

TECHNOLOGY
career guide
1983-1984

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WHY HUMBER COLLEGE?

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HOW THE CAREER GUIDE WORKS

The Career Guide is a complete package of current programs and courses offered at Humber College. The Career Guide contains separate booklets for all of our programs in Applied Arts, Business, Creative and Communication Arts, Health Sciences and Technology Divisions. Each of the publications includes information on admission requirements, campus location, length and content of each program, curriculum and a description of each course, and employment opportunities.

This Career Guide is available for reference in your high school guidance office, public library, or the Registrar's Office of your regional Community College.

For those students who are not sure where their career interest lies, a separate Program Guide publication has also been produced. This quick-reference guide is arranged into occupational areas such as: Helping Services, the Construction Industry, Secretarial and Clerical Occupations, the Entertainment Field, the Hospitality Industry, and Recreation and Leisure. The Program Guide provides valuable program information as well as employment opportunities available upon graduation.

For your own copy of the Program Guide contact the Registrar's office at:

North Campus
205 Humber College Blvd.
Rexdale, Ontario
M9W 5L7

Lakeshore 1 Campus
3199 Lakeshore Blvd. W.
Toronto, Ontario
M8V 1K8

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Humber College Board of Governors

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GENERAL ADMISSION REQUIREMENTS

Now that you have decided to apply to Humber College, it is up to you to familiarize yourself with all admission requirements. Admission requirements vary, depending on the program you have chosen.

For all full-time diploma and certificate programs:

- you must have your Ontario Secondary School Graduation Diploma, (Grade 12), or equivalent

or

- if you are 19 years of age or over, you can apply as a mature student. (If you are applying as a mature student, you must be a Canadian Citizen or Landed Immigrant).

In addition to a Secondary School Graduation Diploma, or applying as a mature student, some programs have additional requirements you must meet before you can be admitted.

- 1) Some programs require that you have better than passing grades in several, specific, secondary school subjects. For example, some Technology programs require Chemistry and Physics.
- 2) You may be required to write a quiz or test to help determine your academic level.
- 3) In some cases, you may be required to attend an interview or audition, present a portfolio of your work, or fill in a questionnaire or report.
- 4) Your chances of being accepted in a program depend on when the Registrar's Office receives your application and how many applications are received for the same program.

The specific admission requirements for each program are listed in the appropriate Career Guide. The Registrar's Office will inform you of more detailed admission information before either your program interview or at some time during the admissions process.

In some cases, more applications are received from qualified students than there are openings in a program. In this situation, if the Registrar's Office considers all other factors to be equal, successful candidates will be selected at random, and a reasonable number of remaining applicants will be placed on a waiting list.

Since you are the one applying to Humber College, it is your responsibility to meet all admissions deadlines. It is up to you to provide the Registrar's Office with a transcript of your final grades from your secondary school, college, or university. If you miss any deadlines or do not supply accurate, up-to-date documents, the Registrar's Office may withdraw your application and offer your place to another individual.

ADMISSION REQUIREMENTS—MATURE STUDENTS

If you are applying as a mature student for a FULL-TIME PROGRAM, you should be aware of the following:

- 1) Part of your admissions procedure may include testing and/or an interview with an Admissions and Records Officer. If it is determined that Academic Upgrading will be of benefit to you, you may be required to complete one or more of the following programs before your application is approved:

English as a Second Language, Advanced English as a Second Language, Basic Job Readiness Training, College Preparatory.

- 2) For students requiring upgrading in a College Prep. area, a special program will be designed to help you meet the entrance requirements of the post-secondary program you have chosen.

ADMISSION PROCEDURES

FEBRUARY 15

To receive equal consideration all applications must be received by this date. If you are enrolled in an Ontario Secondary School you must apply through your Guidance Office. Other applicants can obtain the necessary form from the Registrar's Office of their local community college. Other applicants, (including "mature students") must supply the College with documents supporting the highest level of education achieved.

JANUARY 1 - APRIL 1

If an interview or other assessment is required, you will be notified by mail during this period. Applications received after February 15, are significantly disadvantaged, especially in limited enrollment programs.

APRIL 1

On or after this date you will be notified by mail if you have been accepted by the College. You will also be notified of other conditions that must be met before beginning classes.

Equipment Deposit

Some courses teach the use of equipment that many students cannot afford to buy. When this occurs, some Divisions require a deposit of money at the beginning of the year which is refunded at the end of the year minus the value of any losses or breakages that have occurred.

To find out if this applies to your program, check with your program co-ordinator.

ORDER OF PREFERENCE FOR ADMISSION

Since Humber College is a community college, one of our objectives is to serve the needs of the residents in the Boroughs of Etobicoke and York. For programs that are widely offered by other community colleges, your place of residence may be a factor in your acceptance at Humber.

For other programs you will be given equal consideration in the following order of preference:

1. Permanent residents of Ontario
2. Permanent residents from other Canadian Provinces
3. Overseas students from Commonwealth countries
4. Students from other foreign countries

If you are an Ontario resident, but live some distance from Humber, arrangements can be made for a telephone interview rather than a personal interview. However, no such alternative is available for residents living outside of Ontario.

If you received your high school education in another province you must submit proof that your educational standing is equivalent to the Junior Matriculation level. Normally this will be Grade 11, except for British Columbia, New Brunswick and Prince Edward Island for which Humber College requires Grade 12.

If you received your education outside of Canada, you must submit proof that your educational standing is at least equivalent to that required by Ontario residents. If English is your second language you will be required to include your results of the TOEFL. Details may be obtained from the Educational Testing Service, Box 899, Princeton, New Jersey, U.S.A. 08540

You can apply for advanced standing by including official transcripts and course descriptions of courses taken at another accredited college or university. However, the transfer credit must be equal to or greater than the same course offered at Humber. Credit is granted on a course by course basis.

SHORT PROGRAM PROCEDURES

The short academic, commercial and technical skill programs have been designed to give you the opportunity to learn at your own pace. Using prepared learning packages, (similar to those used in correspondence courses), faculty is able to work more closely with each student.

Emphasis is placed on teaching the clerical, technical and/or trade skills that are in demand by employers.

CANADA EMPLOYMENT COMMISSION

Most short certificate programs are approved by the Canada Employment and Immigration Commission. If you qualify for sponsorship the cost of your tuition fees will be paid for by Canada Employment and Immigration, including a weekly training allowance (if you are eligible). For further information and details on sponsorship, contact your nearest Canada Employment Centre or the Registrar's Office.

PART-TIME PROGRAMS

Part-Time Evening

In most cases, the courses are open to anyone 19 years of age or over, regardless of your academic background. Check the Continuous Learning Guides (either Spring, Summer, Autumn, or Winter) for more information.

Part-Time Day

You may take up to three courses a term as a part-time day student.

As a final alternative, you may wish to reconsider your career objectives; our counselling staff will assist you.

PART TIME PROCEDURES

If you are interested in enrolling in a part-time evening program, check the appropriate Continuous Learning Guide, (either Spring, Summer, Autumn, or Winter), or call 675-3111 for more information.

STARTING DATES

In most cases, both diplomas and certificate programs may be taken full or part-time. Post-secondary day programs begin in September. A limited number begin in January and/or May of each year. Most full or part-time, short skill programs may be started almost any Monday of the year. The part-time evening courses offered through Continuous Learning normally begin in September, January and May.

FEES

The basic tuition fee plus Student Activity is \$272.50* per semester. This does not include the cost of textbooks, instruments, uniforms and supplies, which varies according to the program, from \$50 to \$400. Students are invited to use the facilities of the campus bookstores to purchase supplies.

Applicants from foreign countries who plan to attend Humber College on a student visa must pay a total fee of \$3,350* per year.

Payment of fees can be made by cash, certified cheque or charge card - Visa or Master Card. Cheques and/or money orders should be made out to Humber College.

There is a surcharge for late payment of fees: \$10.00 on the first day after the due date plus \$2.00 per day up to a maximum of \$30.00.

A refund of tuition fees paid, less a deposit charge or prorated fee, will be made to a student who withdraws, in writing, on or before the tenth day of scheduled classes. For part-time students the time limit is reduced to the period prior to the beginning of the third scheduled class.

** The above fees were in effect at the time of publication and are subject to change without notice.*

See page v for equipment deposit.

Transfer of full-time fees to another term will be considered on an individual basis. Transfer of fees to another community college will be allowed within one month after the start of any term.

No student shall be eligible for any examination, report, certificate, transcript or diploma until fees and any other amounts owed to the College are paid. A student will be withdrawn from active roll for failure to pay fees and may not be admitted to classes.

Refund Policy

Full-Time Students

Should you find it necessary to withdraw from a program, you can apply to the College for a refund only if the following procedures are followed:

- you must inform the College in writing of your intention to withdraw
- you must inform the College within ten working days of your first scheduled class

However, the refund you receive will not be the full amount of your tuition fee. You will not be refunded:

- your confirmation deposit
- any service charges
- any prorated fees

Allow four weeks for refund cheques to be processed.

FINANCIAL ASSISTANCE

Your choice of career preparation does not have to be limited by your financial resources. Whether your choice of study is a short skill program or post-secondary studies-full or part-time, day or evening-financial assistance is available depending upon your individual needs.

Ontario Student Assistance Program

This program has a number of plans intended to assist the student who is unable to meet the cost of full-time studies at the post-secondary level. The assessment of your need is based on educational costs, fees, board and lodging, as balanced with your own financial resources.

Canada Student Loans Plan

This program provides subsidized loan assistance to students who are registered in a certificate or diploma program of at least 26 weeks, and are taking at least 60 per cent of the full course load as defined by Humber College

DESIGNATED AWARDS, BURSARIES AND SCHOLARSHIPS

Humber College assists students by administering awards, bursaries and scholarships which have been donated by corporations, community organizations and individuals. Awards cover the specific requests of the donors and are intended to assist students who have shown academic excellence. Bursaries are awarded primarily on a need basis, but marks are taken into consideration.

Selection is generally made by the faculty with most awards being presented in November.

Humber College does not offer any entrance bursaries or scholarships.

For further information on financial assistance, please contact the Financial Aids office at 675-3111.

OTHER SPONSORSHIP

Occasionally, other agencies such as the Workmen's Compensation Board, the Vocational Rehabilitation Branch, and some employers will consider assisting students. Information will be available in your local agency office or company notice board.

Placement

The Colleges of Applied Arts and Technology and Humber College in particular, have established an enviable record for the program related employment of their graduates.

Even with the placement record Humber graduates have established, no one can guarantee a graduate a job. Finding your first permanent job requires a lot of hard work and determination. To your determined and dedicated effort, Humber adds the skills and resources of its Placement Officers. Humber's Placement Officers can assist you in finding your first job by supplying you with tips on job-search techniques, interview techniques, and writing effective letters and resumes.

Throughout the year, the Placement Office posts available summer, part-time, and career-oriented jobs, as well as providing on-campus recruiting facilities for both large and small companies.

The Placement Offices at Lakeshore I, Lakeshore II, Keelestone, and North Campus have adopted the procedure of keeping in contact with students as they graduate from their programs. In this way, when employers contact the Placement Office with information on job opportunities, the Placement Office can pass this information on to graduates.

For more information on job postings and the services available through the Placement Office, call Lakeshore I, Lakeshore II at 252-5571, ext. 316, North Campus at 675-3111, ext. 528 or Keelestone Campus at 763-5141.

Secondary School Liaison

Secondary School Liaison is the primary communication link between Humber College and the secondary school system. The Secondary School Liaison provides accurate, up-to-date information about Humber College to potential students, their parents and secondary school guidance counsellors by:

- distributing College calendars and other information to secondary school guidance offices and other information agencies.
- encouraging students to visit the College to talk with program co-ordinators or counsellors. Students are also given the opportunity to sit in on classes in their area of interest.
- arranging informational visits to secondary schools by Humber personnel.

COUNSELLING SERVICES

Humber College has a commitment to provide you with high quality educational opportunities. Counselling Services can help you take greater advantage of those opportunities.

If during the course of the year, you are stumped by some significant choice or decision, counsellors are available to teach you how to locate the information you require and to assess what you find, in order to reach the best outcome for you.

Whether you are: concerned about the appropriateness of the program you are in, want to gain more control over life's demands, or feel that you could learn more if "you could only remember a little better", counsellors are ready and willing to work with you.

Our resources include: a computerized career search SYSTEM – CHOICES – audio and video tapes on study skills and personal self-management – i.e. building confidence, tension reduction, etc., and a resource centre with an index to our printed life-career materials.

In the educational, personal and vocational world every extra skill constitutes a life-advantage, drop in and give yourself "An Edge".

North Campus	Room C133
Lakeshore I	Room A169
Lakeshore II	Room 6C
Keelesdale	Room 7

ATHLETICS

The Athletics, Recreation and Leisure Education Department provides a complete cross section of activities that will appeal to the needs of all students whether they are competitive or leisure oriented. Opportunities exist for students to become involved in varsity sports, intramural sports, recreational, fitness, and instructional activities.

Participation in the varsity program provides student with enjoyment and personal satisfaction through competitive athletic programs. Intramural recreation programs afford the participant an opportunity to play, socialize and compete on a level consistent with his or her own abilities.

The Athletic Department encourages and facilitates students, staff and the community at large to develop and maintain an adequate level of fitness so they may enjoy a healthy, satisfying and useful life.

Student I.D. Cards

After all admissions paperwork is complete, each full-time student is issued a plastic student card. This card, bearing your student number, identifies you as a student of Humber College, and when properly used, allows you access to the College's athletic facilities and all College Libraries and Learning Resource Centres. The card will also allow you to attend College functions at either a reduced rate or at no charge. The card must be signed to be valid, and expires at the end of the academic year. Loss or theft of the card should be reported immediately.

Libraries

All full-time students are encouraged to use the Learning Resource Centres (Libraries) at the North, Lakeshore 1, Lakeshore 2, Keelesdale, and Osler Campuses. Humber's libraries stock numerous and informative periodicals, newspapers, reference and resource materials that you will find invaluable when essays, reports, and research projects are due.

The Learning Resource Centre, (L.R.C., North campus), and the Instructional Materials Centre, (I.M.C., Lakeshore 1 and 2 campuses), are designed to assist students reach their academic goals by providing Audio Visual equipment and materials that can be used to complement projects and assigned presentations.

Bookstores

The North, Lakeshore 1 and Lakeshore 2 Campuses all have bookstores where you can purchase textbooks, supplies, newspapers, candy, and tobacco. In addition, a sub post office is located in the North Campus bookstore.

Lockers

Lockers are available at all campuses to all full-time students. Applications for locker rentals are mailed to students during the summer months. Lockers can be rented either on a semester-to-semester basis, or for the duration of the academic year. Since lockers are on a "first come, first served" basis it is important that you complete and mail your application early. Rentals are available through the Bookstores at all campuses once the academic year has begun. You must supply your own lock.

Parking

Parking is available at all Humber College campuses. All students must pay for park-

ing privilege in one of three ways:

-hourly-rated parking meters -day parking -permit parking

Applications for parking permits are mailed to students during the summer months. Since only a limited number of parking permits are available and are issued on a "first come, first served" basis, it is recommended that you complete and mail your parking permit application as soon as possible. Once the academic year has begun, a limited number of parking permits are available through the Bookstores at each campus.

Transportation

All Humber College campuses can be reached by public transportation. The North Campus can be reached by both Toronto and Mississauga Transit. For more precise transit information, call Toronto Transit at 484-4544, Mississauga Transit at 279-5800 or refer to Campus Locations in this Career Guide.

Humber College maintains its own fleet of buses for use by College students and staff. The distinctive black and white buses travel several routes in and around the six campuses, including routes to the Islington Subway station and the Osler Campus residence. The buses can be boarded at various points along each route. Students can purchase a semester bus pass which gives unlimited use of the transportation system. Schedules, passes, and tickets, can be obtained at all Campus bookstores.

Housing

The only residence maintained by Humber College is located at the Osler Campus and is for female students only.

Though there are no residences at the other Humber College Campuses, the Housing Registry will assist students in looking for their own accommodations. The Housing Registry maintains lists of homeowners who are looking for tenants but does not inspect accommodations or accept responsibility for arrangements made. All agreements are negotiated between the landlord and the student. Students seeking accommodation for the beginning of September should begin looking during this summer months and plan to spend several days finalizing arrangements. Maps advice on tenant-landlord agreements and other information can be obtained at the Housing Registry. Call 675-3111, ext. 531.

Day Care Facilities (North Campus Only)

Students with children are welcome to use the services of the Children's Activity Centre, and Day Care Centre.

The Children's Activity Centre provides short-term care for children 16 months to

six years. (Maximum 24 hours a week.)

The Day Care Centre provides full-time child care and educational programs for children 2 years to 4 years.

Elevator and Ramp Facilities

The North Campus and Lakeshore I Campus are accessible to wheelchair students; ramps serve as an alternative to stairs and an elevator is available. The Lakeshore II Campus is a single storey building, again, there should be little difficulty for the handicapped student.

Withholding of Grades

Final grades will be withheld for those students who have not:

- paid any or all fees or tuition due to the Registrar's Office
- returned all material borrowed from any campus Library
- returned any A.V. equipment or material borrowed from the North Campus LRC or the Lakeshore 1 or 2 IMC.

Testing

A new service in counselling has been developed: the selective use of career assessment inventories and tests. The information from these inventories aids the student (or prospective student) and counsellor to personalize the career planning process together.

If you are interested in using this service, speak to a counsellor about the necessary time commitment and cost of materials.

IMPORTANT PHONE NUMBERS

General Enquiries:	675-3111, ext. 214.
Athletics: North	675-3111, ext. 217.
Counselling Services: North	675-3111, ext. 524.
	Lakeshore
	252-5571, ext. 242.
Placement Office: Lakeshore 2	252-5571, ext. 316.
	Lakeshore 1
	252-5571, ext. 226/321.
	North
	675-3111, ext. 528/529.
Registrar's Office:	675-3111, ext. 303.
Housing Registry:	675-3111, ext. 523.
GO Transit Information:	630-3933
Mississauga Transit Information:	279-5800
T.T.C. Information	484-4544
Security:	675-3111, ext. 416.
Nursery School:	675-3111, ext. 497.
Children's Activity Centre:	675-3111, ext. 430.

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CONSTRUCTION

AIR CONDITIONING, REFRIGERATION ENGINEERING TECHNICIAN

Campus Location

North

Program Length

Four semesters

Program Information

As an Air Conditioning and Refrigeration Technician you will have a broad and intensive knowledge of the design, installation and operation of heating and air conditioning systems in residential, commercial and industrial buildings. As a Technician you will also be able to size and select environmental and pollution control equipment.

Employment Opportunities

As a graduate, employment opportunities are available in fields such as designer/designer contractor, installation and service management, retrofitting of existing buildings including energy auditing, wholesale dealers, sales representative, estimator specifications writer, and project manager.

As an Estimator you would work with plans and specifications in order to determine material and labour requirements and prepare a bid for a job. As a Designer Contractor you would be responsible for the selection, design, layout and specification of mechanical equipment to meet the end user requirements. As a Project Manager you would be in charge of a specific company project and be responsible for the installation as per design, materials control, on-site problem solving, and co-ordination with other companies on the job site. As a Service Manager you would be responsible for supervising field service, publishing service information, and provide technical training to employees and customers



Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, a Technical subject and Physics at the Senior level are strongly recommended.

For more information please call John Metcalfe at 675-3111 ext. 472.

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester One: 26 hours per week			Semester Two: 25 hours per week		
380-046	Mathematics 1	4	380-002	Mathematics 11	4
941-102	English Communications 1	4	941-103	English Communications 11	4
380-010	Physics, Heat, Light, Sound	4	320-253	Design Loads 11	3
320-020	Refrigeration 1 (Thermodynamics)	4	370-024	Electricity 1	4
320-251	Psychrometrics	3	320-254	Design Loads 111	3
320-252	Design Loads 1	3	320-021	Refrigeration 11	4
370-020	Residential Systems	4		General Studies	3
Semester Three: 24 hours per week			Semester Four: 25 hours per week		
320-256	Ind. Org. & Mgmt.	3	320-030	Commerical Systems 11	4
380-176	Mathematics (Management Application)	4	320-031	Equipment & Energy Selection	4
370-026	Electricity 11	4		General Studies	3
320-029	Commercial Systems 1	4	320-258	Eng. Econ. Analysis	3
	General Studies	3	370-025	Solar Energy 1	4
320-255	Blueprint Reading & Spec.	3	320-259	Commerical Refrig.	3
320-257	Hydronics & Steam Heat System	3	320-260	Solid State HVAC Controls	4

AERIAL SURVEY TECHNICIAN

Campus Location

North

Program Length

Three semesters

Program Information

As an Aerial Survey Technician you will have both the knowledge and experience to operate most types of stereo plotting instruments in aerial mapping. By overlapping aerial photographs on special viewing equipment a three dimension view is produced allowing the operator to compile maps showing roads, buildings, streams and contours of the land.

Note: Students may be required to put refundable deposits on drafting and survey equipment supplied by the College.



Employment Opportunities

As an Aerial Survey Technician you may find employment in an aerial mapping company or with a provincial or government agency. Career alternatives include Plotter Operator and Draftsperson.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, Physics at the Senior level is strongly recommended.

For more information please call John Metcalfe at 675-3111 ext. 472.

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester One: 26 hours per week			Semester Two: 27 hours per week		
330-383	Photogrammetry 1	3	330-385	Advanced Photo-grammetry	3
330-384	Photogrammetry 2	3	330-101	Cartography	4
330-351	Environmental Geology	2	330-039	Surveying 2	6
330-038	Surveying 1	6	330-337	Survey Drawing 2.	3
330-341	Drawing & Descriptive Geometry	3	330-372	Air Photo Interp.	3
941-102	English Communications 1	4	941-103	English Communications 11	4
380-046	Mathematics 1	4	380-010	Heat, Light, & Sound	4
330-336	Survey Drawing 1	1			
Semester Three: 10 hours per week					
330-128	Practical Photogrammetry	10			
	(This is a concentrated, 5 week, 6 to 7 hrs./day, course commencing at the end of the Winter Semester).				

ARCHITECTURAL (DESIGN) TECHNICIAN

Campus Location

North

Program Length

Four semesters

Program Information

As an Architectural Design Technician you would work under the supervision of an Architect or an Architectural Technologist to produce complete sets of working drawings. These drawings would include floor plans, sections, and elevations of a variety of buildings and must comply with local and national building codes. You would also be able to specify the quality of materials and workmanship required for these buildings and report on the job progress of their construction.

NOTE: Students may be required to put refundable deposits on model shop equipment supplied by the College.

Employment Opportunities

As a graduate Architectural Technician you may find employment as an architectural draftsman, building inspector, or as a sales representative for construction materials and equipment.

