Health Record Science | 4 | 4.5 |
| HITA 201 | Concepts of Disease Processes | 6 | 7.5 |
| HITA 202 | Health Record Practicum | 35 | 3 |
| HITA 210 | Health Information Processing | 7 | 10 |
| MATH 280 | Statistics 2 | 4 | 6 |
| | | 32 | 45 |



| Year 2 | Term 3, Set 80A3 | Clrm hrs/wk | Credits |
|---|---|---|---|
| BHSC 337 | Organizational Psychology | 4 | 4 |
| COMP 211 | Computer Applications 1 | 3 | 3 |
| HITA 300 | Health Record Administration | 7 | 7.5 |
| HITA 303 | Health Record Technological Developments | 3 | 3 |
| HITA 310 | Health Information Processing | 8 | 8.5 |
| OPMT 169 | Management Engineering 1 | 4 | 4 |
| | | 29 | 30 |

| Year 2 | Term 4*, Set 80A4 | | |
|---|---|---|---|
| BHSC 437 | Organizational Psychology | 4 | 3 |
| COMP 311 | Computer Applications 2 | 4 | 3 |
| HITA 400 | Health Record Administration | 6 | 5.5 |
| HITA 410 | Health Information Processing | 8 | 7.5 |
| HITA 420 | Health Information Practicum | 35 | 20 |
| HITA 430 | Health Labor Relations | 3 | 3 |
| OPMT 269 | Management Engineering 2 | 4 | 3 |
| | | 29 | 45 |
| | | TOTAL | 150 |

***Courses run from January to spring break in March to be followed by 35 hours/week, 10 week practicum from mid-March to end of May.**



## Health Record Technician Option

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

This program is designed to train students in the technical aspects of health record science. Each graduate receives a Certificate of Technology from BCIT and is eligible for recognition by the Canadian College of Health Record Administrators at the Associate level (CCHRA[A]).

### Job Opportunities

The program is designed to prepare graduates for small hospitals where they may assume major responsibilities in the health record department, and for larger hospitals where they work under the supervision of a health record administrator. Other hospital departments and health facilities (such as the Cancer Control Agency of B.C. or Greater Vancouver Mental Health Services) provide additional employment opportunities.

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

### The Program

Lectures, lab exercises and practical experience are combined in the training of health record technicians. Basic health sciences and the fundamentals of health record science are taught in depth. Two weeks of introductory practical experience in hospital health record departments will be provided during term 2. Also during term 2, the student will be introduced to health information processing, data processing, department management and supervision. The program concludes with a more advanced five week practicum during which technical experience is provided by hospital health record departments. Students incur costs of travel and living expenses for practicum sessions.

Students are expected to become members of the HRABC while attending BCIT. To be recognized by the CCHRA, graduates will successfully complete the national examination, thus becoming Associate members of the CCHRA.

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, with suitable prerequisites, returning to BCIT for the second year of the Health Record Administrator Option.

### Prerequisites

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.

Applicants are required to have a successful personal interview with HIT faculty, following a visit to an acute care general hospital health record department.

## Subject Outlines

| Year 1 | | Term 1, Set 80T1 | Clrm hrs/wk | Credits |
|---|---|---|---|---|
| BHSC | 103 | Human Anatomy and Physiology | 4 | 4 |
| BHSC | 122 | Microbiology | 3 | 3 |
| HCOM | 105 | Communication | 4 | 4 |
| HITA | 100 | Health Record Science | 6 | 6 |
| HITA | 101 | Medical Terminology | 4 | 4 |
| HITT | 103 | Medical and Surgical Transcription 1 | 2 | 1 |
| HITT | 105 | Health Record Laboratory | 3 | 2 |
| MATH | 180 | Statistics 1 | 4 | 4 |
| MLAB | 107 | Introduction to Clinical Laboratory | 3 | 3 |
| | | | 33 | 31 |

| Year 1 | | Term 2, Set 80T2 | | |
|---|---|---|---|---|
| BHSC | 203 | Human Anatomy and Physiology | 3 | 4.5 |
| COMP | 111 | Data Processing Introduction | 3 | 4 |
| HCOM | 204 | Communication | 3 | 4.5 |
| HITA | 200 | Health Record Science | 4 | 4.5 |
| HITA | 201 | Concepts of Disease Processes | 6 | 7.5 |
| HITA | 210 | Health Information Processing | 7 | 10 |
| HITT | 203 | Medical and Surgical Transcription 2 | 4 | 4 |
| HITT | 205 | Health Record Practicum | 35 | 3 |
| | | | 30 | 43 |

| Year 1 | | Term 2C | | |
|---|---|---|---|---|
| HITT | 305 | Health Record Practicum (Five week block practicum in May-June) | 35 | 10 |
| | | | TOTAL | 84 |

## Subject Outlines

**BHSC 103/203 Human Anatomy and Physiology** — Provides students with an understanding of normal body structure and function, and relates this knowledge to various aspects of the work performed by health record technicians and administrators such as coding and abstracting, data collection for evaluation of patient care, and specification of documentation requirements in the health record.

**BHSC 122 Microbiology** — Deals with the basic characteristics of various types of micro organisms that cause disease in humans. The concepts of communicability and host resistance are included and related to nosocomial infections.

**BHSC 203** see **BHSC 103**

**BHSC 337/437 Organizational Psychology** — Prepares students to work in health records departments in health care institutions at the department head level. Organizational behavior theory and research findings will be presented and applied to situations encountered in health care organizations. Role playing and other involvement exercises will be used to apply the theory. Students will be encouraged to present their work-related experiences to discuss the course content.

**BHSC 437** see **BHSC 337**

**COMP 111 Introduction to Data Processing** — Lectures and practical exercises are used to present topics such as: computer operations; input, output, and storage devices; input and reporting methods; report design; data accuracy and error correcting; file processing; systems design concepts; flowcharting; and programming using the BASIC language.

**COMP 211 Computer Applications 1** — Teaches Health Information Technology students the basics of computer systems design concepts with particular emphasis on health information systems. Lectures and labs will provide knowledge on file design, data storage concepts, systems flowcharting, forms design concepts, computer languages and the use of computers in the medical field.

**COMP 311 Computer Applications 2** — The objectives and components of health information systems are examined from various perspectives: types of systems, reasons for computerizing health information, and the role of the health record administrator in the needs assessment, analysis, design and management of health information systems. The evaluation and selection of hardware and software are also discussed.

**HCOM 105/204 Communication** — Health Record Administrators and Health Record Technicians spend several hours each day communicating on the job: writing letters and memos, completing forms, writing instructions and process descriptions, writing policies and procedures, preparing reports, giving oral presentations, chairing or participating in meetings, and conducting inservice education programs. This course teaches the skills to perform these tasks efficiently and effectively.

**HCOM 204** see **HCOM 105**

**HITA 100/200 Health Record Science** — This course provides students with knowledge and practice in the fundamental principles and procedures of health record science. After an orientation to the program and the profession, areas studied in the first term include a detailed examination of all aspects of the health record from formation to completion including numbering and filing systems; microfilming, record retention; hospital accreditation; interdisciplinary relations and intrahospital organization, confidentiality and release of health information. The second term incorporates a more detailed analysis of the profession, legal aspects of health records, the Canadian health care delivery system, and an introduction to management and supervision of a health record department.

**HITA 101 Medical Terminology** — An introduction to the language of medicine. Basic rules of medical terminology, medical abbreviations, medical specialties, hospital services and hospital statistical definitions are included. There will be a detailed study of medical prefixes, roots and suffixes, with emphasis on analysis and word-building.

**HITA 102/HITT 105 Health Record Laboratory** — Provides practical experience in the basic clerical and technical tasks performed in a health record department. The course coordinates with HITA 100 Health Record Science, and is conducted in a simulated health record department on campus.

**HITA 103/HITT 103 Medical and Surgical Transcription 1** — Transcription practice with medical, obstetrical, pathological and surgical reports. The course includes an introduction to the electronic typewriter with limited memory capacity, as well as an introduction to word processing. The emphasis is on accuracy of transcription and increasing competence with electronic equipment.

**HITA 200** see **HITA 100**

**HITA 201 Concepts of Disease Processes** — An introduction to the concepts of pathophysiology. Common diseases for each body system are studied in detail relating each to medical and surgical treatments. Diseases studied will be correlated with patient records in laboratory assignments.

**HITA 202/HITT 205 Health Record Practicum** — Provides practical experience in the basic clerical and technical tasks performed in a health record department. This course co-ordinates with HITA 100/200 Health Record Science, and is conducted off-campus in the health record departments of hospitals.

**HITA 210 Health Information Processing** — Deals with data collection, analysis, and presentation. Topics include classification systems, information systems (with emphasis on HMRI), data quality control, statistical formulae for health information, and an introduction to quality assurance. Labs consist of practice in coding and abstracting and in the retrieval and presentation of data from PAS and HMRI printouts.

**HITA 300/400 Health Record Administration** — These second year courses emphasize the problem-solving approach to certain aspects of health record administration. Areas of advanced study include specialized hospitals (patient records, statistics and accreditation), the problem oriented record, medicolegal and ethical aspects, the health care delivery system and the health record profession. Health record policies, procedures and forms design; administrative committees, office space and environmental planning and administration of the Admitting and Outpatient Department are also studied.

**HITA 303 Health Record Technological Developments** — Examines the technological advances found in health record departments today. Some of the "office of the future" areas discussed are computerized coding and abstracting, computerized CR/ADT, electronic mail and advances in word processing. Emphasis is on implementation and evaluation of these systems.

**HITA 310 Health Information Processing** — Emphasizes the management and use of health information. After a review of HITA 210 (particularly quality assurance and coding principles), the student will learn about the role of the Health Record Department (HRD) in a risk management program. Data collection and presentation will be studied and the student will be able to produce timely, effective, useful reports. Quality assurance, using a criteria audit system, will be reviewed and students will practice data retrieval and reporting with this methodology. An introduction to quality assurance for HRDs will be studied next with emphasis on the coding and abstracting functions. Weekly labs in coding and abstracting will be conducted throughout the term.

**HITA 400** see **HITA 300**

**HITA 410 Health Information Processing** — Examines the principles and practices of research and epidemiology. The development, implementation and maintenance of a quality assurance program for the health record department will be studied in depth.

**HITA 420 Health Information Practicum** — All courses must be successfully completed prior to participating in this practicum. Practical experience in the health record departments of general and specialized hospitals and other health facilities is provided, under the supervision of the director of health record services and a faculty member. After orientation to the clerical and technical duties, emphasis is placed on providing practice and instruction in the duties commonly performed by a health record administrator.

**HITA 430 Health Labor Relations** — A discussion of the development of labor relations in the health care environment, with detailed study of the basic principles of union practices, the application of collective agreements, the grievance procedure, and the collective bargaining process.

**HITT 103** see **HITA 103**

**HITT 105** see **HITA 102**

**HITT 203 Medical and Surgical Transcription 2** — A continuation of HITT 103 with increased emphasis on productivity and experience on word processing equipment. A major project concerned with the concepts, applications and evaluation of word processing services in the health record department is included.

**HITT 205** see **HITA 202**

**HITT 305 Health Record Practicum** — An advanced, five-week practicum for health record technician students. The course provides concentrated, practical experience in coding and abstracting in the health record departments of provincial hospitals. Students spend two weeks at the same site as the HITT 205 practicum and three weeks at a different site. All courses must be successfully completed prior to participation in this practicum.

**MATH 180 Statistics 1** — The course starts with a thorough review of basic math. Percentages, ratios and rates are reviewed and applied to the health information field. Mortality rates, adjusted rates and contingency tables are studied. Methods of data representation, in particular linear graphing techniques are studied. A review of logs and exponents is followed by a study of exponential growth and the use of logarithmic graph paper. The student is introduced to basic health statistics through a library project. The algebra of E notation is covered and followed by an introduction to descriptive statistics. Measures of central tendency and spread are covered.

**MATH 280 Statistics 2** — This course, for students in the health record administrator option only, covers the principles of inferential statistics — sampling techniques, normal distribution, inference on population, means and proportions, survey design.

**MLAB 107 Introduction to Clinical Laboratory** — An introduction to clinical lab procedures in the fields of clinical chemistry, urinalysis, hematology, histotechnology and immunohematology for the purpose of interpreting lab reports in reference to documentation on the health record, abstracting, and quality assurance studies.

**OPMT 169 Management Engineering 1** — Management principles are related to the health care industry in such areas as health care financing, a systems approach to health care, organizational structure, planning, organizing, directing and controlling. Quantitative approaches to the management function are stressed.

**OPMT 269 Management Engineering 2** — A continuation of the scientific principles of management as applied to work improvement and innovation in health care including problem solving, data collection and analysis, methods of work measurement and work sampling techniques, and implementation strategies.

# 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. Starting salaries are about $18,000 per year, rising to about $25,000 after certification.

### The Program

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

The Prosthetics and Orthotics Program is jointly funded by three western Canadian provinces: B.C., Alberta and Saskatchewan. Applications are accepted every second year on a pro-rated basis from each of the three provinces.

The next intake of students is set for September, 1986. For further information please contact the Department Head, Health Engineering Services Department.

### 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

Algebra 12 and Physics 11 are course requirements for this program. Metalwork and woodwork courses are recommended. Applicants should have a good academic background, manual dexterity, mechanical aptitude and good interpersonal skills. Patience and inventiveness are of considerable importance.

### Expenses

In addition to tuition fees, students will need approximately **$600** for textbooks and supplies for the two year program. Students are also responsible for costs of travel to and from agencies where practicums are held, and should be prepared to purchase certain small hand tools.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| BHSC 110 | Anatomy & Physiology (Systems) | 4 |
| HCOM111 | Technical Writing | 3 |
| MATH 184 | Basic Technical Mathematics | 4 |
| P/OT 100 | Prosthetics & Orthotics 1 | 15 |
| PHYS 121 | Physics | 4 |
| | Library and Research | 5 |
| | | 35 |

| Year 1 | Term 2 | 2A | 2B |
|---|---|---|---|
| BHSC 210 | Anatomy & Physiology (Systems) | 3 | 3 |
| BHSC 211 | Anatomy & Physiology (Regional) | 2 | 2 |
| BHSC 242 | Behavioral Science | 3 | 3 |
| CHSC 284 | Materials Workshop | 2 | 2 |
| GNNU183 | Patient Care | - | 3 |
| HCOM206 | Technical Writing | 3 | 3 |
| MATH 284 | Mathematics | 2 | 2 |
| P/OT 200 | Prosthetics & Orthotics 2 | 13 | 13 |
| P/OT 220 | Biomechanics | 2 | - |
| | Library and Research | 5 | 4 |
| | | 35 | 35 |
| P/OT 202 | Practicum — 3 weeks | | 35 |

| Year 2 | Term 3 | |
|---|---|---|
| BHSC 310 | Pathology & Pathophysiology | 3 |
| BHSC 311 | Anatomy & Physiology (Regional) | 2 |
| BMET 384 | Electrical Circuits | 8 |
| P/OT 300 | Prosthetics & Orthotics 3 | 15 |
| P/OT 320 | Biomechanics | 2 |
| | Library and Research | 5 |
| | | 35 |
| P/OT 302 | Practicum — 3 weeks | 35 |

| Year 2 | Term 4 | |
|---|---|---|
| P/OT 400 | Prosthetics & Orthotics 4 | 24 |
| P/OT 401 | Business Practices | 3 |
| P/OT 410 | Patient Assessment & Care | 3 |
| | Library and Research | 5 |
| | | 35 |
| P/OT 402 | Practicum — 5 weeks | 35 |

Within Prosthetics and Orthotics Technology, course content presumes successful completion of course prerequisites. These course prerequisites are listed on each detailed course outline distributed by the course instructor and are listed below. For further information contact the Department Head.

| Course | Course Name | Prerequisites |
|---|---|---|
| BHSC 210 | Anatomy & Physiology (Systems) | BHSC 110 |
| BHSC 211 | Anatomy & Physiology (Regional) | BHSC 110 |
| HCOM206 | Technical Writing | HCOM 111 |
| MATH 284 | Mathematics | MATH 184 |
| P/OT 200 | Prosthetics & Orthotics 2 | P/OT 100 |
| P/OT 202 | Practicum | P/OT 200/220<br>BHSC 210/211/242 |
| P/OT 220 | Biomechanics | PHYS 121 |
| **Term 3** | | |
| BHSC 310 | Pathology & Pathophysiology | BHSC 210 |
| BHSC 311 | Anatomy & Physiology (Regional) | BHSC 211 |
| BMET 384 | Electrical Circuits | MATH 284 |
| P/OT 300 | Prosthetics & Orthotics 3 | P/OT 200 |
| P/OT 302 | Practicum | P/OT 300/320<br>BHSC 310/311 |
| P/OT 320 | Biomechanics | P/OT 202 |
| **Term 4** | | |
| P/OT 400 | Prosthetics & Orthotics 4 | P/OT 300 |
| P/OT 402 | Practicum | P/OT 400/410 |
| P/OT 410 | Patient Assessment & Care | P/OT 300/302 |

## Subject Outlines

**BHSC 110/210 Anatomy and Physiology** — Informs students about the composition and functions of the human body, with emphasis on the nervous, muscular and skeletal systems. Functional anatomy of the musculoskeletal system is treated in detail. Emphasis is also placed on growth and aging processes.

**BHSC 210** see **BHSC 110**

**BHSC 242 Behavioral Science** — In a series of lectures, discussions and planned experiences, students are given a greater understanding of how various people react to physical loss or illness, and of the role to be played in assisting the handicapped to reintegrate 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.

**BHSC 310 Pathology and Pathophysiology** — Students explore basic concepts of the disease process, and the nature of the various disorders they are most likely to see in their prosthetic/orthotic practices. Topics such as cellular injury and death, trauma, inflammation and healing are covered. Specific disorders include bone, joint and muscle pathologies, neurological and hemodynamic disorders, metabolic and congenital abnormalities and neoplasia.

**BMET 384 Electrical 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.

**CHSC 284 Materials** — 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.

**HCOM 111/284 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 groups such 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.

**HCOM 284** see **HCOM 111**

**MATH 184/284 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.

**MATH 284** see **MATH 184**

**P/OT 100 Prosthetics and Orthotics 1** — Initially, students are oriented to the terminology, general concepts and devices commonly prescribed in the field. The area of Lower Limb Orthotics is then treated in detail, with the aim of developing competence in the materials, components and tools commonly used in the construction of lower limb orthoses.

**P/OT 200 Prosthetics and Orthotics 2** — The area of Lower Limb Prosthetics is examined in detail. Design principles underlying the patellar-tendon-bearing prosthesis, 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.

**P/OT 202/302/402 Practicum** — Students are given the opportunity to apply their knowledge of design principles and fitting procedures to a variety of patients under the supervision of a practicing prosthetic 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.

**P/OT 220/320 Biomechanics** — Force tolerance and mobility of the skeletal system are examined in detail to determine the functional loss associated with various physical disorders or amputations, and the residual function upon which a prosthesis or orthosis can be based. The effect of pressure on soft tissue is also explored. Various prostheses and orthoses are analyzed from the viewpoint of the mechanical forces at work and their effect on the disabled person.

**P/OT 300 Prosthetics and Orthotics 3** — Lower Limb Prosthetics is completed with the treatment of a Symes and partial foot prosthesis and a 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.

**P/OT 302** see **P/OT 202**

**P/OT 320** see **P/OT 220**

**P/OT 400 Prosthetics and Orthotics 4** — The area of Spinal Orthotics is covered, from the principles involved in fitting a corset, to the construction of CTLSO, Milwaukee type. Biomechanical principles and fitting guidelines will be emphasized more than construction technqiues. The area of

Upper Limb Prosthetics 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 are examined, with students fitting various myoelectric or switch-controlled devices.

**P/OT 401 Business Practices** — Students receive a basic understanding of the planning, organization, directing and controlling functions of business management. Topics such as human relations, management of time, budgeting and accounting, record keeping and labor relations will be covered, with examples drawn from actual prosthetic/orthotic facilities. The ethical and legal concerns of a health care professional will also be presented.

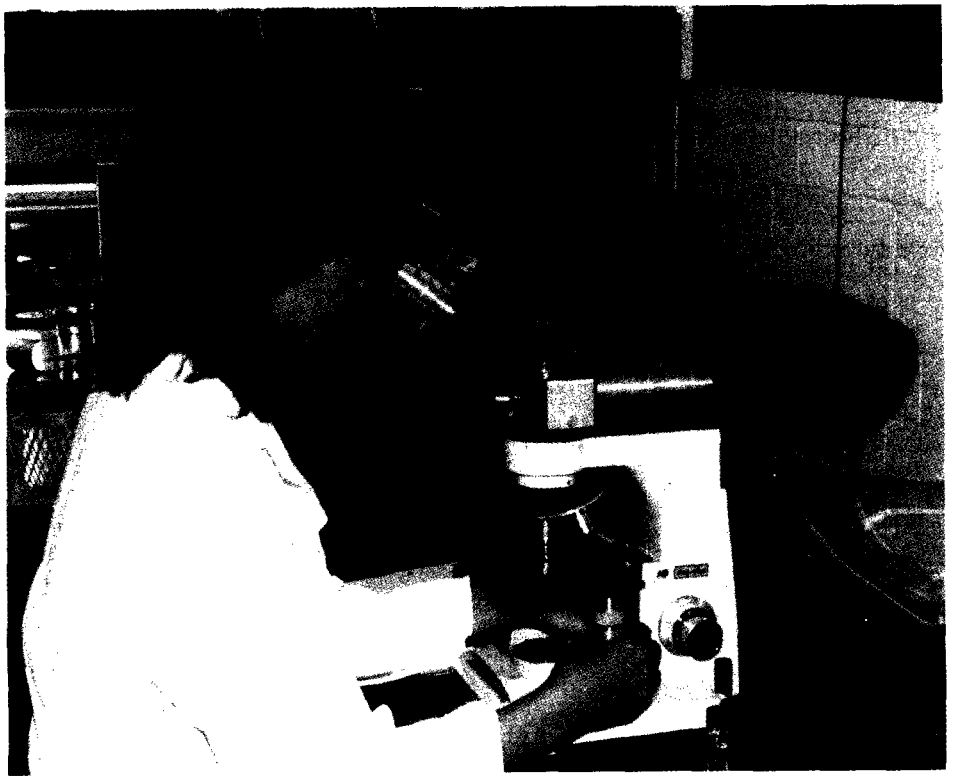
**P/OT 402** see **P/OT 202**

**P/OT 410 Patient Assessment and Care** — A series of presentations and projects help students learn how to evaluate patients from the viewpoint of functional loss, select appropriate devices to restore function, and design solutions to specific needs not met by available componentry. Basic principles and procedures for handling the disabled are also covered.

**PHYS 121 Physics** — A general course with emphasis on the application of physics to prosthetics and orthotics. Topics lie in the general field of mechanics and include kinematics, dynamics, statics, simple machines, energy and fluid mechanics. Measurement and problem solving techniques are stressed. Mathematical treatment requires algebra and trigonometry.

## Faculty and Staff

G. Eisler, M.A. Sc., P.Eng., CCE,
*Department Head*
I. Dyck, C.P.(C)
Wm. J. McGuinness, M.A., C.P.O.,
Program Head



# Medical Laboratory

## Department of Medical Laboratory Technology

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 patients. Laboratory screening programs continue to be developed which 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 pursuits 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 which includes a major introductory course to the field, 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 plus 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 the third year, the student is eligible to take the Canadian Society of Laboratory Technologists examination leading to Registered Technologist Certification, the recognized qualification for working as a technologist in a medical laboratory.

### Prerequisites

Algebra 12, Chemistry 11 and 12, and Physics 11 are course requirements for this program. Preference will be given to those applicants who have successfully completed Biology 12. Final acceptance into the program will be based on the results of a personal interview with a senior member of the Medical Laboratory faculty.

Applicants must be completely competent in written and oral English. Color blindness precludes admission. Applicants should have a strong interest in sciences, be capable of accepting responsibility and possess meticulous work habits.

## Course of Studies

| | | | Clrm hrs/wk |
|---|---|---|---|
| **Year 1** | | **Term 1** | |
| BHSC | 101 | Human Anatomy and Physiology | 3 |
| CHEM | 105 | Chemistry for MLT | 6 |
| HCOM | 101 | Communication | 4 |
| MATH | 170 | Basic Mathematics | 4 |
| MLAB | 101 | Medical Laboratory Technology Fundamentals | 9 |
| PHYS | 110 | Physics for MLT | 5 |
| | | Library and Research | 4 |
| | | | 35 |
| **Year 1** | | **Term 2** | |
| BHSC | 201 | Human Anatomy and Physiology | 3 |
| BHSC | 230 | Introductory Principles of Immunology | 3 |
| BHSC | 236 | Behavioral Science | 1 |
| CHEM | 205 | Chemistry for MLT | 6 |
| MATH | 270 | Statistics | 4 |
| MLAB | 201 | Medical Laboratory Technology Fundamentals | 9 |
| PHYS | 210 | Physics for MLT | 4 |
| | | Library and Research | 5 |
| | | | 35 |
| **Year 2** | | **Term 3** | |
| MLAB | 302 | Clinical Chemistry | 8 |
| MLAB | 303 | Hematology | 7 |
| MLAB | 304 | Histotechnology | 9 |
| MLAB | 305 | Clinical Microbiology | 8 |
| | | Library and Research | 3 |
| | | | 35 |
| **Year 2** | | **Term 4** | |
| MLAB | 402 | Clinical Chemistry | 9 |
| MLAB | 403 | Hematology | 7 |
| MLAB | 405 | Clinical Microbiology | 8 |
| MLAB | 406 | Immunohematology | 8 |
| | | Library and Research | 3 |
| | | | 35 |

## Subject Outlines

**BHSC 101/201 Human Anatomy and Physiology** — A systematic approach to the study of human anatomy and physiology for Medical Laboratory Technology students. Includes basic cytology and introduction to histology, and the skeletal, muscular, nervous, circulatory, respiratory, digestive, urinary and reproductive physiology of these systems. Basic biochemistry related to each system is also included.

**BHSC 201** see **BHSC 101**

**BHSC 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.

**BHSC 236 Behavioral Science** — Presents basic social science theories to explain common health care organizational events. Optimal ways of handling these events are explored in experiential exercises.

**CHEM 105/205 Chemistry for MLT** — Includes basic inorganic and physical chemical principles, an introducton 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 syntheses, 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.

**CHEM 205** see **CHEM 105**

**HCOM 101 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, resumes 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.

**MATH 170 Basic Mathematics** — Review of basic algebra with applications. Functions and graphs. Common and natural logarithms. Exponential growth and decay. Log and semilog graphs. Descriptive statistics. Frequency distributions and histograms. Measures of central tendency and dispersion.

**MATH 270 Statistics** — Probability. Binomial and Normal distributions. Sampling theory. Confidence intervals. Hypothesis testing for means and proportions. Linear regression and correlation.

**MLAB 101 Medical Laboratory Technology Fundamentals** — 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.

**MLAB 201 Medical Laboratory Technology Fundamentals** — Course divided into two 10 week subsections.

**MLAB 201A Introduction to Clinical Microbiology** — In lecture and practical laboratory format, this course orients the student to the theory and methodology used by the Medical Laboratory Technologist for the examination of material from patients with microbial disease. Practical laboratory experience is provided so that the student may begin to develop the knowledge, understanding and skills required to perform and interpret microbiology procedures used in the Clinical Microbiology Laboratory.

**MLAB 201B Introduction to Clinical Chemistry — Basic Spectrophotometry** — Provides a detailed study of the components of a basic spectrophotometer and thorough understanding of the structure and function of these components as well as the various laws and principles involved in spectrophotometric measurement. The laboratory component stresses the operation of a basic spectrophotometer utilizing a variety of clinical methods. An introduction to the way in which basic components are incorporated in more sophisticated instruments is also included.

**MLAB 302/402 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.

**MLAB 303/403 Hematology** — Designed to enable the student to become proficient in the manipulative skills, to perform related laboratory tests, to acquire theoretical and practical knowledge for interpretation of data relating to: the science of blood, its nature and function in health and in disease; origin, development and function of blood and its cellular components; study of blood diseases; study of blood coagulation; principles and techniques of blood examinations and the theory of hematological instrumentation and its practical application.

**MLAB 304 Histotechnology** — A detailed study of the theory and practical applications of the techniques used in the histopathology laboratory to preserve and prepare body tissues for microscopic examination and diagnosis. The emphasis is on human body tissues. The course is designed to introduce students to the principles of normal histology and microanatomy, to provide the opportunity to perform techniques in current use and to examine the results, to prepare students to work in the histopathology laboratory.

**MLAB 305/405 Clinical Microbiology** — Provides a detailed study of clinical microbiology theory, laboratory methodology and techniques. Emphasis is on understanding the interrelationships between the characteristics of microorganisms, their natural habitats, sources of infection, pathogenicity for man and the detailed methodology used by the clinical laboratory technologist to isolate, identify and test the antibiotic susceptibility of human pathogenic organisms. Through practical laboratory sessions, the student develops the basic skills and understanding required to correctly perform and interpret clinical microbiology tests and procedures.

**MLAB 402** see **MLAB 302**

**MLAB 403** see **MLAB 303**

**MLAB 405** see **MLAB 305**

**MLAB 406 Immunohematology** — Uses the sciences of genetics and immunology to explore the major antigen systems of human blood. The practical importance of these systems is applied to the technology of blood and blood component transfusion, and the investigation of the immune hemolytic anemias.

**PHYS 110/210 Physics for MLT** — An introductory course 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 measurements, data analysis, experimental technique and report writing. Mathematical treatment requires algebra and trigonometry.

**PHYS 210** see **PHYS 110**

## Faculty and Staff

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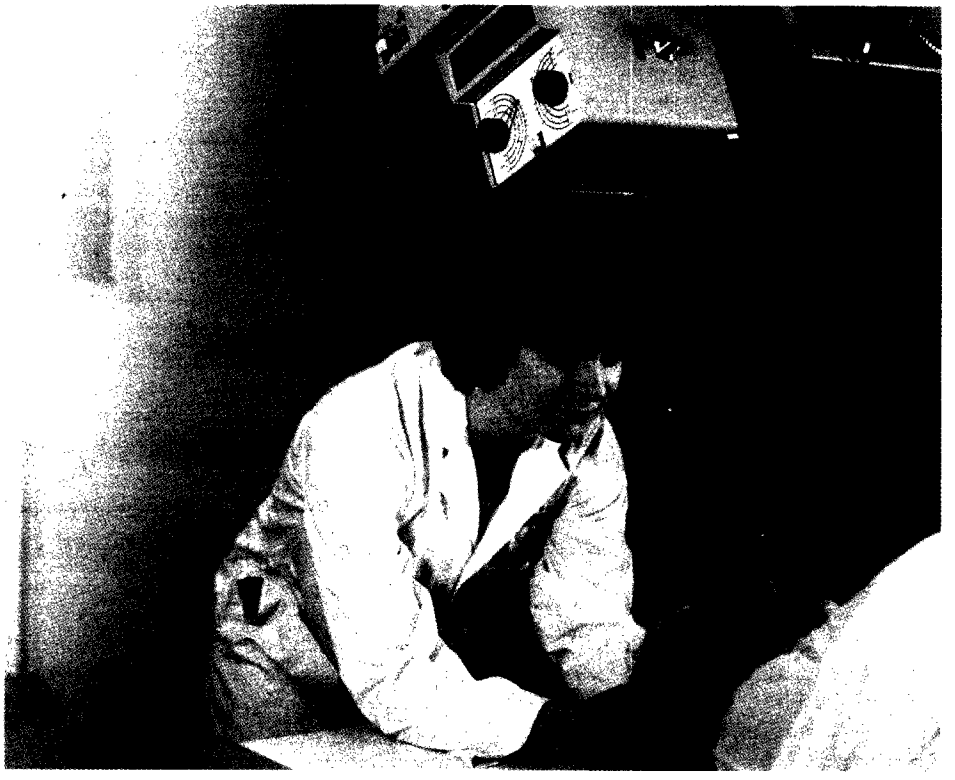

# Medical Radiography

## Department of Radiological Technical Services

The medical radiographer is an x-ray technologist 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 technologists 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 2 week periods at BCIT and in a hospital. A third year of in-service training must be completed at one of the participating hospitals (five in the Lower Mainland; two in the Interior; one on Vancouver Island). This additional training is a prerequisite for writing the certification examination set by the Canadian Association of Medical Radiation Technologists.

### Job Opportunities

BCIT graduates in medical radiography find employment n hospitals and private clinics, which may employ from one to thirty-five technicians. Most x-ray technologists 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

Algebra 12, two science 11s and one science 12 are the course requirements for this program. A C+ plus average in the final year of secondary school is required. Experience has shown that Physics 11 is an advantage, and Computer Science 11 is an asset.

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.

## Course of Studies

| Year 1 | Term 1 (14 weeks) | Clrm hrs/wk |
|---|---|---|
| BHSC 107 | Basic Anatomy and Physiology | 6 |
| HCOM102 | Communication | 4 |
| MATH 172 | Basic Mathematics of Radiography | 4 |
| MRAD 101 | Radiographic Technique | 4.5 |
| MRAD 102 | Medical Imaging | 3.5 |
| PHYS 109 | Physics of Medical Radiography | 5 |
| | Tutorial | 1 |
| | | 28 |

| Year 1 | Term 2A (10 weeks) | |
|---|---|---|
| GNNU180 | Patient Care | 3 |
| MRAD 201 | Radiographic Procedures 1 | 7.5 |
| MRAD 202 | Medical Imaging | 3.5 |
| MRAD 203 | Radiographic Anatomy and Physiology | 6 |
| MRAD 206 | Clinical Experience | 4 |
| PHYS 209 | Physics of Medical Radiography | 5 |
| | Tutorial | 1 |
| | | 30 |

| Year 1 | Term 2B (9 weeks) | |
|---|---|---|
| MRAD 201 | Radiographic Procedures 1 | 7.5 |
| MRAD 202 | Medical Imaging | 3.5 |
| MRAD 203 | Radiographic Anatomy and Physiology | 6 |
| MRAD 206 | Clinical Experience | 4 |
| PHYS 209 | Physics of Medical Radiography | 5 |
| | Tutorial | 1 |
| | | 27 |

| Year 2 | Term 3 (14 weeks) | |
|---|---|---|
| GNNU280 | Patient Care | 6 |
| MRAD 301 | Radiographic Procedures 2 | 9 |
| MRAD 302 | Medical Imaging | 5 |
| MRAD 305 | Emergency Care (3 days) | 3 |
| MRAD 307 | Pathology (Lit. Review Seminar) | 3 |
| MRAD 311 | Specialized Procedures | 2 |
| | Tutorial | 1 |
| | | 29* |
| MRAD 306 | Clinical Experience | 35* |

| Year 2 | Term 4A (10 weeks) | |
|---|---|---|
| BHSC 440 | Human Behavior | 5 |
| MRAD 402 | Medical Imaging — Quality Assurance | 4 |
| MRAD 403 | Radiation Biology | 3 |
| MRAD 407 | Pathology | 2 |
| MRAD 408 | Radiograph Evaluation | 2 |
| MRAD 411 | Specialized Procedures (Lit. Review Seminar) | 3 |
| | Tutorial | 1 |
| | | 20* |
| MRAD 406 | Clinical Experience | 35* |

| Year 2 | Term 4B (9 weeks) | Clrm hrs/wk |
|---|---|---|
| BHSC 440 | Human Behavior (Lit. Review Seminar) | 4 |
| MRAD 402 | Medical Imaging — Quality Assurance | 4 |
| MRAD 404 | Management and Instructional Skills | 4 |
| MRAD 405 | Radiation Protection | 2 |
| MRAD 407 | Pathology | 2 |
| MRAD 408 | Radiograph Evaluation | 2 |
| MRAD 411 | Specialized Procedures | 3 |
| | Tutorial | 1 |
| | | 22* |
| MRAD 406 | Clinical Experience | 35* |

*Alternate two week periods.*

## Subject Outlines

**BHSC 107 Basic Anatomy and Physiology** — A systematic study of the basics of human anatomy and physiology which prepares the student for MRAD 203, Radiographic Anatomy & Physiology. Included are basic physiological chemistry, cytology and histology.

**BHSC 440 Human Behavior** — Provides students with the 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.

**GNNU 180 Patient Care** — Introduces students to the basic safety concepts of patient care. It includes observational and communication skills, body mechanics, fire safety and medical and surgical asepsis.

**GNNU 280 Patient Care** — Provides the student with advanced concepts and techniques necessary to meet the comfort and safety measures of patients undergoing x-ray. 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.

**HCOM 102 Communication** — Introduces medical radiography students to communication for the health professional. It emphasizes clear, concise, technical writing and speaking. Students will learn how to select, organize and sequence information for instructions, resumes, application letters, incident reports, literature reviews, and patient explanations. They will also learn how to use word processing and give oral presentations to patients and colleagues

**MATH 172 Basic Mathematics for 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.

**MRAD 101 Radiographic Technique** — Introduces the student to the basic principles of radiography. A study is made of the application of the basic factors in producing a radiograph. Sessions in the x-ray laboratory allow the student to produce radiographs in an experimental setting.

**MRAD 102 Medical Imaging** — Introduces students to the standard equipment used in the production of a radiograph. Fundamentals of the photo-recording system are introduced. Also studied are the basic factors of x-ray exposure, transformers, simple electrical controls, x-ray film construction and the various film holders, automatic processing and sensitometry. Laboratory work related to all these subjects is included.

**MRAD 201 Radiographic Procedures 1** — Basic radiographic procedures of the upper and lower extremities, vertebrae, thoracic cage and skull are studied. An introductory study is made of the radiography of the digestive, urinary and biliary systems. Five hours each week in the x-ray laboratory allow the student to practice positioning and x-ray the phantoms in the areas covered in class. One hour a week is devoted to radiograph evaluation.

**MRAD 202 Medical Imaging** — Rectification, control circuits, x-ray tubes image amplifiers, C.C. television, video-recording and body section radiography comprise the apparatus studied in this course. The image-recording portion covers special processes, artifacts and image presentation.

**MRAD 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.

**MRAD 206/306 Clinical Experience (Hospital)** — The student acquires a basic knowledge of medical radiographic techniques by applying classroom and laboratory training to clinical situations in the affiliated hospitals.

**MRAD 301 Radiographic Procedures 2** — A continuation of the study of the urinary, digestive and biliary systems introduced in MRAD 201. The skull is studied in greater detail as are the special techniques related to the skeletal system. Instruction is given in contrast media. Students are able to reinforce the classroom material in the x-ray laboratory. One hour a week is devoted to radiograph evaluation. This course runs concurrently with MRAD 306.

**MRAD 302 Medical Imaging** — The equipment used in serial-radiography, cine and mobile units is studied. The basics of digital image processing technology are introduced including: digital angiography, subtraction technique, C.T. scanning and magnetic resonance imaging.

**MRAD 305 Emergency Care** — Instruction is given in basic first-aid procedures and skills required during an emergency situation where no professional help is present. Instruction is also provided in basic life support procedures that enable the student to recognize respiratory and cardiac arrest and start proper application of cardio pulmonary resuscitation.