As a graduate of this four semester program you may be eligible to enter into the 5th semester of Architectural (Design) Technology. Successful completion of the 5th and 6th semester will allow you to graduate as an Architectural (Design) Technologist.

For curriculum see p. 8.

For more information please call John Metcalfe at 675-3111 ext. 472.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, Drafting and Physics at the Senior level are strongly recommended.



ARCHITECTURAL (DESIGN) TECHNOLOGY

Campus Location

North

Program Length

Six semesters

Program Information

Architectural Technology is a six semester program with the first four semesters the same as the Architectural Technician program. During the 5th and 6th semesters you will complete tasks which are more complex in nature and more demanding in accuracy. As a Technologist you will be able to produce complete interior and exterior perspective and presentation drawings, as well as make detailed estimates and specifications of construction materials and report of job progress. As a Technologist you will be able to produce a conceptual layout of a given subdivision showing the general location of streets, houses, schools, etc.

NOTE: Students may be required to put refundable deposits on model shop equipment supplied by the College.

Employment Opportunities

As an Architectural Technologist your career opportunities will cover such fields as job captain, senior draftsman, co-ordinator, estimator, or a variety of related positions in the construction field.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, Drafting and Physics at the Senior level are strongly recommended.

For more information please call John Metcalfe at 675-3111 ext. 472.



CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester 1: 24 hours per week			Semester 2: 26 hours per week		
330-360	Architectural Design Drafting 1	4	330-361	Architectural Design Drafting 2	4
330-220	Architectural Detailing 1	2	330-342	Architectural Detailing 2	2
380-194	Construction Physics	4	330-230	Materials and Methods of Construction 2	2
320-250	Mechanical Servicing and Drafting 1	3	320-001	Statics	4
380-046	Mathematics 1	4	380-002	Mathematics 2	4
941-102	English Communications 1	4	941-103	English Communications 2	4
330-229	Materials and Methods of Construction 1	2	330-341	Drawing and Descriptive Geometry	3
330-228	Building Codes and Regulations 1	1		General Studies	3
Semester 3: 24 hours per week			Semester 4: 26 hours per week		
330-362	Architectural Design Drafting 3	6	330-363	Architectural Design Drafting 4	6
330-366	Rendering Techniques 1	3	330-213	Modern Architectural History & Design 1	2
330-231	Materials and Methods of Construction 3	2	330-089	Specifications	2
320-052	Basic Strength of Materials	4	330-090	Estimating	4
330-344	Structural Drafting	3	330-218	Mechanics of Materials	4
330-367	Surveying	3	350-178	Electrical Drafting	3
	General Studies	3	330-368	Site Management & Construction Safety	3
			330-369	Model Making 1	1
				General Studies	3
Semester 5: 25 hours per week			Semester 6: 25 hours per week		
330-364	Architectural Design Drafting 5	8	330-365	Architectural Design Drafting 6	8
330-224	Model Making 2	2	330-214	Modern Architectural History and Design 2	2
330-227	Introduction to Structural Design	4	320-277	Heating, Ventilation & Air Conditioning	3
330-070	Town Planning Construction	2	380-182	Statistics	3
380-196	Computer Programming	4	330-349	Plumbing & Fire Protection Systems	3
330-371	Arch. Economic Analysis	3	330-063	Technical Report	2
330-370	Rendering Techniques	2	330-387	Arch. Conservation & Restoration	4

For all Architectural programs the following additional academic regulations apply:

A mark of 50% or better is required in Mechanics to continue into Statics, and in Statics to continue into Basic Strength, and in Basic Strength to continue into Stress Analysis, Advanced Strength, or Mechanics of Materials as specified by the Program Curriculum.

CABINET MAKING-BASIC

Campus Location

Lakeshore 2

Program Length

48 weeks

Program Information

Graduates of the forty-eight week Cabinet Making program will have studied the design and construction aspects of commercial and residential woodwork. They will have been instructed how to develop the necessary skills for identifying, manufacturing and using the various wood joints and in the use of hand or power tools to produce them. They will also acquire a knowledge of wood finishes, their application both by hand and mechanical means and a knowledge of the natural and man made materials used in cabinet making.



Employment Opportunities

Employment opportunities for men and women include design, construction, finish, installations, repair and modifications to commercial and residential cabinets, construction, refinishing and repair of furniture, installation of fine quality interior residential and commercial building woodwork and the interior finishing of sail and power boats and motor homes.

Admission Requirements

An admissions interview, as well as pretests in communications and mathematics, to be conducted at the college, at least one week prior to the student's proposed start date. The student should have a working knowledge of mathematics including whole numbers, fractions, decimals, percentages and measurement. A good command of conversational English is also required.

Program Outline

Veneer—Cutting, kinds, matching, tools for veneering, application.

Plastic Laminates—Composition, uses, grade, stain resistance, handling and storage, cutting and trimming, adhesives, core materials.

Hand Tools—Safety rules, measuring and layout, identifications, maintenance and application.

Fasteners and Sandpaper—Nails, screws, application of nails, screws and adhesives, sandpaper.

Wood Joints—Identification and fabrication.

Portable Power Tools—Safety rules, identification, maintenance and application.

Stationary Power Tools—Identification, maintenance and application.

Bending and Laminating—Identifications and application of wood bending and laminating methods.

Veneering and Inlaying—Matching, inlaying, laminating, finishing.

Plastic Laminates—Jointing, laminating, edge treatment, bending, finishing.

Hardware—Identification and installation of cabinet hardware.

Cabinet Construction—Frame and panel construction, cabinet and furniture doors, drawers, shelves and interiors, legs and posts, table and cabinet tops, kitchen cabinets, built-ins, and dividers.

Finishing—Finishing material and procedures, staining, filling, protective coatings.

Drafting—Basic drafting principles, single-view, multi-view, pictorial drawing, free hand sketching, assembly and detail drawing, blue print reading, shop drawings and layout.

Special Project—Produce and project from specifications using established procedures.

Life Skills

For further information call 252-5571 ext. 252 or 253

CIVIL ENGINEERING TECHNICIAN

Campus Location

North

Program Length

Four semesters

Program Information

As a Civil Technician you will be involved in a variety of interesting tasks in the structural, environmental, and transportation fields. Under the supervision of a Civil Technologist or Civil Engineer you would assist in the planning, design, construction, and maintenance of engineering works such as bridges, dams, buildings, airports, highways, railways and water supply and sewage treatment systems.

Note: Students may be required to put refundable deposits on survey equipment.

Employment Opportunities

As a graduate of this program you will find a variety of career opportunities in all phases of design and construction of buildings, municipal services and transportation systems. Career opportunities include that of junior draftsman, junior designer, quality control technician, estimator and project inspector.

As a graduate of the Civil Engineering Technician program you may be eligible to enter directly into the 5th semester of the Civil Engineering Technology Program. The successful completion of the 5th and 6th semester will allow you to graduate as a Civil Engineering Technologist.

For curriculum see p. 13.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses. Drafting and Physics at the Senior level are strongly recommended.

For more information please call John Metcalfe at 675-3111 ext. 472.



CIVIL ENGINEERING TECHNOLOGY

Campus Location

North

Program Length

Six semesters

Program Information

Civil Engineering Technology is a six semester program with the first four semesters the same as the Civil Engineering Technician Program. The 5th and 6th semesters enable you to carry out more complex and challenging tasks. These include design calculations and preparing and interpreting drawings of subdivisions, streets, roads, and highways. These drawings include wood, steel, concrete, and soil structures.

Note: Students may be required to put refundable deposits on survey equipment.

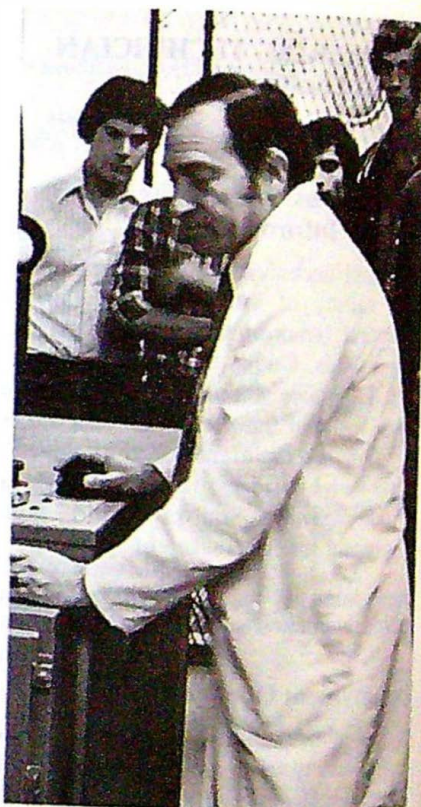
Employment Opportunities

As a Civil Technologist you will have a variety of employment alternatives. These alternatives include Civil Technologist, Design Technologist, Civil Draftsperson, Construction Supervisor, Quality Control Inspector, and Project Cost Estimator. Job responsibilities may include design, detailing and drafting, structural analysis and design, research and technical sales.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses. Drafting and Physics at the Senior level are strongly recommended.

For more information please call John Metcalfe at 675-3111 ext. 472.



CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester 1: 25 hours per week			Semester 2: 25 hours per week		
330-038	Surveying 1	6	330-039	Surveying 2	6
380-194	Construction Physics	4	320-001	Statics	4
380-046	Mathematics 1	4	330-077	Fluid Mechanics 1	4
941-102	English Communications 1	4	380-171	Calculus 1	4
	General Studies	3	941-103	English Communications 2	4
330-148	Const. Tech. Drawing	4	330-344	Structural Drafting	3
Semester 3: 25 hours per week			Semester 4: 25 hours per week		
330-081	Highway Technology	6	330-372	Air Photo Interpretation	3
320-052	Basic Strength of Materials	4	330-219	Advanced Strength of Materials	4
330-222	Graphic Static & Civil Drawing	4	330-373	Construction & Building Materials	3
380-172	Calculus 2	4	330-080	Soil Mechanics	4
330-070	Town Planning	2	330-082	Municipal Services 1	4
330-356	Site Management Technology 1	2	380-182	Statistics	3
	General Studies	3	330-144	Technical Report	1
				General Studies	3
Semester 5: 26 hours per week			Semester 6: 24 hours per week		
330-374	Highway Design	3	330-059	Transportation Planning	4
330-345	Theory of Structure	4	330-346	Structural Design & Drawing	8
330-087	Foundations	6	330-053	Sanitary Technology	4
330-078	Fluid Mechanics 2	4	330-089	Specifications	2
330-375	Municipal Services 2	3	330-090	Estimating	2
380-196	Construction Computer Programming	4	330-376	Site Management Technology 2	3
330-351	Environmental Geology	2	330-389	Technical Project	1

For all Civil programs the following additional academic regulations apply:

A mark of 50% or better is required in Mechanics to continue into Statics, and in Statics to continue into Basic Strength, and in Basic Strength to continue into Stress Analysis, Advanced Strength, or Mechanics of Materials as specified by the Program Curriculum.

CIVIL (EXPLOSIVES) TECHNICIAN

Campus Location

North

Program Length

Four semester

Program Information

As an Explosives Technician you will be trained in the safe and efficient use of explosives. You will be trained in the basic skills of loading blast holes, setting charges, checking circuits and safety firing blasts. You will also be able to design and plan the charge drilling layout, select the explosive, interpret test blasts, estimate drilling and blasting costs, supervise drilling and powder handling, and take all the necessary legal, seismic and safety precautions involved in blasting.

Note: Students may be required to put refundable deposits on survey equipment.

Employment Opportunities

As an Explosives Technician you may find employment in construction, industrial quarries, open pit and underground mines, seismographic control and exploration, technical sales, and troubleshooting. Career alternatives include Site Inspector, Exploration, Specifications Writer and Estimator.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, Chemistry and Physics at the Senior level are strongly recommended.

For more information please call John Metcalfe at 675-3111, ext. 472.



FIELD TRIPS

The students in the two year Civil (Explosives) Program will be afforded the opportunity of attending three field trips. The only cost to the student will be for transportation and living costs, which will be approximately \$200-250/trip. Students who do not wish to attend, or those who for financial reasons will not be able to attend, must complete a comprehensive written assignment, in lieu of.

Field Trips: 1st, 3rd, and 4th semesters respectively:

- 1) Queen's University (Blasting Technology [practical])
- 2) Queen's University (Vibrations Technology [practical])
- 3) Sir Sandford Fleming (Drilling Technology [practical])

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester 1: 28 hours per week			Semester 2: 25 hours per week		
330-141	Explosives Technology 1	4	330-202	Explosives Technology 2	4
340-118	Chemistry of Explosives	2	330-039	Surveying 2	6
330-038	Surveying 1	6	380-002	Mathematics 2	4
380-046	Mathematics 1	4	330-148	Construction Technical Drawing	4
340-051	General Chemistry 1	4	941-103	English Communications 2	4
941-102	English Communications 1	4		General Studies	3
350-083	Electrical Circuits & Applications 1	4			
Semester 3: 26 hours per week			Semester 4: 21 hours per week		
330-154	Explosives Technology 3	8	330-155	Explosives Technology 4	8
330-081	Highway Technology	6	330-382	Technical Project	3
330-351	Environmental Geology	2	330-381	Specifications & Estimating	2
380-196	Construction Computer Programming	4	340-129	Applied Explosives Chemistry	2
380-194	Construction Physics	4		General Studies	3
330-356	Site Management Technology 1	2		General Studies	3

CIVIL (TRANSPORTATION) TECHNICIAN

Campus Location

North

Program Length

Four semesters

Program Information

As a Civil Transportation Technician you will have a variety of responsibilities in transportation flow research. These responsibilities may include conducting traffic and public transit inventory surveys, monitoring traffic flow for volume and speed, checking traffic light timing, preparing simple maps, graphs, plans, and sections, and investigating and recording traffic accidents.

Note: Students may be required to put refundable deposits on survey equipment.

Employment Opportunities

Employment opportunities exist with the federal, provincial and municipal governments, distributing companies, trucking firms, shipping lines, airlines, railways and other carriers. Career alternatives include Data Collection Co-ordinator, Assistant Data Analyst, Assistant Traffic Systems Designer, and Assistant Traffic Terminal Supervisor.

As a graduate Transportation Technician you may be eligible to enter directly into the 5th semester of the Civil (Transportation) Technology program. Successful completion of the 5th and 6th semester will allow you to graduate as a Civil (Transportation) Technologist.

For more information please call John Metcalfe at 675-3111, ext. 472.



CIVIL (TRANSPORTATION) TECHNOLOGY

Campus Location

North

Program Length

Six semesters

Program Information

Civil (Transportation) Technology is a six semester program with the first four semesters the same as the Civil (Transportation) Technician program. The 5th and 6th semesters enable you to carry out more complex and challenging tasks. These include advance work in highway design, air photo interpretation, transportation, planning and public relations.

Note: Students may be required to put refundable deposits on survey equipment.

Employment Opportunities

As a Technologist you will be involved in planning the gathering of data such as traffic counts, traffic movements, etc., analysis of such data, design of new traffic movements, proposals for intersection improvement, methods of handling truck traffic, traffic control, parking plans, public transit system, and preparing proposals for the most efficient and economic methods of transporting goods and people.

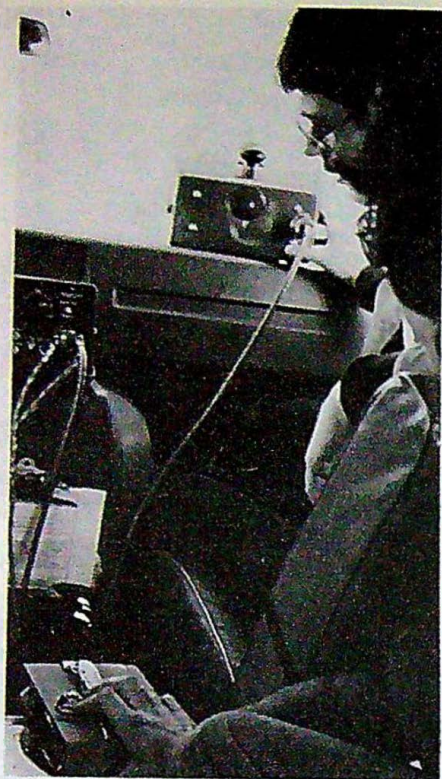
Every indication is that employment opportunities are increasing steadily in this field.

Career alternatives include Data Collection Planner, Traffic Data Analyst, and Transportation Systems Designer.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, Physics at the Senior level is strongly recommended.

For more information please call John Metcalfe at 675-3111 ext. 472.



CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester 1: 25 hours per week			Semester 2: 26 hours per week		
330-038	Surveying 1	6	330-039	Surveying 2	6
380-046	Mathematics 1	4	330-173	Traffic Survey Methods	4
380-194	Construction Physics	4	330-174	Theory of Traffic Flow	4
941-102	English Communications 1	4	380-171	Calculus I	4
330-148	Construction Tech. Drawing	4	941-103	English Communications 2	4
	General Studies	3	330-077	Fluid Mechanics	4
Semester 3: 26 hours per week			Semester 4: 24 hours per week		
330-081	Highway Technology	6	330-181	Mathematical Models for Transportation Planning	4
330-177	Data Collection & Analysis	4	330-176	Demand Actuated Travel	2
330-205	Transportation Design Systems	4	330-372	Air Photo Interpretation	3
380-172	Calculus 2	4	330-082	Municipal Services I	4
330-070	Town Planning	2	380-196	Construction Computer Programming	4
923-101	Sociology	3	330-144	Technical Report	1
380-182	Statistics	3		General Studies	3
				General Studies	3
Semester 5: 25 hours per week			Semester 6: 24 hours per week		
330-374	Highway Design	3	330-059	Transportation Planning	4
330-198	Alternate Modes of Transportation	4	330-200	Air Transportation & Airport Planning	4
330-377	Transportation Planning Project I	8	330-180	Urban Transportation & Mass Transit	4
330-378	Advanced Air Photo Interpretation	3	330-379	Transportation Planning Project II	4
330-078	Fluid Mechanics 2	4	330-101	Cartography	4
330-375	Municipal Services II	3	320-071	Industrial Economics	4

DRAFTING

Campus Location

Industrial Resource Centre

Program Length

You will be using prepared learning packages (similar to those used in correspondence programs), which will allow you to work through the program at your own best pace, while working with the teacher on a one-to-one basis.

Program Information

This program is designed to prepare you for employment in either the mechanical or architectural field. You will learn the basic principles of drafting first, and then be qualified to specialize in one of the two fields above. You will learn to apply different drafting techniques, as well as achieving knowledge of various machines, building materials, engineering practices, mathematics, and other physical sciences. You will need good eyesight, finger dexterity, and overall coordination in order



to cope with the detailed aspects of drafting. For the information of the handicapped, the most common physical activities are sitting, reaching and handling.

Employment Opportunities

After graduating, you may find opportunities for employment in the manufacturing industry, architectural offices, and engineering offices. And since the initial training for all draftsmen is the same, transfer to another area of the work is possible with additional training and experience. Transfer could be to any one area of architectural, electrical, mechanical, structural, or technical drawing. A forty hour, five day work week is usual. With experience, and good leadership qualities, you may advance to supervisor draftsman.

Admission Requirements

An admissions interview, as well as pretests in communications and mathematics, to be conducted at the College, is required at least one week prior to the student's proposed start date. The student should have a working knowledge of mathematics including signed numbers, square root and powers, substitution, equations, formulas, graphing and geometry. A good command of English (written and verbal) is also required.

For more information please call 252-5571, ext. 252 or 253.

Program Outline

MAKE MULTI-VIEW DRAWINGS

- Single view drawings using common drafting instruments & techniques
- Two & three view drawings using common drafting instruments & techniques
- Three view drawings containing one full & half section
- Three-view drawings containing one offset & broken out section
- Three-view drawings containing one removed section and one revolved section
- Three-view drawings containing primary & secondary auxiliary views
- Isometric or oblique pictorial drawings from orthographic drawings
- Freehand sketches of simple objects

MAKE MECHANICAL ASSEMBLY AND DETAIL DRAWINGS

- Identify, select & draw various types of fasteners
- List & describe seven manufacturing processes
- Make drawings, applying limits, fits and finish symbols
- Make assembly drawings
- Draw & detail simple mechanisms

SELECT FERROUS & NON-FERROUS METALS

- State the basic properties of cast iron, steel, aluminum
- List a use for cast iron, steel & aluminum
- Give the meaning of the AISI and SAE numbering system

MAKE ARCHITECTURAL WORKING DRAWINGS

- Make freehand sketches of simple objects
- Make drawings containing commonly used material symbols
- Make drawings which apply the alphabet of lines
- Make drawings of floor plans applying drawing and dimensioning conventions
- Make drawings of full wall sections from footing to cornice.
- Select light structural members from Ontario Building Code to meet a specified condition

MATHEMATICS (STRENGTH OF MATERIALS)

- Solve problems involving mathematics in general drafting
- Solve problems involving bending moments, shearing stresses, in beams

LIFE SKILLS

- Become aware of social and economic factors in relation to family, job, community and the concept of self through seminars and individual and group projects

OPTIONAL OBJECTIVES

- Make detailed drawings of steel structures with standard connections
- Make drawing of jogs and fixtures
- Make mechanical service drawings
- Make electrical working drawings for buildings
- Make process pipe drawings
- Make survey drawings
- Make electronic working drawings
- Make domestic applican schematic drawings

DRAFTING REFRESHER:

Total number of weeks to be arranged as necessary
This program is of particular interest to draftsmen who have been away from the board for some time and wish to return to their former occupation. It will also be useful to draftsmen and engineers from other countries, who can acquaint themselves with Canadian methods and standards prior to obtaining employment. Course areas covered include drafting practice, mathematics, strength of materials, life skills and workshop technology or model building.

Location: Lakeshore 2

Admission Requirements: Previous related education or work experience.

For more information please call 252-5571 ext. 252 or 253

HYDROGRAPHIC SURVEY TECHNOLOGY

Campus Location

North

Program Length

Six semesters

Program Information

Canada, a maritime nation, is bounded on three sides by one of the longest coastlines in the world. On the fourth side are the Great Lakes. These coastlines are becoming increasingly important to Canada for navigational purposes as a fisheries resource, for off-shore exploration, and as a relatively unpolluted ecological paradise.

Mapping and surveying these waters are the prime responsibility of the Canadian Hydrographic Service. They must chart and map water depths, currents, underwater obstructions and obtain data on the marine life in these waters. This program has been developed in liaison with the Canadian Hydrographic Service as the first and only hydrographic training program in Canada. During the in-college portion of the program, you will learn basic skills which can be applied to land, coastline and water surveys. You will also specialize in marine and hydrographic techniques such as: position fixing by astronomical and electronic methods and various forms of radar, depth measurement using acoustic and sonar principles, as well as other forms of hydrographic data on water temperatures, currents, sea bed geology and marine life. You will become familiar with the basic principles of seamanship and navigation and learn the basics of marine and maritime law. During the summer, shipboard employment may be available through the Canadian Hydrographic Service as a practical extension of your college training program.