**MRAD 306** see **MRAD 206**

**MRAD 307 Pathology** — Students are introduced to pathologic terminology and the basic mechanisms underlying disease processes. The balance of the course deals with pathological conditions of bone.

**MRAD 311/411 Specialized Procedures** — Includes discussion of the specialized radiographic procedures utilized to demonstrate the vascular tree, the central nervous system and the digestive, biliary and genito-urinary tracts. Also included is a brief discussion of pediatric radiography and C.T. scanning.

**MRAD 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.

**MRAD 404 Management and Instructional Skills** — The management skills portion of the course explores some of the technical skills required for today's medical radiography supervisor. It is intended to complement BHSC 440 Human Behavior given in terms 4A and 4B. The instructional skills portion of the course presents a broad overview of the teaching/learning process with specific emphasis on clinical teaching skills in order to facilitate maximum student learning through effective student teaching.

**MRAD 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.

**MRAD 406 Clinical Experience (Hospital)** — This course runs concurrently with MRAD 411. The student applies more advanced classroom and lab training to a clinical situation.

**MRAD 407 Pathology** — This course, which follows MRAD 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.

**MRAD 408 Radiograph Evaluation** — A systematic review of the radiographic examinations taught during Radiographic Procedures 1 and 2, is carried out during Term 4. The student evaluates radiographs for positioning, image quality and structures demonstrated.

**MRAD 411** see **MRAD 311**

**PHYS 109/209 Physics of Medical Radiography** — An introductory course which emphasizes the application of physical phenomena in medical radiography. It includes the structural and physical properties of matter, static electricity, direct and alternating current, magnetism, mechanics, energy, wave motion, sound, thermodynamics, optics, quantum concepts, production of x-rays, interaction of x-rays with matter, radioactivity, x-ray tubes, radiation detection and the basics of digital radiography.

**PHYS 209** see **PHYS 109**

## Faculty and Staff

Miss P.M. Rogers, R.T.,
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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.

# Nuclear Medicine Technology

## 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 speciality 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 radiocompounds 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 clinical facilities presently affiliated with the program.

The student will spend terms 1 and 2 of first year at BCIT for lectures and labs in basic subjects applicable to nuclear medicine technology and patient care. The Institute is equipped with a lab containing facilities and equipment commonly used in nuclear medicine departments. The student spends the summer term of first year in the nuclear medicine department of a hospital.

In the second year at BCIT, the student spends alternate 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 take the National Certification Examinations set by the Canadian Association of Medical Radiation Technologists. Successful candidates may use the designation R.T. (N.M). after their names and work as registered nuclear medicine technologists anywhere in Canada or in many parts of the world. An Advanced Certification is now available for those technologists wishing to advance in the field.

### Prerequisites

Algebra 12, Chemistry 11 and 12 and one other science 11 are course requirements for this program. Physics 11 is desirable. 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 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 |
|---|---|---|
| BHSC 106 | Basic Anatomy and Physiology | 4 |
| BHSC 126 | Basic Medical Microbiology and Immunology | 2 |
| CHEM 106 | General Chemistry for Nuclear Medicine Technology | 6 |
| MATH 174 | Basic Technical Mathematics | 5 |
| MLAB 109 | Clinical Laboratory Orientation | 3 |
| NMED 107 | Radioassay Procedures | 3 |
| PHYS 105 | Basic Physics for Nuclear Medicine | 6 |
| | | 29 |

| Year 1 | Term 2 | |
|---|---|---|
| BHSC 206 | Physiology and Pathophysiology | 4 |
| CHEM 206 | General Chemistry for Nuclear Medicine | 6 |
| GNNU202 | Fundamentals of Patient Care | 3 |
| MATH 274 | Statistics and Calculus | 5 |
| NMED 204 | Applied Physiology | 2 |
| NMED 205 | Radiobiology and Protection | 2 |
| NMED 207 | Radiopharmaceuticals | 4 |
| PHYS 205 | Radioactivity and Instrumentation | 7 |
| | | 33 |

| Year 1 | Summer Term | |
|---|---|---|
| NMED 209 | Clinical Experience in Diagnostic Procedures | 35 |
| | | 35 |

| Year 2 | Term 3 | |
|---|---|---|
| BHSC 306 | Physiology and Pathophysiology | 4 |
| HCOM103 | Communication for Health Technologists | 2 |
| NMED 304 | Applied Physiology | 17 |
| NMED 308 | Imaging | 2 |
| PHYS 305 | Radioactivity and Instrumentation | 6 |
| | | 31* |
| NMED 305 | Clinical Experience in Diagnostic Procedures | 35* |

| Year 2 | Term 4A | |
|---|---|---|
| BHSC 439 | Human Behavior | 4 |
| COMP 124 | Computer Applications | 3 |
| HCOM202 | Communication for Health Technologists | 4 |
| NMED 404 | Applied Physiology | 17 |
| PHYS 405 | Radioactivity and Instrumentation | 2 |
| | | 30 |
| NMED 405 | Clinical Experience in Diagnostic Procedures | 35* |

| Year 2 | Term 4B | Clrm hrs/wk |
|---|---|---|
| BHSC 439 | Human Behavior | 4 |
| COMP 124 | Computer Applications | 3 |
| HCOM202 | Communication for Health Technologists | 4 |
| NMED 404 | Applied Physiology | 17 |
| PHYS 405 | Radioactivity and Instrumentation | 2 |
| | | 30* |
| NMED 405 | Clinical Experience in Diagnostic Procedures | 35* |

| Year 2 | Summer Term | |
|---|---|---|
| NMED 409 | Clinical Experience in Diagnostic Procedures | 35 |

*Alternate weeks

## Subject Outlines

**BHSC 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.

**BHSC 126 Basic Medical Microbiology and Immunology** — Deals with basic properties of medically important micro-organisms, the communicability of infection, host-parasite relationships, methods of destruction and control of micro-organisms, with particular attention to the safe preparation of radio pharmaceuticals used for injection. The course also deals with basic immunologic concepts including their related in-vitro applications.

**BHSC 206/306 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.

**BHSC 306** see **BHSC 206**

**BHSC 439 Human Behavior** — An introduction to the basics of the psychological and social environments of health care organization, with the aim of understanding how communication patterns affect task activities.

**CHEM 106/206 General Chemistry for Nuclear Medicine Technology** — 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.

**CHEM 206** see **CHEM 106**

**COMP 124 Computer Applications** — Applications of the computer to engineering and medical technologies — how a computer works, recognizing problems suitable for computer solution, flow-charting and communicating with computer personnel. Emphasizes 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.

**GNNU 181 Fundamentals of Patient Care** — Assists the student to understand the hospital environment and the health problems of the patient. Emphasis will be placed upon observation and communication appropriate to the nuclear medicine technologist. The nursing lab will be used to practice basic technical skills and procedures required in emergency situations.

**HCOM 103/202 Communication for Health Technologists** — An introduction to oral and written communications applicable to the health field. Students will be taught the basic skills of effective writing for reports, letters, job applications, resumes 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.

**HCOM 202** see **HCOM 103**

**MATH 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).

**MATH 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.

**MLAB 109 Clinical Laboratory Orientation** — An introduction to the principles and uses of precision instruments employed in the lab, together with an introduction to hematology pertinent to the nuclear medicine lab.

**NMED 107 Radioassay Procedures** — Covers the basic principles of radioassay procedures. A study is made of the components of the test system, the practical aspects of performing the tests and data reduction techniques. The clinical significance of routinely performed assays is discussed.

**NMED 204 Clinical Orientation** — Involves familiarization with affiliated Nuclear Medicine departments of lower mainland hospitals, and a series of lectures given by technologists on the clinical applications of nuclear medicine techniques.

**NMED 205 Radiobiology and Protection** — A detailed study of ionizing radiation and its interaction with matter. The units and safety guidelines of radiation are also discussed. Emphasis is on the practical applications of radiation safety in the working environment.

**NMED 207 Radiopharmaceuticals** — A study of the preparation and quality control of radiopharmaceuticals in routine use. Emphasizes the radio-nuclide generator. Dosage forms and calculation and dispensing of doses are covered, together with the clinical application of various pharmaceuticals.

**NMED 209/305/405/409 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.

**NMED 304/404 Applied Physiology** — The student is instructed in all aspects of current applied physiology including criteria, methodology, instrumentation, patient problems and approach, data collection and manipulation.

**NMED 305** see **NMED 209**

**NMED 308 Imaging** — Designed to familiarize Nuclear Medicine Technology students with the many methods and materials used to visually display the spatial distribution of radioactivity in nuclear imaging procedures. The utilization of optical, photographic, video tape and computer visual displays will be covered in theory and practice.

**NMED 404** see **NMED 304**

**NMED 405** see **NMED 209**

**NMED 409** see **NMED 209**

**PHYS 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.

**PHYS 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.

**PHYS 305/405 Radioactivity and Instrumentation** — Completes the instrumentation work begun in PHYS 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.

**PHYS 405** see **PHYS 305**

## Faculty and Staff

Miss P.M. Rogers, R.T.,
*Acting 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.)

# General Nursing

## Department of General Nursing

Today's registered nurse assists people in meeting health needs in collaboration with other members of the health care team including dietitians, occupational therapists, pharmacists, physicians, physiotherapists and social workers. Demands made upon nursing professionals range from providing information on health concerns to promoting proper health care, preventing disease, providing restorative care and emotional support. Although it is a high-stress profession, both men and women find general nursing a rewarding career.

### Job Opportunities

Registered nurses are employed in general hospitals and community agencies. Positions for the new graduate are available mainly in medicine and surgery.

### The Program

The Program is approved by the Registered Nurses' Association of British Columbia. Graduates are eligible to write the registration examinations of the Association. Graduates are prepared for employment in general hospitals or other health care agencies where comparable levels of patient care and nursing judgement are required. It provides 22 months of instruction during a 2.33 year period. Enrolment in the program is in January or August of each year. The program provides instruction in Nursing, Basic Health Sciences and English. Learning opportunities include: independent study, lectures, laboratories, tutorials, and experience with medical, surgical, obstetrical, pediatric and psychiatric patients and families.

Students will complete a program consisting of five terms. Each term is 17 weeks in length. The fall term extends from mid-August to mid-December and the winter term from January to mid-May. Students are free of studies from mid-May to mid-August.

### Admission Requirements

A. **Applicants under 23 years of age at the time of entry into the program**:

1. Senior secondary school graduation, with:
   a) Chemistry 11 and either Chemistry 12 or Biology 12 (preferred) with a minimum of C+ standing in both courses.
   b) Algebra 11 with a minimum of C standing.
   c) English 12 with a minimum of C+ standing.
2. 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.
3. CPR course (Basic 1) prior to entry into Term 4.
4. Completion of the immunization program is required before final acceptance into the program.
5. A physical examination by a physician of the applicant's choice, indicating satisfactory health.
6. A satisfactory interview with a member of the General Nursing Department who will assess the applicant's:
   — knowledge of and motivation towards a nursing career
   — financial preparation
   — communication skills
   — experience in the health care field as a volunteer and/or employee.

B. **Applicants over 23 years of age at the time of entry into the program**:

1. Senior secondary school graduation or equivalent e.g. G.E.D. or BTSD, with:
   a) Chemistry 11 and either Chemistry 12 or Biology 12 (preferred) to be completed within two years prior to enrolment with minimum of C+ standing in both courses.
   b) English 12 with a minimum of C+ standing is desirable.
   c) 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).
2. A valid St. John Ambulance standard First-Aid certificate by the end of term 1 and, preferably, prior to entrance into term 1.
3. CPR course (Basic 1) is required prior to entry into Term 4.
4. Completion of the immunization program is required before final acceptance into the program.

5. A physical examination by a physician of the applicant's choice, indicating satisfactory health.
6. A satisfactory interview with a member of the General Nursing Department, who will assess the applicant's:
   — knowledge of and motivation towards a nursing career
   — financial preparation
   — communication skills
   — experience in the health care field as a volunteer and/or employee.

Notes:

1. Applications are accepted for review beginning January 2 for the August class and June 1 for the January class.
2. Applicants with baccalaureate degrees within two years will be assessed on an individual basis to determine equivalency with academic criteria.

**Expenses**

In addition to tuition fees, students will spend approximately $700 for textbooks and other learning materials during the program. Uniforms and shoes are about $250. The student is responsible for transportation to hospitals and other community agencies. It is highly recommended that students have the use of a car two days per week for transportation to these agencies. Most students purchase a graduation pin for approximately $150.

**Financial Assistance**

BCIT has a comprehensive financial assistance program — scholarships, loans and bursaries. Details are available from Student Financial Services in the Counselling department.

**Post-graduation**

Following completion of the nursing diploma program, students write the Canadian registration examinations in order to obtain the R.N. (Registered Nurse) designation. The fee for these examinations is $118. 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.

**Certificate of Credit in Nursing**

The Basic Health Science and English courses of the diploma nursing curriculum are offered through independent study as well as on campus. Applicants who meet all the academic entrance requirements may wish to complete some of these courses prior to enrolment to lighten their study loads during the program.

For information write to Health Continuing Education, BCIT, 3700 Willingdon Avenue, Burnaby, B.C. V5G 3H2. These courses are offered in fall, winter and spring terms.

## Course of Studies

| | | Clrm hrs/wk | Credits |
|---|---|---|---|
| **Year 1** | **Term 1** | | |
| BHSC 105 | Anatomy and Physiology | 3 | 4 |
| BHSC 118 | Personal Fitness Management | 2 | 3 |
| BHSC 140 | Human Development 1 | 3 | 4 |
| GNNU100 | Nursing 1: | | |
| | Theory | 9 | 26.5 |
| | Clinical | 13 | - |
| | | 30 | 37.5 |
| **Year 1** | **Term 2** | | |
| BHSC 205 | Physiology | 3 | 4 |
| BHSC 225 | Microbiology | 1 | 1.5 |
| BHSC 226 | Immunology | 1 | 1.5 |
| BHSC 239 | Sociology | 1.5 | 2 |
| BHSC 240 | Human Development 2 | 1.5 | 2 |
| GNNU200 | Nursing 2: | | |
| | Theory | 8 | 25.5 |
| | Clinical | 13 | - |
| | | 30 | 36.5 |
| **Year 2** | **Term 3** | | |
| GNNU300 | Nursing 3: | | |
| | Theory | 9 | 33.5 |
| | Clinical | 18 | - |
| HCOM107 | Writing for Nurses | 3 | 3 |
| | | 30 | 36.5 |
| **Year 2** | **Term 4** | | |
| GNNU400 | Nursing 4: | | |
| | Theory | 9 | 33.5 |
| | Clinical | 18 | - |
| HCOM109 | Modern Literature | 3 | 3 |
| | | 30 | 36.5 |
| **Year 2** | **Term 5** | | |
| GNNU450 | Nursing 5: | | |
| | Theory (1 week) | 28 | 33 |
| | Clinical (for 16 weeks of term) | 37.5 | - |

## Subject Outlines

**BHSC 105 Anatomy and Physiology** — A survey of the basic structure and function of human body systems. An introduction to the basic principles of genetics is also included.

**BHSC 118 Personal Fitness Management** — A combined theory and practice course designed to emphasize the relationship of physical fitness to lifestyle patterns. The focus is placed on the student's own activity pattern.

**BHSC 140 Human Development 1** — After an initial treatment of the topic of death and loss this course focuses on the processes of growth and development from conception through adolescence. Physical, cognitive, affective and social development are surveyed with emphasis on relating developmental concepts to health care.

**BHSC 205 Physiology** — A study of physiological regulation and control based on the fundamentals established in BHSC 105.

**BHSC 225 Microbiology** — Provides an introduction to basic microbiological concepts, including the distinguishing characteristics of micro-organisms, methods of controlling infectious diseases and host-parasite relationships.

**BHSC 226 Immunology** — Provides an understanding of the immune response as applied to immunity, surveillance, homeostasis, hypersensitivity, autoimmunity and immunohematology. The course progresses from discussions on the components and biological activities of the immune response to the immune response role in protective as well as disease conditions. Prerequisite: Anatomy and Physiology (BHSC 105).

**BHSC 239 Sociology** — An introduction to the study of human behavior. Basic terminology and concepts of sociology are presented. Emphasis is placed on the study of the family as a social institution, as well as on other forms of group processes and collective behavior. The relationship between behavioral sciences and problems of health care is examined.

**BHSC 240 Human Development 2** — Focuses on growth and development from young adulthood to aging adult. Physical, cognitive, affective and social development are surveyed. Emphasis is placed on relating developmental concepts to health care. Prerequisite: Human Development 1 (BSHC 140).

**GNNU 100 Nursing 1** — An overview of the nursing curriculum and the study of individuals who require minimal or no 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 basic concepts of the nursing process; communication and the nurse-patient relationship; organization and responsibilities of the professional nurse. Concurrent theory, laboratory and clinical practice will focus on basic assessment, communication and psychomotor skills. Clinical experience is provided in hospital settings, in medical and extended care units, and in other community agencies.

**GNNU 200 Nursing 2** — The study of individuals of adult age who require assistance to satisfy needs, and to develop appropriate responses to stressors. Emphasis is placed on stressors associated with stages and tasks of growth and development and selected unanticipated events. Concurrent theory, laboratory and clinical practice will focus on the nursing skills required to assist individuals to satisfy their needs. Emphasis is placed on developing comfortable relationships with individuals and their family members. Clinical experience is provided in hospital settings, general surgical units and other community agencies. Prerequisites: GNNU 200 Nursing 1, BHSC 105 Anatomy and Physiology, BHSC 140 Human Development.

**GNNU 300 Nursing 3** — The study of individuals of all ages whose responses to stressors may be appropriate and/or inappropriate. Emphasis is placed on the stressors associated with both selected unanticipated events and the growth and development tasks related to childbearing. Concurrent theory, laboratory and clinical practice will focus on the nursing skills required to assist individuals to satisfy their needs. Emphasis is placed on developing supportive relationships with individuals and their family members. Clinical experience is provided in hospital settings, on family-centered obstetrical units and on pediatric units. Community visits are integrated throughout the course. Prerequisites: GNNU 200 Nursing 2, BHSC 225 Microbiology, BHSC 226 Immunology, BHSC 205 Physiology, BHSC 240 Human Development.

**GNNU 400 Nursing 4** — The study of individuals of all ages whose responses to stressors are inappropriate. Emphasis is placed on the stressors associated with selected unanticipated events. Concurrent theory, laboratory and clinical practice will focus on the nursing skills required to assist individuals to satisfy their needs. Emphasis is placed on developing therapeutic relationships with individuals and their family members. Clinical experience is provided in hospital settings and psychiatric and general medical-surgical units. Community visits are integrated throughout the course. Prerequisite: GNNU 300 Nursing 3.

**GNNU 450 Nursing 5** — 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 in general medical-surgical units. Students are assigned to full-time registered nurses, who act as a preceptor to the student. During this term, students learn to assume the role of a registered nurse. Prerequisites: GNNU 400 Nursing 4, BHSC 118 Personal Fitness Management, BHSC 139 Sociology, HCOM 107 Writing for Nurses, HCOM 109 Modern Literature.

**HCOM 107 Writing for Nurses** — Nurses and student nurses spend several hours each day writing: completing assignments, documenting patient care, writing letters and memos, preparing written information for clients, writing procedures, completing reports, and preparing oral presentations. This course teaches students the planning, writing, and revising skills they need to perform these tasks efficiently and effectively.

**HCOM 109 Modern Literature** — Presents four genres of modern literature: the short story, drama, the novel and poetry. Students will be encouraged to use the literature, the classroom discussion, and the assignments as a way of expanding their experience, developing empathy and detachment, clarifying judgement, and reflecting on their values and assumptions.

## Faculty and Staff

Mrs. M. Neylan, M.A., B.S.N., R.N., R.P.N., *Department Head*
Mrs. L. Barratt, B.A., Diploma Psychiatric Nursing, R.N.
Ms. M.J. Belfry, M.Sc., B.N., R.N.
Mrs. D.M. Belyk, B.S.N., R.N.
Mrs. E. Carr, B.S.N., R.N.
Ms. V. Cartmel, B.S.N., R.N.
Ms. K. Doyle, B.N., Diploma Counselling Psychology, R.N.
Mrs. K. Edwards, B.S.N. (Honors), R.N.
Ms. E.M. Fraser, B.S.N., R.N.
Mrs. S. Gallo, B.Sc., Ph.N., R.N.
Mrs. N. Goad, B.S.N., R.N.
Mrs. H.D. Hintz, B.S.N., Diploma Counselling Psychology, R.N.
Mrs. A. Kenney-Lee, B.N., M.Ed., 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. A.J. Mazzocato, M.S.N., B.N., R.N.
Ms. L.P. Meredith, M. Adult Ed., B.S.N., R.N.
Mrs. L. Milligan, R.N., B.S.N.
Mrs. K. Negoro, Diploma Nrsg. Ed., R.N.
Mrs. A.L. Novada, B.S.N., Diploma T.S.
Mrs. M. Olson, 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.
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Mrs. A. Taylor, B.Sc.N., R.N.
Mrs. J. Verner, B.S.N., R.N.
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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.
Mrs. D. Zimka, B.Sc.N., R.N.

**Support Staff**

Mrs. P. Mushens
Mrs. P. Ord
Ms. C. Themmen
Mrs. C. Smith

# Psychiatric Nursing

## Department of Psychiatric Nursing

The program is being transferred to Douglas College. In 1985-86: term 4 will be offered August - December 1985, term 5 will be offered in August - December 1984 and January - May 1986.

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 2.33 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 employement. However, it is strongly recommended that students plan a month's vacation to assure physical and mental readiness for the next term of studies.

### Educational Expenses

In addition to regular tuition fees, students should be prepared for further educational expenses. In Term 4 additional expenses are estimated to be $125.

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 term 4 and five days per week in 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 two years of graduation from BCIT (fees currently $100).
5. Payment of an inital 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 good, with competitive salaries and benefits.

Effective 1984 starting salary for a Nurse 1 is $2,039 per month.

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 Opportunies 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.

## Course of Studies

| Year 2 | Term 4 | Clrm hrs/wk | Credits |
|---|---|---|---|
| HCOM110 | Modern Literature | 3 | 4 |
| PNNU 401 | Psychiatric Nursing 4 | 6 | 8 |
| PNNU 402 | Psychiatric Nursing Practicum 4 | 15 | 17 |
| PNNU 403 | Interpersonal Relationship Laboratory 4 | 2 | 3 |
| PNNU 404 | Issues in Psychiatric Nursing | 2 | 3 |
| | | 28 | 25 |

| Year 2 | Term 5 | | |
|---|---|---|---|
| PNNU 450 | Psychiatric Nursing 5 (3 weeks) | 27 | 2 |
| PNNU 451 | Psychiatric Nursing Preceptorship (14 weeks) | 30 | 30 |

## Subject Outlines

**Year 2 Term 4**

**HCOM 110 Modern Literature** — A general study of 20th Century literature with emphasis on social and psychological issues.

**PNNU 401 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 PNNU 300. Prerequisites: all third term courses.

**PNNU 402 Psychiatric Nursing Practicum 4** — A clinical practice course offered concurrently with Psychiatric Nursing 4 in 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.

**PNNU 403 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.

**PNNU 404 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**

**PNNU 450 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 PNNU 451 follows this course.

**PNNU 451 Psychiatric Nursing Preceptorship** — This clinical practice course follows Psychiatric Nursing 5 PNNU 450. 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 PNNU 450 in term 5.

## Faculty and Staff

Margaret S. Neylan, R.N., R.P.N., B.S.N., M.A., *Department Head*
Joan Anderson, R.N., B.Sc.N., M.A. (Education)
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Lyn Field, R.N., B.Sc.N.
Ray Fournier, R.P.N.
Stephany Grasset, R.N., B.Sc., P.H.N.
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Norma Vallentgoed, R.P.N., B.A.

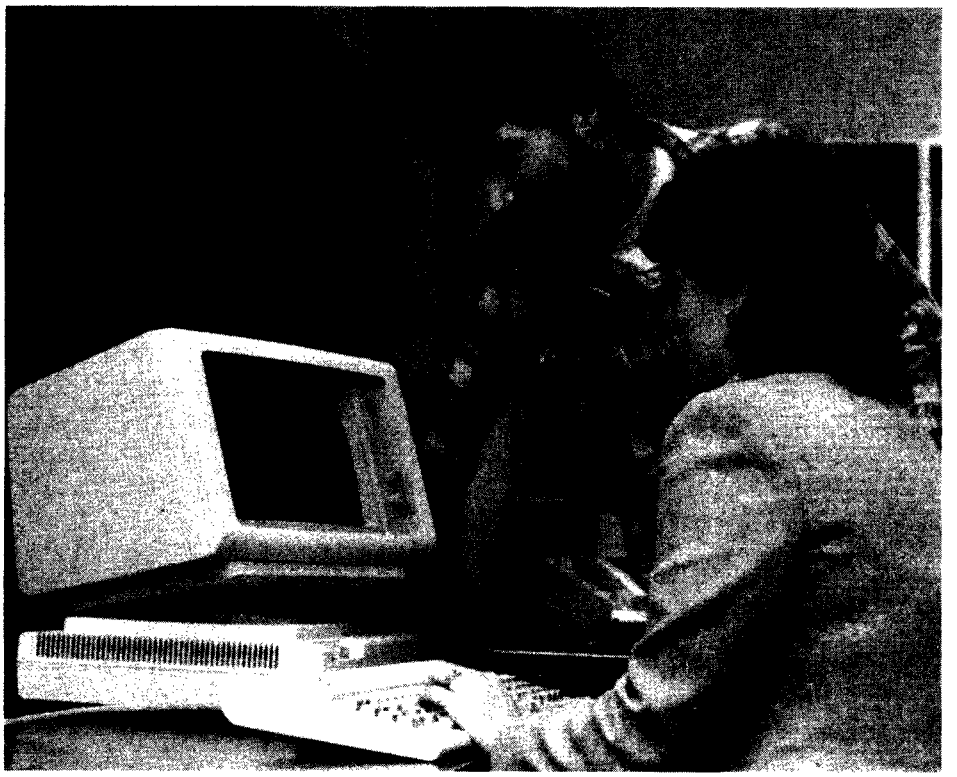
**Support Staff**
Pauline Mushens
Pat Ord

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

**Term 4**
L. Batch, East Lawn, Riverview
M. Ibraheem, Fernwood Lodge, Riverview
J. Kallenberger, Valleyview
S. Kenyon, Riverview
D. Nagel, Valleyview
N. Runganaikaloo, Valleyview
E. Thiessen, Valleyview
M. Wagner, East Lawn, Riverview

**Preceptors**
Terresa Bellez
Dan Metzger
Pat Morris
Soile Silander
Doug Campbell
Gloria Sutcliffe
Becky Brecken
Wayne Russel
Pat McCabe
Virginia Johnston
Joan Brown
Vera Robinson
Kristin Kelly
Diane Pelton
Mitzi Arthur
Nancy Howarth
Jack Bakker
Ken Joyner
Venetta Stowell
Neil Loewen
Tresa Yu
Graham Higgs
Lana Gislason
Brenda Robins
Della Mitchell
Louie Tan
Suzanne Wiseman
Alice Kamstra
Joan Crane
Susan Ross
Shirley Turzak
Joanna Shepheard
Karen Trace
Barbara Debruyn
Diane Jackson
Allison Jones
Lynda Johnson
Remedios Kumar
Andrea Toporowski
Linnea Thomson
Linda Kawamoto

# School of Management



# Administrative Management Systems

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. 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 **Administrative Systems 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.

### The Program

Following a year of general studies, students select one of two options: Administrative Systems, or Personnel and Industrial Relations Administration.

### Prerequisites

Algebra 11 and English 12 both with a C+ standing are course requirements for this program. Enrolment is limited. Applicants should apply early stating full details of work experience, outlining extra-curricular activities. Appropriate business experience and/or other successful post-secondary education will greatly strengthen applications.

Applicants should be good communicators and people oriented with a willingness to work effectively with fellow workers and the public.

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

### Specific Prerequisites

Those students wishing to enter the Personnel and Industrial Relations Option from the first year of the technology program should have maturity and relevant work experience as well as competence in communication skills, as demonstrated by a minimum of 70% standing in the first year communication courses.

### Advanced Standing

Direct entry into the second year of the technology in either option is possible provided students have the equivalent of the first year of the program.

### Post-graduation

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

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| ADMN100 | Economics | 3 |
| ADMN110 | Management 1 | 3 |
| ADMN220 | Organizatonal Behavior | 3 |
| BCOM 102 | Business Communication | 3 |
| COMP 100 | Introduction to Data Processing | 4 |
| FMGT 101 | Accounting 1 | 4 |
| OPMT 110 | Business Mathematics | 4 |
| | | 24 |

| Year 1 | Term 2 | |
|---|---|---|
| ADMN200 | Economics 2 | 3 |
| ADMN210 | Management 2 | 4 |
| BCOM 202 | Business Communication | 4 |
| COMP 120 | Computers in Business | 3 |
| FMGT 201 | Accounting 2 | 4 |
| MKTG 102 | Marketing 1 | 3 |
| OPMT 130 | Business Statistics | 4 |
| | | 25 |

| Year 2 | Term 3 | Adm | Pers |
|---|---|---|---|
| ADMN310 | Management 3 | 3 | 3 |
| ADMN321 | Interpersonal Skills Development | - | 2 |
| ADMN330 | Industrial Relations | 4 | 4 |
| ADMN340 | Personnel Administration | 3 | 3 |
| ADMN341 | Human Resource Analysis | - | 4 |
| ADMN360 | Microcomputer Software Systems | 3 | 3 |
| ADMN380 | Business Law 1 | 3 | 3 |
| FMGT 304 | Managerial Accounting | 4 | - |
| FMGT 307 | Finance | 3 | 3 |
| MTKG 311 | Real Estate | 3 | - |
| | | 26 | 25 |

| Year 2 | Term 4 | Adm | Pers |
|---|---|---|---|
| ADMN410 | Management 4 | 3 | 3 |
| ADMN430 | Collective Bargaining | - | 3 |
| ADMN440 | Personnel Management Systems | - | 4 |
| ADMN441 | Interviewing Skills | - | 2 |
| ADMN442 | Training and Development | - | 2 |
| ADMN460 | Microcomputer Software Applications | 3 | - |
| ADMN480 | Business Law 2 | 3 | 3 |
| ADMN490 | Directed Studies | 6 | 6 |
| FMGT 106 | Credit and Collections | 2 | - |
| FMGT 404 | Finance 2 | 3 | 3 |
| MKTG 411 | Real Estate Management 2 | 3 | - |
| OPMT 170 | Management Engineering | 4 | 4 |
| TDMT 352 | Transportation | 3 | - |
| | | 29 | 30 |

## Subject Outlines

**ADMN 100/200 Economics** — Develops an understanding of the organization and operation of the Canadian economy. Students analyze supply and demand, 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.

**ADMN 110 Management 1** — 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 problems.

**ADMN 200** see **ADMN 100**

**ADMN 210 Management 2** — Follows on from Management 1 to give the student 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 communications, supervision, leadership, and a brief introduction to industrial relations.

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

**ADMN 310 Management 3** — 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

**ADMN 321 Interpersonal Skills Development** — This lab concentrates on the development of skills for personnel problem solving. It emphasizes role-play training with students in advisory capacities, helping management and employees to resolve human resource management problems.

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

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

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

**ADMN 360 Microcomputer Software Systems** — Instruction and practice in the use of commercially available Microcomputer Software Systems, primarily in the solution of business problems. Typical programs involve word processing, electronic worksheets, data base management and business graphics.

**ADMN 380/480 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.

**ADMN 410 Management 4** — 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.

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

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

**ADMN 441 Interviewing Skills** — A skills development course emphasizing the interpersonal skills necessary for successful selection interviews. Training techniques include role-playing, individual counselling and feedback.

**ADMN 442 Training & Development** — Develops ability to design and implement a training program with emphasis on practical problems of training in industry.

**ADMN 460 Microcomputer Software Applications** — A continuation of Microcomputer Software Systems, with emphasis on the solution of practical problems. Familiarity with the programs is developed enabling students to use them in other course areas.

**ADMN 480** see **ADMN 380**

**ADMN 490 Directed Studies** — Designed to give students some practical application of concepts learned in major program areas by engaging in problem-solving projects in business or government.

**COMP 100 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 achievement of data processing objectives.

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

**FMGT 101/201 Accounting** — Basic accounting procedures; closing the books; adjustment; working papers; merchandise operations; statement and ledger organization; special journals; forms of business organization; accounting principles; introduction to cost accounting; analys s of financial data; working capital; departmental and branch operations; consolidations.

**FMGT 106 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.

**FMGT 201** see **FMGT 101**

**FMGT 204 Management Accounting** — The management accountant's role; income determination; decision-making; profit planning; budgeting; 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.

**FMGT 307/404 Finance** — An investigation of different methods of raising funds for new and existing businesses, corporate and non-corporate. Business risk and uncertainty. Analysis of important financial decisions. Working capital policy, capital budgeting, dividend policy, capital structure. Failure and bankruptcy.

**FMGT 404** see **FMGT 307**

**MKTG 102 Marketing** — Gives 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 its administrative and financial functions. Lab sessions will deal with typical marketing problems. Students will be exposed to the decision making process in marketing management.

**MKTG 311/411 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 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.

**MKTG 411** see **MKTG 311**

**OPMT 110 Business Mathematics** — Review of basic mathematics applicable to business and industry. Mathematics of finance including retail operations, simple and compound interest, discounts, annuities, financial papers and depreciation methods. Emphasis is on practical applications to business administration.

**OPMT 130 Business Statistics** — Major emphasis is on descriptive statistics, including numerical and graphical presentation of data, measures of central tendency and dispersion, elementary probability, index numbers and time series. Introduction to inferential statistics through selected topics such as sampling, confidence limits of the mean, hypotheses testing and simple linear regression.

**OPMT 170 Management Engineering — Personnel Option** — Information processing productivity. Systematic problem solving techniques to make cost cutting changes in a "white collar" environment. Methods time measurement, activity sampling, flow process and multiple activity charting to quantify such changes. Applications of critical examination, microcomputer software for productivity gains. Design and implementation of a forms control program. Building a data base for a human resources management information system. Application of computerized out/input microfiche for information storage and retrieval.

**OPMT 170 Management Engineering — Systems Option** — Industrial engineering approach to problem solving with particular application to administrative management problems. Includes method study, charting and analysis, work measurement, facility layout. Also provides training in production and inventory management.

**TDMT 352 Transportation** — Designed to give students a basic understanding of the operation of the four modes of transportation. The course highlights municipal, provincial and federal regulations/deregulations and introduces students to the essentials of freight rate applications and waybill audit. The course is tailored to users of transportation services.

**BCOM 102/202 Business Communication** — The skills and techniques required to write memos, letters and reports of the kind used in business. How to speak in small and large group situations, how 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. It also includes modules on the job search and study skills. One lecture per week provides core information. Practical application of the material occurs in weekly labs, and through periodic assignments.

**BCOM 202** see **BCOM 102**

## Faculty and Staff

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R.A. Yates, LL.B, M.B.A.

# Broadcast Communications

The Broadcast Communications program was initiated through the combined efforts of the private sector of the industry and the Canadian Broadcasting Corporation in this province. The need for trained personnel continues to grow in broadcast journalism, radio and television production. Those interested in entering fields other than mass communications through broadcasting, i.e. 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 throughout British Columbia and in all parts of the world, wherever radio, television or cable facilities exist.

### The Program

#### Television Production

Concentrates 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 operational positions in the television hierachy.

#### Radio

A detailed background 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 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.

### General Information

Students must pass audition and aptitude tests, where applicable, **and must be able to type 25 correct words per minute** to qualify for entrance into the technology.

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

### Prerequisites

All applicants must submit a short essay (approximately 500 words) detailing their reasons for choosing broadcasting as a career. This essay must accompany the application, with all pertinent documents, letters of reference and recommendations, transcripts, etc.

Only a limited number of students can be accepted each year and applicants should apply early. Information meetings are held on the first Monday of each month during the school year (September — June) at 1730 in room 129, just off the north foyer in building 1A. 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. Prior to final acceptance, 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.

## Course of Studies

| | | | Clrm hrs/wk | | |
|---|---|---|---|---|---|
| **Year 1** | | **Term 1** | **Radio** | **TV** | **Jrn** |
| ADMN | 101 | Economic Issues | - | 3 | 3 |
| ADMN | 320 | Interpersonal Relationships | 3 | 3 | - |
| BCOM | 101 | Communication for Broadcasters | 3 | 3 | 3 |
| BCST | 100 | Industry Organization | 2 | 2 | - |
| BCST | 101 | Technical Basics | 2 | 3 | - |
| BCST | 103 | Copywriting | 3 | 3 | |
| BCST | 110 | Radio Operations | 9 | - | - |
| BCST | 111 | Radio Announcing | 6 | - | - |
| BCST | 112 | Awareness | 2 | - | - |
| BCST | 113 | Introduction to Broadcast Journalism | 2 | - | - |
| BCST | 120 | Television Introduction | - | 12 | - |
| BCST | 121 | Film | - | 2 | - |
| BCST | 130 | Introduction to News Reporting | - | - | 2 |
| BCST | 131 | Introduction to Announcing | - | - | 3 |
| BCST | 132 | Introduction to Radio | - | - | 2 |
| BCST | 133 | Introduction to Television | - | - | 2 |
| BCST | 134 | News Writing | - | - | 4 |
| BCST | 135 | Municipal Government | - | - | 2 |
| BCST | 136 | Picture Basics | - | 2 | 4 |
| | | | 35 | 35 | 35 |

| Year 1 | | Term 2 | Radio | Clrm hrs/wk TV | Jrn |
|---|---|---|---|---|---|
| BCOM | 201 | Communications for Broadcasters | 3 | 3 | 3 |
| BCST | 200 | Industry Organization | 2 | 2 | - |
| BCST | 203 | Copywriting | 3 | 3 | - |
| BCST | 210 | Radio Operations | 8 | - | - |
| BCST | 211 | Radio Announcing | 6 | - | - |
| BCST | 212 | Awareness | 2 | - | - |
| BCST | 220 | Television Introduction | - | 18 | - |
| BCST | 221 | Photography and Darkroom Techniques | - | 1 | - |
| BCST | 222 | Theory of Color Television | - | 1 | - |
| BCST | 230 | News Reporting | - | - | 2 |
| BCST | 231 | News Announcing | - | - | 3 |
| BCST | 232 | Radio News | - | - | 6 |
| BCST | 233 | Television News | - | - | 4 |
| BCST | 234 | Documentaries | - | - | 2 |
| BCST | 235 | Government and Politics | - | - | 4 |
| COMP | 212 | Computers in Broadcasting | 3 | - | 3 |
| BCST | 209 | Practicum | 35 | 35 | 35 |
| | | | (Hours per week) | | |

| Year 2 | | Term 3 | | | |
|---|---|---|---|---|---|
| ADMN | 301 | Managerial Styles | *3 | - | - |
| BCOM | 302 | Advanced Communication for Broadcasters | 6 | 3 | 2 |
| BCST | 310 | Radio Operations | *22 | - | - |
| BCST | 311 | Radio Management | *24 | - | - |
| BCST | 320 | Television Production | - | 18 | - |
| BCST | 321 | Television Production Theory | - | 3 | - |
| BCST | 322 | Television News | - | 4 | - |
| BCST | 323 | Television Production Planning | - | 2 | - |
| BCST | 324 | Educational Television Production | - | 5 | - |
| BCST | 330 | Investigative Reporting | - | - | 2 |
| BCST | 331 | Media Law | - | - | 2 |
| BCST | 332 | Radio News | - | - | 10 |
| BCST | 333 | Television News | - | - | 10 |
| BCST | 335 | History and Social Science | - | - | 3 |
| COMP | 312 | Computers in Broadcasting | - | 3 | - |
| OPMT | 319 | Statistics for Broadcasters | *4 | - | - |
| | | | *59 | 38 | 29 |

| Year 2 | | Term 4 | Radio | Clrm hrs/wk TV | Jrn |
|---|---|---|---|---|---|
| BCOM | 401 | Advanced Communication for Broadcasters | 6 | 3 | 2 |
| BCST | 410 | Radio Operations | *25 | - | - |
| BCST | 411 | Radio Management | *28 | - | - |
| BCST | 420 | Television Production | - | 18 | - |
| BCST | 421 | Television Theory | - | 1 | - |
| BCST | 422 | Television News | - | 4 | - |
| BCST | 424 | Educational Television Production | - | 8 | - |
| BCST | 431 | Labor & Business | - | - | 4 |
| BCST | 432 | Radio News | - | - | 10 |
| BCST | 433 | Television News | - | - | 10 |
| BCST | 435 | History and Social Science | - | - | 2 |
| BCST | 437 | Industry Preparation | - | - | 4 |
| | | | *59 | 34 | 32 |
| BSCT | 409 | Practicum | 35 | 35 | 35 |
| | | | (Hours Per Week) | | |

* This total of 59 hours over 2 weeks averages 29.5 hours per week in Term 3 and Term 4.

## Subject Outlines

**ADMN 101 Economic Issues** — In one lecture and two seminar hours per week, students are acquainted with fundamental analytic tools in economics and with economic issues in Canada.

**ADMN 320 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.

**BCOM 101/201/301/401 Communication 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).

**BCOM 201** see **BCOM 101**

**BCOM 301** see **BCOM 101**

**BCOM 401** see **BCOM 101**

**BCST 100 Industry Organization** — A study of the history of broadcasting from its first steps through to the present-day. The rules and regulations under which broadcasting in Canada is governed are also covered. The student is introduced to the development of programming, copyright, broadcast systems and management.

**BCST 101 Technical Basics** — 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."

**BCST 103 Copywriting** — 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.

**BCST 110 Radio Operations** — An introduction to the equipment and techniques used in radio broadcasting. Starting with station organization, the student continues with a study of microphones, radio control boards, tape machines and all broadcast accessories, and develops the manual dexterities needed to operate this equipment.

**BCST 111 Radio Announcing** — An introduction to effective speaking for radio. The course combines classroom instruction with work sessions that employ class critiques. Regular auditions measure individual progress.

**BCST 112 Awareness** — 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.

**BCST 113 Introduction Broadcast Journalism** — 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 situations. The first term will also include the development of planning and scheduling skills, time management and entrepreneurial skills.

**BCST 120 Television Production** — Understand the basic components of a television production and how each interrelates with the others. Equipment explanations include cameras, switchers, audio equipment, video tape recording, and EFP/ENG usage. Manual dexterity is developed in the operation of studio and control room production equipment. The course is divided into approximately 8 hours lab (orientation/practi-

cal) and 3 hours lecture. This may fluctuate from time to time.

**BCST 121 Film (Jrn. Option)** — Covers the fundamentals of picture taking, including the practical aspects of focus, lighting, etc., and creative aspects — how to tell stories with pictures. The course provides the conceptual base for later work in electronic news gathering (E.N.G.) techniques.

**BCST 130 Introduction to News Reporting** — 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.

**BCST 131 Introduction to Announcing** — The student is introduced to basic concepts of voice production, announcing skills and news reading. Stress is placed on daily practice, and students receive individual and group coaching.

**BCST 132 Introduction to Radio** — 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 understanding of all aspects of radio broadcasting.

**BCST 133 Introduction to Television** — Understand the responsibilities of each position in a television crew; be familiar with the basic operation of studio equipment; understand how a newscast is produced by the TV crew and the newsroom staff, and how the two elements inter-relate; set up and shoot on location with ENG equipment, taking into account lighting and staging considerations; do an on-camera read.

**BCST 134 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.

**BCST 135 Municipal Government** — This course follows a lecture format, with practical assignments, and covers the fundamental operations, structures and problems of local government in B.C. The focus is related directly to news reporting work.

**BCST 136 Picture Basics** — Understand the language of pictures and the ways pictures convey information. Understand the relations between picture technology and picture communications. Operate a thirty-five millimeter still camera. Sequence an inanimate object. Tell a story using slides.

**BCST 200** see **BCST 100**

**BCST 203** see **BCST 103**

**BCST 209 Practicum**

**BCST 211** see **BCST 111**

**BCST 212** see **BCST 112**

**BCST 220** see **BCST 120**

**BCST 221 Photography and Darkroom Techniques** — Designed for TV students, the course concentrates on 35 mm photography in TV stations where the production of slides for news and commercial use is often extensive. Students learn how to take good pictures and to develop and print them.

**BCST 222 Theory of Color Television** — 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 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.

**BCST 230** see **BCST 130**

**BCST 231** see **BCST 131**

**BCST 232 Radio News** — 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 judgement.

**BCST 233 Television News Lab** — 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 classroom hours. Some attention is also given to television newscast makeup and presentation.

**BCST 234 Documentaries** — 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.

**BCST 235 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.

**BCST 310 Radio Operations** — Students entering this course have completed their first year of training in the Radio Option of the Broadcast Communications Department. They have gained a basic knowledge of broadcast operations and procedures and have put that knowledge to some practical use. This course will see that knowledge put to **frequent** and **professional** use in the operation of the Campus Radio Station CFML (a licenced FM Radio Station serving the campus and available on Lower Mainland Cable FM systems at 104.5).

**BCST 311 Radio Management** — The management portion of BCST 311 is designed to provide the student with detailed insight into the financial operations of AM/FM television stations in British Columbia. The course will provide students with a better understanding of regulations which govern AM/FM/TV operations, how revenues and costs are directly related to salaries; sales, marketing and promotion; employment promotion opportunities, and why/how they occur; market growth related to projected annual earnings; short and long-term debt retirement, capital expansion projects. The course will utilize guest speakers from the broadcast industry.

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

**BCST 321 Television Production Theory** — Upon successful completion of this course, students will be able to organize and conduct a production meeting, provide constructive criticism of their peers performance and accept the same for their own projects, gain an understanding of various aspects of the broadcast industry through contact with professionals, which will provide the basis for oral **and** written presentations on selected topics. Presentation topics will be assigned by the first week in October.

**BCST 322 Television News** — This studio activity is assigned to second year television students to provide the routine of airing television newscasts on a weekly basis. Students will be rotated through production crew positions following the Broadcast Journalism rotation schedule. Students are expected to demonstrate professional competence in all crew positions as they "air" TV newscasts.

**BCST 323 — Television Production Planning** — Upon successful completion of this course, the student will be able to plan all the elements necessary to guarantee a production which meets the professional standards of the television production industry; organize and conduct pre and post production meetings as the producer/director of a proposed series pilot.

**BCST 324 Educational Television Production** — This studio activity is assigned to second year television students in order to provide them with the opportunity to prove their professional competence as members of the BCIT Television production team for BCIT Knowledge Network productions. These programs will be either "live" transmissions or pre-taped.

**BCST 330 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.

**BCST 331 Media Law** — It s important for a broadcaster to be trained to function within the Canadian judicial system. This course explains the inner workings and the various levels of courts; it familiarizes students with Canadian criminal law and the laws of libel and slander.

**BCST 332 Radio News** — 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.

**BCST 333 Television News** — Upon successful completion of this course, students will be able to demonstrate technical facility in the preparation of television news stories; develop original news stories; operate at levels approximating professional productivity; show the depth, intensity, and significance in their reports that is expected of a journalist (rather than a news packager); operate under pressure as part of a television news team; demonstrate the responsibilities expected of a journalist.

**BCST 335 History & Social Sciences** — Upon successful completion of this course, the student will be able to understand the historical background of major Canadian news stories; understand the ways social groups interact in the Canadian context; develop an in-depth understanding of one of Vancouver's ethnic groups; examine in-depth the historical, ethnic, or geographic realities of an area of Canada.

**BCST 409 Practicum**

**BCST 410** see **BCST 310**

**BCST 411** see **BCST 311**

**BCST 420** see **BCST 320**

**BCST 421** see **BCST 321**

**BCST 422** see **BCST 322**

**BCST 424** see **BCST 324**

**BCST 431** see **BCST 331**

**BCST 432** see **BCST 332**

**BCST 433** see **BCST 333**

**BCST 435** see **BCST 335**

**BCST 437 Industry Preparation** — Designed to give the student final preparation for graduation and employment. Students prepare resumes and audition packages which are distributed to radio and television stations in Western Canada. Another part of the course familiarizes students with sales, marketing and news room management.

**COMP 212/312 Computers in Broadcasting** — The computer as an important servant of broadcast communication — traffic, programming and sales. Field trips to Vancouver stations supplement classroom instruction.

**COMP 312** see **COMP 212**

**OPMT 319 Statistics for Broadcasters** — 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.

## Faculty and Staff

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P. Munoz (on leave)
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# 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 commonplace in business accounting, banking and airline reservations systems, scientific research applications, in compiling insurance actuarial tables and in planning and control of industries. Large mainframe computers, minicomputers and microcomputers are now ubiquitous in the workplace. In order for the computer to do its job, an analyst must define the problem to be solved and a programmer must give the computer a detailed set of instructions to follow in solving the problem. Thus it is the human element which determines the degree of success of any computer application.

**Job Opportunities**
Many 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 become technical writers or move into sales or supervisory positions. Still others seek an entrepreneurial role as independent software authors or original equipment manufacturers (OEMs).

**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, using both mainframe and microcomputers. In the second year, students specialize in one of the following options:

Information Systems — in addition to business systems and programming, students receive additional instruction in accounting and management skills;

Microcomputer Systems — students specin quantitative approaches to managerial decision making. Some of the topics covered are computer simulation, linear programming, computer graphics and the computer language APL;

Microcomputer Systems — students specialize in microcomputer technology; digital logic and hardware, microcomputer systems programming, micro-based systems design and micro applications software;

Engineering Systems — this option offers specialized courses in CAD/CAM and computer graphics, as well as traditional training in computer programming and systems analysis;

Expert Systems — this is the branch of Artificial Intelligence which develops automated systems to capture the skills of human experts. These systems are now feasible for a variety of applications on microcomputers as well as larger systems. Most options are limited in size to about 20 students. Where the number of applications exceeds the option size, students will be selected using a weighted average of selected first year marks.

**Prerequisites 1** — First Year Entry
Graduation from Grade 12 with at least a B average in the following specific subjects: Algebra 12 (B grade or better or Algebra 12 honors C+), English 12, Physics 11 or 12 and at least 4 other grade 11 or 12 academic courses (Arts and Science) are highly recommended.

In the case of mature students, academic transcripts may be supplemented by relevant business experience, successful recent completion of relevant BCIT Continuing Education courses with 75%, or successful recent completion of relevant courses at other post secondary institutions with 75%.

Candidates may be asked to write an aptitude test to aid in the selection process.

**Prerequisites 2** — Second Year Direct Entry
Qualified applicants are also accepted for direct entry into the second year of the diploma program. Successful applicants usually have a university degree or a diploma of technology from a recognized post secondary institution, or a number of courses from the BCIT Part-Time Studies Program equivalent to the first year course load, or an equivalent combination of post secondary training and work experience. Direct entry students may be required to take additional courses in order to make up deficiencies in their backgrounds. Such courses may be scheduled in consultation with the heads of the respective options.

**Additional Information**
All applicants should enjoy solving problems, using a logical and systematic approach. Because students spend many hours at computer terminal keyboards, applicants would find that the ability to touch type is useful.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| ADMN101 | Economic Issues | 3 |
| BCOM 203 | Business Communication 1 | 3 |
| COMP 150 | Application Programmming — ASSEMBLER, PASCAL | 5 |
| COMP 170 | Systems Analysis & Design 1 | 4 |
| COMP 172 | Systems & Programming Methodology | 4 |
| FMGT 101 | Accounting 1 | 4 |
| MKTG 102 | Marketing | 3 |
| OPMT 113 | Applied Math | 4 |
| | | 30 |

| Year 1 | Term 2 | |
|---|---|---|
| ADMN483 | Computers and the Law | 3 |
| BCOM 203 | Business Communication 2 | 4 |
| COMP 250 | Application Programming — ASSEMBLER, COBOL, BASIC | 6 |
| COMP 251 | Microcomputer Systems & Applications 1 | 3 |
| COMP 270 | Systems Analysis & Design 2 | 5 |
| FMGT 201 | Accounting 2 | 4 |
| OPMT 133 | Statistics in Industry | 4 |
| | | 29 |

| Year 2 | Term 3 | Info | Mgmt | Micro | Eng | Exp |
|---|---|---|---|---|---|---|
| | | Clrm hrs/wk | | | | |
| ADMN220 | Organizational Behavior | 3 | - | - | 3 | - |
| COMP 280 | Introduction to Decision Systems | 3 | - | 3 | 3 | 3 |
| COMP 350 | Application Programming — COBOL, ASSEMBLER | 6 | 6 | 6 | - | 6 |
| COMP 351 | Microcomputer Systems & Applications 2 | - | - | 5 | - | - |
| COMP 352 | Software Support Systems 1 | 3 | 3 | 3 | 3 | 3 |
| COMP 355 | CAD/CAM 1 | - | - | - | 3 | - |
| COMP 356 | Applications Programming — FORTRAN, ASSEMBLER, BASIC | - | - | - | 6 | - |
| COMP 357 | LISP & Expert Systems | - | - | - | - | 5 |
| COMP 370 | Technical Aspects of Systems Design | 4 | 4 | 4 | 4 | 4 |
| COMP 381 | Management Decision Systems 1 | - | 8 | - | - | - |
| COMP 392 | Computer Projects 1 | 5 | 5 | 5 | 5 | 5 |
| FMGT 102 | Introduction to Financial Accounting | - | - | - | 3 | - |
| FMGT 301 | Cost & Managerial Accounting 1 | 4 | - | - | - | - |
| FMGT 305 | Cost Accounting | - | 4 | 4 | - | 4 |
| OPMT 168 | Management Engineering 1 | 3 | - | - | - | - |
| | | 31 | 30 | 30 | 30 | 30 |

| Year 2 | Term 4 | Info | Mgmt | Micro | Eng | Exp |
|---|---|---|---|---|---|---|
| ADMN111 | Management Fundamentals | 3 | 3 | 3 | 3* | 3 |
| COMP 251 | Microcomputer Systems & Applications 1 | - | - | - | 3* | - |
| COMP 450 | Applications Programming — PL/I, CICS, 4th Generation Lang. | 6 | 6 | 6 | 6 | 6 |
| COMP 451 | Microcomputer Systems & Applications 3 | - | - | 8 | - | - |
| COMP 452 | Software Support Systems 2 | 3 | 3 | 3 | 3 | 3 |
| COMP 455 | CAD/CAM 2 | - | - | - | 5 | - |
| COMP 457 | PROLOG & Expert Systems | - | - | - | - | 8 |
| COMP 470 | Advanced Systems Analysis & Design | 4 | 4 | 4 | 4 | 4 |
| COMP 481 | Management Decision Systems 2 | - | 8 | - | - | - |
| COMP 492 | Computer Projects 2 | 5 | 5 | 5 | 5 | 5 |
| FMGT 401 | Cost & Managerial Accounting 2 | 4 | - | - | - | - |
| NGAS 206 | Process Control | - | - | - | 3 | - |
| OPMT 268 | Management Engineering 2 | 4 | - | - | - | - |
| | | 29 | 29 | 29 | 29 | 29 |

**Engineering Systems students take ADMN 111 if they have previously taken COMP 251.*

## Subject Outlines

**ADMN 101 Economic Issues** — Develops 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 (microeconomics). The theoretical tools of the economist are used to explore the concepts of national income, employment, money and banking, inflation, international trade and growth.

**ADMN 111 Management Fundamentals** — 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.

**ADMN 220 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.

**ADMN 483 Computers and the Law** — Acquaints students with the legal system of Canada and British Columbia, with an emphasis on understanding how to deal with the kinds of legal problems that one is likely to encounter in the computer field.

**BCOM 103/203 — 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.

**BCOM 203** see **BCOM 103**

**COMP 150 Application Programming — ASSEMBLER, PASCAL** — An introduction to the principles of programming using IBM ASSEMBLER language. Emphasis is on understanding the mode of operation of a program, practice in the flow-charting, coding, debugging and documenting of simple business applications. PASCAL is used to practice writing structured modular programs, emphasizing applications covered in COMP 151.

**COMP 151 Systems & Programming Methodology** — This course complements COMP 150 and 170 and is a prelude to all future systems and programming courses. One of the key activities involving computers is the capture, storing, manipulation and retrieval of DATA to provide information (and thus, knowledge) for more intelligent decision-making. This course introduces various underlying concepts related to DATA such as representation inside a computer, and how data can be manipulated and accessed. The course also provides a collection of standard techniques which can be applied to a variety of commonly encountered programming situations, without regard to the syntax or characteristics of any particular programming language. Lab assignments concentrate on bridging the gap between fuzzy, informal, natural language problem specifications and the precise, formal specifications needed for programming.

**COMP 170 Systems Analysis & Design 1** — An introduction to the common business applications — accounts receivable, accounts payable, inventory. The course will focus on the analysis, design and development of a computer system. The course includes commonly used tools (systems flowcharts, decision tables, data gathering techniques, forms design) in the analysis and design states, and a group project to convert a clerical system to a computer system.

**COMP 250 Application Programming — ASSEMBLER, BASIC, COBOL** — Continues the ASSEMBLER language introduced in COMP 150. Topics include base/displacement addressing, table loading and searching. BASIC is used to develop interactive programming and processing techniques. COBOL is introduced to reinforce the structured, modular programming techniques developed in COMP 150 and 151. COBOL programs are written to provide experience in solving practical business applications. Topics include subroutines, table handling, disk file updating and data validations.

**COMP 251 Microcomputer Systems & Applications 1** — A study of microprocessors and microcomputer systems. Stresses the wide range of microcomputer applications as well as the differences and similarities to mini/mainframe systems. Topics include: overview of LSI and VLSI technology, microcomputer system architecture, hardware and software characteristics, application considerations. Also includes selected topics in computer fundamentals as related to microcomputers, such as machine concepts, Boolean logic, and Digital design principles. Students complete a project involving microcomputer hardware, software or related topic.

**COMP 270 Systems Analysis & Design 2** — A continuation of the material covered in COMP 170, covering areas such as: systems development life cycle, getting a project started, preliminary investigation, systems requirements, fact finding techniques, data flow concepts and diagrams, data dictionaries, decision trees, structured English, cost/benefit analysis, design of input/output

and controls, on-line system design considerations, system testing, and implementation, hardware and software selection. Human factors and ethical issues are stressed.

**COMP 280 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.

**COMP 350 Application Programming COBOL, ASSEMBLER** — Continuation of COMP 250. Completion of ASSEMBLER language programming including the linkage of separately written program sections. Completion of COBOL language. Students write several programs incorporating a variety of programming techniques.

**COMP 351 Microcomputer Systems & Applications 2** — Hardware topics include digital logic, MPU and MPU support chip sets, interfacing techniques and current real life microcomputer systems and peripherals. Software topics include several MPU instruction sets, microcomputer operating systems, and common microcomputer programming languages such as PASCAL, C, Advanced BASIC, and various ASSEMBLY languages.

**COMP 352/452 Software Support Systems 1** — This course covers technical topics in hardware and software related to operating systems and other software support systems. Topics include hardware and software architecture, operating systems, resource management (memory processor, I/O device, data, etc.) utility functions, and programming language issues.

**COMP 355 CAD/CAM 1** — Lectures, demonstrations, and practical hands-on exercises are used to present topics on: CAD/CAM hardware; CAD/CAM software and algorithms; drawing production and management.

**COMP 356 Applications Programming — FORTRAN, ASSEMBLER, BASIC** — Continuation of COMP 150/250. Upon successful completion of this course, the student will be able to design and code advanced FORTRAN programs using structured style and top down design; use subprograms and linkage to ASSEMBLER, and use BASIC to do graphic routines.

**COMP 357 LISP & Expert Systems** — A major goal of this course is to have students become proficient in the language LISP so they can use it as an Expert System development tool in COMP 457. Once the basic syntax and features of the language have been covered, the course will focus strongly on LISP application areas, in particular those suitable for Expert Systems work.

**COMP 370 Technical Aspects of System Design** — Topics include tape and disk storage characteristics with an indepth study of file organization methods, Sequential, Indexed and Direct. In addition, the study of issues in the development of on-line systems with a major on-line systems project.

**COMP 381 Management Decision Systems 1** — 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 PASCAL.

**COMP 392/492 Computer Projects 1** — These courses will allow students to work on projects of their choice within guidelines specified by faculty. The projects will be drawn from a variety of sources, wherever possible from industrial situations, and may require extensive contact with the business community, and will cover a large number of diverse applications. Students will ordinarily work in teams and will seek direction from a faculty member assigned as their project supervisor. Some of the projects will continue through both terms, others will end in COMP 392 and new ones start in COMP 492.

**COMP 450 Application Programming — PL/I, CICS, 4th Generation Languages** — Continuation of COMP 350, including the PL/I language, the chief programmer team approach and on-line programming using CICS. Students will also be briefly introduced to a number of other languages such as RPG, APL, FOCUS, etc. Considerable time will be spent on a large multi-program system which will have been designed in COMP 470.

**COMP 451 Microcomputer Systems & Applications 3** — An advanced course in Microcomputer Systems. Topics covered will include Systems Software (assemblers, compilers, operating systems, editors); Applications Software (spreadsheet, data base, communications, word processing, etc.); microcomputer networks; microcomputer management and control. Students will conceive, design and implement a systems software project (e.g. language interpreter, cross assembler, communications package, etc.). The impact of microcomputer technology within organizations and its relation to traditional data processing will also be emphasized.

**COMP 452** see **COMP 352**

**COMP 455 CAD/CAM 2** — Lectures, demonstrations, and practical hands-on exercises are used to present topics on CAD/CAM hardware, CAD filing systems, work station ergonomics, practical applications of CAD/CAM, acquisition procedures.

**COMP 457 PROLOG & Expert Systems** — This course stresses Expert Systems project development techniques. Students write programs in LISP (learned in COMP 357), to practice the concepts taught. The language PROLOG is taught as the course progresses, and students use either LISP or PROLOG to do major projects towards the end of the course.

**COMP 470 Advanced Systems Analysis & Design** — Structured systems analysis; data base concepts; design of on-line systems. Includes analysis, design and specifications of a major project which will be programmed in COMP 470. Also includes a series of special computer related topics of current interest.

**COMP 481 Management Decision Systems 2** — Systems which assist management in planning and control of projects, the allocation of scarce resources and other short and long range planning and operational decisions. As in COMP 381, behavioral as well as quantitative aspects of the systems are examined and feasibility studies, reports and presentations are required. Topics include PERT and CPM scheduling methods, linear programming theory and application with emphasis on problem formulation, sensitivity analysis and implementation of findings; non-linear, integer and dynamic programming; comparison of optimization, simulation and heuristic methods; choosing the appropriate technique. The course uses "package" programs where applicable.

**COMP 492** see **COMP 392**

**FMGT 101/201 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.

**FMGT 102 Introduction to Financial Management** — Introduction to accounting and the accounting equation; generally accepted accounting principles; balance sheet preparation; the end of period process; accounting for merchandising operations; accounting systems; cash and receivables; inventory.

**FMGT 201** see **FMGT 101**

**FMGT 301/401 — Cost & 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.

**FMGT 305 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. Applications on HP 3000 will be studied during late term labs.

**FMGT 401** see **FMGT 301**

**MKTG 102 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.

**OPMT 113 Applied Math** — First portion of course involves positional numbering systems, binary arithmetic and an introduction to Boolean Algebra as it relates to operation of digital computers. The second phase covers Mathematics of Finance including simple interest, compound interest, annuities and project evaluation methods both before and after taxes. Typical business and personal applications are illustrated.

**OPMT 133 Statistics in Industry** — Fundamentals of descriptive statistics and an introduction to inferential statistics. Covered in the latter are probability theory; sampling and sampling distributions; estimation; hypothesis testing; linear regression and correlation analysis using a computer package (SPSS).

**OPMT 168 Management Engineering 1 — Computer Systems** — The use of systematic problem solving techniques to apply cost saving measures to a data processing environment. The use of terms of reference to clarify goals for system improvements. Recording and analysis techniques such as work measurement, activity sampling, flow process charting and multiple activity charting in the information processing workplace. The application of critical examination to selected work situations. Quantified evaluation of alternatives to arrive at a best solution. Tactics for implementing and maintaining the change.

**OPMT 268 Management Engineering 2 — Computer Systems** — Project control through the use of arrow and precedence diagrams. Time logic to level resource use. Microprocessor software packages for project control. Financial analysis of an investment proposal to prepare a request for expenditure, risks as a decision parameter, sensitivity analysis, decision trees and Monte Carlo techniques to analyze risks. Forecasting and projections using spreadsheet software. Applications of multi-dimensional corporate modelling. Overview of robotics and the implications for computer students. Students research a topic or a company within the computer industry and make an effective oral presentation.

## Faculty and Staff

H. Holst, C.D.P., *Acting Department Head*
P. Abel, B.A. (Hons.), C.G.A.
D. Breckner, B.A., M.A.
R. Coolidge, Dipl. T.
K.E. Holden, R.I.A., Coordinator, Service Courses to School of Management Technologies
G.T. Kidd, B.Sc.
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F.J. Martin, B.A. (Hons.), M.Sc., F.L.M.I., C.D.P., Program Head, Information & Expert Systems Options
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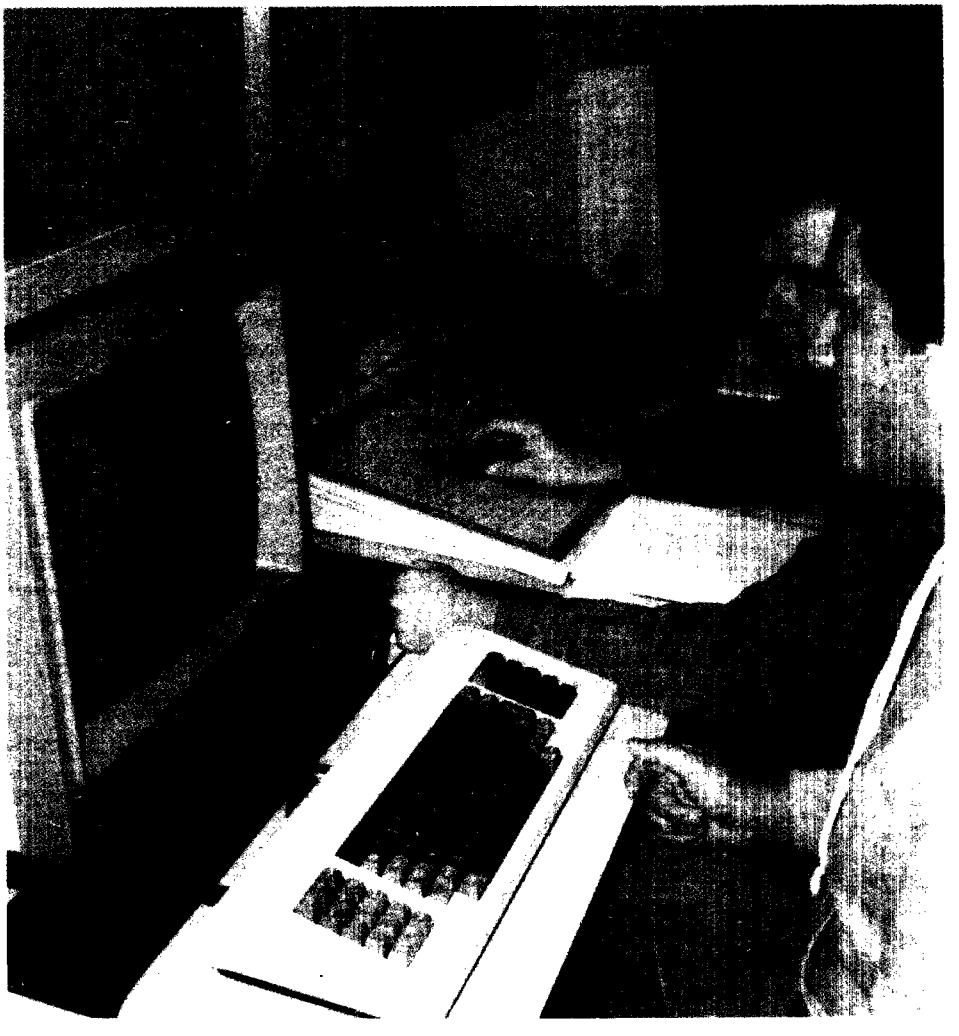
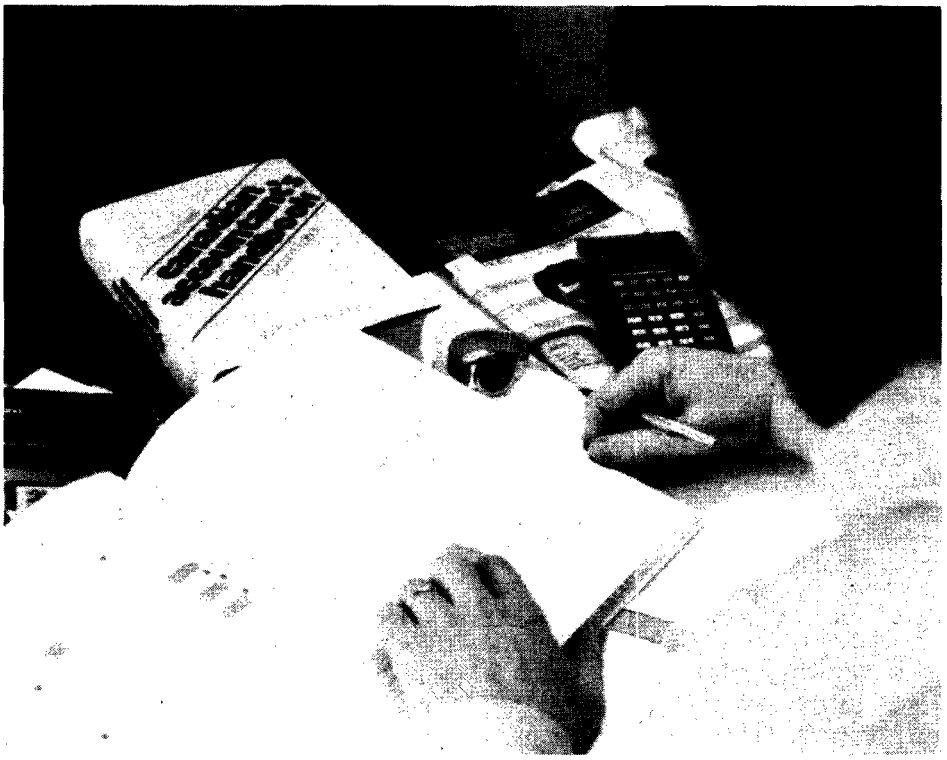
K. Takagaki, B.A. (Hons.), R.I.A., C.D.P. Program Head, Microcomputer Systems Option
M.E. Turner, M.B.A., P.Eng. Ph. D. Program Head, Management Systems Option Senior Instructor
A.Y.W. Wong, B.A.Sc., M.Eng., P.Eng., Program Head, Engineering Systems Options





# Financial Management

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

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

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 two options: Accounting or Finance.

**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 computer systems fundamentals introduced in the first year with increased concentration on financial and cost accounting.

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

**Prerequisites**
Algebra 11 is the course requirement for this program. Applicants are required to specify their second year option choice when applying to first year. 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 accounting profession, through its professional bodies, recognizes a wide variety of accounting subjects offered in the program. The Canadian Institute of Chartered Accountants, the Canadian Certified General Accountants' Association, the Society of Management Accountants and the Canadian Credit Institute give credit for various subjects.

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

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| ADMN100 | Economics 1 | 3 |
| ADMN110 | Management 1 | 3 |
| BCOM 104 | Business Communication | 3 |
| COMP 100 | Introduction to Data Processing | 4 |
| FMGT 101 | Accounting 1 | 4 |
| MKTG 102 | Marketing | 3 |
| OPMT 112 | Business Mathematics | 4 |
| | | 24 |

| Year 1 | Term 2 | |
|---|---|---|
| ADMN200 | Economics 2 | 3 |
| ADMN210 | Management 2 | 3 |
| ADMN220 | Organizational Behavior | 3 |
| BCOM 204 | Business Communication | 4 |
| COMP 120 | Computers in Business | 3 |
| FMGT 106 | Credit and Collections | 3 |
| FMGT 201 | Accounting 2 | 4 |
| OPMT 132 | Statistics for Financial Management | 4 |
| | | 27 |

| Year 2 | Term 3 | Acctg | Fin |
|---|---|---|---|
| ADMN380 | Business Law 1 | 3 | 3 |
| FMGT 105 | Money & Banking 1 | - | 4 |
| FMGT 301 | Cost & Managerial Accounting 1 | 4 | - |
| FMGT 302 | Financial Accounting 1 | 4 | 4 |
| FMGT 307 | Finance 1 | 3 | 3 |
| FMGT 310 | Auditing 1 | 4 | - |
| FMGT 311 | Quantitative Methods for Financial Management | 4 | 4 |
| FMGT 313 | Taxation 1 | 3 | 3 |
| FMGT 315 | Security Analysis 1 | - | 4 |
| FMGT 318 | Microcomputer Software Systems | 4 | 4 |
| | | 29 | 29 |

| Year 2 | Term 4 | Acctg | Fin |
|---|---|---|---|
| ADMN480 | Business Law 2 | 3 | 3 |
| FMGT 203 | Money & Banking 2 | - | 4 |
| FMGT 312 | Projects in Industry | 6 | 6 |
| FMGT 401 | Cost & Managerial Accounting 2 | 4 | - |
| FMGT 402 | Financial Accounting 2 | 4 | 4 |
| FMGT 404 | Finance 2 | 3 | 3 |
| FMGT 405 | Security Analysis 2 | - | 4 |
| FMGT 406 | Auditing 2 | 4 | - |
| FMGT 407 | Microcomputer Software Systems Applications | 4 | 4 |
| FMGT 409 | Taxation 2 | 3 | 3 |
| | | 31 | 31 |

## Subject Outlines

**ADMN 100/200 Economics** — Develops an understanding of the organization and operations of the Canadian economy. Students analyze supply and demand, 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.

**ADMN 110 Management 1** — An orientation to the nature of business in the free enterprise system with emphasis on organization for management. The functions of management, planning and organizing are thoroughly examined, as well as topics such as management information systems, the role of the committee and the development of theory of management philosophy. This leads to the course on administrative practices.

**ADMN 210 Management 2** — 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.

**ADMN 220 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.

10.360/10.460

**ADMN 380/480 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.

**ADMN 480** see **ADMN 380**

**BCOM 104/204 Business Communication** — Develops the 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 meetings and interviews, and to present reports.

**BCOM 204** see **BCOM 104**

**COMP 100 Introduction to Data Processing** — Training in basic data processing principles to develop recognition of the possible application of these principles to 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. Industrial relations is also introduced.

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

**FMGT 101/201 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.

**FMGT 105/203 Money & 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.

**FMGT 106 Credit & Collections** — 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.

**FMGT 203** see **FMGT 105**

**FMGT 301/401 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.

**FMGT 302/402 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 relationships, 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.

**FMGT 307/404 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.

**FMGT 310/406 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.

**FMGT 311 Quantitative Methods for Financial Management** — An explorative study of some of the approaches used in analyzing and solving a number of problems commonly encountered in business. Quantitative techniques such as Linear Programming, Waiting Line Theory, Simulation Decision Trees and Probability are a few of the sophisticated techniques covered in the course.

**FMGT 312 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.

**FMGT 313/409 Taxation** — Examines major income categories and applicable rules; determines who is subject to tax in Canada and the basis on which Canada levies income tax; rules of deductibility of expenses, and reviews some of the common tax sheltered investments available to Canadian residents.

**FMGT 315/405 Security Analysis** — Techniques and principles of security analysis; valuation of securities; analysis of risks inherent in all types of security investments. Emphasizes the investment setting, the securities market, financial statement analysis, investment timing and portfolio analysis of both individual and institutional investors.

**FMGT 318 Microcomputer Software Systems** — Students will receive instruction and practice in the use of commercially available microcomputer software systems and will use these systems to solve business problems. Typical programs will involve word processing, electronic worksheets, data base management and business graphics.

**FMGT 401** see **FMGT 301**

**FMGT 402** see **FMGT 302**

**FMGT 404** see **FMGT 307**

**FMGT 405** see **FMGT 315**

**FMGT 406** see **FMGT 310**

**FMGT 407 Microcomputer Software Systems Applications** — A continuation of Microcomputer Software Systems emphasizing the solution of practical problems. It is expected that the course will develop a level of familiarity with the programs such that the students will use them in other course areas.

**FMGT 409** see **FMGT 313**

**MKTG 102 Marketing** — Designed to give the students a good understanding of the role of marketing in a firm. Marketing plays a critical role in any firm providing products or services, and the decisions made by the marketing manager are reflected in the administrative and financial functions of the firm. Lab sessions will deal with typical marketing problems; students will be exposed to the decision making process in marketing management.

**OPMT 112 Business Mathematics** — Review of basic mathematics applicable to business and industry. Simple and compound interest, financial instruments and discounting, annuities; mortgages, loans, sinking funds, leases. Depreciation methods, capitalised costs. Cash flow analysis, NPV, IRR. Emphasis is on maximum use of preprogrammed calculator, and practical application from the business field of financial management.

**OPMT 132 Statistics for Financial Management** — Will enable students to acquire skills in summarizing and analyzing data using descriptive and inferential statistical techniques. Topics include graphical presentation of data, measures of location and variation, elementary probability, estimation, hypotheses testing, linear regression, correlation, index numbers and time series. Emphasis is on practical applications in the field of Financial Management.