Career alternatives include Party chief (hydrographic and land surveys), Surveyor (instrument person), Field Data Processor, and Draftsperson.

Note: Students may be required to put refundable deposits on drafting and survey equipment supplied by the College.

For more information please call John Metcalfe at 675-3111, ext. 472.



Employment Opportunities:

After graduation you may find employment in widely varied applications of hydrography and hydrography-related activities such as seismic surveys, offshore exploration and land survey for offshore operations. There is an increasing demand from Survey Engineering and Consulting Companies, Offshore Exploration Companies and Government Departments such as Public Works, and Ocean and Aquatic Sciences for hydrographic surveyors. Career alternatives in this field include Party Chief, Surveyor (instrument person), Field Data Processor Draftsperson and in Programming.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, Physics at the Senior level is strongly recommended.

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester One: 27 hours per week			Semester Two: 24 hours per week		
330-038	Surveying I	6	330-157	Hydrographic Survey I	4
330-012	Survey Camp I	4	330-039	Surveying II	6
330-336	Survey Drawing I	1	330-338	Survey Computations	3
380-046	Mathematics I	4	330-337	Survey Drawing II	3
941-102	English Communications I	4	9-11-103	English Communications II	4
380-010	Heat, Light & Sound	4	380-171	Calculus I	4
350-083	Electrical Circuits Application I	4			
Semester Three: 24 hours per week			Semester Four: 26 hours per week		
330-352	Control & Electrical Survey I	5	330-168	Hydrographic Survey II	4
330-096	Advanced Survey I	4	330-354	Astronomy	2
330-383	Photogrammetry I	3	330-339	Survey Law I	2
330-081	Highway Technology	6	330-372	Air Photo Interpretation	3
380-182	Statistics	3	330-386	Land Division	3
	General Studies	3	330-353	Control & Electrical Survey II	3
			330-333	Advanced Surveying II General Studies	2 3
			380-080	Soil Mechanics	4
Semester Five: 23 hours per week			Semester Six: 23 hours per week		
330-204	Hydrographic Survey III	4	330-169	Marine & Offshore Law	4
330-167	Geology & Geophysics	4	330-159	Navigation, Charting & Pilot	4
330-163	Oceanography & Meteorology	4	330-065	Adjustments of Observations	4
330-099	Survey Camp II	4	330-101	Cartography	4
330-098	Geodesy	6	380-196	Construction Computer Programming	4 3
330-144	Technical Report	1		General Studies	3
22					

MECHANICAL (SOLAR) ENGINEERING TECHNOLOGY

Campus Location

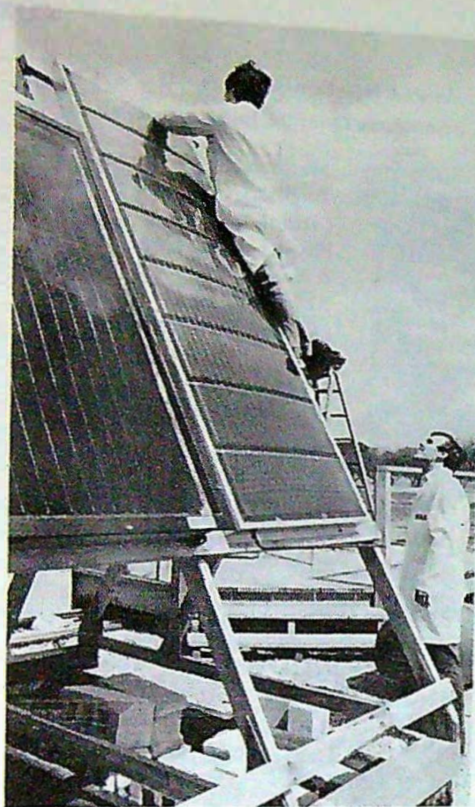
North and Lakeshore I

Program Length

6 semesters (three years)

Program Information

This program will give you an excellent background for entry into the growing alternate energy industry. Your knowledge of the principles of energy conservation and the application of solar energy to industrial and domestic heating requirements will be in great demand. You will receive training in refrigeration, air conditioning and the instrumentation relating to heating systems, and you will be given special training in solar technology and its application to passive and active heating systems. Direct "hands on" training in the solar laboratory, coupled with field trips, will give you the experience needed to play a significant role in this important new industry.



Note: Students in their third year will be located at Lakeshore I for all their courses.

Employment Opportunities

You can expect a wide variety of employment opportunities. Your skills will be needed by architects, consulting engineers, solar equipment manufacturers, refrigeration and heating contractors. Government offices at all levels from Federal to Municipal will be seeking employees with your training.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses. A Technical subject and Physics at the Senior level are strongly recommended.

For more information please call John Metcalfe at 675-3111 ext. 472.

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester One: 26 hours per week			Semester Two: 25 hours per week		
380-046	Mathematics 1	4	380-002	Mathematics 11	4
941-102	English Communi- cations 1	4	941-103	English Communi- cations 11	4
380-010	Physics, Heat, Light, & Sound	4	320-253	Design Loads 11	3
320-020	Refrigeration I (Thermodynamics)	4	370-024	Electricity 1	4
320-251	Psychrometrics	3	320-021	Refrigeration 11	4
320-252	Design Loads I	3		General Studies	3
370-020	Residential Systems	4	320-254	Design Loads 111	3
Semester Three: 24 hours per week			Semester Four: 26 hours per week		
320-256	Ind. Org. & Mgmt.	3	320-258	Eng. Economic Analysis	3
380-176	Mathematics (Manage- ment Applications)	4	320-030	Commerical Systems 11	4
370-026	Electricity 11	4	320-031	Equipment & Energy Selection	4
320-029	Commerical Systems I	4	320-260	Solid State HVAC Controls	4
320-255	Blueprint Reading & Spec.	3		General Studies	3
320-257	Hyd. & Steam Heat Systems	3	370-025	Solar Energy 1	4
	General Studies	3	320-132	Mechanics	4
Semester Five: 25 hours per week			Semester Six: 24 hours per week		
320-261	Mechanical Drawing 1	3	320-262	Mechanical Drawing 11	3
320-278	Cost & Optimization Engineering	3	370-013	Solar Systems Design	4
370-103	Instrumentation I	2	320-052	Basic Strength of Materials	4
320-001	Statics	4	320-279	Solar Project 11	3
370-029	Computer Programming & Controls	4	370-202	Solar Energy 11	4
380-171	Calculus I	4	370-010	Energy Conservation	4
320-275	Solar Project 1	2	320-280	Instrumentations 2	2
320-282	Solar Lab.	3			

SURVEY TECHNICIAN

Campus Location

North

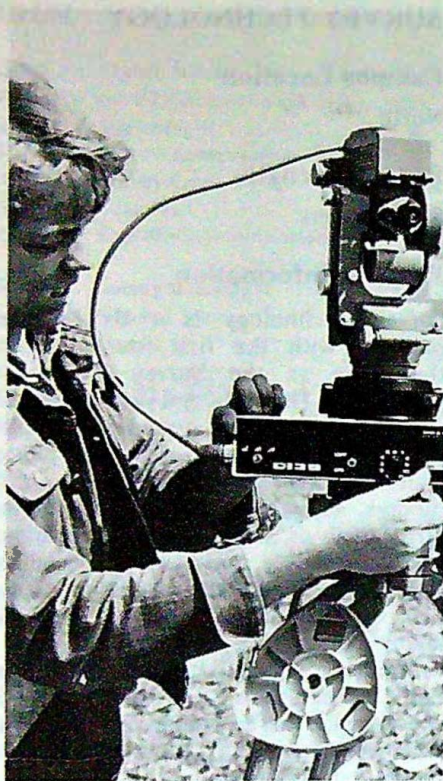
Program Length

Four semesters

Program Information

Working under the direct supervision of a licenced Land Surveyor the Survey Technician will be able to perform technical surveys and conduct the technical aspects of legal surveys, topographical surveys using conventional or electronic equipment, take celesial observations, prepare plans and perform computations related to all phases of survey operations. Depending on individual initiative, the Survey Technician could move into supervisory capacity as a party Chief or supervise survey related operations (supplies, transportation, safety, etc.)

Note: Students may be required to put refundable deposits on drafting and survey equipment supplied by the College.



Employment Opportunities

Possible employers include private land surveyors, federal, provincial and municipal government agencies, construction companies and photogrammetric firms. Career opportunities exist in both outdoor and indoor conditions and include field positions such as chainman/woman, rodman/woman and instrumentman/woman. Office positions include draftsman and field data processor.

As a graduate Survey Technician you may be eligible to enter directly into the 5th semester of the Survey Technology program. Successful completion of the 5th and 6th semesters will allow you to graduate as a Survey Technologist.

For curriculum see p. 28

For more information please call John Metcalfe at 675-3111 ext. 472.

SURVEY TECHNOLOGY

Campus Location

North

Program Length

Six semesters

Program Information

Survey Technology is a six semester program with the first four semesters the same as the Survey Technician program. The 5th and 6th semesters enable you to carry out more complex and challenging tasks such as: photogrammetry, cartography, geodetic control surveys, adjustment of observations and error analysis. The Survey Technologist will be able to supervise specialized field surveys, perform calculations for a plan of a subdivision, prepare the field layout of curves and spirals, use a computer program to adjust and analyse field observations, perform the title search, plan aerial mapping, and write technical reports on surveys conducted under their supervision.



NOTE: Students may be required to put refundable deposits on drafting and survey equipment supplied by the College.

Employment Opportunities

Possible employers include private land surveyors, federal, provincial and municipal government agencies, construction companies and photogrammetric firms. Career opportunities include both field and office positions. Field positions include party chief and surveyor. Office positions include draftsperson, title searcher, supervisor or office manager. Under the supervision of a surveyor your responsibilities may include laying out new property divisions and buildings, retracing old property boundaries, planning new subdivisions, and route location for highways, pipelines and utilities.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, Physics at the Senior level is strongly recommended.

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester One: 24 hours per week			Semester Two: 27 hours per week		
330-038	Surveying I	6	330-039	Surveying II	6
330-336	Survey Drawing I	1	330-338	Survey Computations	3
380-046	Mathematics I	4	330-012	Survey Camp I	4
380-010	Heat, Light & Sound	4	380-171	Calculus I	4
330-341	Drawing & Descriptive Geometry	3	941-103	English Communications II	4
941-102	English Communications I	4	330-337	Survey Drawing II	3
330-351	Environmental Geology	2		General Studies	3
Semester Three: 25 hours per week			Semester Four: 22 hours per week		
330-352	Control & Electrical Survey I	5	330-354	Astronomy	2
330-096	Advanced Survey I	4	330-353	Control & Electrical Survey II	3
330-081	Highway Technology	6	330-333	Advanced Survey II	2
330-383	Photogrammetry I	3	330-372	Air Photo Interpretation	3
380-172	Calculus II	4	330-339	Survey Law I	2
	General Studies	3	330-386	Land Division	3
			330-182	Statistics	3
			330-144	Technical Report	1
				General Studies	3
Semester Five: 26 hours per week			Semester Six: 25 hours per week		
330-098	Geodesy	6	330-065	Adjustments of Observations	4
330-203	Engineering Surveys	4	330-157	Hydrographic Survey I	4
330-378	Advanced Air Photography Interpretation	3	330-099	Survey Camp II	4
330-226	Survey Law II	4	330-385	Advanced Photogrammetry	3
330-070	Town Planning	2	330-101	Cartography	4
380-178	Computer Programming	4	330-347	Legal Surveying	4
380-196	Construction Com- puter Programming	4	330-091	Technical Project	2
330-384	Photogrammetry II	3			

WELDING FITTER

Campus Location

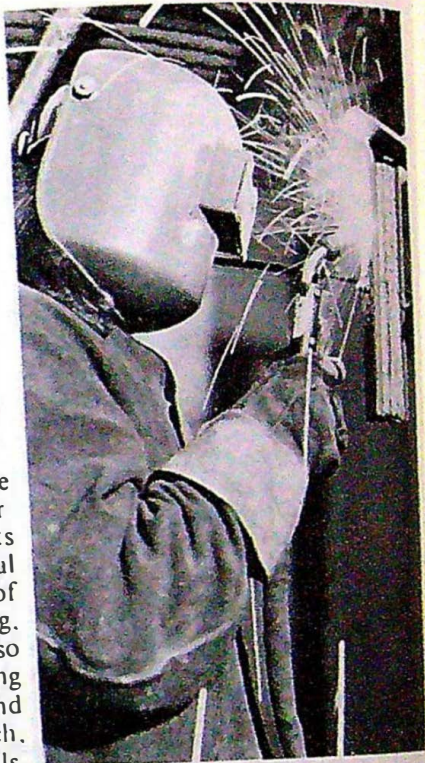
Lakeshore 2

Program Length

40 weeks

Program Information

Graduates of this forty-week program are proficient in fitting and welding pre-fabricated cast and forged metal components applying a knowledge of the physical properties of metal, and the effects of heat allowing for thickness, machining, and weld shrinkage. The student also learns metal products repair including dismantling, straightening, reshaping, and re-assembling parts using a cutting torch, straightening press, and hand tools.



Employment Opportunities

Graduates may find employment in specialized welding shops or large and small general manufacturers in which welding is an integral part of production (ie construction and/or transportation).

Admissions Requirements

An admissions interview, as well as pretests in communications and mathematics to be conducted at the College, is required at least one week prior to the student's proposed start date. The student should have a working knowledge of mathematics including whole numbers, fractions, decimals, percentage, measurement, ratio and proportion. A good command of English (written and verbal) is also required.

Program Outline

SHIELDED METAL ARC WELDING, DOWNHAND

Uses and Characteristics of the Metal Electrode
Running a Bead in the Downhand Position
Determining the Amount of Current for the Job

JOINT, ELECTRODES AND SYMBOLS

Effects of Correct and Incorrect Polarity
Arc Blow and A.C. and D.C. Current
Effects of Welding Heat on Metals
Electrode Classification and Identification
Characteristics and Uses of Iron Powder Electrodes
Welding Symbols and their Application

SHIELDED METAL ARC WELDING, VERTICAL UP AND OVERHEAD

Vertical Up Weld-Beads, Lap & Fillet Welds
Vertical Up Butt or Simulated Butt Welds
Overhead Weld Beads, Fillet & Lap Welds
Overhead Butt or Simulated Butt Welds

OXY-ACETYLENE WELDING, DOWNHAND

The Basic O.A. Process (Emphasis on Safety)
Oxygen and Acetylene Cylinders and Manifolds
Oxygen and Acetylene Regulators
O.A. Welding Flames, Backfires and Flashbacks

OXY-ACETYLENE CORNER, EDGE, FILLERS, BUTT JOINTS

Corner and Edge O.A. Welds With and Without Fillers
Lap and Tee O.A. Welds with Filler

TUNGSTEN INERT GAS WELDING, DOWNHAND

Study of Basic T.I.G. Process
Study of Water Cooled T.I.G. Torches
Fundamentals of T.I.G.
Study of Welding of Aluminum and Aluminum Alloys
Striking an Arch and Running Beads without Filler Rod
Running T.I.G. Weld Beads using Filler Rod

METAL INERT GAS WELDING, DOWNHAND

To Study the Basic M.I.G. Welding Process
M.I.G. Welding Variables
Troubleshooting M.I.G. Equipment
Running M.I.G. Weld Beads

PLEASE NOTE: Space requirements have limited this listing of objectives; additional objectives are required in Blueprint Reading, Oxy-Acetylene Cutting, Oxy-Acetylene Brazing, Tungsten & Metal, Inert Gas Corner, Lap, Fillet and Butt Joints.

For more information please call 252-5571 ext. 252 or 253.

MECHANICAL

AUTOMATIC MACHINING (SETTER OPERATOR)

Campus Location

Industrial Resource Centre

Program Length

40 weeks

Program Information

This program is designed to prepare you for employment as an automatic screw-machine operator. This is a very sophisticated machine tool that is used in most industries such as auto, aero, and appliance industries. You will be working on both single and multi-spindle machines. These machines are used to produce turned (cylindrical) components of many shapes and sizes at speeds which few machines can match. They are controlled by the use of cams, gears and cutting tools which must be precisely set for each part produced. The screw-machine operator is always in great demand by this rapidly growing industry. The work week is generally five days, forty hours, with the possibility of shift work. Most screw-machine shops are noisy, and you may become quite dirty during the job.



Employment Opportunities

Graduates of our training program have found employment in the screw-machine industry as single and multi-spindle operators, sales representatives, and turret lathe operators. Job opportunities in the field are excellent and, with some on-the-job experience after graduating from the program, you may well be hired as a screw-machine setter, cam and tool designer, or technical representative.

Admission Requirements

After pretests in communications and mathematics (to be conducted at the College), you will attend an admissions interview at least one week prior to your proposed starting date. You should have a working knowledge of mathematics, including whole numbers, fractions, decimals, percentages, and measurement. You will also be required to be able to speak, read, and understand the English language without difficulty.

Program Outline

Single Spindle Machine Orientation & Set-Up

- Construction of machine
- Lubrication of machine
- Cycle time gears
- Spindle speed gears
- Collets and collet tension setting, feed fingers
- Turret and cross slide cams
- Indexing, spindle reverse and stock feet out trip-dogs
- Interpretation of tool and cam layout
- Grinding circular cutting tools (form and cut-off)
- Circular cutting tools (form and cut-off)
- Application and grinding of blade type cut-off tools
- Set-up machine to pre tool level
- Set cutting tools to produce components to Blue print specifications
- Inspection of components and machine set-up

Multiple Spindle Orientation Acme Grindley Machine

- Construction and lubrication of machine
- Feed and speed gears (cycle time)
- Collets and collet tension setting, feed fingers
- End toolslide cams and side slide cams, stock feed cams
- Identification and application of end slide and side slide tool holders
- Interpretation of tool and cam layout
- Set-up machine to pre tooling level
- Set cutting tools to produce components to blueprint specifications
- Inspection of components and machine set-up

Set-Up Using 4th Position Thread Rolling Attachment

- Methods and procedure of thread rolling
- Interpretation of tool and cam layout
- Set-up machine to pre tool level
- Set cutting tools to produce components to blueprint specifications
- Inspection of components and machine set-up

PLEASE NOTE: Space requirements have limited a full listing of topics; additional objectives are required in Orientation, Measuring Instruments, Quality Control Twist Drills, set-ups using Drills, Taps, Knurls, Recessing, Threading, Shaving, and Roll Stamps on both Single and Multi-Spindle Machines.

For more information please call 252-5571 ext. 252 or 253

ELECTROMECHANICAL ENGINEERING TECHNICIAN

Campus Location

North

Program Length

Four semesters

Program Information

As an Electromechanical Engineering Technician you will be involved in testing and evaluating the performance of machines and control systems that use hydraulic, pneumatic, mechanical and electrical power as their energy source. You may also provide advice on the maintenance of complex equipment control systems, analyze technical problems involving fluid power equipment and plans, and, install and inspect the installation of such equipment in a variety of industries.

Note: The students may be required to place refundable deposits on such items as lab manuals or other items supplied by the College.

Employment Opportunities

As an Electromechanical Technician you may find employment in different branches of industry that use complex control systems which include fluid power, electrical and mechanical components. Your training and knowledge will enable you to work in component testing programs, system installation, technical services, technical sales, and in plant maintenance programs.

As a graduate of this four semester program you may be eligible to enter into the 5th semester of Electromechanical Technology. Successful completion of the 5th and 6th semester will allow you to graduate as an Electromechanical Engineering Technologist.

For more information please call Joe Pusztai at 675-3111 ext. 378



ELECTROMECHANICAL ENGINEERING TECHNOLOGY

Campus Location

North

Program Length

Six semesters

Program Information

Upon successful completion of the four semesters as an Electromechanical Engineering Technician, you may continue for two additional semesters to complete the Electromechanical Engineering Technologist program

During the 5th and 6th semesters you will have rounded out your knowledge by studying complex systems involving automation, microcomputers and their applications to industry.

Note: The students may be required to place refundable deposits on such items as lab manuals or other items supplied by the College.

Employment Opportunities

As an Electromechanical Engineering Technologist, you will be involved in the design of automation systems and their control functions, in sales, in maintenance or in consulting. The actual opportunities are as varied as the number of industries who would use your skills.

You will enjoy challenges in the sales of major fluid power systems; the design and operation of computer controlled manufacturing systems; or supervision in various departments of manufacturing or service companies.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses. Electricity, Physics or machine shop at the Senior level are strongly recommended.



For more information please call Joe Pusztai at 675-3111 ext. 378

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester One: 23 hours per week			Semester Two: 25 hours per week		
380-046	Mathematics I	4	380-002	Mathematics II	4
941-102	English Communications I	4	941-103	English Communications II	4
320-132	Mechanics	4	320-001	Statics	4
320-098	Manufacturing Processes I	4	320-073	Fluid Mechanics	4
320-046	Mechanical Technical Drawing	4	320-265	Material Sciences	3
320-266	Machining Processes	3	350-190	Electrical Control I General Studies	3 3
Semester Three: 26 hours per week			Semester Four: 26 hours per week		
320-264	Mechanics of Machines	3	320-270	Microcomputer Control I	3
320-147	Mechanical Power Transmission	4	320-234	Stress Analysis	4
320-052	Basic Strength of Materials	4	320-145	Industrial Pneumatics	4
320-063	Industrial Hydraulics	4	320-209	Fluid Power Circuits I	4
320-076	Manufacturing Processes II	4	320-015	Numerical Control I General Studies	4 3
350-092	Logic I General Studies	4 3	380-178	Computer Programming	4
Semester Five: 25 hours per week			Semester Six: 25 hours per week		
350-191	Electrical Control II	3	380-171	Calculus I	4
320-210	Fluid Power Circuits II	4	320-238	Microcomputer Control II	4
320-148	Machine Design I (Project)	4	320-271	Machines Design II (Project)	3
320-016	Numerical Control II	4	320-152	Automation Fundamentals	4
350-192	Electrical Control III	3	350-193	Electrical Control IV	3
320-267	Metrology	3	320-272	Thermodynamics	3
340-037	Industrial Instrumentation I	4	320-065	Industrial Organization & Management	4 4

INDUSTRIAL MAINTENANCE MECHANIC (PACKAGING)

Campus Location

Industrial Resource Centre

Program Length

You will be using prepared learning packages (similar to those used in correspondence programs) which will allow you to work through the material at your own best pace, while working with the teacher on a one-to-one basis.

Program Information

Graduates of this forty-eight week program are trained to set-up and adjust production machines, change tooling, maintain and repair overhaul and service the various machines used in the service, supply, and process industries. Two course paths are available, general and packaging which specializes in the various packaging machines used in filling, wrapping, canning, and bottling plants. Training is provided in hand and bench tools, machining, welding, pneumatics and hydraulics, electrical controls and mechanical drives including repair, troubleshooting, and preventative maintenance.



Employment Opportunities

As General Maintenance Mechanic, you may find employment working on a variety of equipment such as pumps, gear boxes, clutches, and mechanical items. Your duties will include troubleshooting mechanical problems in these devices.

As a Packaging Machine Mechanic, you may find employment in the food, pharmaceutical, beverage, and chemical industries, where you will: set up and adjust packaging machines; change tooling; and maintain, repair and trouble-shoot mechanical, electrical, and fluid power on the various packaging machines used in these fields.

You must have the ability to understand the principles of mechanics and be able to apply these principles in the set-up, repair, and maintenance of machine parts. A knowledge of the principles of mechanics is a prerequisite for this course. You should also have the ability to carry equipment up to thirty pounds in weight, as well as good eyesight and the ability to see colours distinctly.

Admission Requirements

An admissions interview, as well as pretest in communications and mathematics, to be conducted at the College, is required at least one week prior to the student's proposed start date. The student should have a working knowledge of mathematics including square root and powers, substitution, equations, and formulas. A good command of English (written and verbal) is also required.

Program Outline

Welding & Brazing	Mechanical Actuators
Soldering	Fluid Power
Drilling	Control Systems Option
Turning	Packaging Machines Option
Milling & Grinding	Electrical Equipment
Power Transmissions	

Please Note: Space requirements have limited this listing of objectives; additional objectives are required in Safety, Measurement, Blueprint Reading, Hand Tools, Bench Tools, Welding & Brazing, Drilling, Turning, Milling & Grinding, Material Handling, Shop Management Skills & Mechanical Actuators.

For more information please call 252-5571 ext. 252 or 253

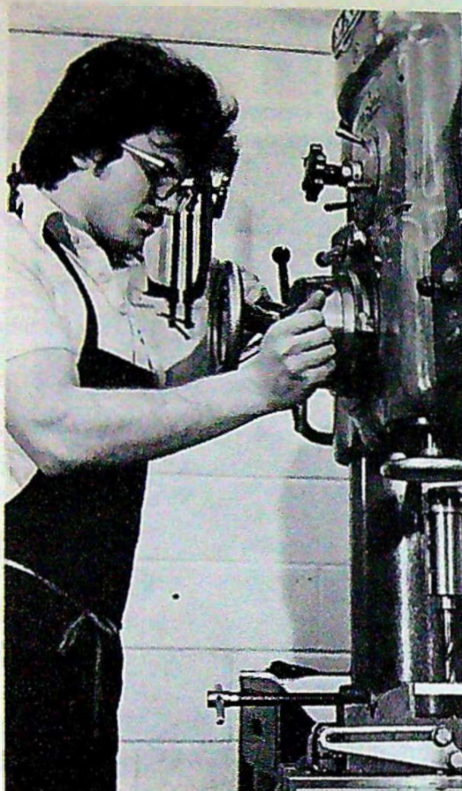
MACHINE SHOP PRACTICE

Campus Location
Industrial Resource Centre

Program Length
40 weeks

Program Information

This forty-week program enables the student to demonstrate competence in machine shop safety practices and procedures found in industrial shop situations; select and correctly use hand tools safely according to instructions and/or print specifications; select and correctly use appropriate measuring tools to measure within verbal and/or print specifications; identify and select ferrous and nonferrous metals for their specified application in machining work pieces; safely set up and operate within print specifications any of a variety of machine tools such as lathes, drill presses, milling machines and grinders; read and interpret blueprints and operational sequence sheets.



Admissions Requirements

An admissions interview, as well as pretests in communications and mathematics, to be conducted at the College, is required at least one week prior to the student's proposed start date. The student should have a working knowledge of mathematics including whole numbers, fractions, decimals, percentage, measurement, ratio and proportion, signed numbers, square root and power. A good command of English (written and verbal) is also required.

Program Outline

SAFETY

Demonstrate competence in Machine Shop safety practices and procedures which comply with regulations found in college and industrial shop situations.

ENGINE LATHE

Safely set up and operate an engine lathe to produce a workpiece within print specifications.

MEASUREMENT

Select and correctly use appropriate measuring tools to measure within verbal and/or print specifications.

MILLING MACHINE

Safely set up and operate horizontal and vertical milling machines to produce a work piece to print specifications.

HAND TOOLS

Select and correctly use hand tools safely to instructions and/or print specifications.

SURFACE GRINDER

Safely set up and operate a surface grinder to produce a work piece within print specifications.

CUTTING TOOLS

Select, use and maintain metal removal cutting tools for their specified application in machining workpieces.

BLUEPRINT READING

Read and interpret blueprints and operational sequence sheets in order to determine layout, machining or inspection specifications of a work piece.

DRILLING MACHINES

Safely set up and operate a drilling machine to produce a work piece within print specifications.

LIFE SKILLS

Discuss and develop cultural, educational, political, economic and social skills, concepts and values in relation to self, family, job and community.

For more information please call 252-5571 ext. 252 or 253

MANUFACTURING ENGINEERING TECHNICIAN

Campus Location

North

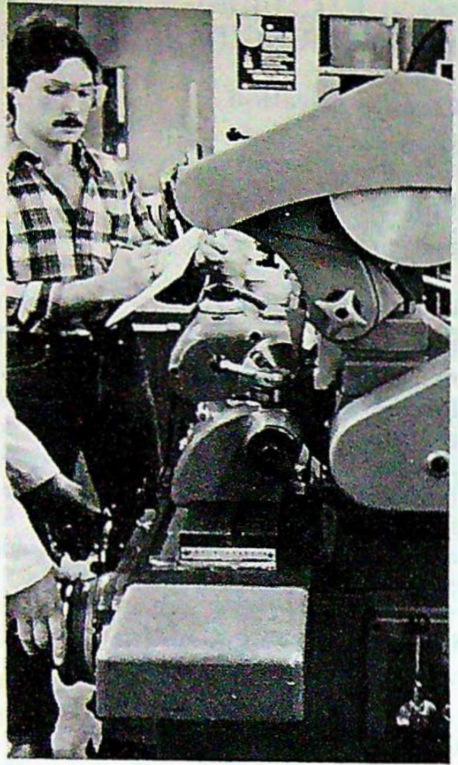
Program Length

Four semesters

Program Information

As a Manufacturing Technician you will decide how a product is to be manufactured, what types of machines are to be used, the kinds of materials required, and the sequence of production and methods. As a graduate of this four semester program you will be able to develop the manufacturing procedures for products produced by assembly, machining processes, presswork methods and plastics technology.

Acquired skills are given practical experience in a modern Production Laboratory equipped with computer-controlled equipment.



Employment Opportunities

As a Manufacturing Technician you may be involved in the scheduling, co-ordination and cost analysis of ongoing manufacturing, and emergency and preventative maintenance systems in a manufacturing operation. You may also have troubleshooting and project responsibilities in process planning, tool design, and quality control.

As a graduate of this four semester program you may be eligible to enter into the 5th semester of Manufacturing Engineering Technology. Successful completion of the 5th and 6th semester will allow you to graduate as a Manufacturing Engineering Technologist.

For Curriculum see p. 41.

For more information please call Joe Pusztai at 675-3111 ext. 378

MANUFACTURING ENGINEERING TECHNOLOGY

Campus Location

North

Program Length

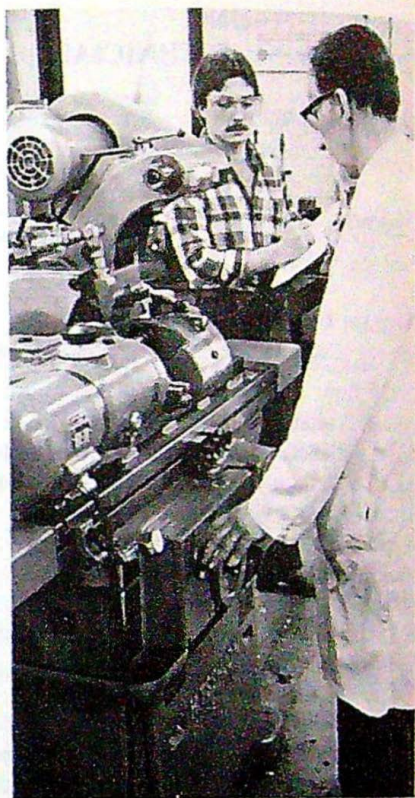
Six Semesters

Program Information

Upon successful completion of the four semesters as a Manufacturing Engineering Technician, you may continue for two additional semesters to complete the Manufacturing Engineering Technology program. These additional semesters enable you to study complex problems in specialized manufacturing processes and costing.

Employment Opportunities

As a key person of an engineering team, you may become involved in the development, implementation and debugging of production processes. You may also become part of a support group which deals with inventory control, plant layout, estimating, quality control or supervision. Employment alternatives include Process Technologist, Manufacturing Supervisor and Cost Estimator. As Process Technologist you would initiate and co-ordinate the design and purchase of equipment and tooling that would efficiently produce the present product line and new lines of the future. As Manufacturing Supervisor you would be part of a team involved in troubleshooting, design, and the development of people skills that meet the demand of current technology. As a Cost Estimator you would be involved in accurately "guesstimating" the manufacturing and production costs of a new part or product that is being considered for the consumer market.



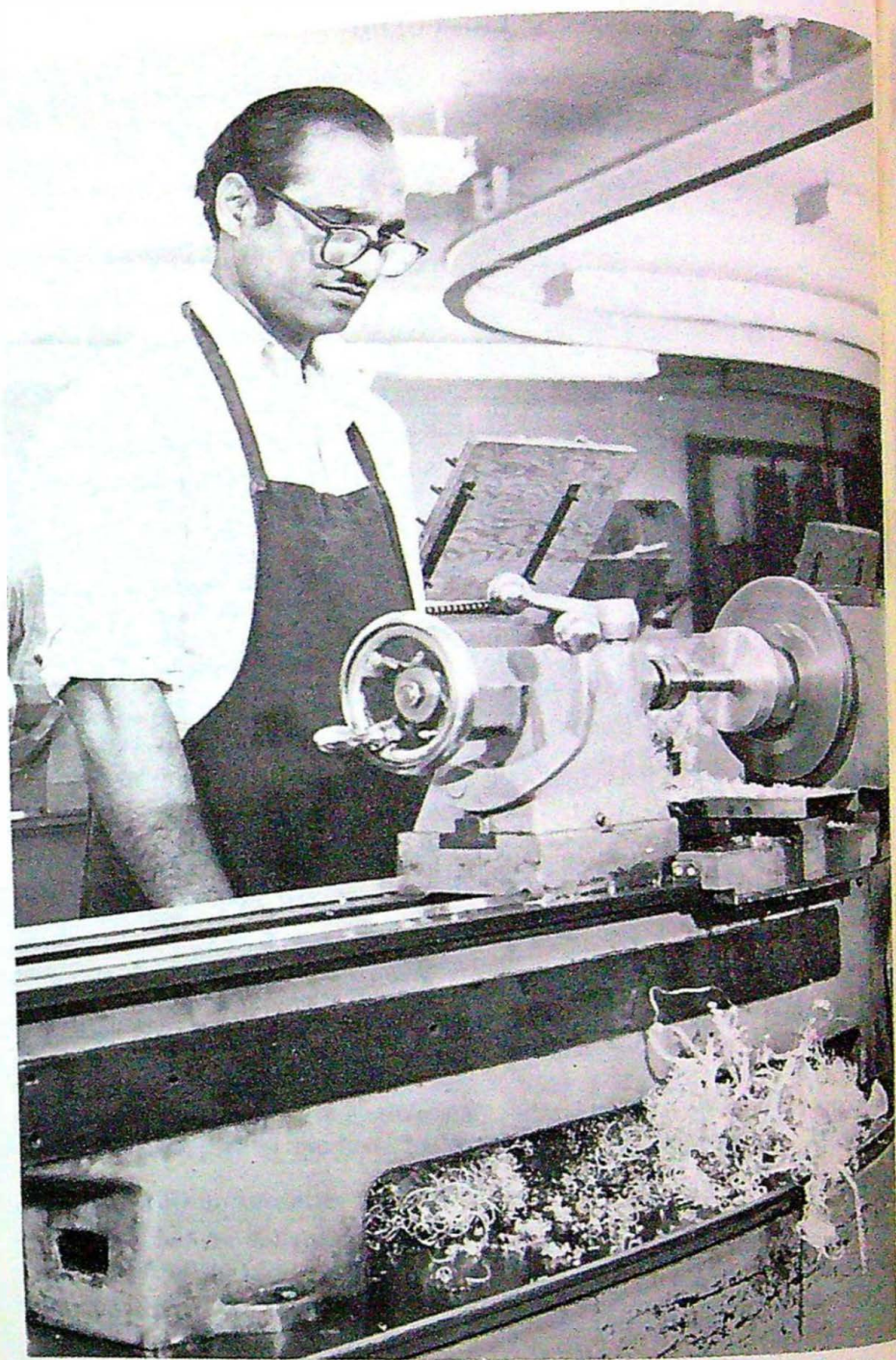
Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses. Electricity, Physics or machine shop at the senior level are strongly recommended.

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester One: 23 hours per week			Semester Two: 26 hours per week		
380-046	Mathematics I	4	380-002	Mathematics II	4
941-102	English Communications I	4	941-103	English Communications II	4
320-132	Mechanics	4	320-001	Statics	4
320-098	Manufacturing Processes I	4	320-237	Basic Tool & Fixture Design	4
320-046	Mechanical Technical Drawing	4	320-048	Time Study	4
320-266	Machining Processess	3	350-190	Electrical Control I	3
				General Studies	3
Semester Three: 26 hours per week			Semester Four: 24 hours per week		
380-175	Mathematics (Dynamics)	4	380-178	Computer Programming	4
320-052	Basic Strength of Materials	4	320-015	Numerical Control I	4
320-063	Industrial Hydraulics	4	320-268	Manufacturing Cost Estimating	3
320-076	Manufacturing Processes II	4	320-269	Manufacturing Process Planning I	6
320-157	Die Design	4	320-145	Industrial Pneumatics	4
320-273	Motion Study	3		General Studies	3
	General Studies	3			
Semester Five: 25 hours per week			Semester Six: 23 hours per week		
380-182	Statistics	3	380-171	Calculus I	4
320-016	Numerical Control II	4	320-265	Material Sciences	3
320-224	Plant Layout	3	320-142	Quality Control	4
320-267	Metrology	3	320-245	Technical Project (Field)	8
350-191	Electrical Control II	3	320-091	Project Mgmt.	4
320-092	Production & Inventory Control	4			
320-244	Manufacturing Process Planning II	4			

For more information please call Joe Pusztai at 675-3111 ext. 378



MARINE AND SMALL POWERED EQUIPMENT MECHANIC

Campus Location

Lakeshore 2

Program Length

40 weeks

Program Information

This program is designed to prepare you for employment as a mechanic for such things as two and four stroke engines, recreational vehicles, marine propulsion units, lawn and garden equipment, and chain saws. You will learn how to repair and refinish fibreglass, use service manuals and parts books, use special service tools, weld, cut, and braze metals, and carry out basic machining procedures.

Employment Opportunities

Opportunities exist in marine equipment dealerships, marinas, sports equipment and rent-all stores, construction equipment dealerships, lawn and garden wholesalers, retail outlets, equipment service centres, golf courses, hardware and department stores. With some experience in the field after graduation, you may advance to service manager, manufacturer's service representative, or you may wish to go into business for yourself

Admission Requirements

After pretests in communications and mathematics (to be conducted at the College), you will attend an admissions interview at least one week prior to your proposed starting date. You should have a working knowledge of mathematics, including whole numbers, fractions, decimals, percentages and measurement. You should also be able to speak, read, and understand the English language without difficulty.



Program Outline

- Identify components, construction features and operation principles of 2 and 4 stroke engines.
- Identify operation principles of carburetors, fuel pumps and supply systems—repair and adjust.
- Explain operation of magneto, CD and battery ignition systems—repair, adjust and maintain.
- Identify the nature, type, purpose and application of lubricants.
- Parts and service manuals—Determine part numbers, prices and service procedures.
- Identify and properly use hand and power tools, and test equipment
- Diagnose faults in, adjust, repair, disassemble and rebuild lawn mowers, garden tillers, snow blowers, garden tractors, chain saws, outboard motors, snowmobiles, boat trailers, marine rigging and wiring.
- Repair and refinish metal and fibreglass components and equipment.
- Identify and properly use hand operated machining tools, accurately read and apply machine measuring tools.
- Set up and operate oxyacetylene welding and cutting equipment.
- Explain the fundamentals of electromagnetism, inductance, capacitance, electrical circuitry and the operation of small AC and DC motors and generators.

For more information please call 252-5571 ext. 252 or 253

MECHANICAL (DRAFTING DESIGN) ENGINEERING TECHNICIAN

Campus Location

North

Program Length

Four semesters

Program Information

As a graduate of the Mechanical (Drafting Design) Engineering Technician Program you are prepared to apply design principles and practices to a variety of engineering and mechanical design problems.

This four semester program provides the background and the skills to design and develop layout drawings, prepare working drawing, and determine specifications and materials for the manufacture or performance of a component or assembly or a major process installation.

Employment Opportunities

As a graduate you may expect to find employment in areas related to drafting and design, testing, estimating, mechanical equipment installation, consulting, and machinery sales.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses Drafting and Physics at the Senior level are strongly recommended.



For more information please call Joe Pusztai at 675-3111 ext. 378

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester One: 24 hours per week			Semester Two: 26 hours per week		
380-046	Mathematics I	4	380-002	Mathematics II	4
941-102	English Communications I	4	941-103	English Communications II	4
320-132	Mechanics	4	320-001	Statics	4
320-240	Fundamentals of Manufacturing Processes	4	320-162	Mechanical Design & Drafting I	8
320-046	Mechanical Technical Drawing	4	350-190	Electrical Control I	3
380-178	Computer Programming	4		General Studies	3
Semester Three: 22 hours per week			Semester Four: 26 hours per week		
320-264	Mechanics of Machines	3	320-073	Fluid Mechanics	4
320-052	Basic Strength of Materials	4	320-038	Mechanical Design & Drafting III	8
320-147	Mechanical Power Transmission	4	320-015	Numerical Control I	4
320-006	Mechanical Design & Drftg. II	8	320-234	Stress Analysis	4
	General Studies	3	320-265	Material Sciences	3
				General Studies	3

MECHANICAL (NUMERICAL CONTROL) TECHNICIAN

Campus Location

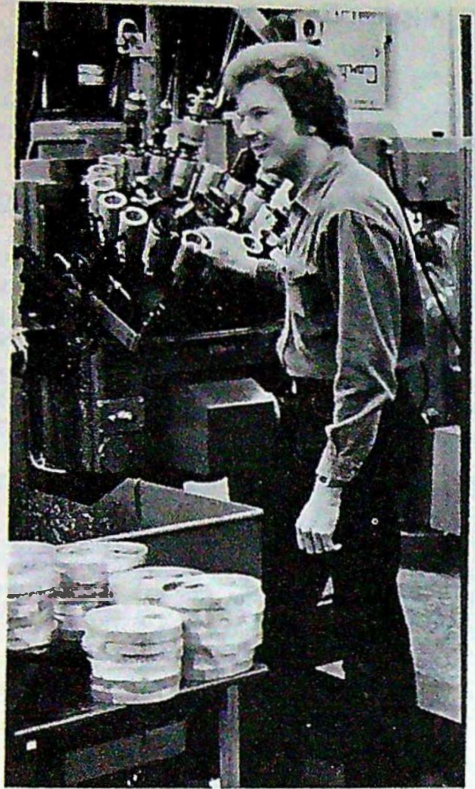
North

Program Length

Four semesters

Program Information

Numerical Control is the most modern way of controlling production machinery. In this program you will learn to write and process programs from part drawings to punched tape. This punched tape will then guide the machine to produce a part. You will learn to select the proper tooling and fixturing required for the machining of a variety of different parts. Not only will you learn to prepare manual and computer assisted programs for the most advanced NC machinery, but you will also be able to operate these machines.



Employment Opportunities

Progressive, technologically modern companies are constantly looking for operators and programmers. As a graduate you may find employment in a variety of industries including, aircraft and aerospace, automotive, agricultural machinery, plastic, rubber manufacturing, instrumentation, and service industries. As an alternative, machine tool sales and servicing, computer programming services are additional areas with which you may obtain employment.

As an NC Programmer you would work with a group of programmers, translating dimensions from drawings into NC machine or computer statements, preparing tooling and fixturing information for the shops. As an Operator you would set up the machine, using tools and holding fixtures, check the tape for correctness and accuracy, make recommendations to improve productivity, and operate the NC machine. As a Sales or Service Representative you would assist the sales department with technical know-how, train operators and programmers for customers, and prepare simple programs for the demonstration of NC machines.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, Physics or machine shop at the Senior level are strongly recommended.

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester One: 23 hours per week					
380-046	Mathematics I	4	380-002	Mathematics II	4
941-102	English Communications I	4	941-103	English Communications II	4
320-132	Mechanics	4	350-190	Electrical Control I	3
320-098	Manufacturing Processes I	4	320-001	Statics	4
320-046	Mechanical Technical Drawing	4	320-015	Numerical Control I	4
320-266	Machining Processes	3	320-237	Basic Tool & Fixture Design	4
			380-178	Computer Programming	4
Semester Two: 27 hours per week					
Semester Three: 25 hours per week					
380-175	Mathematics (Dynamics)	4	320-247	Numerical Control III	3
320-246	Numerical Control II	8	320-268	Manufacturing Cost Estimating	3
320-076	Manufacturing Processes II	4	320-265	Material Sciences	3
320-267	Metrology	3	320-269	Manufacturing Processes and Planning I	6
	General Studies	3		General Studies	3
	General Studies	3			
Semester Four: 23 hours per week					

For more information please call Joe Pusztai at 675-3111 ext. 378

MECHANICAL (TOOL & DIE) ENGINEERING TECHNICIAN

Campus Location

North

Program Length

Four Semesters

Program Information

As a Mechanical Tool & Die Technician you will be able to design and draw tools, prepare manufacturing processes, evaluate methods of production, materials, manufacturing costs and tool performance.