## Faculty and Staff

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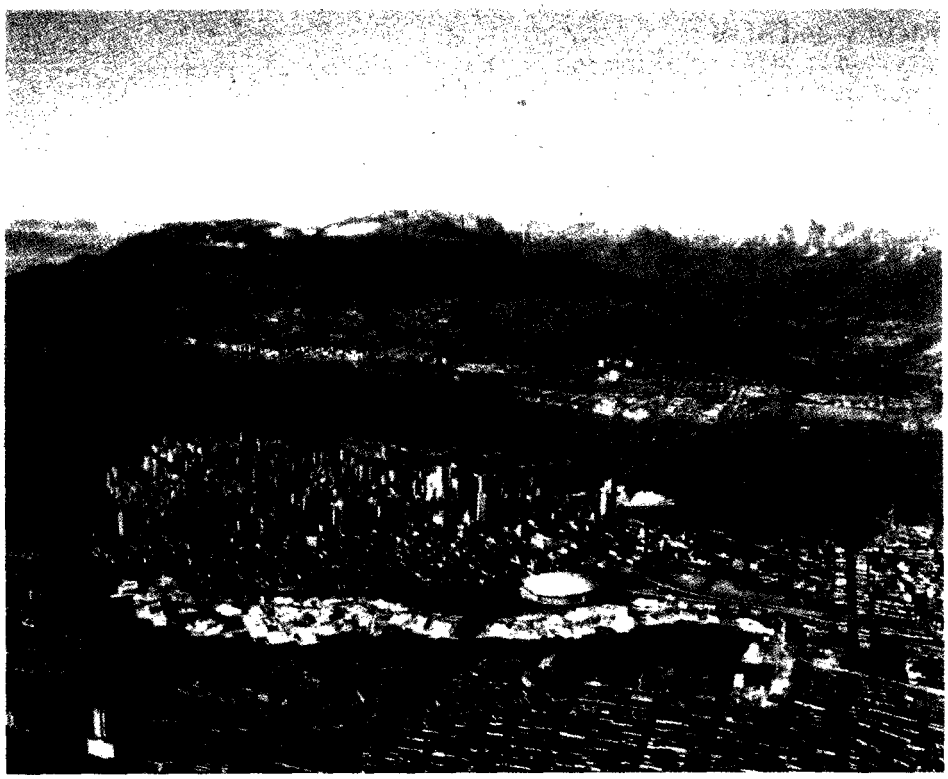


# Hospitality and Tourism Administration

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 Opportunites

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, tour agencies, tour operators, with surface or air transportation companies, or government agencies involved in travel promotion.

### The Program

Students enter a common first year, heavily oriented to general business management subjects applied, where practical, in a hospitality and tourism industry setting. The balance of the first year program provides introductory courses directly related to the hospitality and tourism field. At the end of first year students will choose to continue in second year in either the Hotel, Motel and Food Service option, or the Travel and Tourism option. However, there may be a limited number of seats in the Travel and Tourism option. Regardless of option selected, each student must complete a 500 hour work practicum in some aspect of the hospitality and tourism industry between date of registration and graduation.

### Prerequisites

English 12 and Algebra 11 both with C+ are course requirements for this program. High School graduates having succesfully completed the Career Preparation Program (C.P.P.) in Hospitality and Tourism should so indicate on their BCIT application for possible special consideration.

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

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 reasons for applying to the Hospitality and Tourism Technology.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| ADMN100 | Economics | 3 |
| BCOM105 | Business Communication | 3 |
| COMP100 | Introduction to Data Processing | 4 |
| FMGT 101 | Accounting | 4 |
| FMGT 106 | Credit and Collections | 4 |
| HOSP 101 | Lounge Operations | 2 |
| HOSP 102 | Food Operations | 2 |
| HOSP 111 | Oral Communication | 3 |
| OPMT 111 | Business Mathematics | 4 |
| | | 29 |

| Year 1 | Term 2 | |
|---|---|---|
| ADMN200 | Economics | 3 |
| BCOM205 | Business Communication | 3 |
| COMP104 | Computers in Business | 3 |
| FMGT 201 | Accounting | 4 |
| HOSP 201 | Food Preparation and Service | 2 |
| HOSP 202 | Food Operations | 2 |
| HOSP 206 | Rooms Management | 4 |
| HOSP 231 | Introduction to Tourism | 3 |
| OPMT 165 | Basic Management Engineering | 3 |
| | | 27 |

**Hotel, Motel and Food Service**

| Year 2 | Term 3 | |
|---|---|---|
| HOSP 302 | Food and Beverage Management | 2 |
| HOSP 305 | Food Production and Service | 6 |
| HOSP 313 | Food and Beverage Cost Control | 4 |
| HOSP 316 | Human Relations | 2 |
| HOSP 325 | Marketing and Sales Promotion | 5 |
| HOSP 330 | Tourism Plant Design | 4 |
| OPMT 131 | Business Statistics | 4 |
| | | 27 |

| Year 2 | Term 4 | |
|---|---|---|
| ADMN480 | Fundamentals of Business Law | 3 |
| HOSP 402 | Food and Beverage Management | 2 |
| HOSP 405 | Food Production and Service | 6 |
| HOSP 413 | Hospitality Industry Accounting | 3 |
| HOSP 416 | Human Relations | 2 |
| HOSP 425 | Marketing and Sales Promotion | 5 |
| HOSP 450 | Directed Studies | 4 |
| HOSP 500 | Work Practicum | - |
| | | 25 |

**Travel and Tourism**

| | | Clrm hrs/wk |
|---|---|---|
| **Year 2** | **Term 3** | |
| HOSP 320 | Organizational Behavior | 3 |
| HOSP 326 | Travel Marketing | 4 |
| HOSP 330 | Tourism Plant Design | 4 |
| HOSP 341 | Recreational and Resource Development | 3 |
| HOSP 342 | Transportation Modes | 3 |
| HOSP 343 | Tourism Destinations | 3 |
| MKTG 310 | Transportation Economics and Regulations | 3 |
| OPMT 131 | Business Statistics | 4 |
| | | 27 |
| **Year 2** | **Term 4** | |
| ADMN480 | Fundamentals of Business Law | 3 |
| HOSP 413 | Hospitality Industry Accounting | 4 |
| HOSP 420 | Organizational Behavior | 3 |
| HOSP 426 | Travel Advertising and Sales | 4 |
| HOSP 442 | Transportation Modes | 3 |
| HOSP 443 | Tourism Destinations | 3 |
| HOSP 450 | Directed Study | 4 |
| HOSP 500 | Work Practicum | - |
| MKTG 410 | Transportation Economics and Regulations | 3 |
| | | 27 |

## Subject Outlines

**ADMN 100/200 Economics** — Develops 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 of economic theory and economic policy is provided.

**ADMN 200** see **ADMN 100**

**ADMN 480 Fundamentals of 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.

**BCOM 105/205 Business Communication** — This applied business communications course concentrates on techniques and applications of written and spoken business communications. 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.

**BCOM 205** see **BCOM 105**

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

**COMP 104 Computers in Business** — A look 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.

**FMGT 101/201 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.

**FMGT 106 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.

**FMGT 201** see **FMGT 101**

**HOSP 101 Lounge Operations** — Covers the basic requirements needed to operate a lounge or bar successfully. Subject areas include layout and design, B.C. Liquor Act, liquor classification process, liquor control, bar systems. Practical mixology in preparation of cocktails, pouring techniques, garnishes and bar set up are also covered.

**HOSP 102/202 Food Operations** — 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 speciality 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.

**HOSP 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.

**HOSP 201 Food Preparation and Service** — Develops the basic skills and techniques required for food preparation and service and will lay the groundwork for the more advanced second year course. It will enable the participants to operate kitchen equipment safely, apply sanitation procedures, read, follow and prepare recipes, apply quality standards of food preparation, classify and prepare soups, stocks, sauces, fish and shellfish, meat, poultry, and breakfast items. Basic service techniques are also practiced.

**HOSP 202** see **HOSP 102**

**HOSP 206 Rooms Management** — This course will be segmented into the two component parts of Rooms Operations: housekeeping functions and hotel front desk operations. The housekeeping portion covers housekeeping organization and duties; control forms; supplies and equipment; specifications for purchasing equipment and linen and laundry operations. The hotel front desk operations section involves 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 and processing accounts.

**HOSP 231 Introduction to Tourism** — An introduction to the Travel and Tourism industry including why tourism is growing in domestic and international markets; functions and inter-relationships of the various industry sectors; major organizations and associations and their influence on tourism; exploration of career opportunities in all facets of tourism; economic import of tourism and government initiatives in encouraging growth; current trends in travel; social and environmental impacts of tourism.

**HOSP 302/402 Food and Beverage Management** — An exploraton 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.

**HOSP 305/405 Food Production and Service** — 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.

**HOSP 306/416 Human Relations** — Systematic approach to 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 available facts.

**HOSP 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; the sales mix and its effect on costing. Course emphasis is on interpretation of data for effective and profitable decision-making.

**HOSP 320/420 Organizational Behavior** — Examines personnel problems regarding people at work in all kinds of organizations. Includes human resource recruitment and selection, training and development, career planning, employee motivation, health and safety, discipline, stress, collective agreements, personnel audit. Includes industry participation.

**HOSP 325/425 Marketing and Sales Promotion** — Explores the relative positions of all components of the tourism industry — travel agent, tour operator, air/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 or combined products to the market place.

**HOSP 326 Travel Marketing** — Emphasis is on applying general marketing concepts and techniques to the travel industry, including government marketing agencies, air and surface carriers, tour operators and travel agencies; how and where they inter-relate, consumer demand and competition to serve; product definition and product packaging; consumer awareness of travel; marketing use of audiovisual aids, are some of the topic areas that will be studied.

**HOSP 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.

**HOSP 341 Recreational and Resort Development** — Explores the need and the resources necessary for establishing a strong regional attraction for the recreational, sport and vacation traveller. Topics include development of resort locations; fishing, hunting and sport resorts; ski and water resorts; seasonal developments; promotion of tourist regions depending on recreational travel. While the emphasis may be strongly B.C., in-bound, popular resort areas including Hawaii, Florida, Mexico and Nevada will also be discussed.

**HOSP 342/442 Transportation Modes** — Covers transportation modes such as ferries, cruise ships, bus, rail, rental cars and taxis. Major emphasis in this course is on air travel and the ability to quote both normal and special fares and produce schedules and tickets for airline customers. The course will also teach the use of ticketing terminology and passenger rules and regulations.

**HOSP 343/443 Tourism Destinations** — Provides a survey of the major tourism destinations frequented by the travelling public. These destinations include North and South America, Europe, the South Pacific and Pacific Rim. Subject areas include historical and geographical knowledge of the areas as well as culture, dress and language; social traditions; economic conditions and currency; foods; industry and educational standards; tourist attractions.

**HOSP 402** see **HOSP 302**

**HOSP 405** see **HOSP 305**

**HOSP 413 Hospitality Industry Accounting** — Preparation, interpretation and analysis of balance sheets and profit and loss statements; budgeting and forecasting; feasibility studies; financing and cash flow; cost-volume-profit analysis; investment decision-making.

**HOSP 416** see **HOSP 316**

**HOSP 420** see **HOSP 320**

**HOSP 425** see **HOSP 325**

**HOSP 426 Travel Advertising and Sales** — This course is an extension of Travel Marketing with greater emphasis on promotion, personal selling techniques and salesmanship. Topics will include making personal client presentations, services and itinerary planning, dealing with media and advertising agencies, developing advertising pieces for creative promotion, communication of the printed word and pictures; understanding client behaviors, implications of budget on the selling function.

**HOSP 442** see **HOSP 342**

**HOSP 443** see **HOSP 343**

**HOSP 450 Directed Studies** — One day a week will be set aside for an independent study project. It is expected that some instructor or coordinator input will be generated for up to three hours per week during the term, to set direction and tone for projects.

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

**MKTG 310/410 Transportation Economics and Regulation** — Deals 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 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.

**MKTG 410** see **MKTG 310**

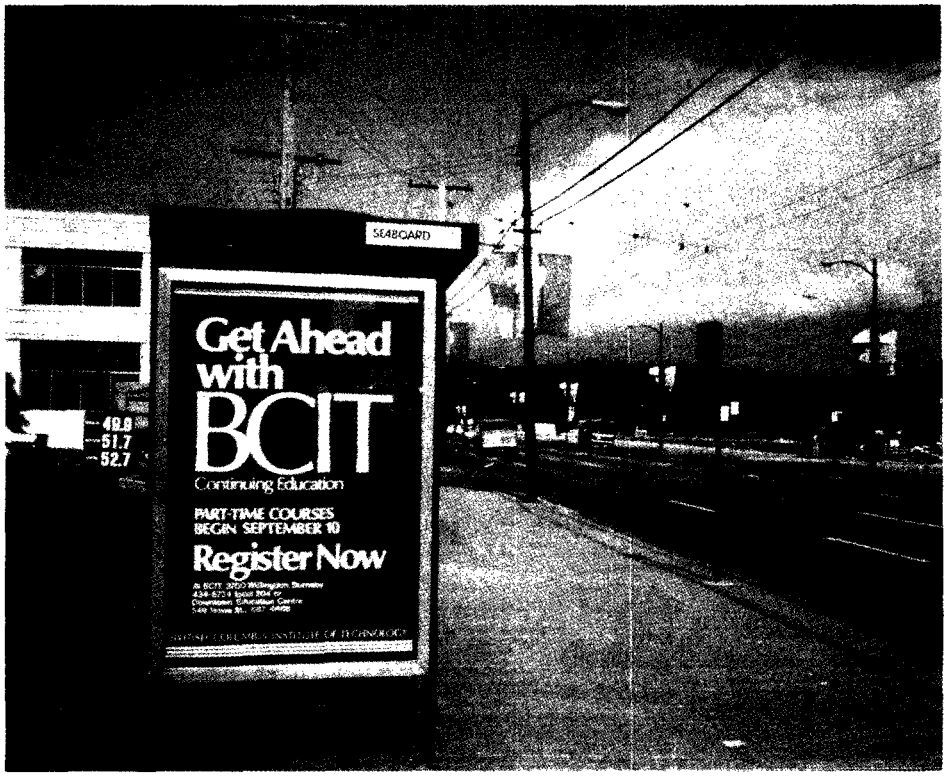
**OPMT 111 Business Mathematics** — Provides a review of basic mathematics applicable to business and industry and enables the student to acquire skills in solving practical financial and mathematical problems encountered in business. Topics in the area of Mathematics of Finance will emphasize retail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

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

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

## 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
L. Lous
C. Morelli
R. Oliver




# Marketing Management

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

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

The Marketing Technology is designed to equip the graduate with a solid generalist background, **plus** allowing the student to concentrate on the unique skills associated with specific sectors of our economy. These include the technical consumer or industrial product/service sector; the Real Estate industry; the international trading sector and the business communications industry.

### Job Opportunities

The **Technical Sales and Marketing** program leads to career positions in manufacturing, wholesale and retailing firms, with emphasis on advanced technology products and services.

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

The **International Business** program provides the technical background for entry into financial institutions, transportation firms or trading houses. Extensive apprenticeship may be required for advancement to a management position.

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

### The Program

In the first year, all Marketing Technology students complete the same course of studies covering general business and economic principles. The second year program offers specialization. **Technical Sales and Marketing** emphasizes sales skills, new product development and entrepreneurship. **Real Estate Studies** addresses residential and commercial property sales and investment analysis skills. **International Business** focuses on marketing, financing and transport of import and export goods. **Advertising and Sales Promotion** courses develop creative communication skills and campaign planning.

### Prerequisites

Algebra 11 and English 12 both with C+ are course requirements for this program. Grades 11 & 12 science courses are beneficial.

Candidates **must** state option choices when applying for admission to first year of the Marketing Technology. Business experience and/or other successful post-secondary education greatly strengthen applications. Admission may be granted to mature students provided they have completed high school at least 2 years prior to date of entry, or can complete pre-entry preparatory programs, or have acquired prerequisite work experience.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| ADMN100 | Economics (Micro) | 3 |
| ADMN111 | Management Fundamentals | 3 |
| BCOM106 | Business Communication for Marketing Management | 3 |
| COMP100 | Data Processing Introduction | 4 |
| FMGT 101 | Accounting 1 | 4 |
| MKTG 101 | Marketing 1 | 3 |
| OPMT 110 | Business Mathematics | 4 |
| | | 24 |

| Year 1 | Term 2 | |
|---|---|---|
| ADMN200 | Economics (Macro) | 3 |
| BCOM206 | Business Communication for Marketing Management | 3 |
| COMP120 | Computers in Business | 3 |
| FMGT 201 | Accounting 2 | 4 |
| MKTG 103 | Sales Skills | 4 |
| MKTG 201 | Marketing 2 | 3 |
| OPMT 130 | Business Statistics | 4 |
| | | 24 |

## Technical Sales and Marketing Program

| Year 2 | Term 3 | Clrm hrs/wk |
|---|---|---|
| ADMN380 | Business Law 1 | 3 |
| MKTG 203 | Sales Management | 3 |
| MKTG 301 | Marketing Planning | 4 |
| MKTG 308 | Advertising and Sales Promotion | 4 |
| MKTG 309 | Marketing Research 1 | 4 |
| **Elective A** — Professional Sales | | |
| MKTG 302 | Industrial Marketing | 3 |
| MKTG 303 | Distributive Systems | 3 |
| | | 24 |
| **Elective B** — Advanced Technology Marketing | | |
| MKTG 304 | Market Strategies | 3 |
| MKTG 305 | International Trade | 3 |
| | | 24 |
| **Elective C** — New Enterprises Development | | |
| MKTG 306 | Principles of Small Business Management | 3 |
| MKTG 307 | Financing New Ventures | 3 |
| | | 24 |

| Year 2 | Term 4 | |
|---|---|---|
| ADMN480 | Business Law 2 | 3 |
| FMGT 401 | Quantitative Method Computer Applications in Marketing | 4 |
| FMGT 403 | Marketing Management Accounting 2 | 4 |
| MKTG 409 | Marketing Research 2 | 3 |
| MKTG 418 | Directed Studies | 4 |
| **Elective A** — Industrial Sales | | |
| MKTG 402 | Advanced Sales Techniques | 3 |
| MKTG 403 | Industrial Sales Practicum | 3 |
| | | 24 |
| **Elective B** — Advanced Technology Marketing | | |
| MKTG 404 | Product Marketing/Info Systems | 3 |
| MKTG 406 | Product Development | 3 |
| | | 24 |
| **Elective C** — New Enterprises Development | | |
| MKTG 407 | Case Studies — Entrepreneurship | 3 |
| MKTG 408 | Business Planning Practicum | 3 |
| | | 24 |

## Applied Real Estate Studies Program

| Year 2 | Term 3 | |
|---|---|---|
| ADMN380 | Business Law 1 | 3 |
| MKTG 203 | Sales Management | 3 |
| MKTG 309 | Marketing Research 1 | 4 |
| MKTG 311 | Real Estate Management 1 | 4 |
| MKTG 312 | Economics of Real Estate Markets | 3 |
| MKTG 313 | Intro to Real Estate Analysis | 3 |
| MKTG 322 | Advertising 1 | 4 |
| | | 24 |

## Applied Real Estate Studies Program

| Year 2 | Term 4 | Clrm hrs/wk |
|---|---|---|
| ADMN480 | Business Law 2 | 3 |
| FMGT 403 | Marketing Management Accounting 2 | 4 |
| MKTG 409 | Marketing Research 2 | 3 |
| MKTG 411 | Real Estate Management 2 | 4 |
| MKTG 412 | Intro to Real Estate Appraisal and Investment Analysis | 3 |
| MKTG 413 | Mortgage Finance | 3 |
| MKTG 418 | Directed Studies | 4 |
| | | 24 |

## International Business Program

| Year 2 | Term 3 | |
|---|---|---|
| ADMN380 | Business Law 1 | 3 |
| MKTG 203 | Sales Management | 3 |
| MKTG 301 | Marketing Planning | 4 |
| MKTG 309 | Marketing Research 1 | 4 |
| MKTG 314 | Introduction International Business | 3 |
| MKTG 315 | Transportation in International Trade | 3 |
| MKTG 322 | Advertising 1 | 4 |
| | | 24 |

| Year 2 | Term 4 | |
|---|---|---|
| ADMN480 | Business Law 2 | 3 |
| FMGT 403 | Marketing Management Accounting 2 | 4 |
| MKTG 401 | Quantitative Method Computer Applications in Marketing | 4 |
| MKTG 409 | Marketing Research 2 | 3 |
| MKTG 414 | International Marketing Management | 3 |
| MKTG 415 | Financing International Trade | 3 |
| MKTG 418 | Directed Studies | 4 |
| | | 24 |

## Advertising and Sales Promotion Program

| Year 2 | Term 3 | |
|---|---|---|
| ADMN203 | Sales Management | 3 |
| ADMN380 | Business Law 1 | 3 |
| MKTG 301 | Marketing Planning | 4 |
| MKTG 309 | Marketing Research | 4 |
| MKTG 316 | Principles of Advertising | 4 |
| MKTG 317 | Design Production | 3 |
| MKTG 318 | Media Planning | 3 |
| | | 24 |

| Year 2 | Term 4 | |
|---|---|---|
| ADMN480 | Business Law 2 | 3 |
| FMGT 403 | Marketing Management Accounting 2 | 4 |
| MKTG 401 | Quantitative Method Computer Applications in Marketing | 4 |
| MKTG 409 | Marketing Research | 3 |
| MKTG 416 | Advertising Internship | 7 |
| MKTG 417 | Promotional Marketing | 3 |
| | | 24 |

## Subject Outlines

**ADMN 100/200 Economics** — Develops 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.

**ADMN 111 Management Fundamentals** — An orientation to the nature of business in the private enterprise system embracing forms of business ownership, organization, leadership, management techniques and business elements of production. Typical cases taken from industry are studied to encourage students to think and decide for themselves.

**ADMN 200** see **ADMN 100**

**ADMN 380/480 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.

**ADMN 480** see **ADMN 380**

**BCOM 106/205 Business Communication** — Develops the students' skills 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 various types of business letters. Students are also exposed to audiovisual presentation techniques and reading and study skills.

**BCOM 205** see **BCOM 106**

**COMP 100 Data Processing — Introduction** — 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.

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

**FMGT 101/201 Accounting** — Basic accounting procedures, closing the books, adjustments, working papers, merchandise operations, statement and ledger organization, special journals, forms of business organizations, statement and ledger organi-

zation, special journals, accounting principles, introduction to cost accounting, analysis of financial data, working capital, departmental and branch operations, consolidations.

**FMGT 201** see **FMGT 101**

**FMGT 403 Marketing Management Accounting 2** — Emphasis is upon profit planning, pricing strategies and control in the marketing 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.

**MKTG 101/201 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.

**MKTG 103 Sales Skills** — Introduction to professional selling. Emphasises practical problems of locating and qualifying prospects, use of depth approach and improving sales preparation and organization. Some examination also given to improving interpersonal communications in non-selling situations.

**MKTG 201** see **MKTG 101**

**MKTG 203 Sales Management** — General principles of sales management. Emphasis is given to the human resource, with stress placed on selection, assimilation, training and supervision. Examination of sales research, planning, organization and analysis is made. Computer applications in sales management are also covered.

**MKTG 301 Marketing Planning** — Examines developing a formal marketing plan including situation analysis, market and competitive conditions research, objective setting and action scheduling using computer based management systems.

**MKTG 302 Industrial Marketing** — An examination of the complex purchase process faced by companies selling to industry, government and institutions. Alternative distribution and pricing strategies are considered. Emphasis is on understanding the growing British Columbia industrial base.

**MKTG 303 Distributive Systems** — A study of the channels and supporting infrastructure necessary to move products from manufacturer to consumer, including thorough coverage of new technology applications to retailing and merchandising systems.

**MKTG 304 Market Strategies** — The development of strategies suited to high technology products and services to achieve productivity improvement.

**MKTG 305 International Trade** — An examination of import/export procedures, particularly in relation to sophisticated technology products and services. Trading patterns and forecasts are thoroughly covered.

**MKTG 306 Principles of Small Business Management** — Examination of the planning stages involved in starting a new business including market, financial and legal feasibility requirements.

**MKTG 307 Financing New Ventures** — Introduces various legal forms, tax matters and sources of financing essential for independent business operators to understand.

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

**MKTG 311/411 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 agency, salesman and appraiser are covered. This is a credit course recognized by the Real Estate Council of British Columbia and the Department of Real Estate Studies at UBC. It exempts the student entering the real estate brokerage business from the salesman's pre-licensing course.

**MKTG 312 Economics of Real Estate Markets** — Lays the foundation for a sound education in property management. It thoroughly familiarizes the student with the basic theories and techniques of managing real estate investment. 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 for this course toward the designation of Certified Property/Manager with the Institute of Real Estate Management. The course covers all responsibilities of the property manager such as management agreements, merchandising rental space and leasing, controlling the physical investment and maintenance of 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.

**MKTG 313 Introduction to Real Estate Analysis** — Presents the tools and techniques for analysis that assist decision making in specific real estate problems including investment (purchase or sale), financing, development or redevelopment, leasing, income and property taxation and property management. In each of these areas, the use of mathematics of finance is central to analysis of the situation, the analysis of alternative courses of action and the comparison of costs/benefits, both today and in the future.

**MKTG 314 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.

**MKTG 315 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 and insurance, clauses.

**MKTG 316 Principles of Advertising** — Examines the evolution and function of advertising and sales promotion within the contexts of society and the business system. The topic is surveyed rigorously, with consideration being given to its application in the fields of retailing, wholesaling, manufacturing, professional and industrial activities.

**MKTG 317 Design Production** — 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.

**MKTG 322 Advertising 1** — 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, pulic 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.

**MKTG 327 Media Planning** — Emphasis is placed on development and execution of the media plan. Close contact is maintained by students with agency media buyers and other industry factors to ensure a practical direction to the course. Quantitative media planning techniques are evaluated in light of most recent computer applications. The main objective of this course is to provide marketable skills in media planning and buying to qualify students for career entry consideration in the advertising agencies.

**MKTG 401 Quantitative Methods/Computer Applications in Marketing** — An examination of decision support systems now available utilizing mathematical modelling methods, data bank access, and computer based information processing.

**MKTG 402 Advanced Sales Techniques** — Professional selling skills utilizing buyer behavior, product knowledge, time management and sales call planning tools.

**MKTG 403 Industrial Sales Practicum** — Field work experience with the sales force of a sponsoring firm. Full evaluation of on-the-job performance is included.

**MKTG 404/405 Product Marketing and High Tech Information Systems** — Covers the channels and supporting infrastructure necessary to market consumer related high technology products. Involves setting up a model distribution network. Examines the hardware/software systems, data sources, and resources available to marketers of high-tech products in gathering and dispensing needed information.

**MKTG 405** see **MKTG 404**

**MKTG 406 Product Development** — A study of effective processes for generating product ideas, design planning, performance evaluation and market testing. Commercialization of highly innovative products is emphasized.

**MKTG 407 Case Studies/Entrepreneurship** — An analysis of both successful and unsuccessful ventures to reveal the role of the entrepreneur.

**MKTG 408 Business Planning Practicum** — Involves the student in the detailed process of preparing a business prospectus. The student is required to demonstrate the legal markets and financial feasibility of a selected new venture.

**MKTG 409** see **MKTG 309**

**MKTG 411** see **MKTG 311**

**MKTG 412 Introduction to Real Estate Appraisal and Investment Analysis** — Designed for use by appraisers, real estate brokers, lenders, builders and assessors. On completion of the course, the student will have learned how to apply appraisal principles and techniques to actual residential appraisal problems. To become a professioal appraiser, the student completing this course must add meaningful practical appraisal experience and further advanced training. The material covered will include such topics as principles of real estate, elements of urban land economics, nature and principles of real estate value, appraising as applied economics analysis, the appraisal framework, area analysis, neighborhood analysis, site analysis, site valuation, improvements analysis, direct sales comparison approach, gross rent multiplier analysis. Cost approach, reproduction cost of new improvements and estimation of accrued depreciation (diminished utility). Summary of the cost approach: Correlation analysis and final value estimate, writing the appraisal report, professional ethics and standards practice. This course is designed for students seeking credit in recognized programs of professional appraising societies.

**MKTG 413 Mortgage Finance** — Will enable students to demonstrate a knowledge of the macro-economic aspects of Canada's mortgage market; structure and analyse both residential and commercial mortgage loan applications and be familiar with loan management; analyse preferred refinancing vehicles from the perspectives of borrower and lender; be familiar with loan management; be familiar with contemporary repayment arrangements, development financing, participation loans, leasehold financing and appraisal for mortgage lending.

**MKTG 414 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.

**MKTG 415 Financing International Trade** — Covers 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.

**MKTG 416 Advertising Internship** — An assigned work experience position with a lower mainland advertising, promotion, broadcasting, print, or graphic services operation. On-the-job performance is fully evaluated.

**MKTG 417 Promotional Marketing** — A study of all promotional support activities such as trade shows, publicity, special events, direct response marketing, and promotional specialties. Emphasis is on when and how to use them.

**MKTG 418 Directed Studies** — One day a week of the student's timetable is allocated to carry out a major project. The project will be in a marketing area of the student's choice, carried out under the guidance of assigned faculty members.

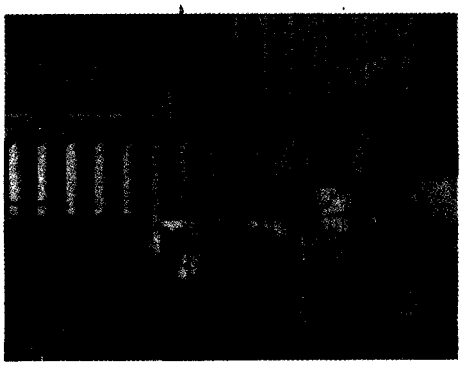
**OPMT 110 Business Mathematics** — Covers business uses of arithmetic and algebra; topics include Break-Even Analysis, Trade and Cash Discounts, Markups and Markdowns. This is followed by Simple Interest and Discount. Compound Interest then leads to the theory of annuities with practical applications, such as debt extinction, amortization, sinking funds, financing mortgages. The course concludes with an examination of evaluation methods, NPN, IRR.

**OPMT 130 Business Statistics** — Covers descriptive statistics, including the methods of presentation of data, measures of central tendency and dispersion, uses of Consumer Price Index. A brief introduction to probability theory then leads to inferential statistics . Topics include sampling, confidence limits of the mean, hypothesis testing and simple linear regression. Emphasis throughout the course is on decision-making based on information available from a small sample of the population.

## Faculty and Staff

R.W. Vandermark, B.A., *Department Head*
G.H. Abbott, B.Comm., M.B.A.
P. Cherry, B.Comm., Chief Instructor
D.K.N. Chowdhury, B.Sc., M.B.A., Ph.D.
J.O. Hicks, R.I. (B.C.), F.R.I.
G.T. Jacobs, B.A. (Hist. & Econ.), B.A., (Bus. Admin.), M.B.A., Program Head, International Business
C.G. Nelson, B.A.
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. Verne, B.Comm., (Hons. Econ.), M.B.A.
W.A.E. Walley, B.A.
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.

Operations management continues to play a vital role in provincial, national and world economics. It is concerned with the management of operations in goods and service producing organizations.

With emphasis on productivity improvement utilizing industrial engineering techniques, computer applications, communications and interpersonal skills, the Operations Management graduate will be prepared to solve business problems.

The **Transportation/Distribution Management Option** 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.

Students in the Transportation and Distribution Management Option study both the "buying" (distribution and management) of a service, and the "selling" (supply of transportation facilities) for the movement of goods and people.

**Job Opportunities**

Operations Management graduates may choose from a variety of dynamic, highly paid management careers in such areas as:

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

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

manufacturing
mining
forestry
construction
warehousing and distribution
food
health care
airlines
railroad
shipping
government

**Prerequisites**

Algebra 11 with C + (Physics 11 is desirable) is the course requirement for this program. Option choices must be declared when applying. This requirement may be waived for mature students on approval of the Department Head. If your mathematical skills are in doubt, it is recommended that you take Preparatory Business Math OPMT 099. It is also recommended that potential students acquire basic typing skills due to the extensive use of computer input terminals in the program. 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?

If the answer is yes — then apply and start charting your future.

## Course of Studies

### OPERATIONS MANAGEMENT OPTION

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| BCOM 107 | Business Communication for Operations Management | 3 |
| CHSC 122 | Engineering Concepts | 3 |
| COMP 100 | Data Processing — Introduction | 4 |
| FGMT 102 | Introduction to Financial Accounting | 5 |
| MECH 102 | Engineering Drawing | 2 |
| OPMT 100 | Applied Mathematics 1 | 5 |
| OPMT 140 | Introduction to Operations Management | 3 |
| OPMT 150 | Introduction to Microcomputers | 2 |
| OPMT 160 | Method Study 1 | 3 |
| PHYS 117 | Basic Science | 3 |
| | | 33 |

| Year 1 | Term 2 | |
|---|---|---|
| ADMN200 | Economics 2 (Macro) | 2 |
| ADMN221 | Organizational Behavior Fundamentals | 2 |
| BCOM 207 | Business Communication for Operations Management | 3 |
| FMGT 202 | Introduction to Managerial Accounting | 3 |
| MECH 207 | Engineering Concepts | 3 |
| OPMT 120 | Applied Mathematics 2 | 4 |
| OPMT 240 | Industrial Engineering | 4 |
| OPMT 241 | Systems Analysis | 3 |
| OPMT 250 | Computer Programming (Applied BASIC) | 3 |
| PHYS 217 | Basic Science | 3 |
| | | 30 |

**OPERATIONS MANAGEMENT OPTION**

| Year 2 | Term 3 | Clrm hrs/wk |
|---|---|---|
| ADMN100 | Economics | 3 |
| ADMN340 | Personnel Administration | 2 |
| FMGT 306 | Cost Accounting-Operations Management | 3 |
| OPMT 244 | Performance Measurement | 4 |
| OPMT 300 | Quantitative Methods 1 | 5 |
| OPMT 340 | Industrial Engineering 1 | 5 |
| OPMT 348 | Production and Inventory Control 1 | 5 |
| OPMT 350 | Computers and Information Processing 1 | 3 |
| | Library and Research | 5 |
| | | 35 |

| Year 2 | Term 4 | 4A | 4B |
|---|---|---|---|
| ADMN331 | Industrial Relations | 2 | 4 |
| OPMT 155 | Supervision | 2 | 2 |
| OPMT 157 | Market Research | 2 | 2 |
| OPMT 245 | Quality Assurance | 2 | - |
| OPMT 400 | Quantitative Methods 2 | 7 | 3 |
| OPMT 440 | Industrial Engineering 2 | 9 | - |
| OPMT 448 | Production Control Management 2 | 5 | 2 |
| OPMT 449 | Industrial Engineering Concepts | - | 17 |
| OPMT 450 | Computers and Information Processing 2 | 3 | - |
| | Library and Research | 4 | 5 |
| | | 35 | 35 |

**TRANSPORTATION/DISTRIBUTION MANAGEMENT OPTION**

| Year 1 | Term 1 | |
|---|---|---|
| ADMN100 | Economics 1 (Micro) | 3 |
| ADMN380 | Law | 3 |
| BCOM107 | Business Communication for Operations Management | 3 |
| COMP100 | Data Processing — Introduction | 4 |
| FGMT 101 | Accounting 1 | 5 |
| MKTG 102 | Introduction to Marketing | 3 |
| OPMT 101 | Business Mathematics | 5 |
| OPMT 150 | Introduction to Microcomputers | 2 |
| TDMT 101 | Economic Geography | 2 |
| | | 30 |

| Year 1 | Term 2 | |
|---|---|---|
| ADMN200 | Economics 2 (Macro) | 3 |
| ADMN 480 | Business Law 2 | 3 |
| BCOM207 | Business Communication for Operations Management | 3 |
| FMGT 201 | Accounting 2 | 5 |
| OPMT 121 | Business Statistics | 4 |
| OPMT 250 | Computer Programming (Applied BASIC) | 3 |
| OPMT 350 | Computers & Information Processing 1 | 3 |
| TDMT 201 | Geography | 3 |
| TDMT 204 | Integrated Purchasing | 3 |
| | | 30 |

**TRANSPORTATION/DISTRIBUTION MANAGEMENT OPTION**

| Year 2 | Term 3 | Clrm hrs/wk |
|---|---|---|
| OPMT 143 | Management Engineering | 3 |
| OPMT 301 | Quantitative Methods | 3 |
| OPMT 450 | Computers & Information Processing 2 | 3 |
| TDMT 202 | Transportation Regulations | 4 |
| TDMT 203 | Transportation Economics | 4 |
| TDMT 305 | International Trade | 4 |
| TDMT 306 | Transportation Marketing | 3 |
| TDMT 309 | International Marine Shipping & Insurance | 3 |
| | | 27 |

| Year 2 | Term 4 | |
|---|---|---|
| January to Mid March | | |
| ADMN340 | Personnel Administration | 2 |
| ADMN430 | Labor Relations | 4 |
| FMGT 442 | Domestic & International Corporate Finance | 3 |
| MKTG 309/409 | Marketing Research | 3 |
| OPMT 245 | Quality Assurance | 2 |
| OPMT 401 | Quantitative Methods 2 | 2 |
| TDMT 307 | Traffic & Transportation Management | 4 |
| TDMT 308 | Transportation Management | 4 |
| TDMT 409 | Importing and Exporting | 2 |
| TDMT 410 | Logistics | 4 |
| | | 30 |
| Mid March to May | | |
| FMGT 442 | Domestic & International Corporate Finance | 3 |
| OPMT 155 | Supervision | 4 |
| TDMT 409 | Importing and Exporting | 2 |
| TDMT 410 | Logistics | 4 |
| TDMT 411 | Transportation Trends | 15 |
| TDMT 414 | Manufacturing Methods | 2 |
| | | 30 |

## Subject Outlines

**ADMN 100/200 Economics** — Develops 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.

**ADMN 200** see **ADMN 100**

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

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

**ADMN 343 Personnel Fundamentals** — An introduction to the fundamentals of personnel management, including human resource planning; recruiting and selection techniques; job analysis, descriptions, and evaluation; compensation administration; performance appraisal systems; training; employee safety and health. Includes a review of current British Columbia employment legislation.

**ADMN 380/480 Business Law** — A study of legal rules under principles which guide decisions involving the law of contracts. Included are the sale of goods and negotiable instruments and the business associations of agency, partnership and the company.

**ADMN 480** see **ADMN 380**

**BCOM 107/207 Business 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 communications skill that the student will need in his or her field.

**BCOM 207** see **BCOM 107**

**COMP 100 Data Processing — Introduction** — Training in basic data processing principles to develop recognition of the application of these principles to industry. The principal functions of data processing are illustrated and practised with an H.P. mini-

computer 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.

**FMGT 101/201 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.

**FMGT 102 Introduction to Financial Accounting** — 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 and owner's equity.

**FMGT 201** see **FMGT 101**

**FMGT 202 Introduction to Managerial Accounting** — 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.

**FMGT 306 Cost Accounting** — Concentrates specifically on cost accounting for operations management. Topics will include basic cost concepts, systems of cost accumulation, accounting for manufacturing overhead, standard cost systems and the analysis of cost variances. Variable costing is also dealt with.

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

**MECH 207 Engineering Concepts** — A study of applied mechanics and design concepts. Topics include some metallurgy, forces, moments, couples, frames, beams, centroids, friction and some elementary dynamics.

**MKTG 101/201 Marketing** — An introduction to the marketing concept, environment and institutions with detailed study of basic marketing functions including marketing research, product planning, selection of trade channels, merchandising, advertising and sales promotion. This course embraces marketing of consumer and industrial goods.

**MKTG 201** see **MKTG 101**

**MKTG 202 Market and Data Research** — Familiarization with the basic approaches to market research. Lectures and workshop sessions will emphasize data gathering techniques, the analysis and interpretation of data related to the decision-making process.

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

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

**OPMT 120 Applied Mathematics 2** — Covers fundamental statistics used in business and industry. Topics include descriptive statistics, probability theory and major distributions, sampling, confidence intervals, tests of hypotheses, applications to quality control, correlation and linear regression.

**OPMT 121 Business Statistics** — Covers fundamental statistics used in business and industry. Topics include descriptive statistics, probability theory and major distributions, sampling, confidence intervals, tests of hypotheses, acceptance sampling, correlation and linear regression.

**OPMT 140 Introduction to Operations Management** — Provides an introduction to the role of business in the British Columbia economy. It considers the management of business and emphasises the types of careers available to Operations Management graduates in B.C. business.

**OPMT 143 Management Engineering** — Topics include method study; charting and analysis, distribution methods and problem solving.

**OPMT 150 Microcomputer Workshop** — Provides an introduction to the role of personal computers in business. Emphasis is on learning to use standard software products for financial modelling (spreadsheet) word.

**OPMT 156 Supervision** — Introduces the student to some of the skills required to survive the initial period of promotion to a first line supervisory position. Topics include role of the supervisor, functions of management, authority relationships, design and implementation of "on the job training" programs how to lead, delegate, discipline and evaluate, as well as dealing with day to day operations including grievances.

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

**OPMT 241 Analysis** — Includes problem definition, systems of data collection, information analysis, problem analysis and solution using quantitative techniques. Other areas include office procedure analysis and facility layout.

**OPMT 244 Performance Measurement** — Gives the student an appreciation of the 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.

**OPMT 245 Quality Assurance** — Modern concepts of quality management for the manufacturing and service industries. Management levels and topics include inspection, quality control and quality assurance; organization; system functions and documentation requirements; technical, economic and legal aspects of quality assurance management; supplier quality assurance; product reliability; Canadian national standards for quality programs.

**OPMT 250 Computer Programming — Applied BASIC** — Instruction in the use of advanced BASIC to solve problems common to the Operations Management discipline. Topics include arithmetical operations, input/output, loops, sub-routines, files, arrays, strings, and functions. Introduction to Data Processing 14.050 is a prerequisite.

**OPMT 300/400 Quantitative Methods 1 and 2** — Applications of mathematical and computer modelling to decision-making in business and industry. Topics include model building, break-even analysis, decision theory, inventory control, linear programming, queuing theory, simulation models, demand analysis and computer applications (mainframe, mini and micro).

**OPMT 301/401 Quantitative Methods** — Following basic training in mathematics of finance and statistics, students are introduced to the solution of more complex business problems by mathematical processes. Forecasting methods are examined with computerized analysis of data. Some aspects of management science that are particularly useful in the transportation business are examined manually and through the computer. These include linear programming, the transportation model simulation and line analysis. Considerable effort is in interpretation of results and preparation of management oriented reports.

**OPMT 340/440 Industrial Engineering 1 and 2** — 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.

**OPMT 348/448 Production Control Management 1 and 2** — Introduces the basic concepts of production control with 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.

**OPMT 350/450 Computers and Information Processing 1 and 2** — Introduction to computer systems design and the application of the computer to 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 current and potential application of the computer to the business world.

**OPMT 400** see **OPMT 300**

**OPMT 401** see **OPMT 301**

**OPMT 440** see **OPMT 340**

**OPMT 445 Quality Assurance Logistics** — A quality assurance course related to the transport and distribution industries covering three main areas: quality control maintenance planning for operating equipment, quality assurance support for the procurement function and the evaluation of suppliers, and quality management programs that affect the business performance of a company with respect to its trading opportunities in local, national and international markets.

**OPMT 448** see **OPMT 348**

**OPMT 449 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.

**OPMT 450** see **OPMT 350**

**PHYS 117/217 Basic Science** - 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.

**PHYS 217** see **PHYS 117**

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

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

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

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

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

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

**TDMT 305 International Trade** — To develop an understanding of international logistics, this course deals with the economic and trading characteristics of nations as they relate to the Canadian economy. An overview of comparative advantage and disadvantage introduces the student to the protectionism and intricacies of international trading. INCO terms and pricing, floating and pegged exchange rates will be discussed together with the movement of international inventories. The course also covers information on counter trade. Prerequisite to Import/Export.

**TDMT 306 Transportation Marketing** — The student learns to relate the services of a transportation company to client requirements. The increasing impact of intermodalism is examined while the student develops the ability to analyse the competitive position of his carrier (employer), to assure effective participation in the market.

**TDMT 307 Traffic & Transportation Management** — Acquaints the student with the broad responsibilities of a traffic manager in an industry requiring transportation services. Includes negotiating with common carriers, criteria for carrier selection, rate negotiations, routing, consolidation, documentation, handling claims, tracing, expediting and carrier performance analysis for future carrier selection.

**TDMT 308 Transportation Management** — The operation departments of a transportation company are described in detail. Freight tariffs as applicable to commodity, special and ancillary services, routing, misrouting, claim prevention, and the organization and control of the company are examined

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

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

**TDMT 414 Manufacturing Methods** — A study of the processes involved in the making of consumables. Physical, chemical and electrical principles are reviewed with special emphasis on the handling, care and disposal of hazardous products.

## 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., C.P.I.M.,
Program Head
F.L. Gruen, B.Mgt.Eng., M.A.Sc.,
Senior Instructor
P.R. Harrison, M.B.A., P.Eng., M.I. Mech.E
K.C. Hartley, B.A.Sc., P.Eng., C.P.I.M.
A.S. Lee, B.Eng., P.Eng., M.Ed.
J.E. Lloyd, M.Ed., P.Eng.
P. McSorley
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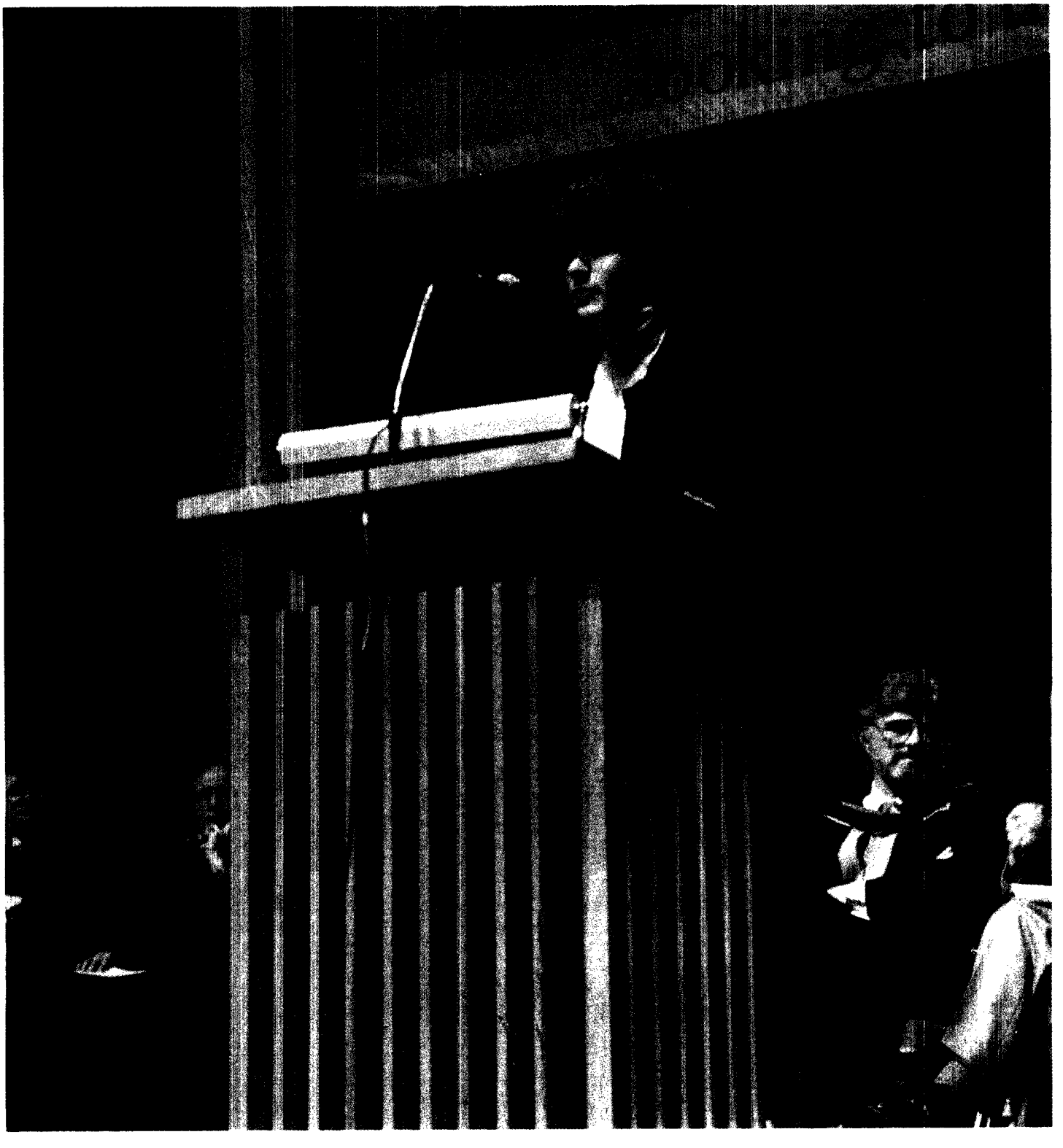
L.A. Smith, Dipl.T., C.A.M.
C.V. Spong, Dipl.T
J. Young, B.Sc., M.B.A., P.Eng.

# Third Year Programs



# Natural Resource Management

## Forest Resource Technology

This post diploma program is designed to meet the needs of resource technologists who wish to broaden their knowledge of the major natural resources of British Columbia.

**The Program**

This nine-month program (two terms) examines the natural resources of British Columbia and the needs, constraints and methods to manage these resources in the best interests of the province. Included will be fish, wildlife, recreation, rangeland, hydrology (water), agriculture, mining, tourism and their interdependencies (natures.)

When course credits are given electives will be chosen in consultation with Department Head.

**Prerequisites**

Graduation from a BCIT diploma program or a two-year college program in an engineering or business technology. Baccalaureate degree in bio science, engineering, geography or geology will also be considered.

## Course of Studies

| | | Term 1 | Clrm hrs/wk |
|---|---|---|---|
| FSTR | 501 | Fish Resource | 2 |
| FSTR | 502 | Rangeland Management | 4 |
| FSTR | 503 | Hydrology & Geomorphology | 4 |
| FSTR | 504 | Forest Land Management | 6 |
| FSTR | 505 | Interdependent Resources | 4 |
| FSTR | 506 | Projects — Special Topics | 6 |
| FSTR | 507 | Wildlife Resources | 2 |
| FSTR | 508 | Recreation Resources | 2 |
| | | Library and Research | 5 |
| | | | 35 |

| | | Term 2 | |
|---|---|---|---|
| FSTR | 601 | Natural Resource Planning | 6 |
| FSTR | 602 | Environmental Impact Assessment | 6 |
| FSTR | 603 | Environmental Law & Public Relations | 3 |
| FSTR | 604 | Natural Resource Economics | 5 |
| FSTR | 606 | Projects | 5 |
| TCOM | 607 | Public Information Techniques | 2 |
| | | Electives | 3 |
| | | Library and Research | 5 |
| | | | 35 |

## Subject Outlines

**FSTR 501 Fish Resource** — The identification, habitat and life cycles of British Columbia's fish. The principles and practice of fish management and the importance of interaction with all other resources.

**FSTR 502 Rangeland Management** — Will include identification of common range plants, knowledge of range distribution, types of range productivity, intensity and variety of uses, assessment of productivity and stocking, range reclamation, season of use, impact on the forest resource, and non-grazing use of range land. Range enhancement techniques will also be included, of which prescribed burning will be a part.

**FSTR 503 Hydrology and Geomorphology – Hydrology** — source of water, climate and topography, water flow in channels, seasonal fluctuation, concept of erosion, transportation and sedimentation. Geomorphology — study of physical and chemical forces acting upon the earth's surface. Development of landscapes in time.

**FSTR 504 Forest Land Management** — The first part will include silviculture, pest management, harvesting, forest policy and management concepts and will be specifically designed for non-forestry graduates. The second half of the course will be devoted to timber supply area (TSA) management and an advanced silviculture project designed for all students.

**FSTR 505 Interdependent Resources** — A conceptual overview of other non-forested resources such as agriculture, mining, water, tourism, etc. and the need for planning and resources in total.

**FSTR 506/606 Projects – Special Topics and Current Issues** — Will include discussions and guest lectures relating to current resource topics or issues. A project will also be selected by a student from any of these topics or one of his own choosing in the resource field.

**FSTR 507 Wildlife Resources** — The identification, habitat and life cycles of British Columbia's wildlife and the roles they play in the environment.

**FSTR 508 Recreation Resources** — The principles and practice of recreational land management. Tourism as related to outdoor recreation.

**FSTR 601 Natural Resource Planning** — The emphasis is on integrated resource use. Guest lectures with expertise in resource planning may be included as part of the instructional team. The course will emphasize integrated resource planning analysis with priority setting assessments. An integrated resource project involving several weeks with considerable field input will be an integral part of this course.

**FSTR 602 Environmental Impact Assessment** — Assessment of environmental impacts and inventory techniques.

**FSTR 603 Environmental Law and Public Relations** — Environmental Law will include review of various provincial and federal resource acts. Public relations will include dealing with the public, media and other resource users.

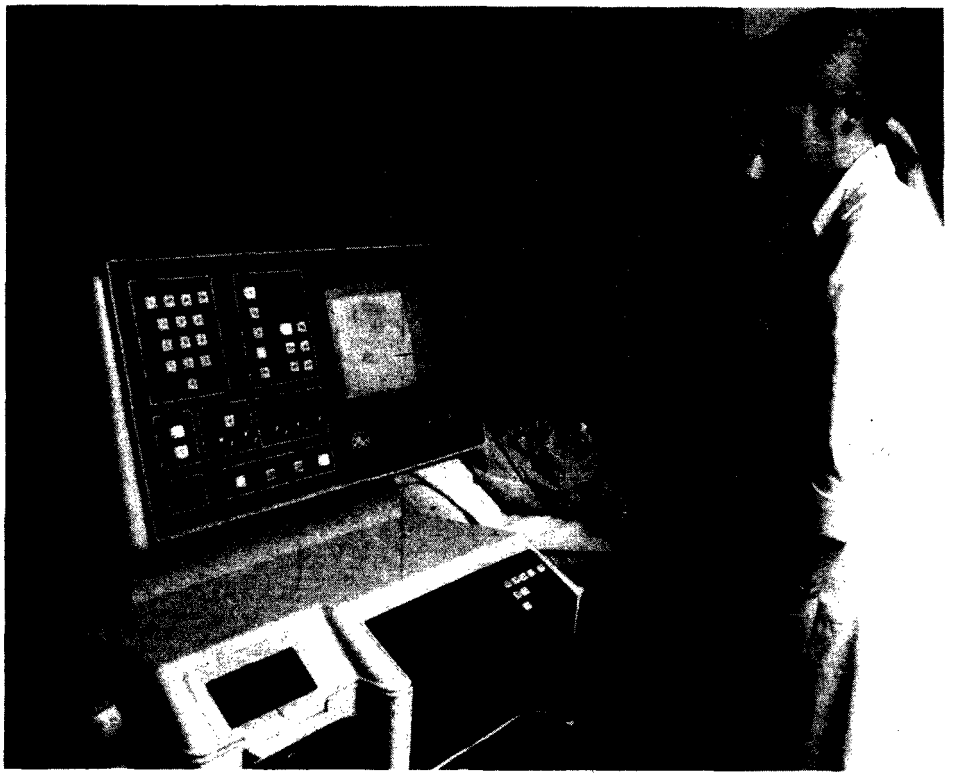
**FSTR 604 Natural Resource Economics** — Includes economic concepts as applied to various natural resources, and relationships to consider in cost/benefit analysis.

**FSTR 606** see **FSTR 506**

**TCOM 607 Public Information Techniques** — Covers the essential skills from TCOM 406. Students will study techniques for communicating with the public through interpretive and educational programs and the media. They will write promotional data, news releases and journal articles and practice public speaking, preparing graphic displays and interpretive program design.

## Faculty and Staff

H.R. Chisholm, B.A.Sc., P. Eng.,
*Department Head*
M.R. Angelo, B.S.F., M.F.
F. Cassetta, B.Sc.F., R.P.F.
C.W. Chestnut, B.A., Ph.D.
E.C. Crossin, B.S.F., R.P.F.
D. Guthrie, B.Sc., M.Sc., Ph.D.
A.G. Jakoy, B.S.F., M.F., R.P.F.
J. Simpson, B.Sc.F., M.Sc.
B. Sivak, B.S.F., M.F., Ph.D., R.P.F.



# 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, to date no significant biological effects have been demonstrated.

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

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

**Job Opportunities**

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

Employment opportunities exist in hospital ultrasound facilities, or integral sections of other hospital departments, such as radiology, cardiology or obstetrics. A large percentage of hospitals in B.C. have diagnostic ultrasound equipment, and its use is expanding rapidly.

**The Program**

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

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

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

**Prerequisites**

Diploma of Technology in Radiography, Nuclear Medicine, or Registered Nursing, or a Bachelor of Science.

**Selection Criteria**

Acceptance into the program will be based on: post-secondary education transcripts, previous educational and professional achievements, an autobiographical letter outlining the reasons for your interest in Diagnostic Ultrasound as a career, a personal interview, a letter of reference from a medical doctor with whom you have worked professionally.

## Course of Studies

| Year 1 | Term 1 | Clrm hrs/wk |
|---|---|---|
| BHSC 108 | Anatomy and Physiology | 3 |
| BHSC 109 | Pathophysiology | 3 |
| DSON 101 | Applied Sonography | 7.5 |
| DSON 105 | Clinical Experience | 15 |
| PHYS 523 | Physics of Ultrasound | 4.5 |
| | | 36 |

| Year 1 | Term 2 | |
|---|---|---|
| DSON 206 | Clinical Experience in Echocardiography | 12 |
| DSON 306 | Clinical Experience in Abdominal Sonography | 12 |
| DSON 307 | Clinical Experience in Obstetrical and Gynecological Sonography | 12 |
| | | 36 |

## Subject Outlines

**BHSC 108 Anatomy and Physiology** — 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.

**BHSC 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.

**DSON 101 Applied Sonography** — Encompasses an in-depth study of techniques required for competency in echocardiography, abdominal sonography and obstetrical and gynecological sonography. Image production and the recognition of normal and abnormal patterns are stressed, as well as examination protocols for all major areas of interest.

**DSON 105 Clinical Experience** — Time is spent in hospital Ultrasound Departments to obtain clinical and practical experience in support of classroom studies.

**DSON 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.

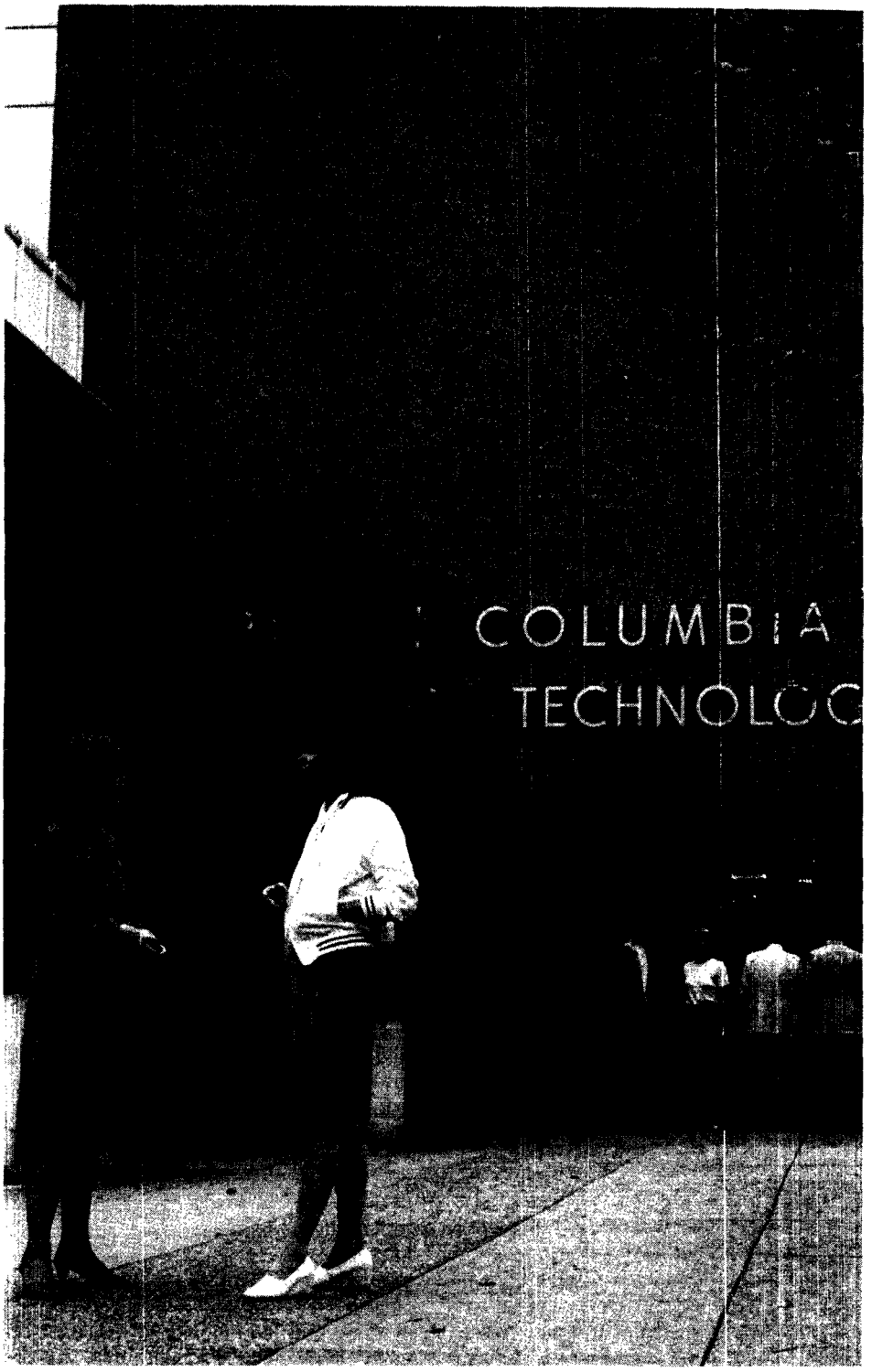
**DSON 306 Clinical Experience in Abdominal Sonography** — The student will acquire the skills to carry out sonographic examinations and the ability to recognize normal and abnormal sonographic patterns in the abdomen.

**DSON 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.

**PHYS 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.

## Faculty and Staff

Miss P.M. Rogers, R.T.,
*Acting Department Head*
Ms. K.A. McDiarmid, R.T., R.D.M.S.



# 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, including 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**

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

## Course of Studies

| | | Clrm hrs/ annually |
|---|---|---|
| BENG 501 | Basic Audio Production | 38 |
| BENG 502 | Audio Technology | 152 |
| BENG 503 | AM and FM Transmitters | 76 |
| BENG 504 | Basic TV Production | 76 |
| BENG 505 | Video Technology 1 | 190 |
| BENG 603 | TV Transmitters | 30 |
| BENG 605 | Video Technology 2 | 190 |
| BENG 609 | Practicum | 120 |

## Subject Outlines

**BENG 501 Basic Audio Production** — Operation familiarization and production techniques for sound studies. 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.

**BENG 502 Audio Technology** — 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. 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. 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.

**BENG 503 A.M. and F.M. Transmitters** — A.M. transmission standards and channel assignments; typical A.M. transmitting systems; A.M. stereo, 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 alignment techniques; DOC proof of performance requirements; supplementary proof requirements; test equipment calibration. 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.

**BENG 504 Basic TV Production** — Studio equipment operation and familiarization with production techniques.

**BENG 505 Video Technology 1** — 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. 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.

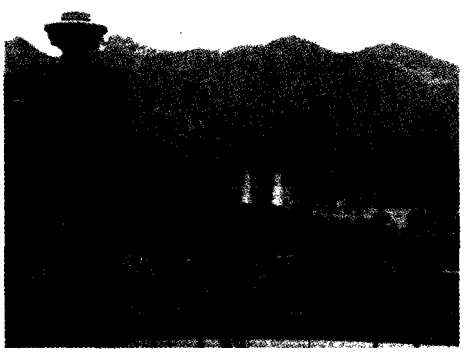
**BENG 603 TV Transmitters** — TV transmission standards and channel assignments; principles of vestigial sideband transmission and signal recovery, principle of negative modulation; DOC transmission standards and monitoring requirements; principles and merits of various forms of visual trasmitter modulation — 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 TV transmission; transmitting antenna selection criteria; antenna system performance measurements.

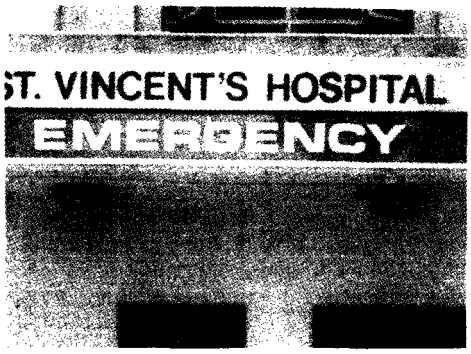
**BENG 605 Video Technology 2** — Principles of helical scan video recording; detailed analysis of typical recorders; equipment test and alignment techniques; equipment servicing exercises; principles of quadruplex video recording; detailed analysis of typical recorder; equipment test and alignment techniques; equipment servicing exercises; principles of electronic video editing; analysis of typical editing system C format video records, 3/4" and 1/2" video recorders. 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.

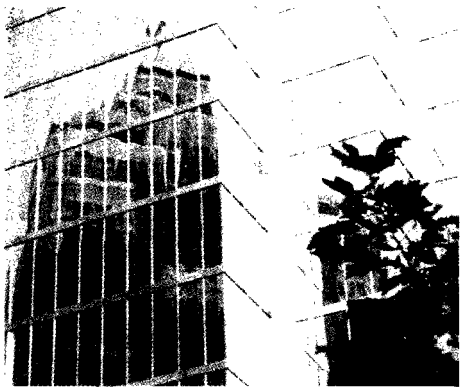
**BENG 609 Practicum** — Practical experience working in and with the broadcast industry.

## Faculty and Staff

F.L. Sanderson, Dipl. Ed., B.Th.,
*Department Head*
S. Smolar, B.A. (Comms.), 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 fields, 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 from health and engineering technologies or equivalent.

### The Program

The nine month program includes such basic business subjects as management 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 a full course load each term.

### Prerequisites

Diploma of Technology in Health or Engineering, 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 5 | Clrm hrs/wk |
|---|---|---|
| ADMN100 | Economics 1 (Micro) | 3 |
| ADMN310 | Management 3 | 3 |
| ADMN342 | Human Resource Management | 4 |
| ADMN360 | Microcomputer Software Systems | 3 |
| ADMN380 | Business Law 1 | 3 |
| BCOM301 | Advanced Business Communication | 4 |
| FMGT 519 | Financial Management 1 | 4 |
| OPMT 510 | Business Mathematics | 4 |
| | | 28 |

| Year 1 | Term 6 | |
|---|---|---|
| ADMN200 | Economics 2 (Macro) | 3 |
| ADMN220 | Organizational Behavior | 3 |
| ADMN410 | Management 4 (Policy) | 3 |
| ADMN460 | Microcomputer Software Systems Applications | 4 |
| ADMN480 | Business Law 2 | 3 |
| COMP 213 | Computers and Information Systems | 4 |
| FMGT 619 | Financial Management 2 | 4 |
| MKTG 601 | Introduction to Marketing | 3 |
| | | 27 |

## Subject Outlines

**ADMN 100/200 Economics** — Develops 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.

**ADMN 200** see **ADMN 100**

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

**ADMN 310 Management 3** — A survey of management science models. 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. Extensive use of microcomputers to solve models.

**ADMN 342 Human Resource Management** — An introduction to the major personnel and industrial relations programs applicable to the British Columbia workplace with emphasis on the value of the worker and the overall effectiveness of modern human resource management. It develops understanding of the skills required for selection interviews, performance appraisals, compensation reviews, labor contract negotiations, training and development programs, grievance and collective agreement administration and reviews relevant employment law.

**ADMN 360 Microcomputer Software Systems** — Instruction and practice with commercially available microcomputer software systems primarily in the solution of business problems. Typical programs involve word processing, electronic work sheets, data base management and business graphics.

**ADMN 380/480 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.

**ADMN 410 Management 4** — An analysis of business policy formulation designed to give the student practice, experience and confidence in handling business situations, including those of a complex nature where basic policy decisions are necessary to assist in problem solving. Comprehensive business cases will be selected covering such fields as finance, control, personnel, production, marketing and general management, for study and discussion. The course is designed to acquaint the student with the role of top management and the interrelationships between these fields.

**ADMN 460 Microcomputer Software Applications** — A continuation of ADMN 360 emphasizing the solution of practical problems. Familiarity with software programs is developed enabling students to use them in other course areas. Determination of an acceptable course of action will be followed by the development of a proposed scheme of implementation.

**ADMN 480** see **ADMN 380**

**BCOM 301 Advanced Business Communication** — As future managers, students learn to retrieve, extract and report information efficiently. Building on skills acquired in previous communication courses, this course emphasizes improved reading, writing and speaking skills. Course content includes speed reading, oral and written presentations, executive summaries and proposals.

**COMP 100 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 practised with a 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.

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

**FMGT 519/619 Financial Management** — Basic accounting procedures; closing the books; adjustments; working papers; merchandise operations; statement and ledger organization; special journals; forms of business organization; accounting principles; introduction to cost accounting; analysis of financial data; working capital; departmental and branch operations; consolidations.

**FMGT 619** see **FMGT 519**

**MKTG 601 Introduction to Marketing** — 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.

**OPMT 510 Business Mathematics** — Review of basic mathematics applicable to business and industry; mathematics of finance, including retail operations, simple and compound interest, discounts, annuities, financial papers and depreciation methods. Emphasis is on practical applications to business administration.

## Faculty and Staff

R.A. Cradock, B.Comm., M.B.A., R.I.A., F.S.M.A.C., *Department Head*

T.P. Juzkow, B.A.Sc., M.B.A., P.Eng., Program Head

# Division of Academic Support

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

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

The Library, Medical Services and Timetabling provide specialized services to the entire Institute.

## Faculty and Staff

Henry Arthur, B.A. (Hons.), M.A., *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.
W. Whalen, Dipl. Tech.

**Department of Mathematics**
J. Meisen, B.Sc., M.S., Ph.D., *Department Head*
M.C. Bojadziev, Dip. Ing.
J.W. Brown, B.Sc. (Hons.), M.A.
A.K. Chu, B.A.Sc., P.Eng.
G. Cocksedge, B.Sc. For., M.Eng.
C.A. Copping, B.Sc.
A. Ellingsen, B.Sc.
E. Hiob, B.Sc., M.Sc., Ph.D.
P. M. Hobbins, B. Sc.
R. Inrig, B.Ed., M.Ed.
C.C. Lawrence, B.Sc. (Hons.)
R.D. Lynn, B.Sc. (Hons.), M.S.B.A., A.F.I.M.A.
E.R. Martin, B.Sc., M.Ed.
L. Routledge, B.A., B.Ed.
D. Sabo, B.Sc. (Hons.), Ph.D.
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**
J. Meisen, B.Sc., M.S., Ph.D., *Department Head*
G. Bodnar
C. Deurzen, B.Sc., M.A., Ph.D.
F. DiSpirito, B.A.Sc., P. Eng.
L. Greenwood, B.Eng., B.A., Cert.Ed.
J. Griffiths, B.A.Sc., M.A.
H.D. Hecker, Dipl. Tech.
D. Hutcheon, B.Sc., B.Ap. Sc., M.Sc.
D.E.A. Kenyon, B.Sc.
A. Kshatriya, B.Sc., M.Sc., C.P.G.S.(Cantab.), M.Ed.
A. MacArthur, B.Sc.(Hons.), Cert.Ed.(Cantab.)
D. MacDuff, B.Sc.
S. Morter, Dipl. Tech.
G. Olive, B.Sc. (Hons.), M.A.Sc., Ph.D.
W.V. Olson, B.Sc., M.Sc.
G.R. Paulson
J.R. Saunders, B.Sc., M.Sc.
G. Schellenberg, Dipl. Tech.
W. Swetlishoff, B.Ed.
D.E. Thom, B.Sc.
L. Warren, B.A., M.A.
W.T. Withers
K.A Yakel, B.Sc. (Hons.), M.Sc.

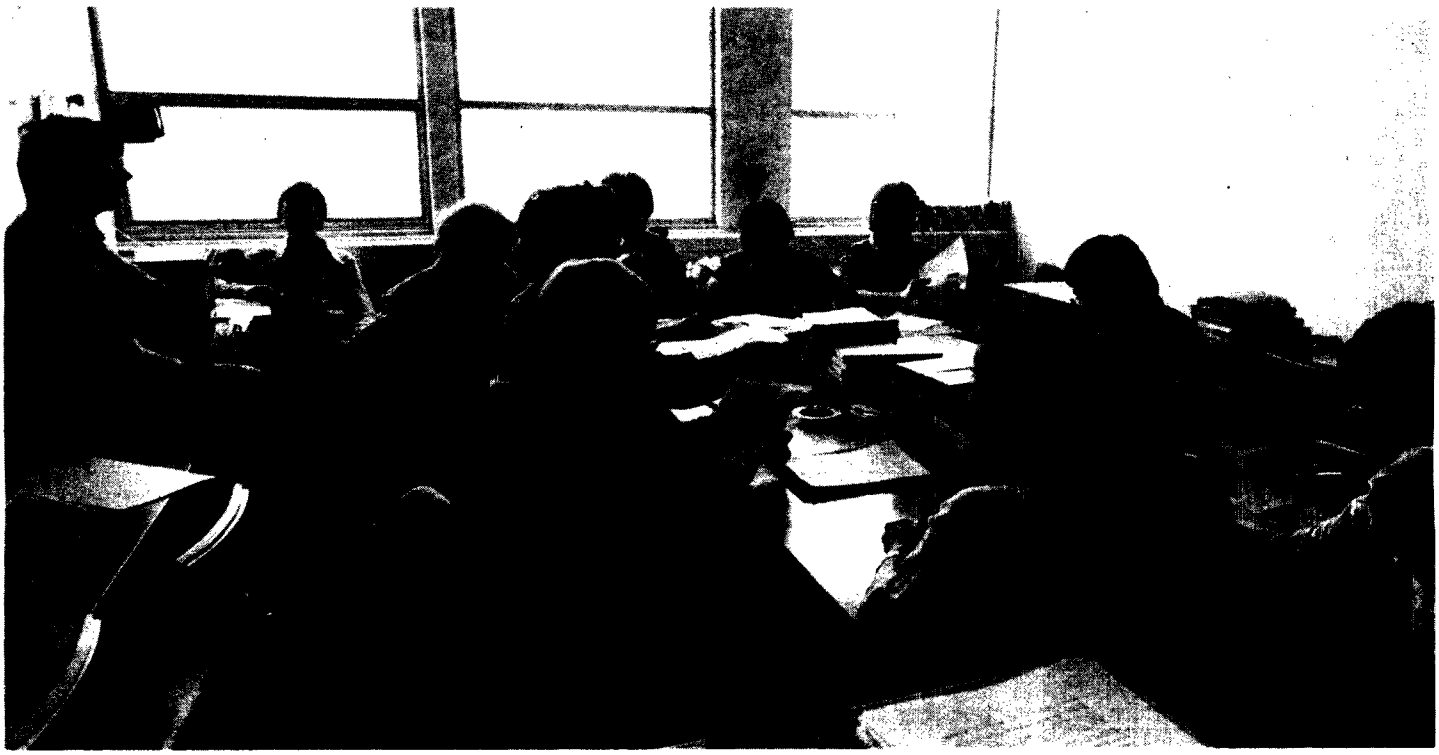
**Preparatory Programs**

**Technology Fundamentals Program**
David Sabo, B.Sc., Ph.D., Chief Instructor
Rick Inrig, B.Ed., M.Ed.
Eva Longman, Program Assistant

**Communication Department**
Richard Lund, B.A. (Hons.), M.A., *Department Head*
Robert Allin, B.A., M.A.
May Archer, B.A. (Hons.), M.A.
Ken Brambleby, B.A.
Patrick Burns, B.A., M.A.
Rider Cooey, B.A. (Hons.)
Grant Douglas, M. Ed.,
Tristan Easton, B.A., M.A.
Sue Fahey, B.A.
Brendan Frain, B.A.
David Hamilton, B.Sc.
David Helgesen, B.A., M.B.A.
Douglas Horan, B.Journ., B.A. (Hons.)
Caroline Jellinck, B. Comm. (Hons.)
Valda Johnston, B.A., B.Ed.
Glen Kask, Dipl.T., B.A.
Wayne Kean, B.A., M.A.
David Kipling, F.E.T.C., A.L.A. (U.K.)
Ron Knott, B.A. (Hons.), M.Ed.
Greg Layton, B.A.
David McNeal, B.A., M.A., Ph.D.
Maureen Moore, B.A., M.A.
Jennifer Nachlas, B.A. (Hons.), M.A., Ph.D.
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, B.A. (Hons.)
Eileen Stephens, B.A., M.A.
Dixie Stockmayer, B.A.
Patrick Thomas, B.A., B.Ed., M.A.
David Vale, B.A., B.Ed., M.Ed.
Kathy Vance, B.A. (Hons.), M.A., Ph.D.
Anita Willson, B.A., M.A.

**Timetabling Department**
George Brown
Elmer Beck, Dipl. Tech.
Jean Romanisson

# Preparatory Courses



BCIT offers preparatory courses to individuals seeking entrance to full or part-time technology programs. This academic upgrading provides students with the opportunity to meet BCIT entrance requirements. Applications for admission to day school full-time technology programs from students who do not meet all entry requirements for those programs will be considered, provided applicants indicate which preparatory courses they intend to complete prior to regular program registration deadlines.