Employment Opportunities

As a Tool & Die Technician there are several areas of employment opportunities in various manufacturing industries such as automotive and aeronautical, consulting engineering firms, and the tool design offices of specialized tooling companies. Employment opportunities include such positions as Die Designer, Cost Estimator and Process Analyst.

As a Die Designer your responsibilities include determining production sequence and cost as well as the layout and detailing of dies. As a Cost Estimator you would be responsible for preparing and detailing the manufacturing cost requirements for new or modified parts for a manufacturing facility.

As a Process Analyst you would be involved in developing the tooling and operational sequence for continuous line manufacturing. This type of manufacturing includes the product of engines, electric motors, consumer products, and military systems.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, Drafting and Physics at the Senior level are strongly recommended.



CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name
Semester One: 23 hours per week			Semester Two: 26 hours per week	
320-132	Mechanics	4	320-001	Statics
320-098	Manufacturing Processes I	4	350-160	Electrical Controls I
320-046	Mechanical Technical Drawing	4	320-218	Tool & Fixture Design
320-266	Machining Processes	3	380-002	General Studies
941-102	English Comm. I	4	380-002	Mathematics 11
380-046	Mathematics I	4	941-103	English Comm. 11
Semester Three: 26 hours per week			Semester Four: 25 hours per week	
380-175	Mathematics (Dynamics)	4	380-178	Comp. Programming
320-052	Basic Strength of Materials	4	320-044	Die Design II
320-076	Manufacturing Processes II	4	320-268	Manufacturing Cost Estimating
320-043	Die Design I	8	320-015	Numerical Control I
320-267	Metrology	3	320-265	Material Sciences
	General Studies	3		General Studies

For more information please call Joe Pusztai at 675-3111 ext. 378

NUMERICAL CONTROL MACHINE PROGRAMMER

Campus Location

Industrial Resource Centre

Program Length

48 Weeks

Program Information

Graduates of this 48-week program are trained in the modern technological methods of Numerical Control machine tool operation, as well as in the writing and editing of manual part-programs. Practical skills learned include: machine set-up, tool pre-set, tape preparation, cutter diameter and length compensation setting, and on-site modification of existing programs.

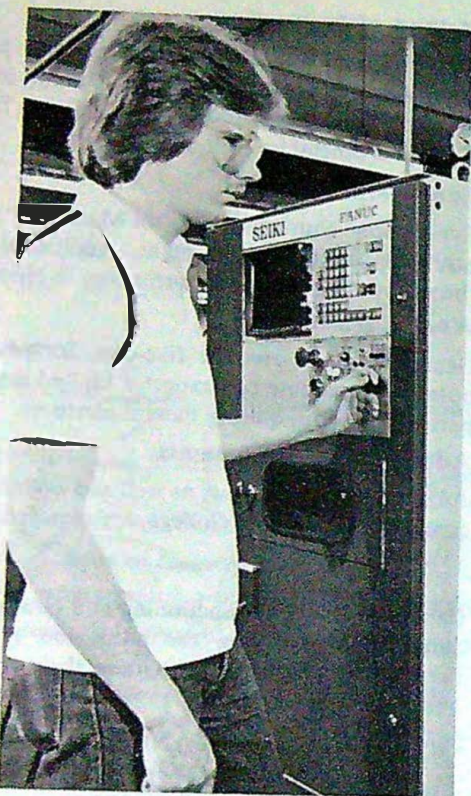
A person interested in this occupation must have a basic knowledge of conventional machine shop operations with the ability to conceptualize these operations related to programming and control of machine tools. The occupation requires an individual who is alert, perceptive and able to deal effectively with both tangible and intangible problems.

Numerical ability and above average communication skills are essential components of the career-oriented person.

Employment Opportunities

Employment potential for the prospective graduate is excellent. Progressive, technologically-modern companies are constantly looking for operators and programmers. As these companies update their machinery, the Numerical Control Machine Programmer will be a vital member of their staff. Graduates can expect to find employment in a variety of industries including: production and jobbing shops, aircraft and aerospace, automotive, agricultural machinery production, plastic and rubber manufacturing, instrumentation, and service industries.

Graduates with a higher level of hands-on skill will find employment as operators and set-up persons. Those who excel in the programming area will become suitably employed as Numerical Control Machine Programmers.



Method of Instruction:

This program utilizes prepared learning packages (similar to those used in correspondence programs) with the maximum of personal interaction between faculty and students. This allows student the maximum flexibility in his/her rate of progress and in individual timetables.

Long-Term Potential

Experienced Numerical Control Machine Programmers may advance into supervisory positions or into management. Additional training in computer programming and theory would enhance opportunities in Numerical Control (Systems) technology.

Work Environment

Generally, shops run the five-day, forty-hour work week with rotating shifts. The potential candidate can expect a limited amount of physical activity, with the greater part of the job requiring mental alertness.

Admissions Requirements:

An admissions interview, as well as a pretest in communications and mathematics to be conducted at Humber College, are required at least one week prior to the student's prospective start date.

Candidates must be functioning at a Grade 10 (BTSD Level III) for direct entry. Candidates not achieving the admission requirements will be prescribed a College Preparatory program to upgrade their academic skills to the program entrance requirements.

FINANCIAL ASSISTANCE

Canada Manpower Sponsorship:

This program is approved by Canada Employment and Immigration Commission. If you qualify for sponsorship the cost of your tuition fees will be paid for by Canada Employment and Immigration, including a weekly training allowance (if you are eligible). For further information and details on sponsorship contact your nearest Canada Employment Centre or the Registrar's Office of Humber College at 252-5571.

Ontario Student Loans Plan:

The Ontario Student Loans Plan is a program of the Government of Ontario which provides loans to eligible students. To apply, a student must be at least 18 years of age, a Canadian citizen or landed immigrant, and a resident of Ontario for at least 12 months not counting time spent at a post-secondary institution. For further information regarding loans and grants, contact the Financial Aids Office of Humber College at (416) 675-3111.

FURTHER INFORMATION:

For additional information and assistance, contact the Registrar's Office of Humber College, (416) 252-5571.

Program Outline

1. Learn basic machine shop skills with emphasis on turning, milling and drilling.
2. Learn Numerical Control machine basic preparation (lubrication, set-up and start-up).
3. Solve course related mathematical problems.
4. Learn Numerical Control coordinate systems, codes, technology, and programming modes.
5. Learn Numerical Control machine operation and production of parts using instructions supplied by programmer.
6. Dry run, debug, and trouble-shoot new programs on Numerical Control machines.
7. Apply learned skills to the operation of all types of Numerical Control machines.
8. Select the most efficient procedure for programming a part in relation to quantity required, material specification, complexity, control and machine type and capability.
9. Produce a programmer's sketch, part program sheet and tapé, holding fixture instructions, tool set-up, tool offset list, and additional instructions for operator as required.
10. Develop effective communication skills with operators, service personnel, supervisors and management in relation to Numerical Control operation and equipment.

YACHTING STUDIES TECHNICIAN

Campus Location

Lakeshore 2

Program Length

Four semesters

Program Information

As a student in the Yachting Studies program, you will acquire a broad technical and practical understanding of small craft, their design, construction, operation, maintenance and repair. You also receive a thorough grounding in the practical business and managerial aspects of a variety of yachting support and service activities such as: marina and yacht club operation; boat building and repair; wholesale and retail marketing of small craft and their equipment, yacht brokerage and charter fleet operation. The program structure is flexible, taking into account the needs of both full-time and part-time students – many of whom bring with them previous business, professional, trades, craft and seamanship experience.



Employment Opportunities

A great variety of occupations exist for graduates of the Yachting Studies program. Boat building; boat maintenance and repair; wholesale, retail outlets; marina operations; club management; yacht brokerage and charter; Federal, Provincial and Municipal agencies; sailing schools/community courses in on-water activities. Graduates may also be eligible to enter directly into the 5th semester of the Yachting Studies technology programs.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses with passing grades.

For more information please call 252-5571 ext. 252 or 253

YACHTING STUDIES TECHNOLOGY

Campus Location

Lakeshore 2

Program Length

6 semesters – three years

Program Information

Yachting Studies Technology is a six semester program, with the first four semesters being the same as the Yachting Studies Technician program. The 5th and 6th semesters incorporate advanced practical work in design and construction, combined with training in marine business operations management. This advanced work enables you to undertake more complex and challenging tasks, and prepares you to accept basic supervisory and management responsibilities.



Employment Opportunities

A great variety of occupations exist for graduates of the Yachting Studies program. Boat building; boat maintenance and repair; wholesale, retail outlets; marina operations; club management; yacht brokerage and charter; Federal, Provincial and Municipal agencies; sailing schools/community courses in on-water activities.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses with passing grades.

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester 1			Semester 2		
	English Communications I	4		English Communications II	4
371-046	Mathematics for S-C&MT	4		General Studies	3
371-117	Seamanship I	3	371-075	Intro. to Micro-computers	4
371-036	Navigation	3	371-113	Gas & Diesel Motors for Yachts	3
371-009	Sails & Rigging	3	371-119	Marina/Yacht Club Design Construction & Planning	3
371-150	Yacht Maintenance & Repair I	8	371-250	Yacht Maintenance & Repair II	8
 Semester 3			 Semester 4		
	General Studies			General Studies	3
371-217	Seamanship II	3	371-218	Small-craft Electronics	3
371-108	Yacht Design I	3	371-208	Yacht Design II	3
371-120	Electrical Circuits & Applications	3	371-038	Yacht Brokerage, Marine Sales & Marketing	3
371-121	Standard Operating Procedures & Office Routine	3	371-033	Marine Contracts, Insurance & Taxation	4
371-031	Sailing School & Charter Fleet Operation	3	371-450	Boatbuilding & Repair II	8
371-350	Boatbuilding & Repair I	8			
 Semester 5			 Semester 6		
371-315	Fall Decommissioning	3	371-413	Spring Commissioning	3
371-308	Yacht Design III	3	371-220	Marina & Boatyard Organization & Operation	3
371-213	Outboard Engines & Marine Drive Trains	4	371-417	Purchasing & Inventory Management	3
371-317	Marina/Yacht Club Management	3	371-318	Small Business Start-up	3
371-219	Small Business Accounting	3	371-319	Inboard Marine Engines	3
371-550	Boatbuilding & Repair III	8	371-913	Yacht Survey	3
			371-650	Boatbuilding & Repair IV	8

CHEMICAL

CAREERS IN CHEMISTRY

As a graduate from one of Humber's four Chemistry programs you are qualified to become an integral and essential part of a scientific team. Employment after graduation usually falls into one of the following four major areas:

1. Analytical or Quality Control Laboratories

Your main function as an analyst is to ensure that all materials purchased or sold by your company meet certain requirements. You may determine if an ore contains enough gold to make mining operations economically feasible. You may monitor the sulphur dioxide content of the city air. You may analyze the content of the stomach of a murder victim to establish the identity of a poison. To accomplish tasks of this nature, you will find that you must be familiar with the operation of specialized instruments. Humber's laboratories are equipped with gas chromatographs, infra-red spectrophotometers, atomic absorption spectrophotometers, pH meters, refractometers and many other pieces of equipment necessary for chemical analysis.

2. Technical Service and Sales

As a technical sales representative you will contact customers interested in the products your company manufactures. You may also trouble shoot, service or initially set up equipment purchased from your company. This type of position usually provides you with a company car and you may be asked to travel extensively.

3. Research and Development Laboratories

In a research laboratory you will take part in the development of new products or the improvement of established ones. You may assist in the development of everlasting razor blades, a deodorant that provides protection for a whole week, an antacid that absorbs 200 times its weight in excess stomach acid, a lead-free gasoline, a lubricating oil that eliminates oil changes and plastic bottles that will disintegrate in sunlight. The list is never ending and the variety of projects you may be involved in is without limitation.

4. Pilot Plants and Production

Pilot plant experiments are experiments on a much larger scale than most development laboratory experiments. Pilot plant experiments usually involve working with up to several hundred pounds of materials.

If you are involved in production, you may operate a "cat cracker" in an oil refinery, you may prepare and colour match several hundred gallons of paint, or you may be involved in the manufacture and packing of large quantities of measles vaccine. With your background from Humber College and additional experience you are well suited for a responsible position in this expanding field.



CHEMICAL ENGINEERING TECHNOLOGY

Campus Location

North

Program Length

Six semesters

Program Information

As a graduate of this six semester program, you will be qualified to perform a variety of chemical engineering tasks. These include the assembly and operation of laboratory and pilot plant equipment used in industrial, analytical and manufacturing operations. You will also be able to handle safety problems for petroleum, mining, rubber, plastic, glass, food or metallurgical industries.

Note: The students may be required to place refundable deposits on such items as lab manuals or other items supplied by the College.

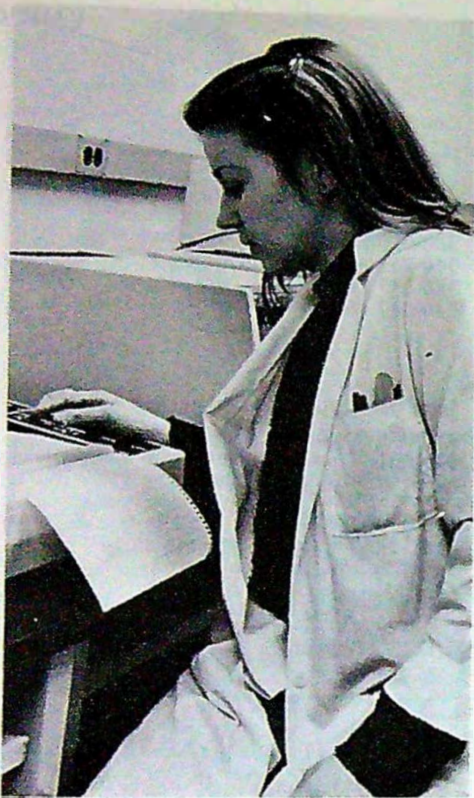
Employment Opportunities

You may find employment as an operating member in research and/or testing and quality control teams, technical sales, or as an operating supervisor in chemical or processing industries.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, years 3 and 4 Physics and Chemistry at least at the general level are strongly recommended.

For more information please call Wayne Lem at 675-3111 ext. 389



CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester 1: 24 hours per week			Semester 2: 24 hours per week		
380-046	Mathematics 1	4	941-103	English Communications 2	
941-102	English Communications 1	4	380-191	Physics (Mechanics & Waves)	
380-010	Heat, Light, & Sound	4	340-054	General Chemistry 2	
340-051	General Chemistry 1	4	344-055	Organic Chemistry 1	
340-043	Bioscience	4	340-056	Organic Chemistry I Lab	
340-052	Stoichiometry	4	340-123	Introductory Microbiology	
			380-182	Statistics	
Semester 3: 26 hours per week			Semester 4: 26 hours per week		
340-060	Organic Chemistry 2	2	340-120	Elec. Meas. for Chem. System	
340-061	Organic Chemistry 2 Lab	4	340-062	Lab Instrumentation	
340-131	Analytical Chemistry 1	3	340-063	Lab Instrumentation Applications	
340-059	Analytical Chemistry I Lab	4	340-125	Environmental Microbiology	
340-124	Methods of Microbiology	4	340-133	Process Industries & Plant Safety	
340-109	Physical Chemistry	2		General Studies	
				General Studies	
380-171	Calculus 1	4	340-064	Analytical Chemical Applications	
	General Studies	3			
Semester 5: 26 hours per week			Semester 6: 24 hours per week		
380-186	Calculus 2	3	340-135	Industrial Organic Chemistry	
340-037	Industrial Instrumentation 1	4	340-071	Industrial Organic Chemistry Lab	
340-137	Chemical Engineering 1	4	340-030	Unit Operations 2	
340-029	Unit Operations 1	4	340-134	Chemical Thermodynamics & Kinetics	
340-126	Environmental Studies	2	340-038	Industrial Instrumentation 2	
330-144	Technical Report	1	380-192	Computer Programming for Chemical Technology	
340-066	Analytical Chemistry 2	4	340-138	Chemical Engineering 2	
340-067	Analytical Chemistry 2 Lab	4			

CHEMICAL (INDUSTRIAL) ENGINEERING TECHNOLOGY

Campus Location

North
Program Length

Six semester

Program Information

As a graduate of this six semester program you are equipped to operate laboratory and pilot plant equipment, prepare solutions and synthesize organic compounds. You are also capable of analyzing industrial raw materials, interpreting, calculating and reporting the results and developing the test procedures for further testing.

Note: The students may be required to place refundable deposits on such items as lab manuals or other items supplied by the College.

Employment Opportunities

Opportunities exist in research, testing, control, plant operation and supervision, technical sales or service in such industries as petroleum, glass, foods, plastics, etc.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, years 3 and 4 Physics and Chemistry at least at the general level are strongly recommended.



For more information please call Wayne Lem at 675-3111 ext. 389

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester 1: 24 hours per week			Semester 2: 24 hours per week		
380-046	Mathematics 1	4	941-103	English Communications 2	4
941-102	English Communications 1	4	380-191	Physics (Mechanics & Waves)	4
380-010	Heat, Light, & Sound	4	340-054	General Chemistry 2	3
340-051	General Chemistry 1	4	344-055	Organic Chemistry I	2
340-043	Bioscience	4	340-056	Organic Chemistry I—Lab	4
340-052	Stoichiometry	4	340-123	Introductory Microbiology	4
			380-182	Statistics	3
Semester 3: 26 hours per week			Semester 4: 26 hours per week		
340-060	Organic Chemistry 2	2	340-120	Elec. Meas. for Chem. Systems	4
340-061	Organic Chemistry 2 Lab	4	340-062	Lab Instrumentation	4
340-131	Analytical Chemistry 1	3	340-063	Lab Instrumentation Applications	4
340-059	Analytical Chemistry I Lab	4	340-125	Environmental Microbiology	4
340-124	Methods of Microbiology	4	340-133	Process Industries & Plant Safety	2
340-109	Physical Chemistry	2		General Studies	3
380-171	Calculus 1	4	340-064	General Studies	3
	General Studies	3		Analytical Chemical Applications	2
Semester 5: 25 hours per week			Semester 6: 25 hours per week		
380-186	Calculus 2	3	340-134	Chemical Thermodynamics & Kinetics	3
340-066	Analytical Chemistry 2	4	340-135	Industrial Organic Chemistry	2
340-067	Analytical Chemistry 2—Lab	4	340-071	Industrial Organic Chemistry Lab	4
340-029	Unit Operations 1	4	344-030	Unit Operations 2	4
340-037	Industrial Instrumentation 1	4	340-073	Biochemistry Lab	4
340-136	Biochemistry	3	340-038	Industrial Instrumentation 2	4
340-126	Environmental Studies	2	380-192	Computer Programming for Chemical Technology	2
330-144	Technical Report	1			

CHEMICAL (LABORATORY) TECHNICIAN

Campus Location

North

Program Length

Four semesters

Program Information

As a graduate of this four semester program, you will be able to analyse materials and products, synthesize basic organic compounds and prepare solutions. You will also be able to assemble and operate laboratory equipment, conduct routine tests, prepare graphs and report results in a wide variety of research and testing functions.

Note: The students may be required to place refundable deposits on such items as lab manuals or other items supplied by the by the College.

Employment Opportunities

Graduates will seek employment in quality control testing and inspection, research, sales and service, pharmaceutical or public health laboratories, or perhaps in pollution control and measurement. Alternatively, you may continue for a third year in one of our chemical technology programs.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, years 3 and 4 Physics and Chemistry at least at the general level are strongly recommended.



For more information please call Wayne Lem at 675-3111 ext. 389

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester 1: 24 hours per week			Semester 2: 24 hours per week		
380-046	Mathematics 1	4	941-103	English Communications 2	4
941-102	English Communications 1	4	380-191	Physics (Mechanics & Waves)	4
380-010	Heat, Light, & Sound	4	340-054	General Chemistry 2	4
340-051	General Chemistry 1	4	340-055	Organic Chemistry I	4
340-043	Bioscience	4	340-056	Organic Chemistry I-Lab	2
340-052	Stoichiometry	4	340-123	Introductory Microbiology	4
			380-182	Statistics	3
Semester 3: 26 hours per week			Semester 4: 26 hours per week		
340-060	Organic Chemistry 2	2	340-120	Elec. Meas. for Chem. System	4
340-061	Organic Chemistry 2 Lab	4	340-062	Lab Instrumentation	4
340-131	Analytical Chemistry I	3	340-063	Lab Instrumentation Applications	4
340-059	Analytical Chemistry I Lab	4	340-125	Environmental Microbiology	4
340-124	Methods of Microbiology	4	340-133	Process Industries & Plant Safety	2
340-109	Physical Chemistry	2		General Studies	3
380-171	Calculus I	4		General Studies	3
	General Studies	3	340-064	Analytical Chemical Applications	2

CHEMICAL (MICROBIOLOGY) TECHNOLOGY

Campus Location

North

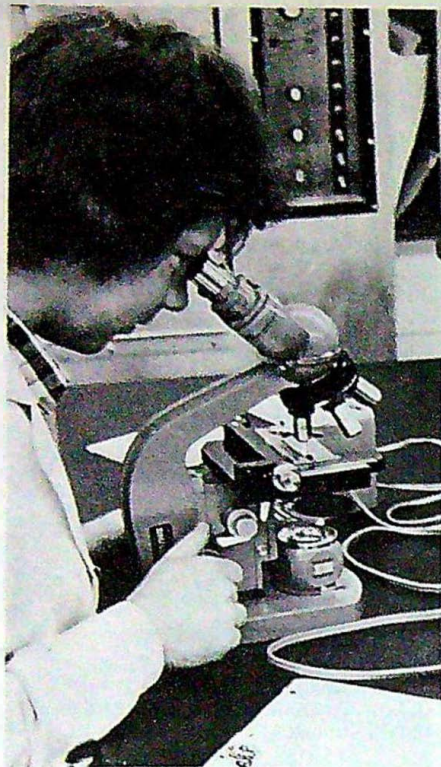
Program Length

Six semesters

Program Information

As a graduate of this six semester program you will be able to perform a wide variety of tasks in the chemical technology field. You will be able to prepare solutions and samples for instrumental analysis and microscopic examination. You will also be able to analyse both industrial raw materials and finished products using common analytical, chemical, biological and instrumental methods.

Note: The students may be required to place refundable deposits on such items as lab manuals or other items supplied by the College.



Employment Opportunities

Employment opportunities exist in research and testing in the areas of health, food, pharmaceutical and chemical laboratories.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses, years 3 and 4 Physics and Chemistry at least at the general level are strongly recommended.