Courses in business mathematics, engineering mathematics, business and technical communication, physics and biology are offered regularly throughout the year.

Since all courses may not be available in each time period, students should consult the Continuing Education course offerings for exact dates and times.

Advice on course selection is available through the Continuing Education office of the Academic Support Division.

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

## WRITING AND LEARNING SKILLS

**COMM 001 Effective Writing** — 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 skills in business and technical writing. Covers organization, paragraph development and effective sentences in letter and memo writing.

**COMM 002 Textbook Reading and Learning Skills** — Develops the skills necessary for success in learning, with particular emphasis on technology and career studies. Covers textbook reading, note taking, exam writing and time management.

**COMM 003 Comprehensive Reading, Writing and Learning Skills** — Provides extensive coverage of the reading, writing and learning skills required in technology and career programs. Covers all topics listed in COMM 001 and COMM 002, plus additional reading techniques for increased speed and comprehension.

## MATHEMATICS FOR ENGINEERING AND HEALTH

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

**MATH 002 Technical Mathematics — Correspondence** — A self study version of MATH 001 for those unable to attend classes. Satisfies Algebra 12 entrance requirements. Students intending to enter a BCIT technology which requires an Algebra 12 grade of C+ or better, must achieve a final mark of 65% or higher in MATH 002. Students must have a C or better in Algebra 11, or an approved equivalent mathematics, course to register. Note: students who experience difficulty with math or who have been away from school for several years, are advised to take MATH 001.

## MATHEMATICS FOR BUSINESS

**OPMT 099 Mathematics for Business** — A course to upgrade and refresh the mathematical knowledge of students intending to enter the School of Management at BCIT. The course includes arithmetic, elementary algebra, graphical techniques and an introduction to business applications. It provides students with acceptable prerequisites for the mathematics programs in the School of Management, and meets the entrance requirement for BCIT.

## CHEMISTRY

**CHEM 001 Chemistry 1** — This course satisfies Chemistry 11 entrance requirements at BCIT. It is 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.

**CHEM 002 Chemistry 2** — This course meets the Chemistry 12 entrance requirement for BCIT. It is an upgrading course for people with a weak background in chemistry, or a refresher course for those who have not studied chemistry for several years. Applicants must have passed Chemistry 11 or approved equivalent chemistry course to register.

## PHYSICS

**PHYS 009 Pre-Entry Physics** — This course satisfies Physics 11 entrance requirements at BCIT. It is 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.

## BIOLOGY

**BHSC 001 Biology 1** — This course meets the Biology 11 or equivalent program entrance requirement for BCIT.

**BHSC 002 Biology 2** — This course meets the Biology 12 or equivalent entrance requirement for BCIT.

For additional information about courses and registration please write to BCIT or telephone: Preparatory Program Office (604) 432-8475

## TECHNOLOGY FUNDAMENTALS PROGRAM

The Technology Fundamentals program is an upgrading program to assist the day school applicant who lacks some of the prerequisites for admission to a BCIT technology program.

Technology Fundamentals is a full-time day school program (Monday through Friday) beginning in January and running for 15 weeks. The program may also be offered at other times during the year. The courses in the program are offered at Douglas College, and classes are held at the New Westminister campus. Applications for admission into the program **must** be sent to BCIT and the application must also indicate which BCIT technology program you wish to apply for.

Courses available include: biology, business mathematics, chemistry, communications (English), physics and mathematics. These courses meet entrance requirements for BCIT technology programs.

Technology Fundamentals students may be guaranteed entry for the next September in a participating technology, subject to successful completion of the Technology Fundamentals Program. Space is limited. The participating Technologies include:

**School of Engineering Technology**
- Biological Sciences
- Building
- Civil and Structural
- Forest Resource
- Mechanical/Mechanical Systems
- Mining
- Natural Gas & Petroleum
- Chemical Sciences
- Lumber and Plywood
- Recreation Facilities Management
- Survey

**School of Health Sciences**
- Biomedical Electronics
- Health Information
- Environmental Health
- Nuclear Medicine Technology
- Medical Radiography
- Occupational Health & Safety

**School of Management**
- Operations Management
- Transportation and Distribution

Depending on the courses required, the workload is 20-25 hours per week in day school classes plus a considerable number of hours studying. For further information contact:

David Sabo, Program Co-ordinator
432-8475 or
Eva Longman, Program Assistant
432-8842 or
The Office of the Registrar
432-8240

# Continuing Education at BCIT

BCIT offers a wide range of continuing education opportunities for those who wish to follow programs of part-time study. We provide comprehensive programs leading to a certificate or diploma, non-credit seminars, workshops in specialized topics and contract in-house training. Our Distance Education courses will help you if you cannot attend classes at one of our convenient campus locations.

Whatever your part-time educational needs are, you should contact the Department of Continuing Education in the appropriate School, or talk to a program consultant for advice on our programs.

The Downtown Education Centre provides mostly business courses to the Downtown community. It also houses the Educational Information Centre, a consortium of the Greater Vancouver School Districts and lower mainland post secondary, educational institutions.

## SCHOOL OF ENGINEERING TECHNOLOGY

**Engineering Continuing Education and Industry Services** offer a full range of credit and non-credit engineering technology courses:

- — programs of part-time study leading to certificates and diplomas in many technology areas equivalent to full-time programs at BCIT
- — programs of part-time study leading to certificates in specialized technology areas not available through full-time study at BCIT, for example, Naval Architecture, Non-Destructive Testing
- — non-credit courses, seminars and workshops on topics of interest to those wishing to update knowledge and enhance skills
- — contract training for business and industry, government agencies, professional and volunteer organizations, focusing on training needs analysis, curriculum development and delivery of contract training throughout the Province wherever required.

## SCHOOL OF HEALTH SCIENCES

**Health Continuing Education.** Advanced and continuing education in the Health Sciences is offered to those working in the health care delivery system and to those wishing to re-enter the health care field. These courses and programs enable health care workers to keep current with the latest developments in their fields and to prepare for career change and advancement.

The Certificate of Credit in Nursing, enables students to begin courses leading to careers in nursing through guided learning. Advanced diploma courses for working nurses and technologists are also offered in several fields. The Certificate Program in Occupational Health & Safety is available through part-time study.

Both credit and non-credit courses are available in Nursing and Medical Technology as well as Health Care Management programs at two levels, and full-time refresher programs in Nursing, Medical Laboratory and Medical Radiography.

Most courses are offered in the Lower Mainland, but some are available throughout the province.

## SCHOOL OF MANAGEMENT

**Business Continuing Education** offers credit courses in most BCIT technology programs in a variety of time frames at four locations in the lower mainland — Burnaby, Downtown, Richmond and Surrey.

Students wishing either to upgrade their work related skills, or to earn a certificate or diploma in a designated technology are provided with broad offerings across seven major business technologies.

**The Division of Academic Support** offers numerous credit and non-credit courses in biology, chemistry, business and technical communication, mathematics and physics to support Engineering Technology and Business Certificate programs.

Preparatory courses are also available to individuals wishing to qualify for entrance into full-time or part-time technology programs.

By taking one or more preparatory courses as required, students can meet the academic prerequisites necessary for admission into the technology programs of their choice at BCIT

**The Distance Education Department** provides selected courses to adults who are unable to attend classes at the BCIT campus or who wish to study on an unscheduled basis. The courses provided through the department's Directed Study Centre are mainly career oriented and usually carry credit towards a BCIT or industry certificate. Students may register at any time of the year in most courses.

Telephone teleconferencing is used in many courses to reach homebound students in the lower mainland and correspondence students throughout the province.

The department provides educational consulting and design services to clients who need special courses or programs for their employees, members or communities.

## CONTINUING EDUCATION ADMINISTRATION

**School of Engineering Technology**

P.M. O'Reilly, B.Sc., *Department Head,* Engineering Technology Continuing Education

Eric A. Morse, B.Sc., B.Ed., Industry Services

**School of Health Sciences**

Patricia D. Wolczuk, M.Sc., *Department Head,* Health Continuing Education

**School of Management**

Lorne Fingarson, *Department Head,* Business Continuing Education

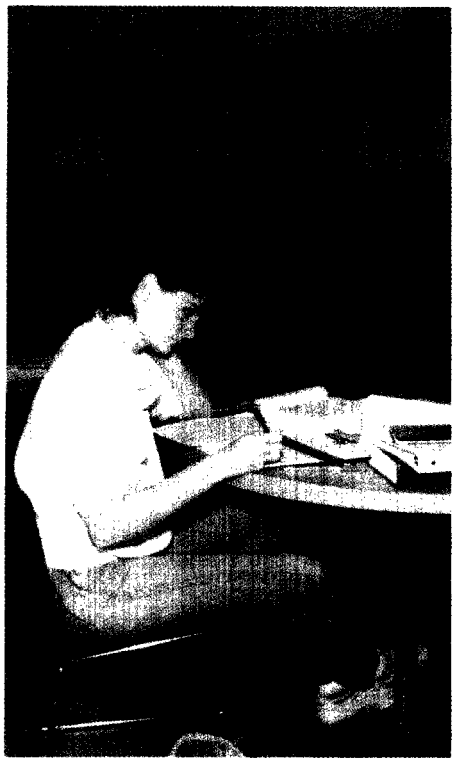
**Division of Academic Support**

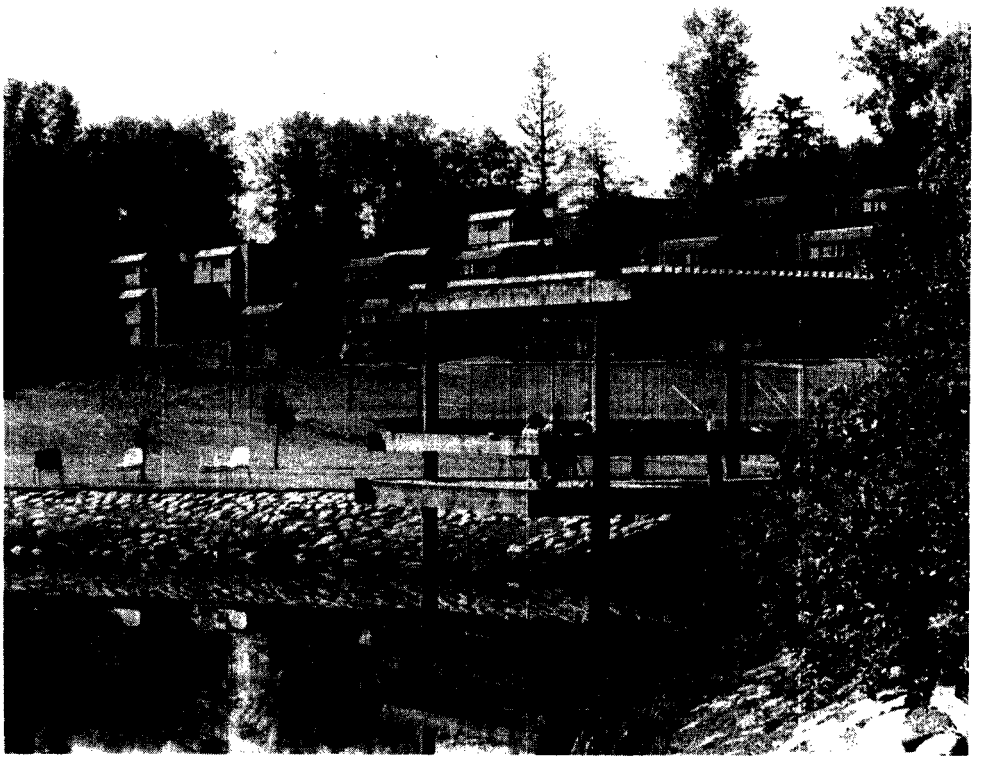
D. Sabo, B.Sc. (Hons.), Ph.D.

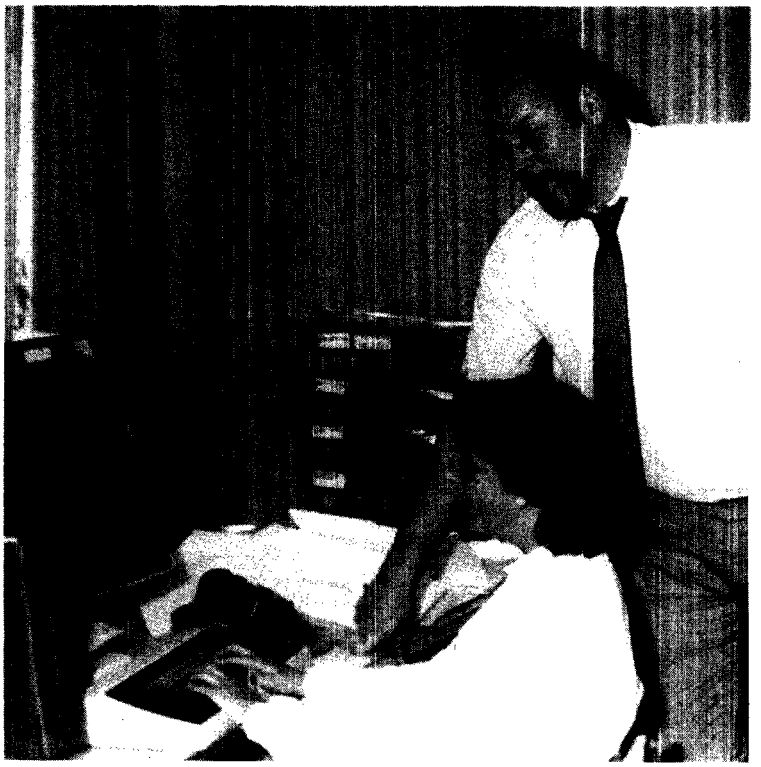
William D. Robertson, B.Ed., M.A., *Department Head,* Distance Education

C.J. Dukowski, B.A., M.Ed., *Manager,* Downtown Education Centre

# Office of the Registrar








BCIT
Continuing Education and Part-time Studies
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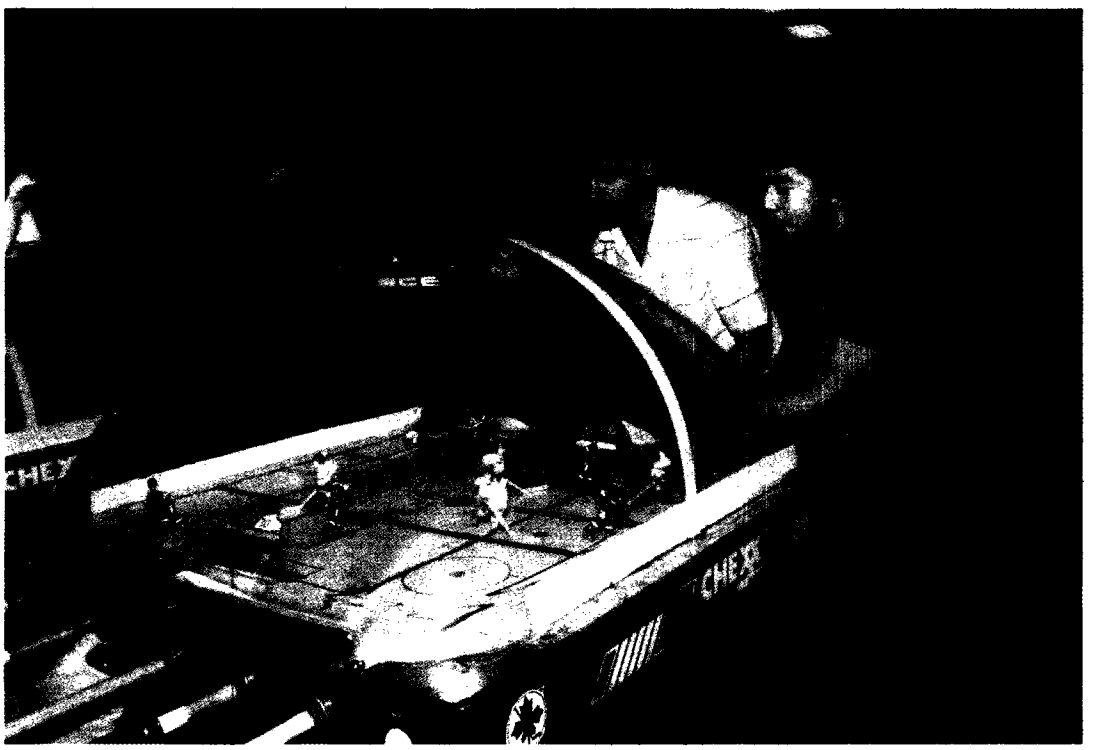
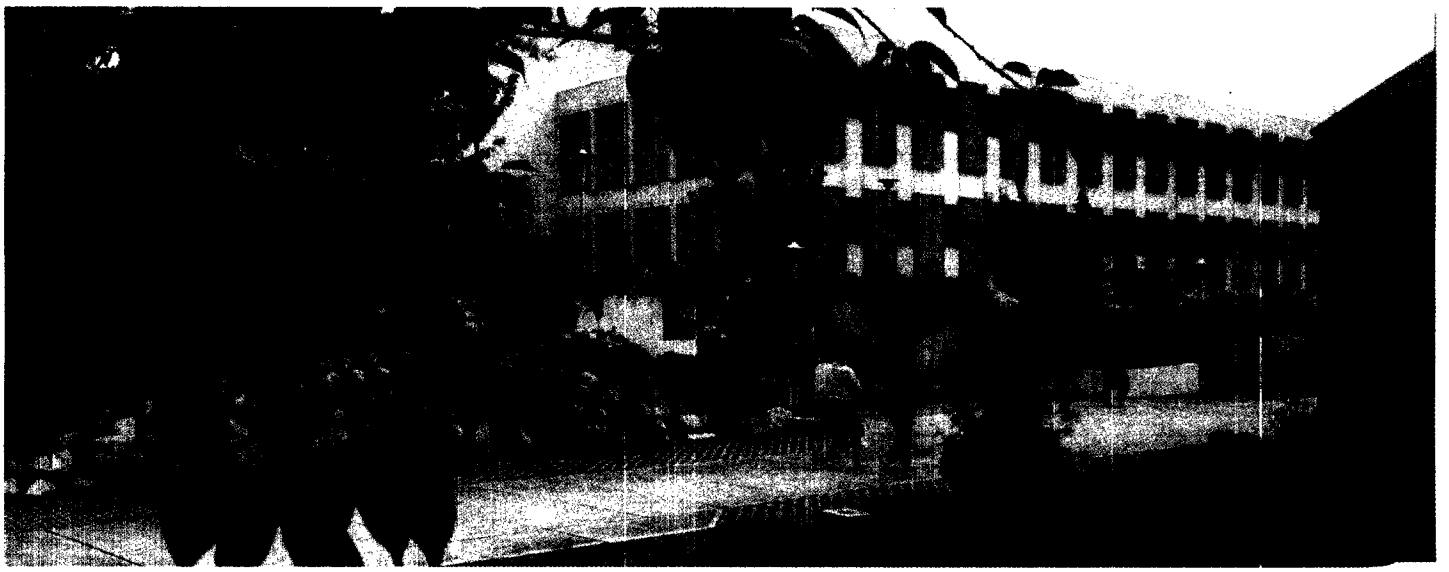


# Admissions



## Admissions Policy

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

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

All applicants must provide documentary proof that they meet the necessary Institute and technology prerequisites. Applicants lacking specific prerequisite courses or adequate grades will be referred for upgrading.

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

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

**Policy subject to change.**

## Academic Prerequisites

See page 134.

### English Language Proficiency

Students whose primary language is not English, may be required to demonstrate competence by scoring a minimum of 145 on the Vancouver Community College English Language Assessment Test; by scoring a minimum of 550 on the TOEFL; by completing Academic English 12 (B.C.) with a C+ or better (English 12 Minimum Essentials is not acceptable); by successfully completing English 099 at Vancouver Community College; or by individual assessment by the English Department.

Applicants should write to: Test of English as a Foreign Language, Box 889, Princeton, New Jersey, 08540, U.S.A., for test locations and application procedures for TOEFL.

### Mature Student

A person not eligible for admission under any other category may apply as a mature student by submitting an application, official supporting documentation and a statement of intent. Interviews and/or specific tests may be required. Applications are reviewed by the Registrar and the Technology Department Head who must be satisfied that the applicant has clear objectives and displays evidence of success. Contact the Office of the Registrar for further information.

### Second Year Regional College Transfer

BCIT offers transfer programs for various technologies from recognized regional colleges within British Columbia. Further information may be obtained from the Office of the Registrar at BCIT.

### Direct Entry

Persons who have successfully completed one or more years of study at a level equal to, or higher than, that of a BCIT full-time day program course may apply for direct entry into an advanced term 1 level of the program, providing course content is similar and, in the opinion of the Office of the Registrar, the applicant's academic record justifies advanced standing.

### Readmissions

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

## Technology Prerequisites

### School of Management

Administrative Management Systems — Algebra 11, English 12 both with C+

Broadcast Communications

Computer Systems — Graduation from Grade 12 with at least a B average in the following specific subjects: Algebra 12 (B grade, Algebra 12 honors C+), English 12, Physics 11 or 12. At least 4 additional grade 11 or 12 academic courses (Arts and Science) are highly recommended. In the case of mature students, academic transcripts may be supplemented by relevant business experience, successful recent completion of relevant BCIT Continuing Education courses with 75%, or successful recent completion of relevant courses at other post secondary institutions with 75%. Candidates may be asked to write an aptitude test to aid in the selection process

Financial Management — Algebra 11. Option must be declared when applying

Hospitality and Tourism Administration — English 12, Algebra 11 both with C+

Marketing Management — Algebra 11 and English 12 both with C+

Operations Management — Algebra 11

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

### School of Engineering Technology

Biological Sciences — Algebra 12 and Chemistry 11

Management in Agriculture — Algebra 11

Building — Algebra 12, English 12, Physics 11 all with C+

CAD/CAM — Algebra 12, Physics 11, Drafting 11

Chemical Sciences — Algebra 12, Chemistry 11

Civil and Structural — Algebra 12, Physics 11

Electrical/Electronics — Algebra 12, Physics 11, Chemistry 11 all with C+

Robotics — Algebra 12, Physics 11 both with C+

Forest Resource — Algebra 11 with C+; a science 11 (Biology required for Fish, Wildlife and Recreation; preferred for Forestry); one of Algebra 12, Geometry 12, Probability & Statistics 12, Computer Science 12, Physics 12 with C, or Physics 11 with C+

Lumber and Plywood — Algebra 12 and one science 11

Mechanical — Algebra 12, Physics 11

Mechanical Systems — Algebra 12, Physics 11

Mining — Algebra 12, Physics 11, Chemistry 11

Natural Gas and Petroleum — Algebra 12, Physics 11 or Chemistry 11

Recreation Facilities Management — Algebra 12, Physics 11

Surveying — Algebra 12, Physics 11

Natural Resource Management — Graduation from a BCIT diploma program in an engineering or business technology. Baccalaureate degree in Bio-Science, Engineering, Geography or Geology will also be considered

### School of Health Sciences

Biomedical Electronics — Algebra 12, Physics 11, Chemistry 11 (a C+ standing is desirable)

Environmental Health — Algebra 12, Physics 11, Chemistry 12

General Nursing (R.N.) — **Under 23 at time of entry**: Chemistry 11, Chemistry 12 or Biology 12 and English 12 with C+; Algebra 11 with C standing. **Over 23 at time of entry**: Chemistry 11, Chemistry 12 or Biology 12 and English 12, with a C+ standing. A valid St. John Ambulance Standard First-Aid Certificate or equivalent is required by the end of term 1

Health Information — Algebra 12, Biology 12, 50 wpm in typing

Medical Laboratory — Algebra 12, Chemistry 11 and 12; Physics 11 and Biology 12 are desirable

Medical Radiography — Algebra 12, two science 11s (Physics 11 desirable) and one science 12. Grade 12 C+ average required

Nuclear Medicine Technology — Algebra 12, Chemistry 11 and 12, and one other Science 11 (Physics 11 desirable.)

Occupational Health and Safety — Algebra 12, Chemistry 11 and Physics 11

Prosthetics and Orthotics — Algebra 12, Physics 11. Note that this program offers an entry once every two years only. The next session begins September, 1986.

Diagnostic Medical Sonography — Completion of a two year allied health program such as Radiography, Nuclear Medicine Technology or General Nursing, or a Bachelor of Science or equivalent in a health-related science

### Important

Where an algebra course requirement is specified in Engineering Technology and Health Sciences, please note that Academic Math 12 completed before 1978 is an acceptable prerequisite. English 12 Minimum Essentials is not an acceptable prerequisite for entry into BCIT.

### Basic Training for Skills Development Upgrading — Level 4

Experience has indicated that those students who have taken the five months upgrading course could not successfuly compete with those students who have an 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. Students who have taken the upgrading course are still required to have Grade 12 level special technology prerequisites.

### General Educational Development Tests

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

Therefore, success in the General Educational Development Tests is considered to be equivalent to BCIT general prerequisites; that is, graduation from a senior secondary school. Applicants who are successful in these tests are required to achieve satisfactory standings in the special prerequisites specified by the technology they have applied to.

### How to Make up Course Deficiencies

Preparatory programs are available through the Division of Academic Support for those students who lack specific prerequisites or who desire refresher courses. For information, please contact Program Information at 434-1610.

## How to Apply

Applications for admission to a technology or option 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 434-1610. These forms should be completed and returned with the necessary **official** documents attached. See Document Requirements.

## When to Apply

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

| Session Starting | Processing Date |
|---|---|
| May 1985 (Electrical/Electronics) | August 1, 1984 |
| September 1985 (All Programs) | January 2, 1985 |

## 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.

**Wait Lists** — When all seats in a program are filled, a wait list of qualified applicants is generated. If a space becomes available, an applicant on the wait list will be given the seat. Waitlists are not transferred to following sessions.

We encourage applicants to contact Admissions who may suggest other similar technologies in which seats are available.

**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 Registrar. BCIT reserves the right to accept only those applicants who appear to have the capabilities necessary to succeed in the chosen programs.

Acceptance is non-transferable from year to year. Applicants are considered for the current school year only.

## Document Requirements

The following official documents must accompany the completed application form (photocopies are not acceptable).

1. A senior secondary school transcript showing graduation. Applicants who are presently attending high school must submit a statement of marks of grade 11 subjects, and first semester grade 12 marks from the principal's office. A statement showing courses currently attended is also required. All marks must be substantiated by a final secondary school transcript incorporating school marks and provincial exam marks.
2. If applicable, all 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 Authorization. Transcripts and all other related academic documents must be translated into English and notarized at the applicant's expense.
4. School of Health Sciences applicants are required to complete a medical questionnaire and return it to the Medical Services Department at BCIT. Some health technologies require students to present evidence of having had a recent chest x-ray as well as having completed an immunization program. You will be notified if this information is required from you. If, due to extenuating circumstances, supporting documentation is not available at the time, students will be required to complete the necessary procedures at Medical Services.
5. Students who have been selected for admission must have medical insurance coverage prior to registration.

   Non-Canadian students who have been selected for admission must apply in person to the Medical Services Department, for an Application for Student Medical and Hospital Plan, prior to attending BCIT. Payment for this medical coverage is to be made at the same time, either by personal cheque or money order, to the vendor of the policy. Proof of coverage will be required.

**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 course is equivalent in content to the course for which credit is sought.

### Guidelines

a) First year students may only apply for course credit after they have been fully accepted and paid their commitment fees.

b) Second and third year students, who are direct entrants 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 teaching department head.

If course credit is granted and not replaced with an approved course of equal duration, you will not be eligible for BCIT scholarships. However, if you are registered in courses for which the weekly hours total at least 80% of the weekly hours for the full program, you may apply for a B.C. Student Loan. If registered for at least 60% load, you may apply for a Canada Student Loan. In order to be eligible to receive an HONORS diploma or GRADUATING AWARD, SECOND YEAR students who receive course credit or advanced standing in one or more subjects must register in a substitute course approved for this purpose by the department head.

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

### Change of Program

After a student has enrolled in a technology, a request for technology transfer requires the completion of a Program Change 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 Registrar before a change in program can be affected.

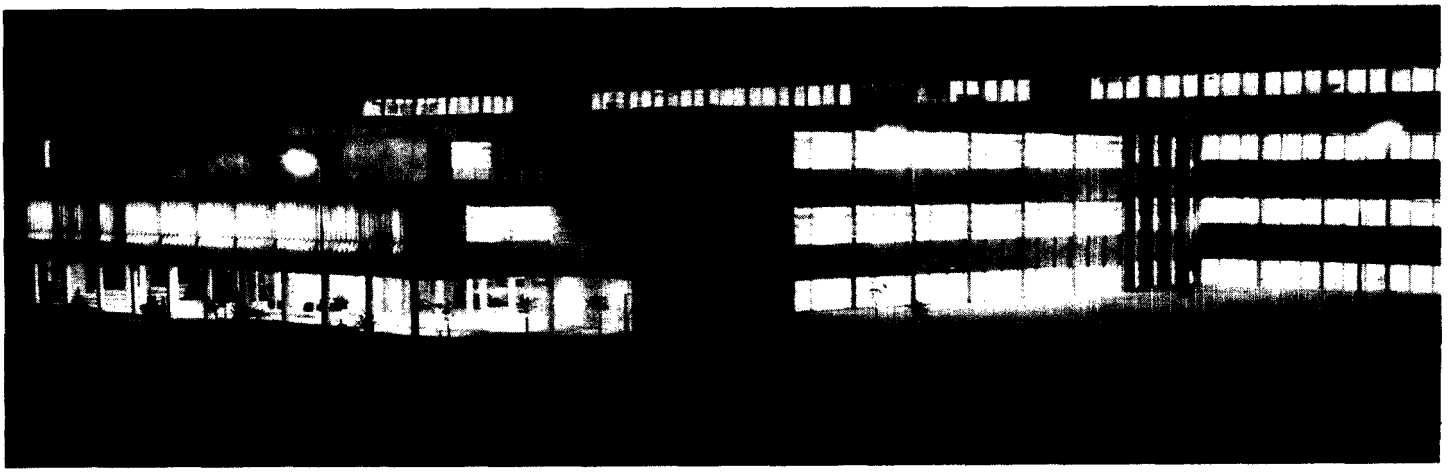
## Changes in Curricula and Regulations

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

### Office of the Registrar

Atley W. Morrow, B.A., M.Ed., Registrar
J. Gordon Kenyon, Dip. Admin. Eng., P.Eng., Associate Registrar
Jean McDonald, Secretary to the Registrar

# Fees and Expenses



## Fees for 1985/86 Academic Year

### Annual Fees

Tuition fees and all related policies will be reviewed for the 1985/1986 year by the British Columbia Institute of Technology Board of Governors and accordingly all fees and all policies are subject to change.

**The current 1984/85 fee structure** — subject to change for 1985/86

| Annual Fees | 1st Year | 2nd & 3rd Year |
|---|---|---|
| General Tuition | $ 1,260 | $ 1,260 |
| Student Activity (annual) | 65 | 65 |
| Convocation (mandatory) | - | 11 |
| Total | $ 1,325 | $ 1,336 |

Annual fees may be paid in full or by term.

**First Year Students 1984/85** — subject to change for 1985/86

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 non refundable commitment fee) | $ 630 |
| Student activity fee | 65 |
| | $ 695 |

Second term fees (due first week of the term)

| | |
|---|---|
| General tuition | 630 |
| First year total | $1,325 |

**Second and third year students 1984/85** — subject to change for 1985/86

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

First term fees (due 30 days before commencement of classes)

| | |
|---|---|
| General tuition | $ 630 |
| Student activity | 65 |
| | $ 695 |

Second term fees (due first week of the term)

| | |
|---|---|
| General tuition | $ 630 |
| Convocation fee | 11 |
| | 641 |
| Second and third year total | $1,336 |

**One term only** — subject to change for 1985/86

Term 2 readmissions (due at Registration)

| | |
|---|---|
| General Tuition | $ 630 |
| Student Activity | 35 |
| Term 2 total | $ 665 |

**Electrical/Electronics Technology** — subject to change for 1985/86 (for each Trimester — (Level 1,2,3, & 4)

| | |
|---|---|
| General Tuition | $ 630 |
| Student Activity | 22 |
| Total | $ 652 |

Electrical Trimester Level 5 only:

| | |
|---|---|
| General tuition | $ 630 |
| Student Activity | 22 |
| Convocation | 11 |
| Total | $ 663 |

**Electrical Co-op Students** — subject to change for 1985/86

| | |
|---|---|
| General Tuition | $ 315 |

NOTE: Level 1 fees are due 60 days prior to the commencement of classes.

Level 2 fees are due during the first week of classes.

Level 1 and 3 students entering in May 1985 will pay according to this Fee Schedule.

**Health Record Technician 1984-85** — subject to change for 1985/86

First Term (due 60 days prior to the commencement of classes)

| | |
|---|---|
| Commitment Fee | $ 75 |
| Fall Term | 555 |
| General Tuition | $ 630 |
| Student Activity | 65 |
| Fall Term Total | $ 695 |

General Tuition due the first week of classes

| | |
|---|---|
| General Tuition | $ 630 |
| Convocation | 11 |
| Total | $1,336 |

**International Students**

Fees for international students on student visas are based on full cost recovery, and subject to approval by the Provincial Government. Based on the 1984-85 fee structure, the minimum tuition fee rate for international students for 1985-86 will be $6,800 per academic year.

Individual fee arrangements for international students can sometimes be made through the Registrar.

**Tax Receipts** —
subject to change for 1985/86
An official tax receipt will be mailed by the Finance Office on or before February 28. To allow for normal mail problems, the student should wait until March 31 before contacting the Finance Office if a tuition fee tax receipt has not been received. A nominal charge will be levied for duplicate receipts.

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

**Financial Obligation to the Institute**

**No Statement of Marks, diploma or certificate will be issued until the student has cleared up all financial obligations to the Institute.**

## Additional Expenditures —
subject to change for 1985/86

**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 1984/85
subject to change for 1985/86

**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 of classes.

**Payment** — subject to change for 1985/86
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. Payment may also be made by Visa or Mastercard.

## Withdrawal and Refund Procedure
subject to change for 1985/86

**How to Withdraw**
Students who wish to withdraw officially from BCIT must commence the process by first 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.

**Refunds** — subject to change for 1985/86
**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: Complete refund.

**Refunds of fees for students (other than first year students) who withdraw up to 14 days after the commencement of classes:**
General Tuition: Complete refund.
Student Activity: Complete refund.

**Refunds of fees for students who withdraw 14 days after the commencement of classes:**
General Tuition: No refund.
Student Activity: Appropriate student activity fee refunds will be issued by the Institute up to the last day of February. A refund of $3.00 per month for each full month the student is not in attendance and has officially withdrawn from BCIT. (The maximum repayable would be $30.00).

After the last day of February, any student activity fee refunds 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.

**Miscellaneous Fees** — subject to change for 1985/86

| | |
|---|---|
| Reread or appeal of examination (per subject) | $10.00 |
| Transcript of marks (per copy) | $ 3.00 |
| Duplicate of diploma (per copy) | $ 6.00 |

(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.

# Examinations and Marks

**Examinations**
Formal examinations are written at the end 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 standings 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 a course it indicates one of the following:

1. Failure in the subject
2. Withdrawal after the deadline (refer to section on Withdrawal from Program Courses.)

Therefore, a student whose transcript bears such a 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 by the Divisional Marks Review Committee.

A Aegrotat — A pass standing based upon term marks.

C Course Credit Granted — Recognition of approved equivalent studies and/or experience.

PP Provisional Pass — Will be changed to Pass or Fail depending on performance in a subsequent specific course.

P Provisional Pass Fulfilled — Provisional Pass conditions achieved.

AP Adjudicated Pass — Standing based upon overall performance in the term.

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 assigned.

W Withdrawal — Approved withdrawal from a subject or 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 School 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 Marks**
Students will not be provided with marks prior to the issuance of a Statement of Marks by the Registrar's Office.

Marks, including the result of December examinations, will be mailed to students by the Office of the Registrar.

**Note**: A student who has failed a term ending in December will be advised by telegram prior to the commencement of the next term. A letter together with the student Statement of Marks follows the telegram.

Transcripts resulting from final examinations are mailed to graduating students by the Office of the Registrar. All other students will receive a Statement of Marks for the term.

**Additional Transcripts**
A fee of $3 is charged for each additional transcript of an undergraduate's or graduate's Statement of Marks. The fee is due at the time the request is made.

**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 such as tuition fees, library fines, rent. These documents may also be withheld on such other grounds as the Board of Governors may from time to time direct.

**Rereads and Reassessments**
It is the policy of the Institute that students shall be dealt with fairly in all decisions affecting their academic standing. Requests for rereads or reassessment of an academic standing should be submitted in writing to the Office of the Registrar within two calendar weeks of the official Institute transcript distribution date. There is a fee of $10 for each subject reread or reassessed. If the mark or standing is favorably adjusted, the fee will be refunded. The Registrar will inform the student of the results of the reread or reassessment.

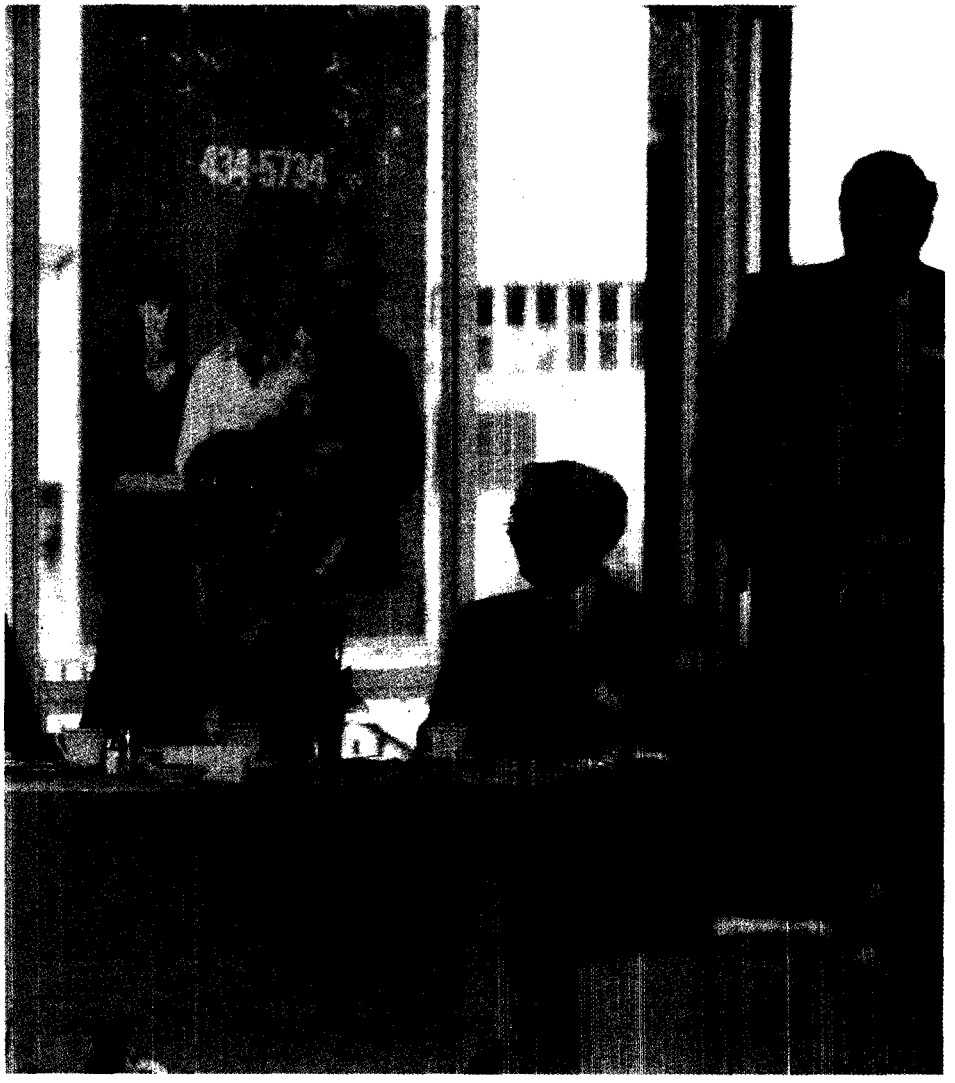
**Appeals**
Following an unsuccessful reassessment, students may appeal to the President for reconsideration. A student who wishes to appeal an academic standing may do so by submitting to the Registrar, in writing, the reasons for and the desired result of the appeal. The student has one calendar week to appeal an unsuccessful reassessment or reread. A student who has been permitted to audit classes during the reassessment procedure may continue to audit during the appeal procedure (including the week prior to the deadline for submitting the appeal). The student must provide with his/her letter of appeal a written statement from the Dean indicating that he/she has met with the Dean of the relevant School in an attempt to resolve the situation giving rise to the appeal.

The appeal must be accompanied by a $10.00 fee, returnable in the case of a successful appeal.

On notification by the Registrar of an appeal, an Appeal Panel will be convened. The Panel will be selected from the members of the Student Appeals Subcommitee of the Educational Council. Decisions rendered by the Appeal Panel with regards to such appeals shall be final and binding.

**Failures and Repetition**
A student who fails more than one subject in a term may be permitted to repeat the term only at the discretion of the Dean of the School and the Registrar (see Readmissions procedure under Admissions). 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.

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



# Graduating Awards

## Honor Awards

Five Honor awards are presented at convocation.

The **Governor General's Silver Medal** is presented to the top academic student in his or her graduating class year. Graduates from the previous year of August Nursing and Nuclear Medicine Technology classes are also considered.

The **Board of Governors' 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 **President's Award** is presented to the most outstanding academic student in each of the three schools, Engineering Technology, Health Sciences and Management.

**The Lieutenant Governor's Silver Medal** is awarded to a student who has completed the requirements for at least one certificate through Continuing Education, not necessarily in the current academic year. The student should be a part-time student in Continuing Education, taking courses in the current academic year; have contributed in a positive way to the life of the Institute and the community at large; and have an excellent academic record.

## Academic Awards

Academic Awards, sponsored by private organizations, are presented annually to students who achieve the highest academic standing in their programs of studies. The following awards were presented at the 1984 Graduating Awards Ceremony.

SCHOOL OF ENGINEERING TECHNOLOGY

**Biological Sciences**
The B.C. Federation of Agriculture R.B. Stocks Award in Agri-Management
The B.C. Nursery Trades Association Award in Landscape Horticulture
The Canadian Agricultural Chemical Association, B.C. Section Award in Food Production
The Fisheries Association of B.C. Award in Food Processing

**Building**
The Architectural Institute of British Columbia Award in Architecture
The Building Award in Economics
The Building Award in Mechanical Systems

**Chemical Sciences**
The Canadian Institute of Mining and Metallurgy, Vancouver Branch Award in Extractive Metallurgy
The Canadian Pulp and Paper Association, Technical Section, Pacific Coast and Western Branches Award in Pulp & Paper
The Canadian Society for Chemical Technology Award in Organic Chemistry
The Chemical Sciences Award in Pollution Sciences
The Chemical Sciences Award in Physical Metallurgy

**Civil and Structural**
The Swan Wooster Engineering Company Limited, Col. W.G. Swan Award

**Electrical/Electronics**
The Microtel Pacific Research Award in Telecommunications
The Federal Pioneer Ltd. Award in Power
The Instrument Society of America Award in Instrumentation
The MacDonald, Dettwiler and Associates Limited Award in Control Electronics

**Lumber and Plywood**
The Council of Forest Industries Award

**Forest Resource**
The Council of Forest Industries Award in Forestry
The Forest Resource Award in Fish, Wildlife and Recreation

**Mechanical**
The Canadian Manufacturers' Association Award in Production
The Canadian Society for Mechanical Engineering Award in Design
The Mechanical Contractors Association of B.C. Award in Mechanical Systems

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

**Natural Gas and Petroleum**
The Westcoast Transmission Company Ltd. Award

**Recreation Facilities Management**
The Recreation Facilities Management Award

**Surveying**
The Corporation of Land Surveyors of the Province of British Columbia Award

SCHOOL OF HEALTH SCIENCES

**Biomedical Electronics**
The Biomedical Electronics Graduation Award

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

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

**Medical Radiography**
The B.C. Radiological Society Award

**Nuclear Medicine Technology**
The Frosst Radiopharmaceutical Division, Ralph Jamieson Award

**Occupational Health and Safety**
The Occupational Health and Safety Award

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

**Psychiatric Nursing**
The Registered Psychiatric Nurses Association of B.C., Richard Strong Memorial Award

**Prosthetics and Orthotics**
The J.A. Pentland Ltd. Award

SCHOOL OF MANAGEMENT

**Administrative Management Systems**
The Bank of British Columbia Award in Administrative Systems
The Finning Tractor & Equipment Co. Ltd. Award in Personnel and Industrial Relations
The Business Administration Award

**Broadcast Communications**
The British Columbia Association of Broadcasters Award

**Computer Systems**
The Computer Systems Award in Information Systems
The Computer Systems Award in Management Systems

**Financial Management**
The Canadian Life and Health Insurance Association Award
The Society of Management Accountants of British Columbia Award in Accounting
The Royal Bank of Canada Award in Finance

**Hospitality and Tourism Administration**
The British Columbia Hotels' Association Award in Hotel, Motel and Food Service
The Ryan Schlyecher Memorial Award in Travel and Tourism

**Marketing Management**
The Bank of British Columbia Award in International Business
The Real Estate Council of British Columbia Award in Real Estate
The Vancouver Sun Award in Technical Sales and Marketing
The Canadian Tire Award in Advertising and Sales Promotion

**Operations Management**
The Vancouver Transportation Club Award in Transportation and Distribution
The Operations Management Faculty Award for Academic Excellence

## 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 1984 Graduating Awards Ceremony.

SCHOOL OF ENGINEERING TECHNOLOGY

**Biological Sciences**
The B.C. Food Technologists Award in Food Processing

**Building**
The Clay Brick Association Award
The P.B. Ford and Company Award
The Royal Institution of Chartered Surveyors, B.C. Group Award
The Quantity Surveyors Society of B.C. Awards

**Chemical Sciences**
The Canadian Pulp and Paper Association, Technical Section, Pacific Coast and Western Branches Award in Pulp and Paper

**Civil and Structural**
The Dillingham Construction Ltd. Award
The Dominion Construction Co. Ltd. Awards
The Wright Engineers Ltd. Award

**Electrical/Electronics**
The Hewlett-Packard Achievement Award
The Western Canada Telecommunications Council, R.C. Eldridge Award in Technical Writing
The Teleglobe Canada Award in Telecommunications
The Isabel Verner Memorial Book Prize

**Forest Resource**
The Society of Engineering Technologists of the Province of B.C. President's Award of Excellence

**Lumber and Plywood**
The Ralph S. Plant Ltd. Award

**Mechanical**
The Bingham Willamette Ltd. Award
The Institution of Mechanical Engineers, Western Canada Branch, Commander S.M. Terry Memorial Award
H.A. Simons (International) Ltd. Award
The Wright Engineers Ltd. Award

**Natural Gas and Petroleum**
The BCIT Mathematics Department Book Award

**Surveying**
The Dillingham Construction Ltd. Award
The Canadian Institute of Surveying Membership Award

SCHOOL OF HEALTH SCIENCES

**Biomedical Electronics**
The Canadian Medical and Biological Engineering Society, B.C. Chapter, Awards

**Medical Laboratory**
The Coulter Electronics Canada Awards in Haematology
The Warner-Chilcott General Diagnostics Award for General Proficiency
The Metropolitan Clinical Laboratories Ltd. Award in Bio-chemistry
The Metropolitan Clinical Laboratories Ltd. Award in Microbiology
The Ortho Diagnostics Award in Immunohaematology
The Sherwood Medical Industries Inc., Paraplast Award in Histology

**Nuclear Medicine Technology**
The Metropolitan Clinical Laboratories Ltd. Award for Clinical Excellence

**Environmental Health**
The Environmental Health Services Award for Outstanding Achievement in Public Health Inspection

**Psychiatric Nursing**
The Psychiatric Nursing Department Service Award

**Prosthetics and Orthotics**
The Norris Stewart Menzies Memorial Awards

The School of Health Sciences Prize

SCHOOL OF MANAGEMENT

**Administrative Management Systems**
The Westcoast Transmission Company Ltd. Awards
The Administrative Management Students' Award
The Block Bros. Industries Ltd. Award in Real Estate Management

**Broadcast Communications**
The British Columbia Film Industry Association, Jack Gettles Memorial Award for Creativity in Television
The Broadcast Communications Commercial Production Award of Excellence
The Broadcast Communications Commercial Production Award, Honorable Mention
The Rogers Cable T.V. — Vancouver Award of Excellence in Broadcast Engineering
The Canadian Broadcasting Corporation Award in Television

**Financial Management**
The Certified General Accountants of B.C. Awards
The Financial Executives Institute, Vancouver Chapter Award
The Society of Management Accountants of B.C. Award
The Jackson-Mapleton Award in Credit and Collections
The Institute of Chartered Accountants of B.C. Award
The Vancouver Stock Exchange Award
The Financial Management Department Certificate of Recognition

**Hospitality and Tourism Administration**
The Cara Hospitality Award
The Columbia Association of Hospitality Accountants Award in Accounting
The Hotel Vancouver Award in Hotel, Motel and Food Service
The Sunsational Vacations Limited Award in Travel and Tourism
The White Spot Ltd. Awards in Hotel, Motel and Food Service
The Restaurant and Food Services Association of B.C. Award

**Marketing Management**
The Block Bros. Industries Ltd. Award in Real Estate Management

**Operations Management**
The Canadian Materials Handling and Distribution Society, B.C. Chapter, Award
The Canadian Association for Production and Inventory Control, Vancouver Chapter Awards

# Diplomas

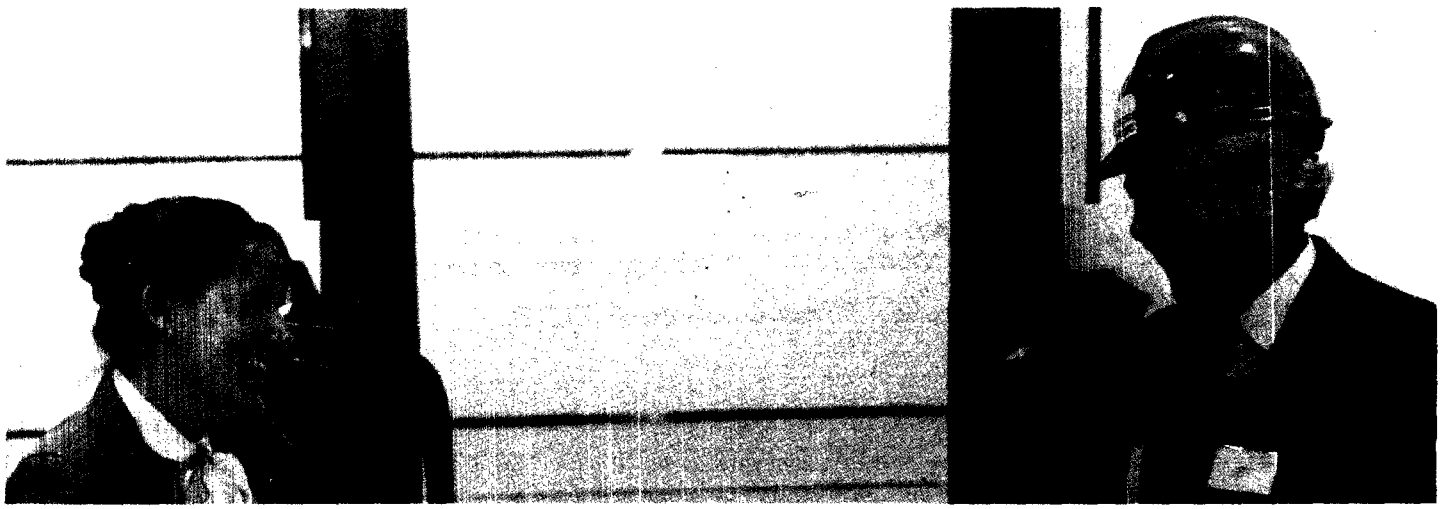
**Diploma of Technology**
Graduates of the British Columbia Institute of Technology will be awarded a nationally recognized Diploma of Technology at the convocation exercises. Graduates unable to attend the convocation exercises will have their diplomas sent by registered mail to their current address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

**Honors Diploma**
An Honors Diploma is awarded to a graduating student whose average marks for all courses that constitute an approved second year program of studies is 80% or greater. 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, unless approved courses are added to maintain 100% workload.

**Double Diploma**
After receiving a Diploma of Technology in any field of study from BCIT, a graduate may earn a second diploma in another area of study upon the successful completion of one full year or its equivalent. Each program will be developed in consultation with the student's department head, giving special recognition to the student's individual needs. Each program leading to a Double Diploma must be approved by the Technology Department Head and the Registrar. Application forms may be obtained from the Office of the Registrar, located on the main floor of the Administration Building.

**Replacement Diploma**
Only one diploma will be issued to each student. 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.

# Conduct and Attendance



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

**1.** Students are expected to conduct themselves in exemplary fashion at all times and pay diligent attention to their studies. If the School Dean or the Registrar believes a student's conduct is such that it is detrimental to the interests of the Institute, a recommendation may be made to the President to exclude the student from further attendance. The President has the final power to suspend or expel a student for disciplinary reasons, subject to the student's right to appeal this decision to a committee designated by the Board of Governors. A student who has been expelled or suspended for misconduct will not be admitted to the Institute grounds or buildings.

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

**3.** If through carelessness or negligence, a student damages Institute property, the student will be held responsible. If the damage is caused by students whose names are not known, the cost of repairing the damage may be assessed equally among all students enrolled at the Institute.

**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 judgement of students to maintain a reasonable standard of dress and appearance. The choice of dress is left to the individual student, subject to the following considerations:

(a) in some field trips and laboratory situations, safety considerations require that special head gear, shoes or other clothing, and other safety equipment must be worn;

(b) where programs involve regular periods of scheduled experience, in ndustry 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% 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 School of Health Sciences.

# Counselling and Student Financial Services

## Student Financial Services

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

### How Much Will It Cost

The first step in determining your total financial picture is to calculate resources and expenses. Single students not living with their parents can expect to spend approximately $5,000 on living expenses, $1,300 for tuition fees and at least another $500 for books or supplies. It is important that costs such as room and board, transportation, clothing, laundry and entertainment 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. (Note: These programs and services are subject to change).

### 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 1984/85 guidelines, a single student or married student without children enrolled in the average 36 week BCIT program is eligible for up to $5,780 in assistance ($3,780 in Canada Student loan and $2,000 in B.C. Student loan). Single parents or married students with children, enrolled in a 36 week BCIT program are eligible for up to $6,180 in assistance ($3,780 in Canada Student loan and $2,400 in B.C. Student loan). **Please note**, these figures are maximums; the amount actually received is determined by a needs assessment of each applicant's circumstances.

Students who require funds at the beginning of the academic year should apply at least 3 months before the start of classes.

### Work Study Program

The Work Study Program is a government sponsored program designed to provide on-campus, part-time work for students in financial need. This program is intended for students whose financial needs cannot be fully met by the B.C. Student Assistance Program, or for those who wish to reduce the amount of their student loans. Many of the positions provide career related work experience, and the hours are generally flexible so as not to interfere with classes.

Positions are posted at the Canada Employment Centre beginning in September.

### BCIT Bursaries

BCIT Bursaries are non-repayable awards ranging from $100 to $1,000. These bursaries are made possible through contributions from private companies, organizations and individuals to the BCIT Scholarship and Bursary Fund.

To be considered for a Bursary, students must demonstrate financial need, have an overall average of at least 60%, and have a clear pass in all subjects. Consideration is also given to voluntary services a student provides to the Institute or the community.

Students are eligible to apply only after successful completion of at least one term. The deadline for application is January 20.

### Scholarship and Bursary Funds

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 further information from the Institute Development Office (604) 432-8869.

### U.S. Veterans Allowances

U.S. veterans intending to study at BCIT may now be eligible for an Education Allowance from the U.S. Veterans Administration.

Applications may be obtained at the office of the Associate Registrar.

**Emergency Loans**

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

For further information, telephone 432-8327 or visit the Counselling Services Centre, Room 205, Building 2N.
Office hours, Monday - Friday are:

| | |
|---|---|
| September - June | 0830 - 1630 |
| July, August | 1300 - 1600 |
| (subject to change) | |

## Counselling

The Counselling Services centre offers a free and confidential career counselling service to all BCIT and prospective students. Professionally trained counsellors will assist students in selecting a career, making a career change, re-entering the work force, or adjusting a career to fit a chosen style of living.

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

Counselling Services, in conjunction with Continuing Education, offers several Career Search Workshops during the school year. These workshops are four sessions (12 hours) long and are designed primarily for prospective students who have been in the work force at least two years. Participants examine their career paths and lifestyles in terms of direction and personal satisfaction. Registration for Career Search Workshops is handled through **Continuing Education** in the Admissions general office. For more information call 432-8204 or 432-8205.

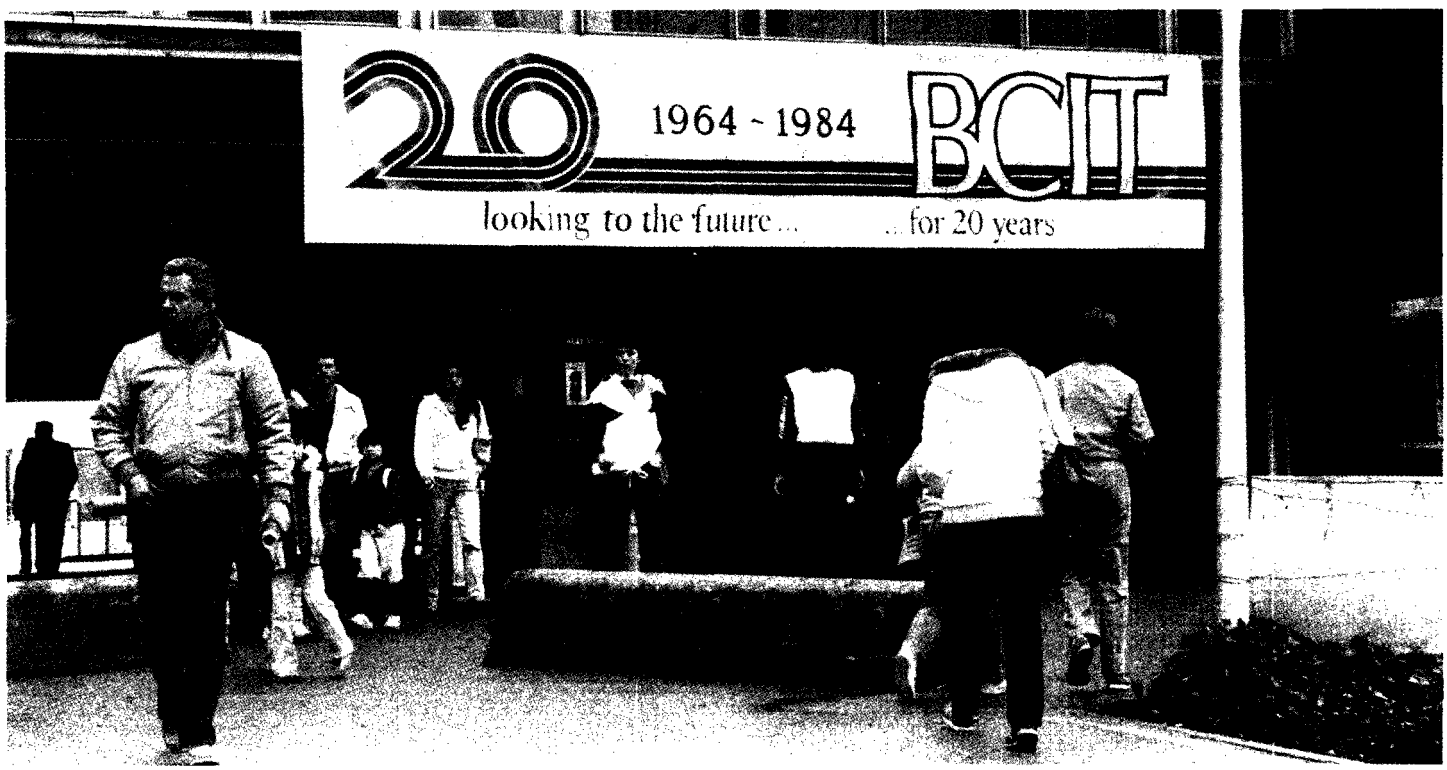
Supportive counselling to BCIT students during times of stress or change is also available through Counselling Services. It may take the form of direct service to the student or referral to the appropriate campus or community agency.

For further information about any of the counselling services at BCIT, contact the **Counselling Services** centre in room 205, building 2N, or telephone 432-8327. The centre is open Monday to Friday, 0830 - 1630, September to June and 1300 - 1600 July and August. (subject to change)

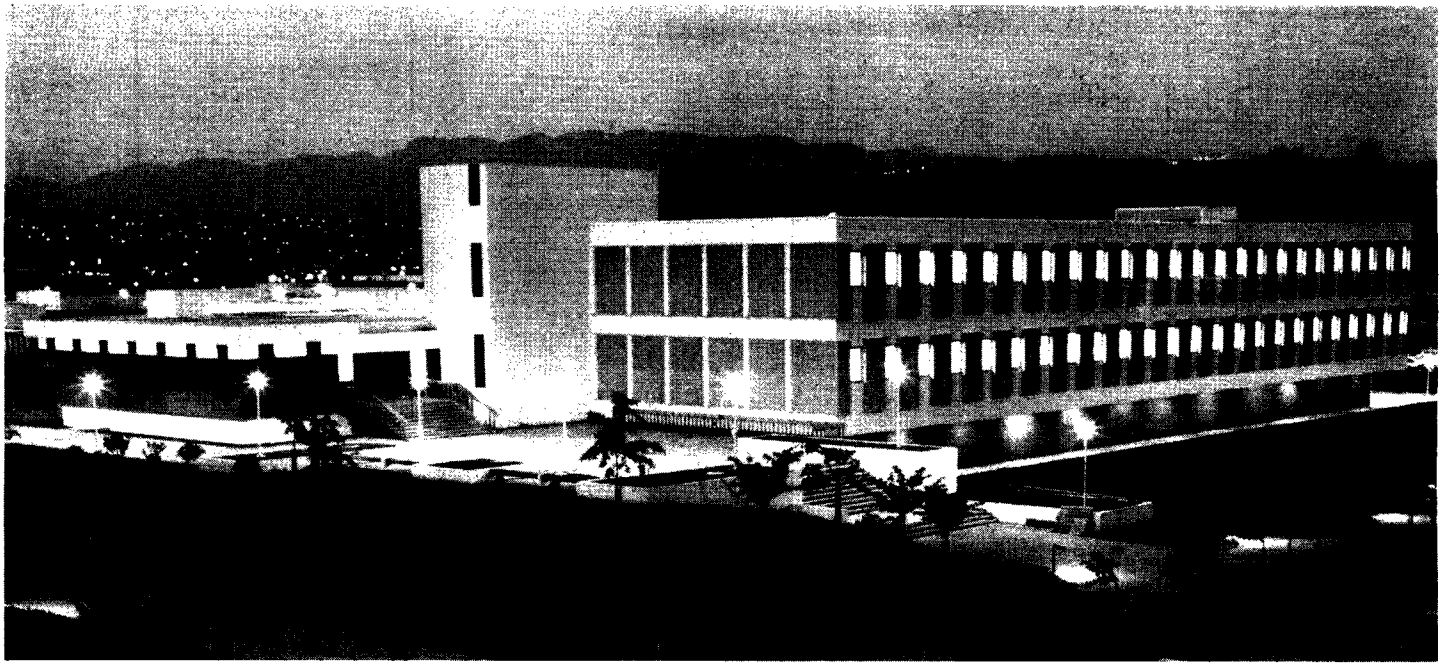
Prospective students should make appointments to attend the group information sessions.

## Staff

Al McLean, B.A., B.S.W., M.S.W.,
Director of Counselling Services
Counsellors:
Stu Gibbs, B.A., M.S.Ed.
Dr. Norma Hawkes, B.A., M.Ed., D.Ed.
Jennifer Orum, B.Ed., M.A.
Howard Peto, B.S.A., M.Ed.



# Library Services



As a major technological information resource centre in British Columbia, the BCIT Library contains current books, periodicals, maps, research reports and literature indices supporting all technologies. In addition, there are over 1500 films and 2000 learning kits and audiotapes. The Listening and Viewing facilities include preview booths, slide tape units, video monitors and microform viewers plus several microcomputers available to students interested in using the library's growing software collection.

The curriculum at BCIT provides five hours a week for library use and research. The opportunity to become familiar with information sources in a chosen field and to develop research skills, assists the technologist not only in completing course assignments but also in facing the future challenge of keeping current in a changing and innovative work environment.

A self-guided tour and a video program of soundtape explaining the use of the microcatalogue for locating materials, provide the basis of library usage. Printed guides to various information sources are available in the reference area. Orientation seminars are available by the subject specialist usually at the time of the first major research assignment and on request by your instructor. In addition, librarians are always on hand to answer individual queries.

## Quick Facts about the Library Services Division

**Hours:** September - May (subject to change)

| | |
|---|---|
| Monday-Thursday | 0730 - 2230 |
| Friday | 0730 - 1800 |
| Saturday & Sunday | 1000 - 1800 |

### Book Replacement Fee

Levied 30 days after due date, the non-refundable fee covers the purchase and processing of a replacement copy long overdue and unavailable to other borrowers. It is payable to the Finance Division, 1A Building.

### Penalties

Failure to pay the book replacement fee results in suspended library privileges. No statement of marks, diploma or certificate is issued until the student settles all financial obligations for overdue material.

## Faculty and Staff

### Administration

Jos. E. Carver, B.A., B.L.S., Institute Librarian

### Library

Robert A. Roy, B.A., M.A., B.L.S., Assistant Institute Librarian
Margot Allingham, B.A., M.L.S., Reference Librarian
Sheila Ferry, B.A., B.L.S., Reference Librarian
Frank Knor, Dipl. T., B.Ed., B.L.S., Reference Librarian
Merilee MacKinnon, B.A., M.L.S., Cataloguer
Marj McLeod, B.A., B.L.S., Reference Librarian
Paula Pick, B.A., M.L.S., Head Cataloguer
Gerry Weeks, B.A., M.L.S., Reference Librarian

# Medical Services

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

An interview with a doctor is chargeable to the patient's medical plan, and students must either be covered under their parents' plan or make their own arrangements for coverage before registration (application forms and information are also available in Medical Services). Out-of-Province students may use their Provincial Health Plan.

Some medication is dispensed free of charge and most immunizations are free. Prescribed allergy shots can be given. There is no dentist on staff, but Medical Services can usually assist with dental referrals.

No appointment is needed to visit Medical Services, except in the case of a complete physical examination. Referral to either the physiotherapist or the psychiatrist is through Medical Services or your own physician. The physiotherapist's office is adjacent to the Medical Services facility. For more information on Medical Services please visit us or call 432-8608.

## Staff

Barbara E. Copping, B.Sc., M.Sc., M.D., Director-Physician
David Mullard, M.D., B.S., Physician (part-time)
Jacqueline Hurst, B.Sc., M.D., Physician (part-time)
Oliver Robinow, B.Sc., M.D., F.R.C.P.(C), Psychiatrist (part-time)
Ralph, Wyatt, B.A., B.S.R., Physiotherapist
Joyce Jamieson, R.N., Nurse
Shirley Tempest, R.N., Nurse (part-time)
Millie Linnen, R.N., Nurse (part-time)
Joan Barrett, Secretary
Carol Braden, Medical Office Assistant

# 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 seven low-rise, split-level houses with a total of 336 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 facilites. Two floors share a kitchen, dining area and living room. The common kitchen area includes three refrigerators, two stoves, two sinks and adequate cupboard space. Each house has separate laundry and storage facilities.

Each house accommodates 48 people and has a Residence Adviser's apartment. Houses 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**

Before the inception of the academic year, students from outside the Vancouver Lower Mainland are given first priority for residence accommodation. First year students receive a residence application 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.

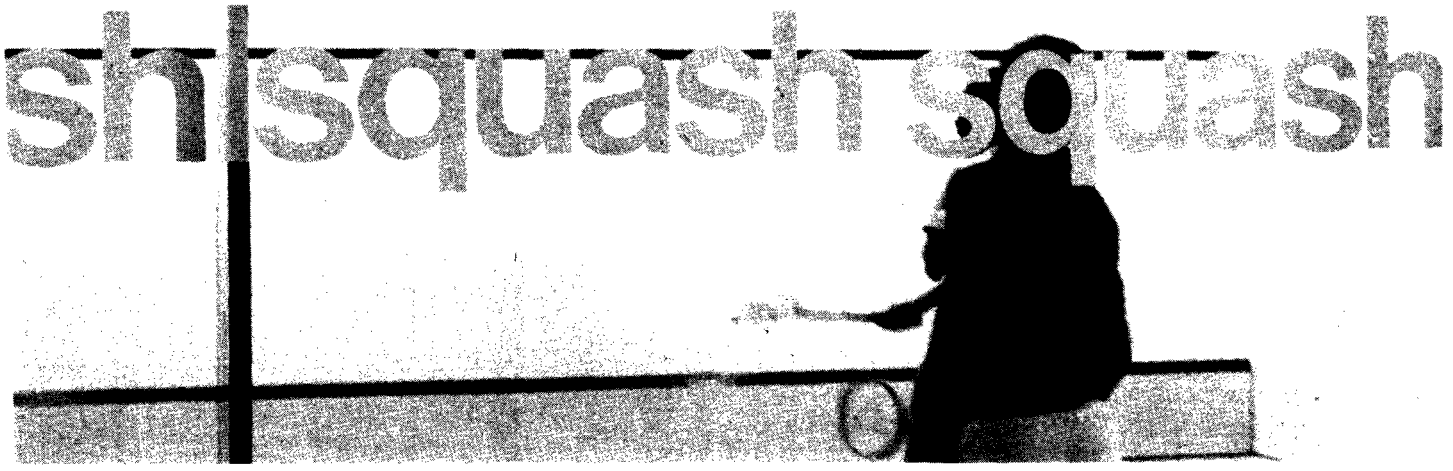
**Off-campus housing**

Since residence accommodation is limited, most BCIT students live in off-campus housing. The Housing Office which is located in Maquinna Residence 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. The off-campus housing service is available on a year-round basis.

## Housing Staff

Val Karpinsky, Director Ancillary Services
Helen Moore, Secretary

# Recreation Services




BCIT offers a variety of indoor and outdoor recreational facilities designed to appeal to most students. These include four racquetball/handball courts and two squash courts; an excellent gymnasium which accommodates eight badminton, two basketball and three volleyball courts, which is also used for many other sports and recreational activities. Our activity room is equipped with a universal gym, free weights, exercise area, table tennis, ballet barre and much more. Four tennis courts, two sports fields, a fitness trail and exercise stations, as well as a 396 metre (440 yard) track offer excellent outdoor recreation. Complete shower facilities, change and locker rooms for both men and women are included.

**Hours of operation**

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

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

**Facilities and Services — How to Use Them**

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

**Guests**

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

**Booking the Gym**

Technologies or BCIT groups can book half the gym at three or four specified times a week. This program is known as **Technology Challenge Booking** and is set up so that groups can get together and enjoy a recreation activity.

**How to Book Badminton, Tennis and Table Tennis Facilities**

Bookings are made on a first-come, first served basis with no charge for court time. You must check in and book the court at the equipment office. (No pre-booking allowed, 45 minute court time limit).

**How to Book Squash and Racquetball Courts**

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

**Payment of Court Fees**

All fees must be paid prior to court use. Current BCIT ID must be presented in order to get the student rate. Players are required to check in at the Equipment Office prior to using the courts. A 10 minute grace period is provided for players to claim their courts. If left unclaimed, they may be resold to someone else. Players must vacate their courts at the end of the specified booking period whether the game has ended or not. Failure to observe court courtesy rules will result in loss of playing privileges. A person may book a court for practice or hold a court if a partner does not show. Recreation Services reserves the right to book court times for private lessons.

**Facility Regulations**

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

**Campus Recreation**

Is here to assist you in planning your leisure time. Fitness activities and leagues are scheduled around your academic programs. If you have a special interest that does not appear in this section drop in or call the Campus Recreation office located in the lobby of the SAC building, telephone 432-8782.

**Intramurals**
Leagues for volleyball, indoor soccer, soccer, ice hockey, basketball, squash, racquetball, etc. are organized for school breaks, evenings and early mornings. Watch notice boards and **The Link** for rules, costs and team information.

**Clubs**
We can get together and organize activities such as trips or tournaments for weekends or midterm breaks. Some funding is available to assist in transportation and equipment rentals. Activities pursued by existing clubs include skiing, outdoor recreation, scuba, sky-diving, archery and windsurfing.

**Non-credit Courses**
Beginner courses in Kung-fu, squash, racquetball, jazz dance, golf, fitness to music, etc., are on-going during the school year and are subsidized by the student activity fee.

**One-day Workshops**
Are scheduled on weekends. They include self-defence for women, massage, stress management and various sports. Your student activity fee subsidizes the cost.

**Personal Fitness Incentives**
To encourage you to do your own thing, we have T-shirt awards for jogging, swimming and walking. Register when you start, tell us when you have finished and pick up your free T-shirt. Swimmers and skaters can obtain tickets at the campus recreation office for Burnaby recreation facilities, your student activity fee pays half the cost. Tickets are also available for the Canada Games Pool in New Westminster.

**Special Events**
Throughout the year, we schedule special events for students and staff to promote fitness and social activities (Turkey Trot, Bunny Shoot, Challenge games, etc.), also recreational, low skill requirement, invitational and competitive tournaments with students and staff from UBC, SFU, Douglas College, etc. BCIT students are entitled to participate in any program. If you have any other interests that might attract students/staff, drop in or call the campus recreation coordinator 432-8782.

**Alumni**
Your membership entitles you to participate individually or as a team in intramural leagues and other events. Contact the recreation coordinator for information on leagues and schedules.

**Additional Information**
A brochure on dates, times and rules for intramural activities is available from the campus recreation and equipment office in the SAC.

**Extramural Athletics**
BCIT, in conjunction with funding assistance from the Student Association, will embark on the gradual re-introduction of an extramural athletic program for the 85/86 academic year.

Because of limited funds, the following sports have been selected due to past participation and success rates:

| | |
|---|---|
| Badminton | Men and Women |
| Curling | Men and Women |
| Rugby | Men |
| Racquetball & Squash | Men and Women |
| Volleyball | Women |

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

| | |
|---|---|
| Campus recreation co-ordinator | local 8782 |
| Facilities co-ordinator | 8613 |
| Equipment Office and attendants | 8612 |
| Weekend/nightline | 434-8612 |

# Student Association

The Student Association is the independent "student union" at BCIT with an annual cash flow approaching $2 million. It provides most of the non-academic services and nearly all of the recreation and entertainment on the campus.

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

Another portion of the fee goes to pay for the SA's new Campus Centre, a multi-million dollar recreational complex organized and financed entirely by the SA. The Campus Centre is the first independently financed student building constructed in western Canada in twenty years. Phase one, containing squash and racquetball courts, is now complete. Fund raising is underway for two more phases.

Student government began in 1966, two years after the Institute opened its doors. In October 1968, the Student Association was registered in Victoria as a Society under the Societies Act. The Student Activity Centre was built in July 1971 and the first TNT was opened. The SA pub, known as "Taps", is fully licenced and first opened its doors in 1976. In 1978 the SA opened its own food service, Growlies. In 1983 a racquetball centre was built, expanding the SAC building. In 1984 a satellite dish and screen with M.T.V. was installed in the pub.

The SA holds elections each April to choose a nine member executive: President, Vice-Presidents of Administration and Public Relations, Treasurer, Activities and Sports representatives, and one representative each from the Schools of Engineering Technology, Health Sciences and Management. The executive is responsible for the day-to-day management of the Association's affairs and the spending of its budget. The executive meets regularly with the Student Council which consists of about 20 students selected by and from technologies.

The Executive and Council, in addition to managing the SA's internal affairs, are charged with representing BCIT's students to all levels of institutional, municipal and provincial governments. In recent years, this work has included lobbying against tuition fee increases, coordination of the Campus Centre and work with the BCIT Administration for efficient and useful student services.

Most of the management of the SA's business operations is entrusted to a full-time professional staff of about 18, which is hired by the executive and reports to business manager Phil Henderson. Linda Field is the TNT stores manager, Bill Sekhon is food and beverage manager, Graham Humphries is pub manager, Don Wright is manager of the publications office, Janice Eden is the executive secretary and a student looks after marketing and public relations.

**Activities**

The SA funds the Intramurals athletics and clubs program, which provides lunch hour and after class recreation for several hundred BCIT students. Extramurals have returned to BCIT this year. For skiers, the SA owns a 24 bed chalet at Whistler Mountain, which is available year round to students at a reasonable nightly rent.