For more information please call Wayne Lem at 675-3111 ext. 389

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester 1: 24 hours per week			Semester 2: 24 hours per week		
380-046	Mathematics 1	4	941-103	English Communications 2	4
941-102	English Communications 1	4	380-191	Physics (Mechanics & Waves)	3
380-010	Heat, Light, & Sound	4	340-054	General Chemistry 2	4
340-051	General Chemistry 1	4	340-055	Organic Chemistry I	2
340-043	BioScience	4	340-056	Organic Chemistry I—Lab	4
340-052	Stoichiometry	4	340-123	Introductory Microbiology	4
			380-182	Statistics	3
Semester 3: 26 hours per week			Semester 4: 26 hours per week		
340-060	Organic Chemistry 2	2	340-120	Elec. Meas. for Chem. System	4
340-061	Organic Chemistry 2—Lab	4	340-062	Lab Instrumentation	4
340-131	Analytical Chemistry 1	3	340-063	Lab Instrumentation Applications	4
340-059	Analytical Chemistry I Lab	4	340-125	Environmental Microbiology	4
340-124	Methods of Microbiology	4	340-133	Process Industries & Plant Safety	2
340-109	Physical Chemistry	2		General Studies	3
380-171	Calculus I	4		General Studies	3
	General Studies	3	340-064	Analytical Chemical Applications	2
Semester 5: 25 hours per week			Semester 6: 25 hours per week		
340-066	Analytical Chemistry 2	4	340-037	Biochemistry Lab	4
340-067	Analytical Chemistry 2—Lab	4	340-135	Industrial Organic Chemistry	3
340-068	Industrial Microbiology	4	340-071	Industrial Organic Chemistry Lab	4
380-186	Calculus 2	3	340-134	Chemical Thermodynamics & Kinetics	3
340-136	Biochemistry	3	340-127	Food Microbiology	4
340-126	Environmental Studies	2	340-128	Microbial Ecology	4
330-144	Technical Report	1	380-192	Computer Programming for Chemical Technology	3
340-074	Microscopy & Photomicrography	4			

ELECTRONICS/ELECTRICAL

CAMERA REPAIR MECHANIC

Campus Location

Lakeshore 2

Program Length

40 weeks

Program Information

Graduates of this forty-week program are trained in the methods and procedures of repairing photographic equipment and related devices, especially the 35 mm. still picture camera and its accessories. Practical activity includes the dismantling, assembling, adjusting, and repairing of actual photo equipment and related devices. Fundamental theory in picture taking, photo chemical process work, basic electronics, machine technology, drafting, and basic social skills are also taught.

Canada Manpower Sponsorship is available.

Employment Opportunities

An experienced camera repair mechanic with supervisory potential may advance to foreman of precision instrument mechanics and repairmen. With additional training, transfer to appropriate occupations in business machines or fabricating and assembling occupations is possible. Graduates may find employment in photographic equipment service department and repair shops or related industries. College surveys indicate a continuing demand for graduates. Graduates are also normally admissible to related technician programs such as Precision Instrument Technician.

Admission Requirements

An admissions interview, as well as pretests in communications and mathematics, to be conducted at the College, is required at least one week prior to the student's proposed start date. The student should have a working knowledge of mathematics including substitution, equations, formulas, graphing and geometry. A good command of conversational English is also required.

A person in this occupation is usually interested in dealing with the operation of mechanical devices. The occupation usually requires men and women with above



average ability to understand the principles of precision-instrument construction and operation, and to apply appropriate techniques for installation, repair, and adjustment. Also necessary are numerical ability, spatial perception, eye-finger-hand coordination, and finger and manual dexterity.

Program Objectives

These objectives are short descriptions of skills that have to be mastered by the student.

- Identify, apply and operate photo equipment and process.
- Repair, and work with basic photographic equipment, including mechanics and optical components and special work processes.
- Select and use measuring tools and equipment such as shutter and synchrotesters, exp-meter testers, tachometers and stroboscopes.
- Select and use hand and hand power tools, e.g: layout tools, soft and hard soldering tools, repair and assembly tools and surface treatment tools.
- Select and use machine tools, e.g: micro drill presses, grinders and buffers, instrumentmaker's lathe, jewellers lathe and two dimensional pantographs.
- Read, interpret and produce technical drawings.
- Select and use materials related to photo equipment.
- Solve mathematical problems related to photographic equipment repair.
- Deal with administrative and communicative requirements.
- Identify, apply, operate and test photo electronic devices and equipment e.g: oscilloscopes, resistor, capacitor tester, decade boxes.
- Discuss and develop cultural, educational, political, economic and social skills, concepts and values in relation to self, family, job and community.

Work Environment

A five-day, forty-hour week is generally required. Physical demands are light.

Method of Instruction

This program utilizes prepared learning packages (similar to those used in correspondence programs) with the maximum of personal interaction between faculty and students.

For more information please call 252-5571 ext. 252 or 253

COMPUTER ENGINEERING TECHNOLOGY

Campus Location

North

The Technology Division of Humber College is in the preliminary stages of a proposal to start a three year post-secondary Computer Technology Program. It is planned that the graduate of this program will have a strong hardware (electronics) orientation supplemented with a consideration software background. (Pending approval of Ministry of College and Universities) expected start date 1983.

Under the supervision of a computer systems engineer in an engineering or process environment, the graduate computer technologist will be able to either individually or as part of a team:



1. Through the use of structured analysis specify, develop and test required systems and acceptance criteria to solve stated requirements.
2. Be able to produce well structured and documented modules easily followed by other technologists and to debug these modules.
3. Integrate hardware and software components into a complete system.
4. Apply operating systems and system tools to software to solve real time problems.
5. Understand appropriate protocol between local and remote systems and have the ability to employ appropriate diagnostic techniques.
6. Solve specified problems through the application of appropriate languages.

COMPUTER TECHNOLOGY – PROPOSED CURRICULUM

FIRST SEMESTER

Mathematics 1
English Communications 1
Physics (Heat, Light, Sound)
Electronic Circuits & Applications 1
Logic 1
BASIC Programming (2 Hrs)
Problem Solving (3 Hrs)

THIRD SEMESTER

Microcomputer Systems
Methods of Analysis
Programming Languages (6 Hrs)
Data Communications Systems 1
General Studies (3 Hrs)
Algorithms & Data Structures 1

FIFTH SEMESTER

Operating Systems 1
Real Time Programming
Micro Processor Development Systems
Data Communications Systems 2
Peripherals
Software Project 2 (5 Hrs)

SECOND SEMESTER

Mathematics 1
English Communications 2
Physics (Mechanics & Waves)
Electronic Circuits & Applications 2
Logic 2
Pascal Programming (2 Hrs)
Circuits & Measurements

FOURTH SEMESTER

Assembler
Numerical Methods
Testing Techniques
Software Project 1 (6 Hrs)
General Studies (3 Hrs)
Algorithms & Data Structures 2

SIXTH SEMESTER

Operating Systems 2
General Studies (3 Hrs)
Computer Architecture
Software Management
Graphics Systems & Software
Software Project 3 (6 Hrs)

ELECTRICAL (CONTROL) TECHNICIAN

Campus Location

Lakeshore 2

Program Length

Four semesters

Program Information

For many years, industries and power utilities have sought electrical technicians to handle heavy current apparatus. The advent of automation has long broadened the technician's role to cover controls, instrumentation, electronics and sophisticated hardware of all descriptions. The primary concern of the Electrical (Control) Technician Program is to train people in the conceptual understanding, design and operation of electrical equipment, power systems, their control and practice, whether they be the heavy current on-off type, or the continuous light current variety. The physics of circuit and equipment behaviour is emphasized;

this will enable the graduate to be more flexible in his approach to unfamiliar situations which he no doubt will encounter in the ever-widening electrical field.

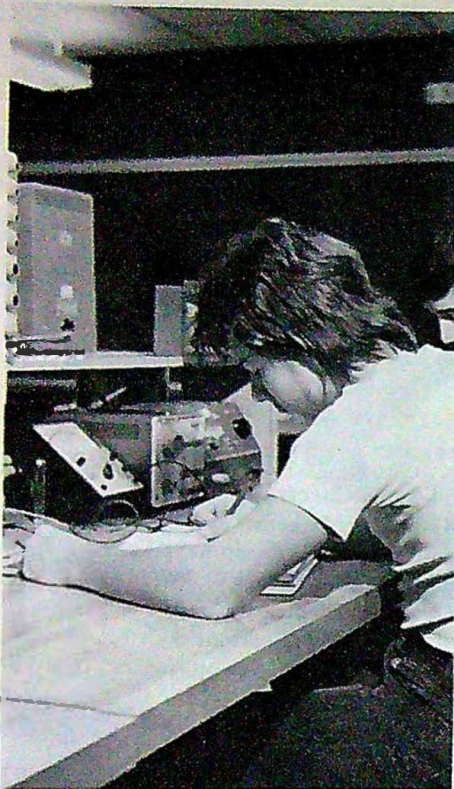
Note: The students may be required to place refundable deposits on such items as lab manuals or other items supplied by the College.

Employment Opportunities

Career opportunities are growing in the utilities and industries such as paper, chemical, metallurgical, as well as in many endeavours such as maintenance, design and sales. The Electrical (Control) Technician is required wherever electrical energy is produced or used.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in Senior level Science and / or program related Senior level Technical courses, Electricity, or Electronics and Physics at the Senior level are strongly recommended.



CURRICULUM

Semester 1: 25 hours per week

389-104	Physics 1	3
329-101	Mathematics 1	4
941-102	Communications 1	4
354-106	Computer Programming & Concepts	3
354-107	Electrical Circuits & Applications 1	8
	General Studies	3

Semester 2: 25 hours per week

389-204	Physics 2
389-201	Mathematics 2
941-103	Communications 2
354-207	D. C. Equipment
354-206	Electrical Circuits & Applications 2
	General Studies

Semester 3: 25 hours per week

354-303	Electrical Design 1	3
389-302	Mathematics 3	3
354-108	A.C. Equipment 1	4
354-305	Industrial Electronics 1	8
354-302	Electrical Circuits & Applications 3	4
	General Studies	3

Semester 4: 25 hours per week

354-402	Electrical Design 2
354-403	Industrial Instrumentation
354-203	A.C. Equipment 2
354-405	Digital Circuits
254-204	Industrial Electronics 2
354-406	Control Systems
354-407	Power Systems

For more information please call 252-5571 ext. 252 or 253

ELECTRO-MECHANICAL (PRECISION INSTRUMENT) ENGINEERING TECHNICIAN

3 Campus Location

4 Lakeshore 2

7 Program Length

4 Four semesters

3 Program Information

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3
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3
The skills and abilities of a Precision Instrument Technician cover the manufacturing, maintenance and operation of optical and electromechanical devices, electronic instruments, fine mechanisms and their combinations in regard to prototype development, in plant production requirement, repair and field activities, research, sales and service. He or she are able to design, fabricate and modify components for, and assemble, adjust,

repair and test complex precision instruments by using common and special hand and machine tools, equipment, processes and materials and to apply relevant principles of physics, chemistry and mathematics to meet a wide range of technological requirements in regard to craftsmanship, concept knowledge, inventiveness and adaptability to situations.

Note: The students may be required to place refundable deposits on such items as lab manuals or other items supplied by the College.

Employment Opportunities

The Precision Instrument Industry is rapidly expanding due to automation, computerization, miniaturization of devices, space and air travel, nuclear and hydro power etc.

It is the opinion of industry members that if by 1985 Canada has not built up a sufficiently large pool of Precision Instrument Technicians this industry will break down since manpower from Europe is not forthcoming as was the case in past years.

Graduates have the best possible insurance to find gainful employment even in a depressed economy if there are any technical job openings at all since they fit readily in so many occupations.

*Subject to individual company participation this program may be completed through an apprenticeship format.



Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses.

CURRICULUM

Semester 1: 25 hours per week			Semester 2: 24 hours per week	
Course No.	Course Name	Credits	Course No.	Course Name
941-102	Communications 1	4	941-103	Communications 2
389-104	Physics 1	3	389-204	Physics 2
389-101	Mathematics 1	4	389-201	Mathematics 2
354-107	Electrical Circuits & Applications 1	8	354-298	Electrical Circuits & Applications 2
354-106	Computer Programming & Concepts	3	328-107	Technical Drawings
	General Studies	3	328-117	Fabrication & Manufacturing Process 1
				General Studies
Semester 3: 26 hours per week			Semester 4: 25 hours per week	
389-302	Mathematics 3	3	329-318	Fabrication Manufacturing Process 3
328-108	Electronics 1	5	329-705	Precision Instrument Technology 2
328-105	Chemistry	3	329-014	Industrial Instrumentation
329-002	Electrical Circuits & Applications 3	4	329-015	Automation & Robotics Technology
329-217	Fabrication & Manufacturing Process 2	4	329-016	Precision Instrument Servical Maintenance
329-504	Precision Instrument Technology 1	4	329-013	Welding/Sheet Metal Technology
	General Studies	3		

ELECTRONICS CERTIFICATE: DIGITAL EQUIPMENT AND SYSTEMS

Campus Location

North

Program Length

You will be able to proceed through the program at your own pace using prepared learning packages and working with the teacher on a one-to-one basis. Average completion time is 48 weeks.

Program Information

There is an ever growing need for digital and microprocessor based electronic systems. Most electronic systems being developed in the 1980's will have digital circuits in them. Some examples are microcomputers, automotive electronic systems, televisions and data communication systems.

The basic electronics of this program is common to that in the Radio and TV Receivers and Mobile Radio Communications program, but the latter part of the program specializes in varying types of digital systems.

Employment Opportunities

Graduates may expect to find employment with the manufacturers and users of digital based equipment as troubleshooters, maintainers, and installers.

Admission Requirements

An admissions interview, as well as pretests in communications and mathematics, to be conducted at the College, is required at least one week prior to the student's proposed start date. The student should have a knowledge of basic mathematical skills such as adding, subtracting, multiplying and dividing of whole numbers and fractions. Skills in basic algebraic expressions, percentages and ratios will also be required. In addition, your ability to effectively read and comprehend English will be an important asset.

Program Outline

- Direct Current Circuits
- Alternating Current Circuits
- Solid State Devices
- Electronic Circuits and Applications
- Basic Digital Logic Circuits
- Microprocessors
- Analysis of microprocessor based systems
- Troubleshooting and repair of microprocessor based systems
- Analysis of digital interfaces to peripheral devices
- Data interface with fibre optic systems

For more information please call FRANK FORD 675-3111, ext. 380



ELECTRONICS CERTIFICATE: MOBILE RADIO COMMUNICATIONS

Campus Location

North

Program Length

You will be able to proceed through the program at your own pace using prepared learning packages and working with the teacher on a one-to-one basis. Average completion time is 48 weeks.

Program Information

There is an ever growing need for mobile radio communications. Examples are police departments, security companies, fleet operators, taxi and service equipment dispatching. The use of mobile radio communications is also growing in the field of construction.

The basic electronics of this program is common to that in the Radio & TV Receivers and Digital Equipment and Systems program, but the latter part of the program specializes in Mobile radio systems of varying types.

You will learn to install, troubleshoot, repair and align 2-way solid state mobile radio equipment.

Employment Opportunities

You may expect to find employment with the manufacturing companies of radio service systems and commercial VHF FM systems. You may also find opportunities with users of this equipment such as police departments, taxi companies, construction companies, telephone companies, and public utilities.

Admission Requirements

An admissions interview, as well as pretests in communications and mathematics to be conducted at the College, is required at least one week prior to the student's proposed start date. The student should have a knowledge of basic mathematical skills such as adding, subtracting, multiplying and dividing of whole numbers and fractions. Skills in basic algebraic expressions, percentages and ratios will also be required. In addition, your ability to effectively read and comprehend English will be an important asset.



Program Outline

Direct Current Circuits

Alternating Current Circuits

Solid State Devices

Electronic Circuits and Applications

Basic Digital Logic Circuits

Mobile Radio Receiver Systems and Servicing

Mobile Radio Transmitter Systems and Servicing

Communications Antennas

For more information please call Frank Ford at 675-3111, ext. 380

ELECTRONICS CERTIFICATE: RADIO & T.V. RECEIVERS

Campus Location.

North

Program Length

You will be able to proceed through the program at your own pace, working with the teacher on a one-to-one basis using prepared learning packages. Average completion time is 48 weeks.

Program Information

This program is designed to prepare you for employment in the electronic industry. While in the program you will apply theory and practice in basic circuit behaviour, solid state techniques, AM and FM radio, monochrome and colour T.V. You will also learn to use various types of test equipment which are encountered in the electronics service industry.

Employment Opportunities

Since the emphasis in this program is on trouble-shooting and repair of electronic equipment, you can expect to be employed by companies who manufacture, distribute, and service many different kinds of equipment. These may include the repair of radios and television receivers, auto radios and audio equipment, cable T.V. equipment, closed circuit T.V. equipment, security systems, office copying equipment and industrial automated production equipment. Opportunities also exist as sales/service representatives with electronic distributors.

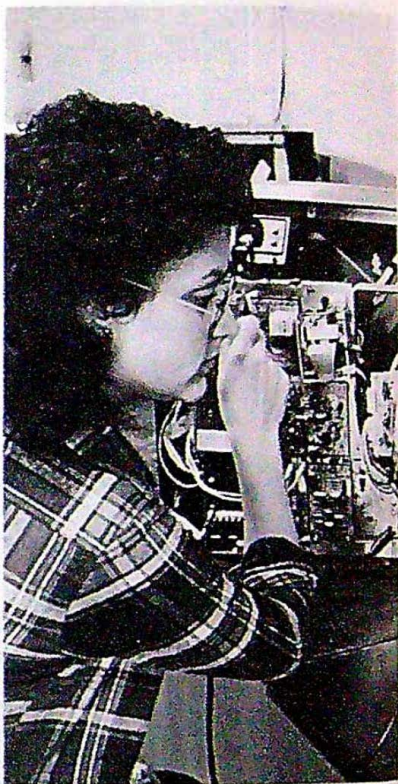
Admission Requirements

An admissions interview, as well as pretests in communications and mathematics, to be conducted at the College, is required at least one week prior to the student's proposed start date. The student should have a knowledge of basic mathematical skills such as adding, subtracting, multiplying and dividing of whole numbers and fractions. Skills in basic algebraic expressions, percentages and ratios will also be required. In addition, your ability to effectively read and comprehend English will be an important asset.

Program Outline

Direct Current Circuits
Alternating Current Circuits
Solid State Devices
Electronic Circuits and Applications

AM and FM Receiver Systems
Television Systems and Servicing
Basic Digital Logic Systems



For more information please call Frank Ford at 675-3111, ext 380.

ELECTRONICS ENGINEERING TECHNICIAN

Campus Location

North

Program Length

Four semesters

Program Information

This program is designed to provide you with a comprehensive background in modern electronic principles and practical experience in modern, well-equipped laboratories. The practical experience gained in this program prepares you for employment in the computer, telecommunications, and industrial electronics industries.

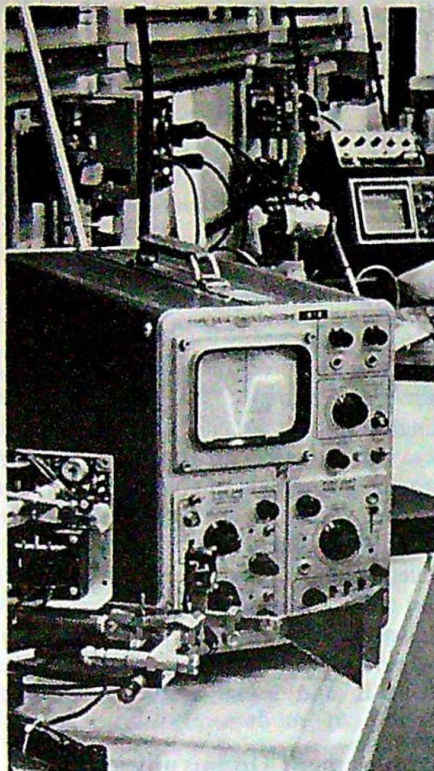
Note: Electronics students may be required to purchase electronics components kits and a recommended multimeter at the college.

Employment Opportunities

As an Electronics Engineering Technician you may find employment in a variety of industrial, engineering, and scientific organizations. You may become involved

in equipment and component manufacturing, research and testing, equipment maintenance and electronic sales.

As a graduate of this four semester program you may further develop your expertise by entering the 5th semester of the Electronics Engineering Technology Program or the 5th semester of the Electronics (Video) Engineering Technology Program. For curriculum see p. 81



For more information please call Bob Nash at 675-3111 ext 472.

ELECTRONICS ENGINEERING TECHNOLOGY

Campus Location

North

Program Length

Six semesters

Program Information

Electronics Engineering Technology is a six semester program with the first four semesters common to the Electronics Engineering Technician program. The 5th and 6th semesters provide more advanced studies in the field of electronics. Emphasis on advanced circuitry measurement techniques and design fundamentals enables you to perform measurements, test and troubleshoot complex equipment, design and construct prototypes, and prepare electronic drawings, technical manuals and specifications for a wide variety of modern electronic systems.



Employment Opportunities

As a graduate of the Electronic Technology program you may find employment in industries as varied as telecommunications, control equipment, computer systems, entertainment equipment, and industrial electronics systems.

As a technologist you can use your greater theoretical training in high technology areas such as fibre optics, microprocessor application and development, and electronic design techniques. You may also use your skills troubleshooting prototype equipment prior to manufacture. For Curriculum see pg. 81

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses. Electronics and Physics at the Senior level are strongly recommended.

For more information please call Bob Nash at 675 3111

CURRICULUM

Electronics Engineering Technician

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester 1: 24 hours per week			Semester 2: 25 hours per week		
380-183	Mathematics 1	3	380-184	Mathematics 2	3
941-102	English Communications I	4	941-103	English Communications 2	4
380-010	Heat, Light, & Sound	4	380-191	Mechanics & Waves	3
350-083	Elect. Circuits & Application 1	4	350-102	Elect. Circuits & Application 2	4
350-092	Logic 1	4	350-187	Medical Equipment Maintenance 1	3
350-094	Elect. Production Technology 1	4	350-107	Circuits & Measurement	4
380-189	Basic Programming	1	350-093	Logic 2	4
			350-194	Elect. Production Technology II	3
Semester 3: 26 hours per week			Semester 4: 25 hours per week		
380-185	Calculus 1	3	380-186	Calculus 2	3
350-188	Medical Equipment Maintenance 2	3			
350-103	Elect. Circuits & Application 3	4	350-104	Elect. Circuits & Application 4	4
350-051	H.F. Circuits	4	350-180	Microcomputer Systems 2	4
350-179	Microcomputer Systems I	4			
	General Studies	3	350-016	Troubleshooting General Studies	3
	General Studies	3			
380-190	Fortran Programming	1	350-183	Telecomm. Systems	4
350-175	Principles of T.V.	4	350-184	Motors & Controls	3
Semester Five: 25 hours per week			Semester Six: 25 hours per week		
380-187	Calculus 3	3			
350-105	Elec. Circuits & Appl. 5	4	350-106	Elec. Circuits & Appl. 6	4
350-150	Opto-Electronics	4	350-149	Control Systems	4
350-185	Electromech. Techniques	3	350-078	Communication Systems	4
350-151	Video Systems	4	350-148	Applied Electromagnetics	4
350-181	Microcomputer Systems 3	4	350-186	Technical Project	2
350-200	Techniques of Design	3	350-153	Microwave Techniques	4
			380-195	Applied Statistics	3

ELECTRONICS (MEDICAL EQUIPMENT) ENGINEERING TECHNICIAN

Campus Location

North

Program Length

Four semesters

Program Information

This program combines the application of basic electronics and health knowledge to the maintenance of sophisticated electronic equipment used in the hospital and medical research environments.