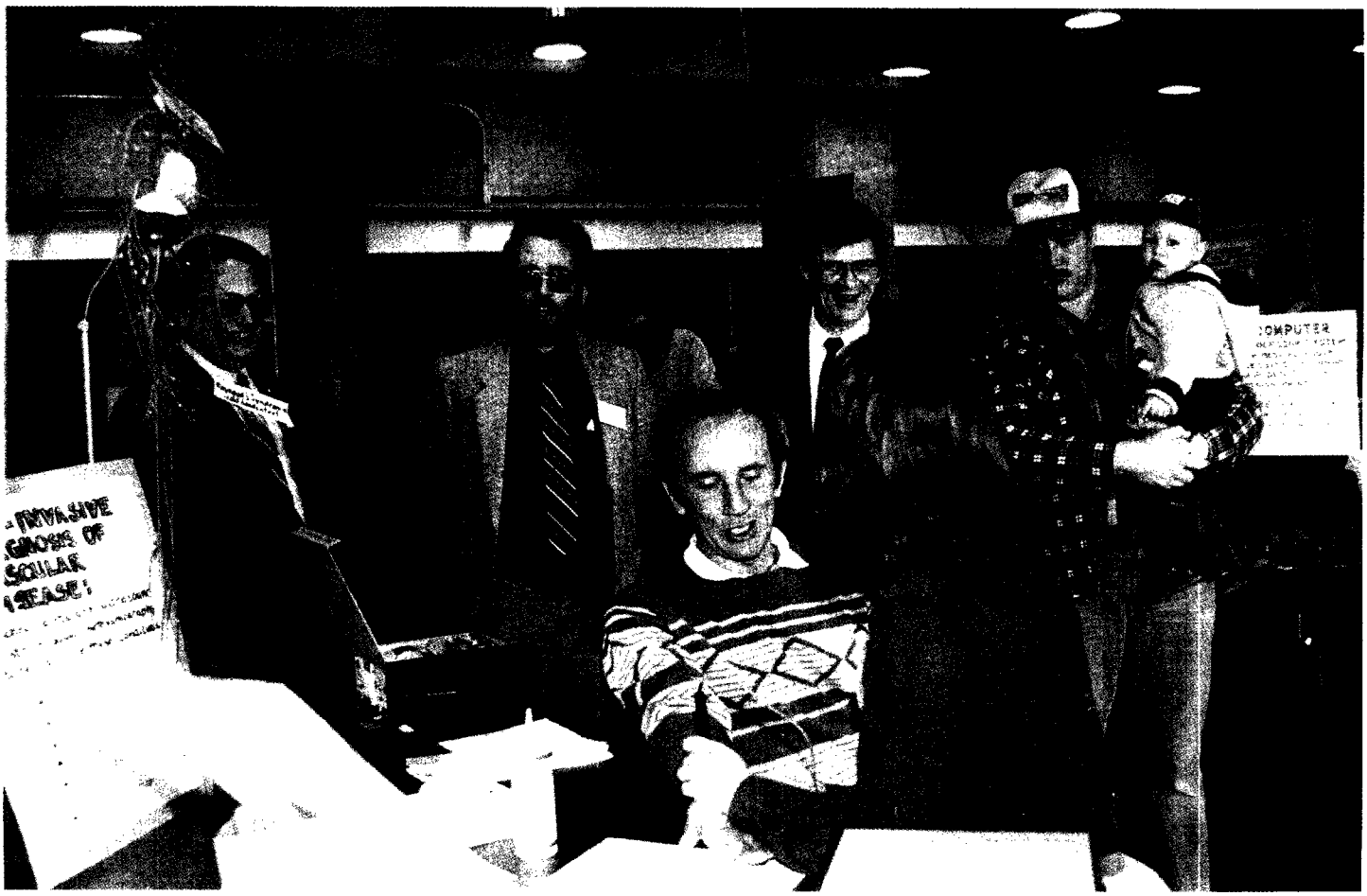
The publications department provides The Link, BCIT's student newspaper, printing and binding jobs for students and maintains the SA-owned copy machines.

For the past dozen years, the SA has been a major supporter of the Shinerama Cystic Fibrosis fundraising campaign held each September, during which students shine shoes for donations around the Lower Mainland. Students are also organized to help with the Variety Club Telethon each February. Over a quarter of a million dollars have been donated to charities in Vancouver by BCIT students.

Video game addicts find a well equipped games room in the SAC Building. Student travellers can obtain discount charter flights through the SA's Association of Student Councils affiliation.

BCIT's Student Association deserves its reputation as "the best organized student union in western Canada".

# Open House '84



# Alumni

The BCIT Alumni Association acts as the official record keeper for BCIT graduates. The Board of Directors has organized a group insurance plan, numerous small reunions and the first All Years Reunion in October 1984. There are 22,000 BCIT Alumni, who enjoy the privileges of using the library, recreation and other campus facilities after graduation.

The Association's priorities are to establish a Travel Group, Alumni Directory and a Speakers Bureau. The Association is represented on the Educational Council, the Board of Governors and the Advisory Boards for each technology.

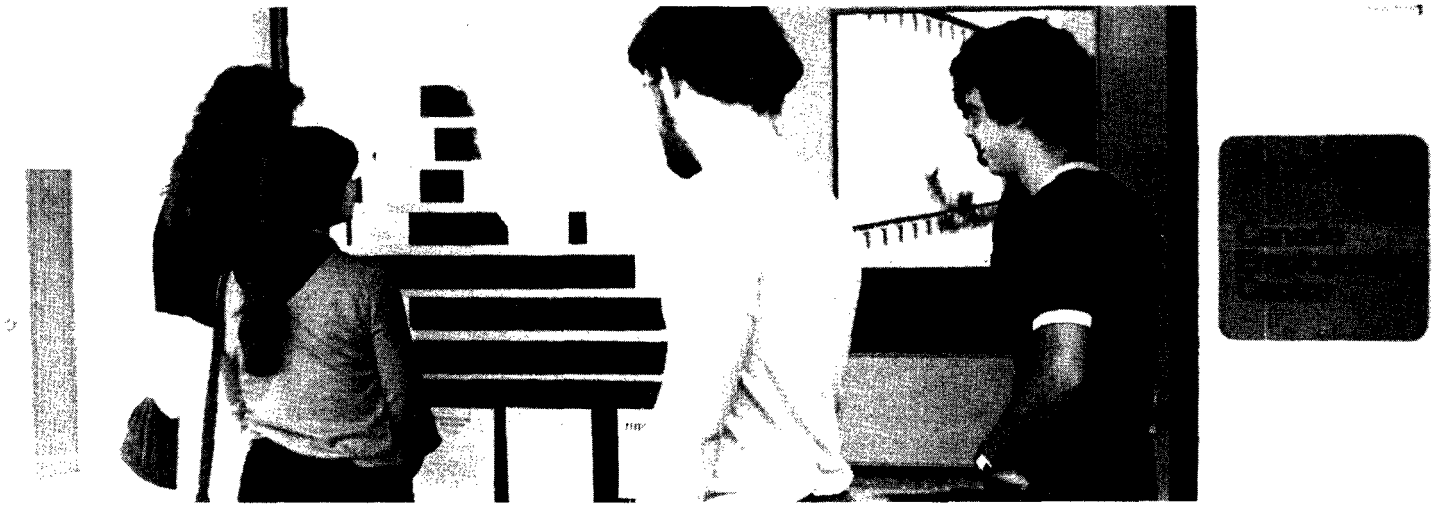
The Alumni Office is part of the Development Group and is located in Trailer 1B. The direct line phone number is 432-8847.

Alumni Co-ordinator:
Linda Bell (Hotel/Motel '72)

## Alumni Executive

President:
Debbie Mitchell (Medical Laboratory '75)
Vice President:
Ron Kuebler (Financial Management '79)
Secretary:
Michael Deane (Administrative Management '81)
Treasurer:
Fred Gaier (Financial Management '83)
Past President:
Grant Crittenden (Marketing Management '72)
Board of Governors Representative:
Robert Fawcett (Administrative Management '79)

# Placement



**The Canada Employment Centre** is located in room 204 of the 2N building. The office is open between 0800-1630, Monday through Friday, throughout the year.

The Centre provides a job placement service to diploma graduates as well as summer employment opportunities for undergraduates. Alumni may use the services of the Centre for up to two years from graduation.

To assist new graduates, the Centre provides an on-campus recruiting program for employers to interview students for career positions prior to graduation.

As well as job placement, the Centre also provides labor market information, company information files, job search techniques, assistance with resume writing and interview preparation.

For students who require a tutor or a typist, a registry of peer tutors and typists is maintained.

## Staff

Bev English, Dipl.T., Branch Manager
Alison Meunier, B.A.Sc., Counsellor
Judy MacDonald, B.Ed., Counsellor
Carolynne Tyson, Cert. Business, Counsellor
Patricia Stephens, Cert. Personnel, Employment Counsellor Assistant

# Etcetera

The Institute and the Student Association offer many services and amenities which make student life more interesting and enjoyable.

**Campus Food Services**
One of the most popular eating spots on campus is the newly renovated **Campus Cafe**. It offers a wide array of food — hamburgers and french fries, pasta specialities, a salad bar, fresh donuts and pastries, fresh fruit and muffins, soft drinks, ice cream and ready-to-go sandwiches, and is located in the breezeway of Building 2N.

In Building 1A, room 237 you'll find the **Roadrunner**, a selfservice facility with salad bar, sandwiches, microwave items, pastries, soft drinks and ice cream.

If you don't mind a quick walk across campus, the **Food Training Centre** is a good place to buy an inexpensive meal. Located in Building 2B, the FTC is a shared facility used for training by BCIT Hospitality and Tourism students, PVI cooking students and Campus Food Services.

"**Growlies**", the student-operated cafeteria in the Student Activity Centre, offers a wide variety of salads, custom-made sandwiches and hot foods. Vending machines are located at several points around campus.

**The Bookstore** is located on the ground floor of the library in the southeast corner of the 2D building. It sells all required textbooks for BCIT courses and provides students with a wide selection of school, drafting and computer supplies, bestsellers, magazines and sportswear. Special orders may be placed for titles not in stock. Before buying any textbook, check with your instructors as to the specific texts you will require. The booklists provided on the first day of classes may contain some recommended texts that need not be purchased. Extended hours of operation are scheduled each term.

**Parking** All vehicles parking on the BCIT campus are required to register with Parking Control. Paid parking is in effect between 0700-2300 Monday through Sunday, all year round.

Parking permits go on sale during the first week of April each year and are sold on a continuous basis until all spaces are filled.

Cost of permits for the period September 1, 1985 to May 31, 1986 is $35 for cars, $17.50 for motorcycles.

Parking lots are patrolled regularly by the BCIT Safety and Security department. Cars that are improperly parked will be towed away at the owner's expense and impounded off campus (towing charge about $45). If your car is towed away, check outside the Parking Control trailer 2T for the name and location of the towing company.

The speed limit on campus is 30 kmh and all vehicles on your right have the right of way in parking lots and on all campus roadways. 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 BCIT Parking Office located in portable 2T (local 8719).

**Transit** The BCIT campus has frequent bus service every day on the following routes:

**25 King Edward** — operates between Brentwood and 10th & Blanca (UBC) every 15 minutes.

**30 Willingdon** — operates between Kootenay Loop and Marine Drive at Patterson with stops at BCIT on Willingdon in both directions. Rush hour service is every 15 minutes; otherwise every 30 minutes.

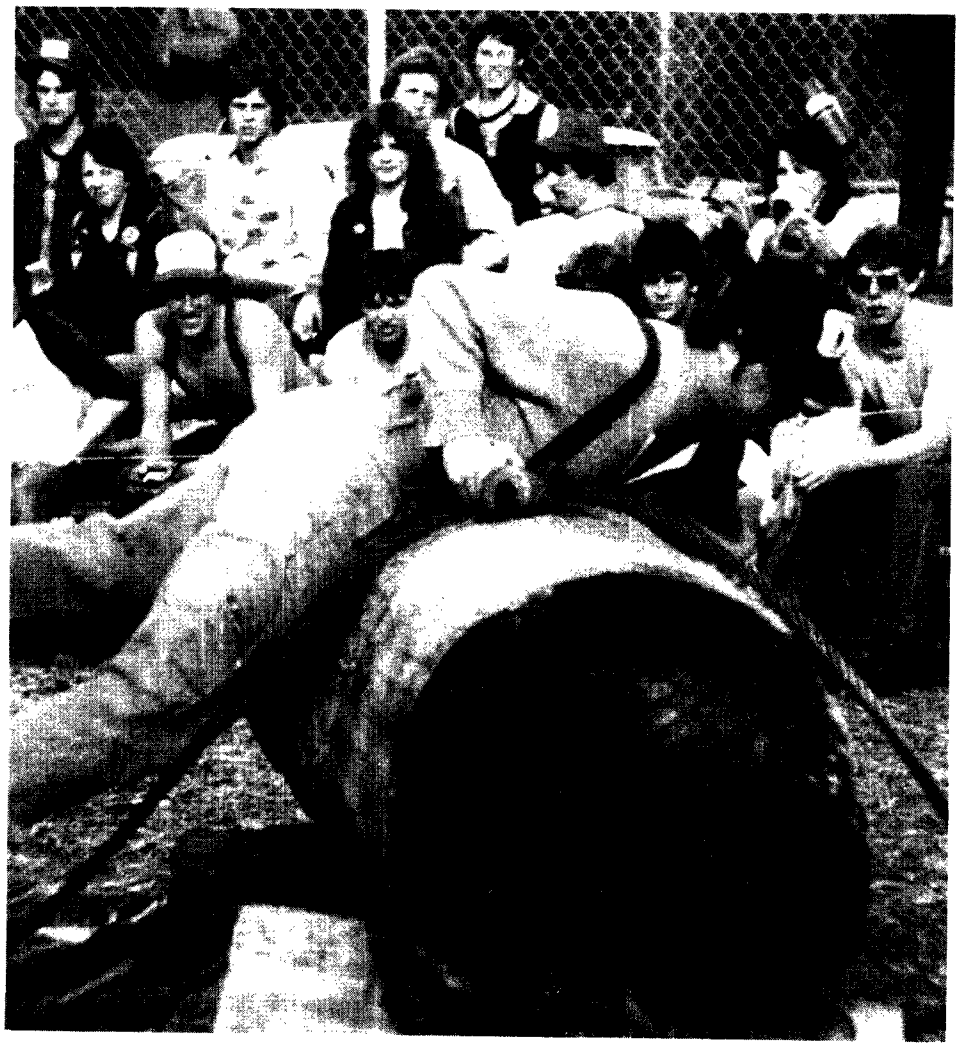
**32 Grandview** — operates between Kootenay Loop and Edmonds Loop with stops at BCIT on Canada Way in both directions. Rush hour service is every 30 minutes; otherwise every 60 minutes.

**820 Canada Way** — operates between New Westminster and Downtown Vancouver via Kootenay Loop with stops at BCIT on Canada Way in both directions. Service throughout the day is every 15 minutes with 30 minute service after 2050.

Monthly bus farecard costs vary depending on how far you travel each day. Farecards are available from This 'n That stores on-campus.

For information about bus routes, fares and schedules within the Greater Vancouver transit system, call the Metro Transit Information Line at 324-3211. On campus, you can pick up bus schedules for Greater Vancouver in the Housing Office.

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



**Lockers** at BCIT are available to students on a first-come basis, except in technologies with special requirements such as Forest Resources, Surveying and Building. Students should locate an unreserved locker near their technology and put their lock on it. Lockers are situated throughout the Institute on each floor of most builings. Lockers must be vacated at the end of each academic year, or no later than May 31. After this date, locks will be removed and the contents sent to the Athletic Office in the gym. Gym lockers may be rented during the school year for a nominal fee. The Institute will not accept responsibility for loss or damage to a student's personal property.

There are three **"This and That"** stores on campus; one in the north foyer of the 1A building, one on the ground level of the 2N building, and one in the Student Activity Centre. The shops sell stationery and school supplies as well as BCIT souvenir items and confectionery. "This and That" stores are operated by the BCIT Student Assocation. Profits go towards student activities.

**Banking services** on campus are available through the Canadian Imperial Bank of Commerce at the north end of the administration building. The branch is well acquainted with Canada Student Loans, so you may choose to negotiate your loan on campus. Out of town students should bring enough money to buy books, pay fees and pay the first month's rent. This can be in the form of a bank draft, travellers cheques, or inter branch banking can be arranged before students leave their home towns.

# Board of Governors

BCIT is governed by a ten member Board, appointed by the Lieutenant-Governor in Council.

**Chairman:**
*Malcolm C.J. Wickson*, B.Comm., LL.B.
President
Mal-Cam Properties.

**Vice-Chairman:**
*Edward V. Hird*, P.Eng.
President
E.V. Hird & Associates Ltd.

**Members:**
*Norman Barth*
President
Burnaby Hospital

*Marilyn Chilvers*, B.A.
Partner
Chilvers/Lam Public Relations
Consultants

*E.H. Alan Emery*, B.A., LL.B.
Partner
Jones, Emery and MacDonald
Barristers and Solicitors

*Robert O. Fawcett*
Assistant Secretary
Real Estate Council of B.C.

*James L. McPherson*, C.A.
Senior Vice-President and Chief
Financial Officer
Placer Development Limited

*Audrey D. Schatz*
President
B.C. Personnel

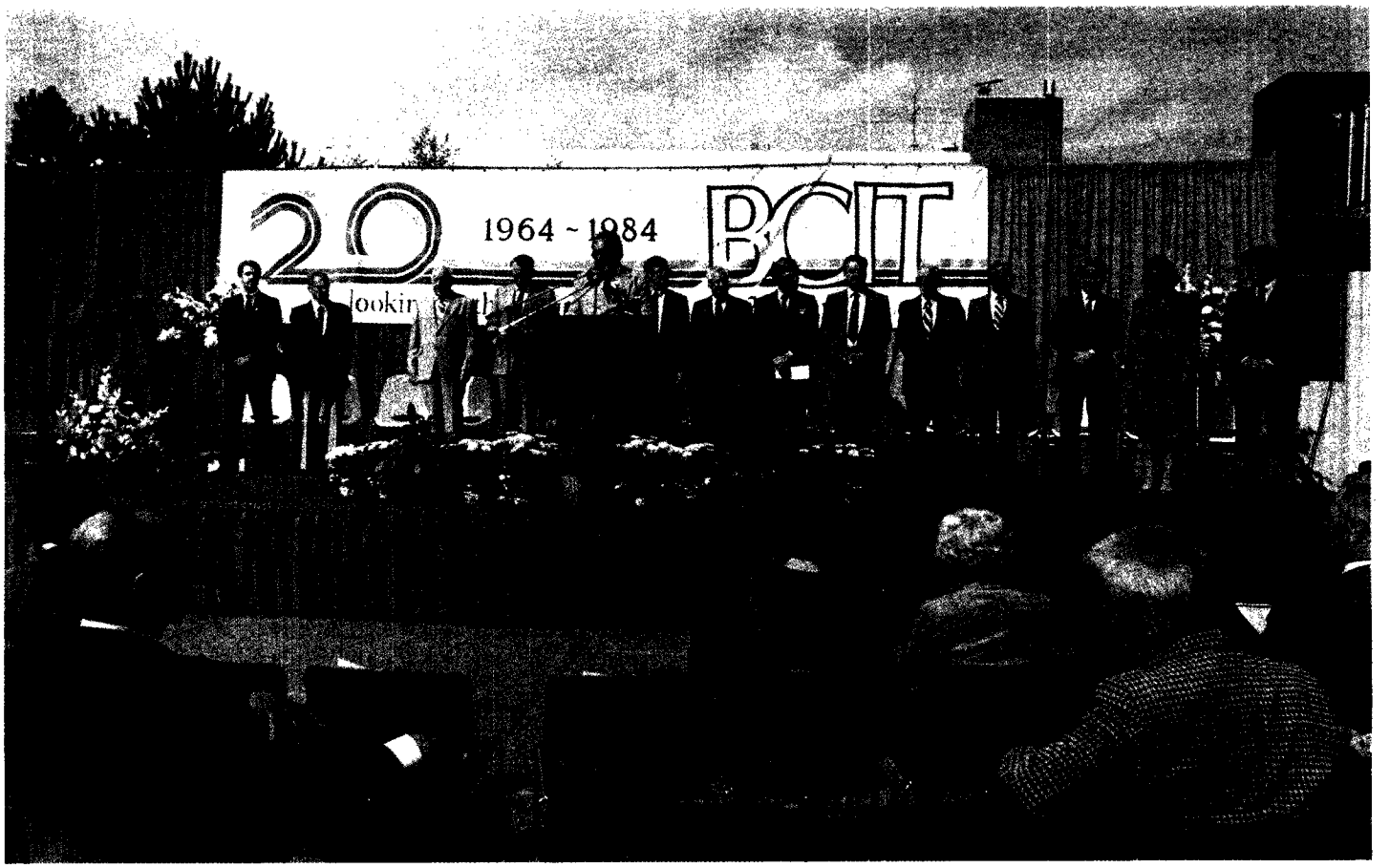
*Edward A. Taylor*, C.G.A.
Comptroller
Crestbrook Forest Industry Limited

*Keith Yorston*
Chairman
Q.M. Industries Limited

**Secretary to the Board:**
*Patricia Maertz*

# Academic and Administrative Personnel

*G.A. Thom, B.Comm., M.B.A., M.Ed.,*
President
*D.J. Svetic, B.A.Sc.,* P. Eng.,
Vice President, Education
*D.M. Macpherson,* C.A.,
Vice President, Administration & Bursar
*R. Sterne,* B.A.Sc., P.Eng.,
Dean, School of Engineering Technology
*B. Gillespie,* B.Sc., M.Sc., Ph.D.,
Dean, School of Health Sciences
*J.D. Kyle,* B.A., M.B.A., Ph.D.,
Dean, School of Management
*H. Arthur,* B.A. (Hons.), M.A.,
Dean, Division of Academic Support
*D.M. Brousson,* B.A.Sc., P.Eng.,
Dean of Development
*P.W. Jones,* Ph.B., Ph.L., Ph.D.,
Dean of Development (effective July 1985)
*E.B. Stewart,* B.A., M.B.A.,
Director, Personnel/Employee Relations Services
*A.W. Morrow,* B.A., B.Ed., M.Ed.,
Registrar
*W. Kurz,* B.Sc., M.B.A.,
Director, Computer Resources Centre
*C. Greenhill,* Dipl.T., B.Sc., M.A., Ed.D.,
Director, Institute Planning
*B. Copping.* M.D., B.Sc., M.Sc.,
Director, Medical Services
*J.E. Carver,* C.D., B.A., B.L.S.,
Institute Librarian
*A. McLean,* B.A., B.S.W., M.S.W.,
Director, Counselling Services
*N. Andrew* C.G.A.,
Director, Institute Budget and Analyses
*G. Nakatsu,* C.A.,
Acting Director, Financial Accounting
*V. Karpinsky,* B.A. (Hons.),
Director, Ancillary Services
*W. Hepple,*
Director, Purchasing and Materiels Management
*R.C.W. Smyth,* C.Eng., P.Eng.,
Director, Physical Plant




# Rededication '84

# Calendar

## 1985

### Janvier - January

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### Février - February

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### Mars - March

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### Avril - April

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### Mai - May

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### Juin - June

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### Juillet - July

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### Août - August

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### Septembre - September

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### Octobre - October

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### Novembre - November

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### Décembre - December

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## 1986

### Janvier - January

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### Février - February

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### Mars - March

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| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | | | | | |

### Avril - April

| D S | L M | M T | M W | J T | V F | S 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 | | | |

### Mai - May

| D S | L M | M T | M W | J T | V F | S 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 |

### Juin - June

| D S | L M | M T | M W | J T | V F | S 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 | | | | | |

### Juillet - July

| D S | L M | M T | M W | J T | V F | S 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 | | |

### Août - August

| D S | L M | M T | M W | J T | V F | S 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 | | | | | | |

### Septembre - September

| D S | L M | M T | M W | J T | V F | S 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 | | | | |

### Octobre - October

| D S | L M | M T | M W | J T | V F | S 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 | |

### Novembre - November

| D S | L M | M T | M W | J T | V F | S 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 | | | | | | |

### Décembre - December

| D S | L M | M T | M W | J T | V F | S 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 | | | |

# Calendar of Events 1985-86

**Schools of Engineering Technology, Health Sciences and Management**

The following holidays are common to all technologies

| | |
|---|---|
| August 5 | B.C. Day |
| September 2 | Labor Day |
| TBA | Shinerama |
| October 14 | Thanksgiving Day |
| November 12 | Remembrance Day |
| December 16 - January 1 | Student Christmas Break |
| March 10-14 | Student Spring Break |
| March 28 | Good Friday |
| March 31 | Easter Monday |
| May 19 | Victoria Day (may be changed by order in council) |

Please see subsequent pages for General and Psychiatric Nursing, Electrical/Electronics and Diagnostic Medical Sonography.

**1985**

| | |
|---|---|
| July 5 | Term 1 fees due for classes starting September 3 |
| August 5 | Term 3 fees due for classes starting September 3 |
| August 9 | Term 3 fees due for Hotel, Motel and Food Service option of Hospitality and Tourism Technology |
| August 26-30 | Medical Radiography Term 1 Hospital Orientation |
| September 3 | Registration/Orientation Day for students (Terms 1 and 3) |
| September 4 | Terms 1 and 3 Classes begin |
| September 9 | Hospitality and Tourism: Administration, Hotel, Motel & Food Service Option (Term 3) registration/orientation and start of classes |
| September 17 | Last day to withdraw from classes in order to receive a full refund (minus $75 commitment fee) Terms 1 and 3 |
| TBA | Shinerama |
| November 8 | Last day to withdraw from program in order to receive "W" (withdrawal) on Transcript. |
| December 9-13 | Terms 1 and 3 Examinations |

**1986**

| | |
|---|---|
| January 2 | Classes begin, Terms 2 and 4 |
| January 3 | Deadline for Term 2 and 4 fees |
| January 16 | Last day to withdraw from classes in order to receive a full refund (Terms 2 and 4) |
| April 4 | Last day to withdraw from program in order to receive "W" (withdrawal) on Transcript |
| May 20-23 | Terms 2 and 4 examinations |
| June 13 | Convocation |

**Diagnostic Medical Sonography**

**1985**

| | |
|---|---|
| July 6 | Term 1 fees due for classes commencing September 3 |
| September 3 | Registration/Orientation for Term 1 students |
| September 4 | Classes begin |
| September 17 | Last day to withdraw from classes in order to receive a full refund (minus $75 commitment fee) Term 1 |
| November 8 | Last day to withdraw from program in order to receive "W" (withdrawal) on Transcript |
| December 9-13 | Term 1 Examinations |

**1986**

| | |
|---|---|
| January 2 | Commence Clinical Phase (Term 2) |
| January 3 | Deadline for Term 2 fees |
| January 16 | Last day to withdraw from classes in order to receive a full refund (Term 2) |
| April 4 | Last day to withdraw from program in order to receive "W" (withdrawal) on Transcript |
| July 2 | Canada Day |
| August 4 | B.C. Day |
| August 18-22 | Term 2 Examinations |
| TBA | Convocation |

NOTE: There is no summer break for these students

# Calendar of Events 1985-86

**Electrical/Electronics Technology**

**1985**

| | |
|---|---|
| July 5 | Level 1 fees due for classes starting September 3 |
| August 5 | Level 1 fees due. (Classes start September 4) |
| September 3 | Registration for Levels, 1, 2, 3 and Co-op 1 |
| September 4 | Classes commence for Levels 1, 2, 3 |
| September 6 | Levels 1, 2, 3 and Co-op 1 fees are due |
| September 17 | Last day to withdraw from classes in order to receive a full refund (minus $75 commitment fee for Level 1) |
| November 4 | Level 1 fees due for classes starting January 2/86 |
| November 8 | Last day to withdraw from program in order to receive "W" (withdrawal) on Transcript |
| December 9-13 | Examinations for Levels 1, 2, 3 and Co-op 1 |

**1986**

| | |
|---|---|
| January 2 | Registration and class start for Levels 1, 2, 3, 4, Co-op 1 |
| January 3 | Levels 2, 3, 4 and Co-op 1 fees are due |
| January 16 | Last day to withdraw from classes in order to receive a full refund (minus $75 commitment fee for Level 1) |
| February 27 | Level 1 fees are due for classes starting April 29/86 |
| March 7 | Last day to withdraw from program in order to receive "W" (withdrawal) on Transcript |
| April 13-18 | Examinations for Levels 1, 2, 3, 4, Co-op 1 |
| April 28 | Registration for Levels 1, 2, 3, 4, Co-op 1 and 2 classes commence |
| May 2 | Levels 2, 3, 4, Co-op 1, 2 and fees are due |
| May 14 | Last day to withdraw from Level 1 classes in order to receive a full refund (minus $75 commitment fee) |
| June 13 | Convocation |
| July 2 | Canada Day |
| July 4 | Last day to withdraw from Level 2, 3, 4, Co-op 1 or Co-op 2, in order to receive "W" (withdrawal) on Transcript |
| August 4 | B.C. Day |
| August 6-9 | Examinations for Levels 1, 2, 3, 4, Co-op 1, 2 |

**SUMMARY** **FEES DUE** Level 1: 60 days prior to commencement of classes
Levels 2, 3, 4, Co-op 1 and 2: fees due first week of classes in that level

**General and Psychiatric Nursing**

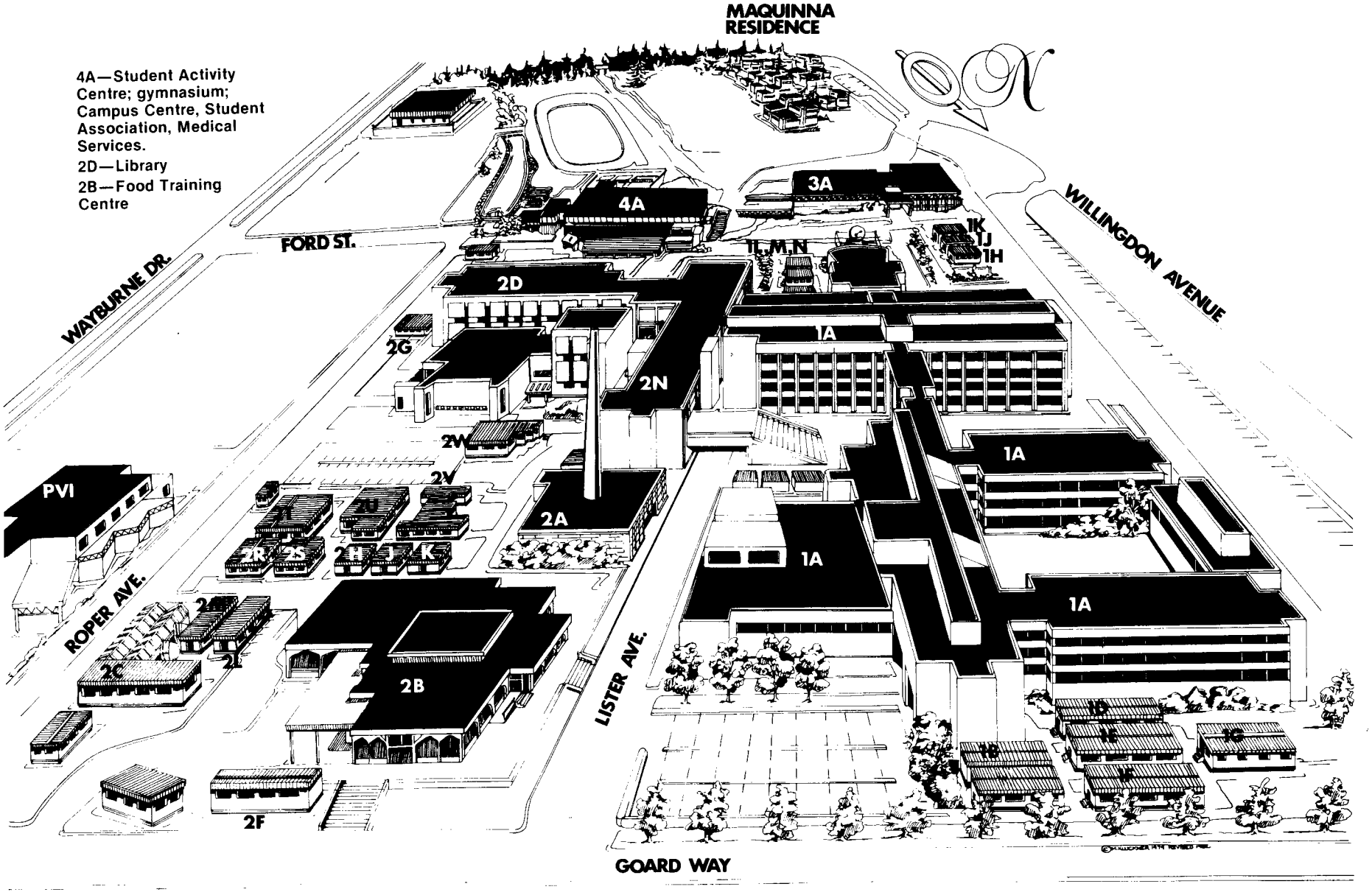
**1985**

| | |
|---|---|
| June 20 | Term 1 fees due for classes starting August 19 |
| July 19 | Terms 3 and 5 fees due |
| August 19 | Registration day for Terms, 1, 3, and 5 students; Terms 1, 2, 3, 4, and 5 classes commence |
| August 24 | Terms 2 and 4 fees due for classes started August 19 |
| September 4 | Last day to withdraw from classes in order to receive a full refund (minus $75 commitment fee) Terms 1, 3 and 5 |
| October 28 | Last day to withdraw from program in order to receive "W" (withdrawal) on Transcript |
| November 4 | Term 1 fees due for classes starting January 2/86 |
| December 4 | Term 3 fees due for classes starting January 2/86 |
| December 9 | Term 5 fees due for classes starting January 7/86 |
| December 10-14 | Terms 1, 2, 3, 4 and 5 examinations |

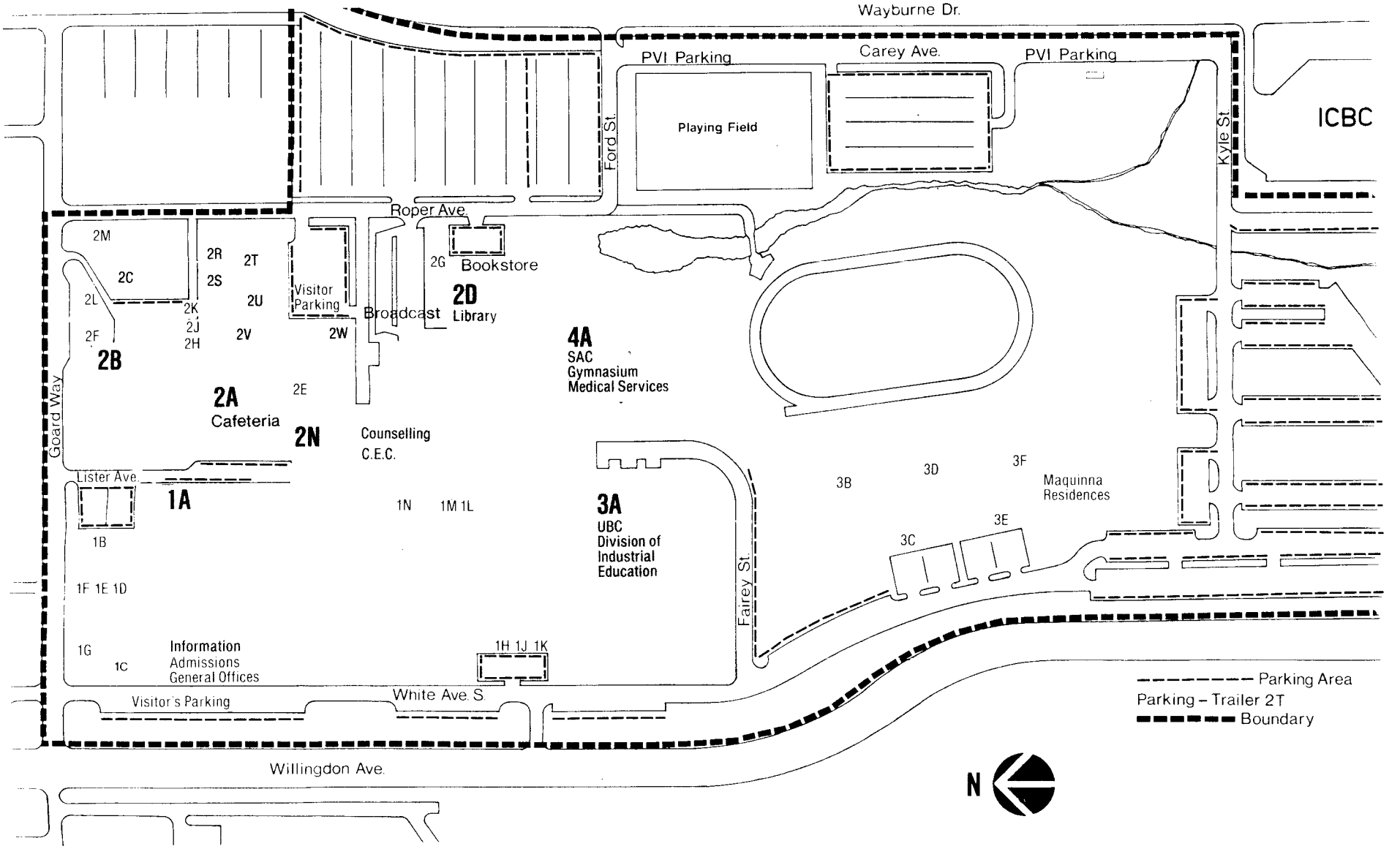
**1986**

| | |
|---|---|
| January 2 | Registration Day for Terms 1 and 3 students; Terms 1, 2, 3 and 4 classes commence |
| January 3 | Term 2 and 4 fees due for classes started January 2/86 |
| January 6 | Term 5 registration and classes commence |
| TBA | Convocation |
| January 16 | Last day to withdraw from classes in order to receive a full refund (Terms 2 and 4) |
| January 21 | Last day to withdraw from classes in order to receive a full refund (Term 5) |
| March 22 | Last day to withdraw from program in order to receive "W" (withdrawal) on Transcript |
| April 29 - May 3 | Terms 1, 2, 3*, 4 and 5 examinations |
| June 13 | Convocation |

*NOTE — For Psychiatric Nursing students, April 29th and 30th become class days.


MAQUINNA RESIDENCE
4A—Student Activity Centre; gymnasium; Campus Centre, Student Association, Medical Services.
2D—Library
2B—Food Training Centre
WAYBURNE DR.
FORD ST.
WILLINGDON AVENUE
ROPER AVE.
LISTER AVE.
GOARD WAY
4A
3A
2D
1A
2N
2G
2W
2V
2A
PVI
2B
2F
1K
1J
1H
1L,M,N
1A
1A
1A
1B
1C
1G

# PARKING MAP


Wayburne Dr.
PVI Parking
Carey Ave.
PVI Parking
Playing Field
Ford St.
Kyle St
ICBC
Roper Ave.
2M
2C
2L
2F
2B
2R
2S
2T
2U
2K
2J
2H
2V
2W
Visitor Parking
Broadcast
2G
Bookstore
2D
Library
4A
SAC
Gymnasium
Medical Services
Goard Way
2A
Cafeteria
2E
2N
Counselling
C.E.C.
Lister Ave.
1A
1B
1F 1E 1D
1G
1C
Information
Admissions
General Offices
1N
1M 1L
1H 1J 1K
3A
UBC
Division of
Industrial
Education
Fairey St.
3B
3D
3F
Maquinna
Residences
3E
3C
Visitor's Parking
White Ave. S
Willingdon Ave.
Parking Area
Parking – Trailer 2T
Boundary
N

# Index