Note: Electronics students may be required to purchase electronics components kits and a recommended multimeter at the college.

Employment Opportunities

As a graduate of this program you will be familiar with the sophisticated electronic equipment used in hospitals and medical research centres today. You may find employment in a variety of areas including employment with the manufacturers of medical electronic aids. These sophisticated electronic aids are an important factor in the advancement of medical care. You may also find employment analyzing and solving potentially hazardous situations, comparing equipment performance to manufacturer's specifications, calibrating, testing and repairing hospital electronic equipment and preparing the necessary technical reports.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses. Electronics and Physics at the Senior level are strongly recommended.

For more information please call Bob Nash at 675-3111, ext. 472.



CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester 1: 24 hours per week			Semester 2: 25 hours per week		
380-183	Mathematics 1	3	380-184	Mathematics 2	3
941-102	English Communications	4	941-103	English Communications 2	4
380-010	Heat, Light, & Sound	4	380-191	Mechanics & Waves	3
350-083	Elect. Circuits & Application 1	4	350-102	Elect. Circuits & Application 2	4
350-092	Logic 1	4	350-187	Medical Equipment Maintenance 1	3
350-094	Elect. Production Technology 1	4	350-107	Circuits & Measurement	4
380-189	Basic Programming	1	350-093	Logic 2	4
Semester 3: 25 hours per week			Semester 4: 25 hours per week		
380-185	Calculus 1	3	380-186	Calculus 2	3
350-188	Medical Equipment Maintenance 2	3	350-189	Medical Equipment Maintenance 3	3
350-103	Elect. Circuits & Application 3	4	350-104	Elect. Circuits & Application 4	4
350-051	H.F. Circuits	4	350-180	Microcomputer Systems 2	4
350-179	Microcomputer Systems 1	4	350-016	Troubleshooting	4
	General Studies	3		General Studies	3
380-190	Fortran Programming 1	1	350-183	Telecomm. Systems	4

INSTRUMENTATION (INDUSTRIAL) ENGINEERING TECHNICIAN

Campus Location

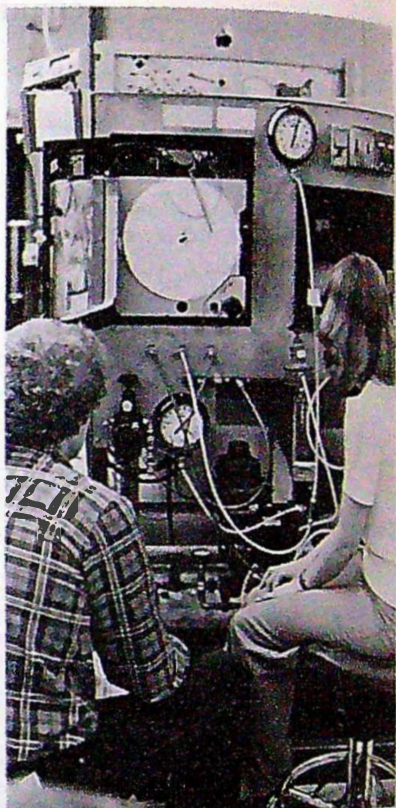
Lakeshore 2

Program Length

4 semesters (over 2 years)

Program Information

The Industrial Instrumentation Technician program will provide you with knowledge of up-to-date technology and the skills to enable you to function in todays technical and automated industries. Some of the subjects that are influential in this program are: mechanics, electronics, physics and chemistry. Graduates from this program will exhibit the ability to calibrate, troubleshoot, repair and maintain instruments and computer systems used for process measurement and control.



Note: The students may be required to place refundable deposits on such items as lab manuals or other items supplied by the College.

Employment Opportunities

With industry becoming more automated every year, there is a great demand for instrumentation technicians. Your future prospects are excellent, limited only by your ability, initiative, and ambition.

As a graduate, you will find employment in fields such as manufacturing, pulp and paper, nuclear and hydro generating plants, mining, petro chemical, and natural gas. instrument manufacturing companies, plant construction, consulting firms, and service industries.

Your training will enable you to choose other occupations relating to instrumentation such as, instrumentation technical salesperson, process operator, control maintenance technician, refrigeration equipment mechanic, computer programmer and avionic instrument technician.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses.

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester One: 25 hours per week			Semester Two: 25 hours per week		
389-104	Physics 1	3	389-204	Physics 2	3
389101	Mathematics 1	4	389-201	Mathematics 2	4
941-102	Communications 1	4	941-103	Communications 2	4
354-106	Computer Programming & Concepts	3	328-002	Workshop Practices	2
354-107	Electrical Circuits & Applications 1	8	328-103	Measuring Instruments 1	5
	General Studies	3	354-208	Electrical Circuits & Applications 2	4
				General Studies	3
Semester Three: 26 hours per week			Semester Four: 24 hours per week		
389-302	Mathematics 3	3	328-018	Final Control Elements	3
328-202	Measuring Instruments 2	4	389-203	Chemistry 2	2
328-004	Pneumatic Instruments	4	328-006	Electronic Applications	3
328-108	Electronics 1	5	328-206	Automatic Controls 2	5
389-104	Chemistry 1	2	328-017	Analysis Instruments	3
328-106	Automatic Controls 1	5	328-208	Electronics 2	4
	General Studies	3	328-016	Computer Control	2
			328-107	Technical Drawings	2

For more information please call 252-5571 ext. 252 or 253

INDUSTRIAL INSTRUMENTATION MECHANIC

Campus Location

Lakeshore 2

Program Length

40 weeks

Program Information

As a graduate of this 40-week program you will be able to install, repair, maintain, and calibrate indicating, recording, telemetering and controlling instruments used to measure and control variables such as pressure, level, flow, temperature, and chemical composition. You will also learn how to disassemble malfunctioning instruments, and be able to trouble-shoot equipment. You will also be able to instruct plant personnel in correct and safe operating procedures of instrumentation.

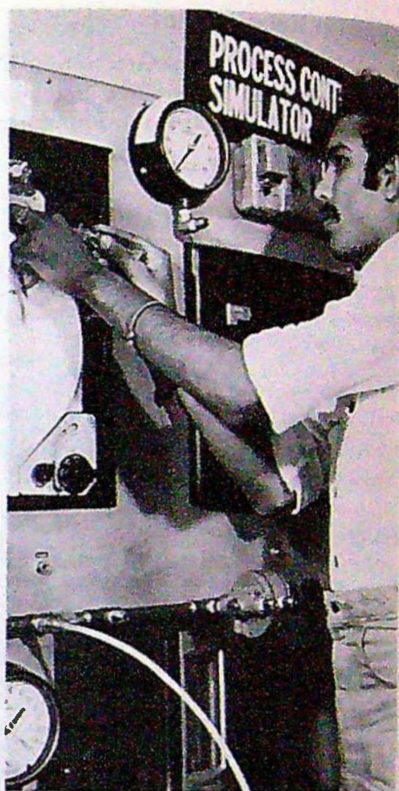
Employment Opportunities

This occupation requires a person who enjoys dealing with physics and electricity. He/she requires logical thinking, numerical ability, and the ability to understand the principles of instrumentation construction and operation, and the skill to apply appropriate techniques for installation, repair and adjustment.

The prospect for employment is excellent. There is an increased need for well-trained men and women to maintain, service, operate, and sell instrumentation equipment. As a graduate of this program, one will be in demand in a great variety of industries.

Transfer is possible to other positions within the occupation requiring similar skills or with limited additional training such as analytical instrumentation with oil companies and government laboratories.

Some activities include analysis and problem diagnosis and resolution in an industrial environment.



Admission Requirements

An admissions interview, as well as pretests in communications and mathematics, to be conducted at the College, is required at least one week prior to your proposed starting date. You should have a working knowledge of mathematics, including substitution, equations, formulae, graphing, and trigonometry.

Program Outline

- Calibration Principles
- Pressure Measurement (non electrical)
- Flow Measurement (non electrical)
 - physics & terms
 - secondary elements
 - integration
 - rotameters
 - positive displacement meters
 - turbine meters
- Level Measurement (non electrical)
 - gauge glasses
 - floats
 - buoyancy displacers
 - differential pressure
- Temperature Measurement (non electrical)
 - physics & terms
 - temperature scales & conversion
 - glass stem & solid expansion thermometers
 - filled thermal systems
 - standards & calibration
- Valves
- Mechanical Practices
- Pneumatic Instruments
- Application Pneumatic and Mechanical Instruments
- Thermocouple Theory
- Electrical & Electronic Instruments
- Control Theory and Instruments
- Technical Drawing

For more information please call 252-5571 ext. 252 or 253

PRECISION INSTRUMENT MECHANIC

Campus Location

Lakeshore 2

Program Length

Approximately 48 weeks.

Program Information

Based on individualized instruction, the program provides training in the practice of precision instrument manufacturing, service and sales. Graduates will be able to construct and modify components and assemble, repair, adjust and test precision instruments. These would include complex mechanical, electromechanical, electronic, photographic or optical devices, and the necessary tools, machines and processes found in the industry today.

The program emphasis is on hand and machine skills such as metal cutting, forming and turning, soldering, welding and brazing as applicable to precision instrument requirements. Included is a mechanics industrial electronics program and introductions to sheet metal processes, woodworking, industrial instrumentation, photographic equipment repair and automatic screw machine operations.

The flexible timetable, continuous intake and the wide range of subjects makes this program an ideal basic and retraining vehicle for persons who like interesting technical work with many and varied opportunities for employment.

Manpower sponsorship may be available to qualifying individuals.

Employment Opportunities

Precision Instrument Mechanics are in high demand by manufacturing companies, commercial, transportation and communication concerns, government and research establishments who manufacture, import and sell, service or use complex precision, electromechanical, electronic, optical or photographic devices. Typical instruments are microscopes, analytical instruments, chemical process control and sensing equipment, photographic apparatuses, scientific, research biochemical and medical equip-



ment, nuclear instrumentation, navigation and aircraft instruments, computer, duplicating and data storage and retrieval hardware, spacecraft instrumentation, high frequency communication devices, to name a few of a large number. Graduates fit readily into a wide range of technical situations and will be able to carry out fine part and prototype manufacturing, equipment and systems assembling, analysis, quality control and repair work. There are more than two hundred companies in Ontario alone involved in precision instrument work.

Admission Requirements

An admissions interview, as well as pretests in communications and mathematics, to be conducted at the College, is required at least one week prior to the student's proposed start date. The student should have a knowledge of basic mathematical skills such as adding, subtracting, multiplying and dividing of whole numbers and fractions. Skills in basic algebraic expressions, percentages and ratios will also be required. In addition, your ability to effectively read and comprehend English will be an important asset.

Program Outline

- Orientation
- Life Skills
- Dimensional Metrology
- Drafting Fundamentals
- Hand Tool & Bench Work
- Precision Instrument Electronics
- Precision Instrument & Toolroom Machine Tools
- Portable Power Tools
- Machine Shop Practice
- Introduction To Automatic Screw Machine Operations
- Electronic and Micro Soldering
- Precision Instrument Work Processes
- Introduction To Welding Processes
- Precision Instrument Measuring Techniques and Quality Control
- Introduction To Electric Circuit Fundamentals
- Introduction To Sheet Metal Work Processes
- Introduction To Woodworking Processes
- Precision Instrument Technology
- Introduction To Industrial Instrumentation
- Precision Instrument Calibration, Adjustment & Repair Procedures
- Introduction To Photographic Equipment Repair
- Introduction To Industrial Maintenance
- Industrial Relations
- Basic Prototype & Modification Design
- Digital Circuits & Micro Processors Fundamentals
- Introduction to Automation & Robotics
- Final Precision Instrument Work Project

For more information please call 252-5571 ext. 252 or 253

INDUSTRIAL

INDUSTRIAL (MANAGEMENT) ENGINEERING TECHNOLOGY

Campus Location

North

Program Length

Six semesters

Program Information

The Industrial (Management) Engineering Technology program is designed to satisfy the complex needs of modern industry. As a graduate from this six semester program you will be familiar with industrial engineering and business management techniques that can be applied to virtually all industry or business.

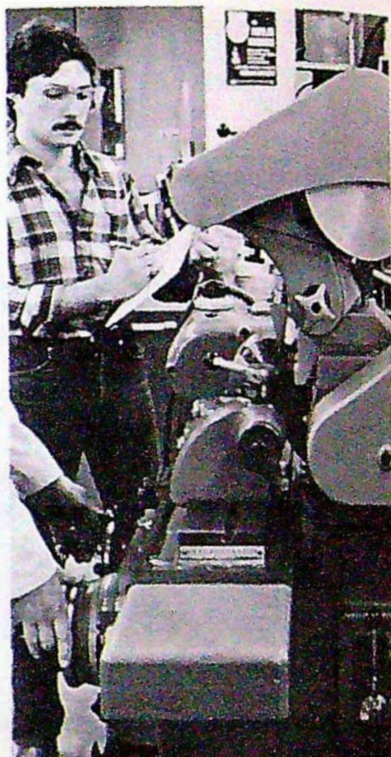
Employment Opportunities

The diversity of Industrial Engineering Technology creates a variety of employment opportunities in areas such as quality control, facilities planning, operations research, product development and procedures planning. Career alternatives include Systems Analyst and Industrial Engineer. As a Systems Analyst you may find employment in almost any industry from a manufacturing industry to a service industry. Your responsibilities may include the development of efficient and effective reporting, paper systems, and/or computer programs as well as providing information and feedback for effective decision making. As an Industrial Engineer your responsibilities may include the development of work standards and manpower planning to maximize the effective use of men, materials and machines. This involves time studies and analysis techniques.

With experience and a desire to become part of the management team, a graduate can move into a middle management position such as a Production Superintendent.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses.



CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester One: 27 hours per week			Semester Two: 26 hours per week		
380-046	Mathematics I	4	380-002	Mathematics II	4
941-102	English Communications I	4	941-103	English Communications II	4
320-132	Mechanics	4	320-001	Statics	4
380-182	Statistics	3	320-048	Time Study	4
			320-142	Quality Control	4
320-098	Manufacturing Processes I	4			
320-046	Mechanical Tech. Drawing	4	350-190	Electrical Control I	3
320-037	Total Loss Control	4		General Studies	3
Semester Three: 25 hours per week			Semester Four: 25 hours per week		
380-178	Fortran Prog. for Ind. Eng.	4	320-065	Industrial Organization & Management	4
320-052	Basic Strength of Materials	4	320-268	Manufacturing Cost Estimating	3
320-076	Manufacturing Processes II	4	320-164	Work Simplification	4
320-273	Motion Study	3	320-265	Material Sciences	3
320-267	Metrology	3	221-010	Elements of Accounting	4
320-221	Occupational Health (Chemical Agents)	4	320-234	Stress Analysis	4
	General Studies	3		General Studies	3
Semester Five: 23 hours per week			Semester Six: 24 hours per week		
320-070	Wage & Salary Administration	4	380-171	Calculus I	4
320-226	Plant Layout & Material Handling	8	320-013	Industrial Psychology	4
320-090	Operations Research	4	320-072	Systems & Procedures	4
320-092	Production & Inventory Control	4	320-071	Industrial Economics	4
380-193	Computer Applications	3	253-111	Labour Relations	4
			320-091	Project Management	4

For more information please call Jim Montgomery at 675-3111, ext. 378.

SAFETY ENGINEERING TECHNOLOGY

Campus Location

North

Program Length

Six semesters

Program Information

As a Safety Professional you will be involved in recognizing and evaluating potential loss-producing conditions due to occupational health and safety problems. You will also be involved in the development of practical programs to control these losses.

Humber prepares you for your career in Safety Engineering Technology by providing a wide background in the physical sciences, mathematics and management techniques with special emphasis on the concepts of occupational health and safety engineering.

Field Trip

Every second or third year a Safety Engineering Field Trip is taken through Ontario and Northern Ontario. The trip is optional but strongly recommended. The cost of food and accommodation is borne by the student. The College provides transportation. Optional projects are provided for students who do not participate in the field trips.

Employment Opportunities

As a graduate from the Safety Engineering Technology program you may find a challenging and rewarding career in various industries such as mining, forest products, petrochemical, construction and manufacturing. Opportunities also exist within government agencies, safety associations and labour organizations.

Career alternatives include that of Safety Co-ordinator, Loss Control Analyst and Accident Investigator.

As a Safety Co-ordinator you are actively involved in ensuring the health and safety of workers on and off the job. This position requires current knowledge of occupational health and safety legislation and the ability to apply this knowledge to the everyday working situation of all employees.

As a Loss Control Analyst you will be instrumental in reducing costs, improving working conditions and maximizing the profits of a particular industry. This position primarily benefits the consumer since the products produced are of better durability, reduced hazard, and lower prices.



As an Accident Investigator you will be able to employ your technical experience and knowledge to investigating the causes of an accident situation. You then would be involved in making recommendations that help to prevent similar incidents in the future.

Admission Requirements

Ontario Secondary School Graduation Diploma. Additional requirements are four credits in English, four credits in technical or academic Mathematics and a minimum of two credits in any combination of Senior level Science and program related Senior level Technical courses.

CURRICULUM

Course No.	Course Name	Credits	Course No.	Course Name	Credits
Semester One: 27 hours per week			Semester Two: 26 hours per week		
380-046	Mathematics I	4	380-002	Mathematics II	4
941-102	English Communications I	4	941-103	English Communications II	4
320-132	Mechanics	4	320-001	Statics	4
380-182	Statistics	3	350-190	Electrical Control 1	3
320-098	Manufacturing Processes I	4	380-010	Heat, Light, & Sound	4
320-046	Mechanical Technical Drawing	4	320-095	Fire Protection	4
320-037	Total Loss Control	4		General Studies	3
Semester Three: 27 hours per week			Semester Four: 25 hours per week		
320-221	Occupational Health (Chemical Agents)	4	380-171	Calculus I	4
380-178	Fortran Programming for Ind. Eng.	4	320-276	Industrial Security	3
320-052	Basic Strength of Materials	4	320-222	Occupational Health (Physical Agents)	4
320-076	Manufacturing Processes II	4	320-065	Industrial Organization & Management	4
320-224	Plant Layout	4	438-450	A.V. Techniques	4
340-051	General Chemistry I	4	340-133	Process Industries & Plant Safety	2
	General Studies	3	320-234	Stress Analysis	4
Semester Five: 22 hours per week			Semester Six: 23 hours per week		
380-193	Computer Applications	3	320-091	Project Management	4
320-090	Operations Research	4	320-013	Industrial Psychology	4
320-171	Product & Public Safety	4	221-010	Elements of Accounting	4
320-281	Environmental Health	4	320-071	Industrial Economics	4
320-248	Occupational Health (Life Style)	4	253-111	Labour Relations	4
	General Studies	3	320-274	Safety Program Development	3

For more information please call Jim Montgomery at 675-3111, ext. 378.

APPRENTICESHIP PROGRAMS

Those interested in enrolling in an apprenticeship program, or interested in more detailed information, should contact the Industrial Training Branch, Ministry of Colleges and Universities. In Toronto the number is 965-6462. Information can also be obtained from your local Canada Manpower Office. The Colleges, in general, have no hand in selecting candidates for apprenticeship and will direct such students to the above representatives.

Humber College provides in-school training for the following programs: Plumbing Sheet Metal, Steamfitting, Tool & Die, General Machinist, Electrical (Construction and Maintenance), Hairdressing.

Plumber Apprentice

This program offers you the opportunity to study the theory and practice plumbing, mathematics, welding, blueprint reading, and industrial communications. As a registered apprentice, you will complete studies through the basic, intermediate and advanced programs combined with practical training in the plumbing industry. A certified plumber is a qualified tradesman in a highly organized trade offering excellent working conditions at an excellent rate of pay.

Sheet Metal Worker Apprentice

As a sheet metal apprentice you will study the theory and practice of sheet metal pattern drafting, mathematics, welding, blueprint reading and industrial communications. The program is divided into three fields: basic, intermediate and advanced. These studies are combined with practical training in the sheet metal industry.

Steamfitter Apprentice

As a steamfitting apprentice your studies will bring you through basic, intermediate and advanced steamfitting as well as a sound academic background. During each of the various levels, you will find yourself studying the theory and practice of steamfitting, mathematics, blueprint reading, welding and industrial communications. Modern industries such as paper mills, oil refineries, and chemical plants require complex piping systems assuring qualified steamfitters ample employment opportunities.

Electrician (Construction and Maintenance) Apprentice

The program provides you with both academic training and practical apprenticeship work periods. The working conditions and the salary are among the best in the construction industry. One of every twenty persons employed in Canada is in some branch of the electrical industry, thus making the trade of the Electrician a secure and satisfying career. As a registered apprentice, you will complete studies through the basic, intermediate and advanced programs combined with practical training in the electrical industry.

General Machinist Apprentice

As a General Machinist apprentice, you will complete studies at the Basic, Intermediate and Advanced levels in such topics as Trade Theory, Shop Practice, Blueprint Reading and Shop Calculations. The trade of General Machinist is one of the more essential skills required for the present and future growth of the Canadian economy. Work in most of the manufacturing industries such as the Aircraft, Automobile, Appliance, etc. require the skills of a General Machinist. A General Machinist is a highly skilled occupation that brings good security and monetary rewards.

Tool & Die Maker Apprentice

As a Tool & Die Maker apprentice you will complete studies at the Basic, Intermediate and Advanced levels in such topics as Trade Theory, Shop Practice, Blueprint Reading and Shop Calculations. The trade of Tool & Die Maker is one of the more essential skills required for the present and future growth of the Canadian economy. Work in most of the manufacturing industries such as the Aircraft, Automobile, Appliance, etc. required the skills of a Tool & Die Maker. A Tool & Die Maker is a highly skilled occupation that brings good security and Monetary rewards.

Hairstyling Apprentice

This program is designed to offer the apprentice the necessary skills and knowledge required by today's Hairstylists. Subjects included in the program are the Theoretical and practical involvement of: Hair-cutting, hair-styling, hair-colouring; permanent waving, hair-straightening, care of wigs, shaving, face massage, scalp massage, facials, manicuring, shampooing and rinses. Ancillary - but no less important - is the theoretical study of: hair, skin, bacteriology and hygiene. Personality development and business management are also part of the course. Basic, Intermediate and Advanced programs are integrated with salon training, leading to the Certificate of Qualification Exam at completion of course.

PART-TIME TECHNICAL ADVANCEMENT PROGRAMS DIPLOMA PROGRAMS

Diplomas offered for part-time programs are identical to full-time diploma programs.

T.A.P. (Technical Advancement Program) is an evening program leading to a College Diploma and OACETT certification where applicable. If you would like to know more about T.A.P., phone, write or visit us. We will give you a personal interview at your convenience. When we have assessed your academic and industrial background you can plan for both your long term and immediate goals.

- Advanced standing for previous related courses.
- Advanced standing for related industrial experience.

T.A.P. programs enable you to receive a diploma in:

- Chemical Laboratory Technician
- Chemical (Industrial) Engineering Technology
- Chemical (Microbiological) Technology
- Civil Engineering Technician/Technology
- Explosives Engineering Technician
- Electromechanical Engineering Technician/Technology
- Electronics Engineering Technician/Technology
- Industrial (Management) Engineering Technology
- Manufacturing Engineering Technician
- Mechanical (Drafting Design) Engineering Technician
- Mechanical (Tool & Design) Engineering Technician
- Safety Engineering Technology
- Survey Technician/Technology
- Aerial Survey Technician
- Mechanical (Numerical Control) Technician

CERTIFICATE PROGRAMS

Certificates are offered in:

- Civil (Construction)
- Digital Electronics
- Electronics Certificate (Radio and TV)
- Electronics Certificate (Mobile Radio)
- Electronics Telecommunications
- Heating, Refrigeration & Air Conditioning
- Industrial Electronics
- Industrial Engineering
- Legal Surveying
- Machine Tool Sales
- Fluid Power Certificate
- Manufacturing Engineering
- Numerical Control
- Quality Control
- Surveying
- Tool Engineering
- Safety Certificate
- Occupational Health Certificate

These certificate programs vary in length from 2 to 12 courses, depending on the subject. In most cases the certificates form part of a diploma program, and can be used as credit toward a diploma. In addition, special programs are designed and run for industry. These programs are tailored to meet the specific need of the client company or organization.

REFRESHER PROGRAMS

WELDER OPERATOR CERTIFICATE:

20 weeks or completion of the learning objectives

This program is similar to the Welder Fitter program, except that it does not include blueprint reading and layout and fitting, but does include welding theory, and welding practices.

The course is designed primarily for production welding and other welding operations normally carried out under the supervision of a fully qualified welder fitter.

For further information on program content, see Welder Fitter.

Location: Lakeshore 2

Admission Requirements: Grade 8

WELDER REFRESHER CERTIFICATE:

Total number of weeks to be arranged as necessary

This is a special program for former welders who wish to return to their previous occupation or for experienced welders who need upgrading in the varied welding techniques for the G4 test, as administered by the Ontario Department of Labour. This program reviews the basic welding techniques and concentrates on blueprint reading, layout and assembly and the new welding techniques such as Tig and Mig. Included also are mathematics and life skills.

Location: Lakeshore 2

Admission Requirements: Previous related education or work experience.

For more information please call 252-5571 ext. 252 or 253

Exemption Statement:

Course credits at the Senior level may be basis for obtaining exemptions (either in part or in total) in corresponding courses of the program of study. For evaluation of their academic background, students should contact the Senior Program Coordinator of the Program.

Field Trips

Associated with some programs, are some extensive field trips which are recommended but optional. If a student is unable to participate in the field trip, a comprehensive project will be assigned in its place.

THE WORKING WORLD OF TECHNOLOGY

NATURE OF WORK	A Doer (Constructs, builds, repairs)	A Scheduler/Controller (Implements plans as instructed)	A Problem Solver (Modifies/improves plans and administers change)	A Policy Manager (Conceptual Planning Design)
TIME FRAME OF WORK	Today (Day-to-day assignments)	One week to one year ahead of actual production.	Six months to two years ahead of actual production. Practical solutions for yesterday's problems (eg. environment)	Tomorrow. On to five years ahead of production. "Research today's answers to problems created yesterday"
SAMPLE PROGRAMS	Drafting	Architectural (Design) Technician	Architectural (Design) Technology	Architect
LENGTH	One year or less	Two years	An additional year for a total of three years.	Four years
TRAINING INSTITUTIONS	Secondary Schools Community Colleges Private Trade Schools	Community Colleges	Community Colleges	Universities
MINIMUM ENTRY REQUIREMENTS*	Grade 10 including English and Math	Grade 12 including Math and Sciences or the completion of a related one year skilled trades program at a Community College.	Grade 12 with strength in Math and Sciences or the completion/transfer from a related two year technician program at a Community College.	Grade 13 with strength in Math and Sciences or the completion of a related three year technology program at a Community College plus several years work experience
CERTIFICATION	Certificate	Diploma	Diploma	Degree

*These pages attempt to portray, graphically, the flexible environment in which you as a Hamblet Technology graduate, will be working. Please note that the entry levels are given as minimums, this is not to suggest that you can only enter from these points. For example, you may have a grade 13 standing but would prefer a more "hands-on" experience and, therefore, might enter at the Architectural (Design) Technician (or even Drafting) level. Then, as your work experience increases, and, perhaps, your interests change, you may wish to change your career by moving to a more theoretical level. This may be achieved through on-the-job training, and/or a combination of full, and part-time study. Similarly, a student year old grade 10 graduate, whose work has involved mathematics etc., may wish to enter the technician level program as a transfer student.

Course Descriptions

241-010 Elements of Marketing

You will be involved in an in-depth study of the marketing concept. Identification of the potential market, consumer trends in purchasing, development of the product, channels of distribution, pricing strategy, advertising and sales promotion form the framework of this course.

320-001 Statics

This course is primarily a problem solving course which prepares the student for more advanced and specialized courses requiring a general knowledge of equilibrium. It provides the student with an approach and a method of analysis of practical systems. Emphasis will be placed on physical problems which will require an elementary knowledge of our physical world.

Course is designed for Technology students who have successfully completed the first semester Mechanics and Mathematics courses.

320-006 Mechanical Design and Drafting 2

The student will be able to design and draw storage tanks and piping systems; design and draw simple structures for the support of machines; design and draw pneumatic and hydraulic cylinder systems.

320-013 Industrial Psychology

It is the objective of this course to provide the student with an insight into the psychological and social aspects of industrial organizations and to enhance the student's ability to perceive the interrelationship of psychology and technological factors. Case studies, role-playing and group problems will introduce the student to methods of resolving organizational problems.

320-015 Numerical Control 1

The student will become able to prepare a manual program for turning, milling, punching, etc. The student will prepare manual programs, punch and debug them, and successfully run them on the shop's C.N.C. equipment.

320-016 Numerical Control 2

The student will become able to prepare a computer assisted program, punch cards, obtain printout, debug-program, convert punched cards to tape and successfully run tape on existing systems.

- 320-020 Refrigeration 1 (Thermodynamics)**
The student will be able to define the basic theories of refrigeration including the pressure-enthalpy diagrams and refrigeration components. The course also encompasses the measuring and sizing of compressors, compressor construction and basic refrigeration practices. The study entails reciprocating compressors only, in preparation for Refrigeration 2.
- 320-021 Refrigeration 2**
The student will be able to size compressors, refrigerant systems and refrigerant piping. The more complex compression systems and controls are studied in depth. The course also encompasses the operation and characteristics of centrifugal and absorption systems to prepare the student for the study of commercial systems.
- 320-029 Commercial Systems 1**
The student will be able to analyze commercial systems, design layouts, specify components and troubleshoot. The course encompasses central systems and all-air systems including single-zone, variable air volume, dual-duct, multizone, and induction units.
- 320-030 Commercial Systems 2:**
To enable the student to analyze Commercial Systems, design layouts, specify components and troubleshoot. The course is a continuation of Commercial Systems 1 and encompasses air-water, all-water, heat recovery, panel and control systems.
- 320-031 Equipment and Energy Selection:**
The student will be able to select types of air conditioning systems and equipment for residential, commercial and industrial use with due consideration to first cost, owning and operating costs and other economic factors.
- 320-037 Total Loss Control**
Health and safety problems represent a staggering loss of human and financial resources in the work place, on the highway, at home, and at recreation. More effective programs must be developed to reduce these problems in order to provide an improved quality of life in our society.
- 320-038 Mechanical Design and Drafting 3**
The student will be able to design and draw gear and chain reduction units, and design and draw belt conveyors and components.

320-043 Die Design 1

The course is aimed to identify and explain the fundamental requirements, which must be known and understood for a large number of cold presswork operations, to provide the student with the theoretical methods in calculating and analyzing components of sheet metal produced by cutting and forming. The student will be involved in practical design activity for most of the time — die details and function and nomenclature, die and drafting techniques forming the core object of the course. The projects will consist of: 1) Two stage piercing blanking die. 2) Compound die. 3) Bending die.

320-044 Die Design 2

Using the principles laid out in Die Design 1, the student will solidify and expand on his/her design techniques by performing practical die design assignments.

The student will be involved in drafting and design activity for most of the time by working on projects such as: Adjustable Die Design for short run production, drawing dies, curling dies, etc.

320-046 Mechanical Technical Drawing

The student will be able to make drawings incorporating Canadian standards for first and third angle orthographic projection, dimensioning in metric and inches, sectional views, screw thread symbols, welded joints, fits and tolerances, surface finishes, assembly drawings and isometric drawings.

Reference: CSA Standard B78.1-1967 & B78.2-1973.

320-048 Time Study

To train the student to select those techniques of Time and Motion Study in order to produce and install the proper standard time for an operation. The student will be able to perform a time study utilizing the basic principles of work station layout, to analyze the operation and construct the optimum method before writing and calculating the Time Study. Topics included are process charts, stop watches, time study forms, assembly and machine operations, foreign elements, allowances and performance ratings.

320-052 Basic Strength of Materials

Stress and deflection analysis is essential in order to design practical and safe components that are functional.

This is an introductory course in the theory of elasticity. The student will calculate stress and strain for metal components and other building materials.

This course is designed for third semester Technology students who have successfully completed the Statics and Mechanics courses in addition to Math 1 and 2.

- 320-063 Industrial Hydraulics**
The course introduces Hydraulic Hardware and illustrates its use in hydraulic circuits with the aim of preparing the student to identify and install, specify and select, analyse and design industrially applicable hydraulic systems.
- 320-065 Industrial Organization and Management**
The student will gain an overview of the industrial management picture so that he/she may identify the interrelation and function of each department. He/she will be able to describe the many principles of management for analyzing facts and thus plan the effective internal and external coordination of control within the enterprise. Topics of concern are internal organization, risk, manufacturing, capital and investment and Canadian business methods.
- 320-070 Wage and Salary Administration**
The student will be able to identify factors of compensation and wage theories and recognize the weaknesses and limitations of those theories. Motivations to work are determined in view of intrinsic rewards. You will be able to produce a job design for work and to perform a job analysis and job evaluation. You will analyze requirements for wage surveys, pricing job structures, and communicate on wage systems and compensation programs.
- 320-071 Industrial Economics**
To identify and analyze the factors affecting the business sector and its organization, the market structure and conduct, market performance, restriction of competition, and economic efficiency.
- 320-072 Systems and Procedures**
All businesses require paperwork to accomplish its survival. This course will evaluate and develop systems and procedures to improve the efficiency of an organization to deal with complex problems involving men and machines.
- 320-073 Fluid Mechanics**
This course is to provide the student with a basic understanding of the Fluid Mechanics principles in general and their applications to Fluid Power Technology in particular. It will enable the student to analyse the behaviour of fluids, determine their properties and calculate parameters of simple fluid systems.

320-076 Manufacturing Process II

This course will be concerned with the basic fundamentals of processes and materials used in plastic and rubber industries.

Other manufacturing methods, related to the metal industries, such as various thread and gear manufacturing will be discussed. The principles of process planning will be discussed also with emphasis on preparing routing and operation sheets for a given component to be manufactured.

320-090 Operations Research

The introduction of the important conceptual ideas of operations research which are both fundamental and long lasting, will provide the student with enough understanding and confidence to appreciate the strengths and inherent limitations of operation research approach. As a result, we will establish the models for the traditional recurring tactical problems of operations research and to provide the opportunity for the student to derive the quantitative solutions from these models.

320-091 Project Management

To provide an understanding of the scope and possibilities for planning and controlling using such management techniques as Pert, C.P.M. Pert/Cost. It is intended to develop in the student, sufficient skills in these techniques so that he/she can apply them to industrial projects.

320-092 Production and Inventory Control

The student will be able to specify the techniques necessary to synchronize the work of those concerned with production, to provide procedures for forecasting the required plant output, raw material flow, equipment and labour scheduling through the sequences of manufacturing; to determine warehouse levels and order quantities to maintain low costs, meet delivery dates and assume the highest quality with the minimum of capital investment.

320-095 Fire Protection

Effective programs must be developed to reduce the immense loss potential due to fire both in terms of human values and economics impact. Techniques for fire prevention and extinguishment are considered.

320-098 Manufacturing Processes I

To introduce the basic fundamentals of various production processes used in secondary and primary industries. The processes related to the secondary industries will include: casting, machining, forming and shearing processes. The primary industry processes will be limited only to iron and steel making methods.

320-132 Mechanics

This course is an introduction to Mechanics with emphasis on Analytical Problem Solving. It serves as a background to higher level or special courses dealing with specific aspects of Mechanics. The contents include Vectors, Translational and Rotational Equilibrium, Linear and Rotational Motions, Work, Energy and Power.

320-142 Quality Control

The student will begin with a brief history of Q.C. and discuss the basic concepts, definitions and terminology of Measurement and Analysis of Q costs. The topics of Reliability and Q Assurance, Planning for Q in a Manufacturing Operation, vendor relations and customer relations will be covered. The student will be able to plan for finished goods inspection and techniques for quality improvement.

320-145 Industrial Pneumatics

This course introduces the student to the use of compressed air as power and control medium. It will enable him/her to select, install and maintain industrially used pneumatic hardware; design simple sequencing and control circuits. It includes the gas laws, compression of air, selection of hardware and basic circuit design. A major portion of the course is laboratory work where the student builds simple and complex simulated control circuits.

320-147 Mechanical Power Transmission

The course is an introduction to the most commonly used mechanical power transmission elements. It discusses belts, chains, shafting, bearings, seals and gear type reducers. The student in this course will select those based on calculations considering load and performance requirements and design complete drive units.

320-148 Machine Design 1

Machine Design is an engineering subject concerned with the creation of plans for machines or structures to perform desired function. Machine Design covers a vast field of engineering and the competence in design rests on many factors other than scientific training. (e.g. ingenuity, judgment, familiarity with design codes and standards, etc.)

Some of these factors can be developed only over a number of years of actual experience, however, the student can be provided with the basics, namely a good training in the logical application of theory to the design of industrial products. It is to this end that the course is directed.

320-152 Automation

Improving productivity is a fundamental goal of technology. Automation is the application of automatic control systems to manufacturing processes in order to achieve a high level of productivity.

320-157 Die Design

The course is aimed to identify and explain the fundamental requirements which must be known and understood for a large number of cold presswork operations, and to provide the student with the theoretical methods in calculating and analyzing components of sheet metal produced by cutting and forming. The student will be involved in practical design activity for most of the time — die details function and nomenclature, die and drafting techniques forming the core object of the course. The project will consist of: 1) Two stage piercing blanking die. 2) Compound die. 3) Bending die.

320-162 Mechanical Design and Drafting 1

The student will be able to draw pattern and machining drawings for castings; design weldments and make drawings for them using standard welding symbols; lay out sheet metal developments; and design and draw parts fabricated by machining.

320-164 Work Simplification

The student will be provided with the methods and procedures required for increasing productivity through work simplification. They must be able to record the job process in the most convenient analysis form (flow process, man/machine, multiple activity chart). The student will use the critical analysis technique and determine the most economical method; measure or calculate standard times, and make the new method operational in the minimum amount of time.

320-171 Product and Public Safety

The customer (and the community) is becoming more informed and aggressive in demanding that goods and services shall not injure or present a hazard to health. As liability awards and legislative regulations increase, it is becoming essential to evaluate systems for potential hazards so that effective control programs may be implemented.

320-209 Fluid Power Circuits and Controls 1

This is a continuation of the Industrial Hydraulics course. It discusses typical industrial hydraulic circuits, analyses the relation and interaction between components and sub-system. Topics include; load analysis, component matching and steady state characteristics.

320-210 Fluid Power Circuits and Controls 2

The course introduces moving part logic and the theories and equipment associated with this method of control. It will enable the student to design complex pneumatic control circuits using Boolean Algebra and other accepted methods. It will introduce hardware in the laboratory through projects.

320-212 Safety Program Development

Upon completion of the first five semesters of specialty courses in Occupational Health and Safety, the student will undertake a major, on-site project which will combine all the specialties learned. The project results will be presented as a written technical report and will be given verbally in a seminar situation to the involved managers of the subject business.

320-218 Basic Tool and Fixture Design

This course is aimed at enabling the student to understand what tool design is and its place in industry. Procedures of blueprint reading for tool design purposes, tool drafting vs. other drafting techniques, view selection rules for dimensioning and tolerancing will be discussed. The student will be involved in practical design activity for most of the time by working on such projects as: single point and form cutting tools, template and gage design clamping and holding fixtures.

320-221 Occupational Health 1 (Chemical Substances)

This course represents an introduction to the fundamentals of Occupational Health. The recognition, evaluation and control of health hazards in the working environment involving toxic substances and dusts are considered.

320-222 Occupational Health (Physical Agents)

This course is a continuation of Occupational Health 1. It will deal with physical agents and will include: noise (physics, effects, control), heat/cold stress, light, non-ionizing radiation (radar, laser, microwave), ionizing radiation (physics, effects, control), ergonomics, instrumentation, and personal protective equipment.

320-224 Plant Layout

This advanced course, emphasizing economic realism, will enable the student to specify production facility and capacity requirements for a multi-product manufacturing plant of about \$2,000,000/yr. He/she will integrate material handling, warehouse, inventory and material control to produce an optimum layout design, then redesign to suit a new product mix.

320-226 Plant Layout and Material Handling

This is a primary course in Plant Layout emphasizing the essential co-ordination between plant layout, material handling, industrial engineering, production control and industrial safety, from a practical standpoint. It is the objective of this course to convey the fundamentals of material handling and layout from a quantitative viewpoint. Economic realism will be emphasized in all projects.

320-234 Stress Analysis

This is a continuation of the course in Basic Strength of Materials with special emphasis on the stress developed in mechanical components due to static and dynamic load conditions. An introduction to more advanced techniques is included.

320-237 Basic Tool and Fixture Design

This course is aimed at enabling the student to understand what tool design is and its place in industry. Procedures of blueprint readings for tool design purposes, tool drafting vs. other drafting techniques, view selection rules for dimensioning and tolerances will be discussed. The student will be involved in practical design activity for most of the time by working on such projects as: single point and form cutting tools, template design, drill fixture and compound die design.

320-244 Manufacturing Process Planning 2

Using as prerequisites the fundamentals of process planning as laid out in the Manufacturing Process Planning I, a series of process planning projects will be carried out.

The student will be involved in processing parts of a more complex nature to be manufactured by machining, sheet metal fabrication and welding.

320-247 Numerical Control 3

By applying the principles and techniques of CNC parts programming which will include computer assisted (Compact II) language, polar and cylindrical co-ordinate systems. The student will be able to: understand subroutines programming, write complex contouring part programs, recommend suitable process for machining, set-up and tooling; process, edit, plot, and run programs for CNC turning and milling applications.

320-250 Mechanical Services & Drafting

The course involves the calculation of heat loss and heat gains for residential buildings, including the design and drawing of the appropriate forced air distribution systems. To accomplish this, the student will study the principles of heat transfer, methods of moving air, duct layout and equipment selection. The methods used will comply with the regulations of the latest issue of the Ontario Building Code i.e. HRA Institute of Canada Digest.

320-251 Psychrometrics

The student will be able to analyze air conditioning processes, specify and design systems relating to human environmental conditions. The psychrometric chart is the basis of the course and the student, therefore, will be able to solve heating, cooling, humidification and dehumidification problems, using the chart as his/her instrument. The course also prepares the student for the more advanced studies of equipment selection, commercial and residential systems.

320-255 Blueprint and Specification Reading

The student will be able to interpret mechanical and architectural specifications and drawings and make a take-off for HVAC (including solar) quotations and/or design purposes.

The study encompasses drafting, sketching, the development of an architectural vocabulary of building structure features and the procedure to obtain tender forms and prepare quotations.

320-261 Mechanical Drawing 1

The student will be able to produce construction details of solar and/or conventional heating, cooling and hot water systems; follow the appropriate building codes as related to solar and/or conventional heating, cooling and hot water systems, and electrical systems; all as applied to residential and small commercial/industrial buildings.

320-262 Mechanical Drawing 2

The student will be able to read and modify working drawings of a small commercial, industrial or residential building to accept a previously designed solar system to its maximum benefit with consideration of structural drawing and detailing; prepare additional drawings of solar or conventional heating, cooling and domestic hot water systems, and electrical wiring.

320-263 Solar Energy 2

This course is designed to cover advanced topics in solar energy as well as allowing time to look at some of the equipment and designs previously covered in greater detail.

320-264 Mechanics of Machines

Mechanics of Machines is an engineering science which investigates the relationship between moving machine parts. It is the study and analysis of the functional motions of mechanisms combined with force, torque, and power ratios. During the course you will be acquainted with a variety of engineering and scientific calculations, and engineering drawing; during the lab sessions you will be exposed to a variety of visual, tactile and judgment making experiences which contribute so much to the elusive quality described as "technical intuition".

320-267 Metrology

The student will be able to perform measurements using gauges and instruments to determine and check dimensions. Theory is mixed with practice to provide the fundamentals of dimensional Metrology. Inch and metric systems will be used while the inch system phases out.

320-268 Manufacturing Cost Estimating

In order to prepare for estimating the expenses that are incurred in manufacturing products, the student will use the prerequisite of blueprint reading and manufacturing processes, to develop the techniques of cost estimating products manufactured by various processes such as machining, casting, welding, stamping or processes related to the plastic industries.

The student will learn to calculate labour and material cost for different types of estimates, will become familiar with the terminology related to estimating such as direct and indirect costs, burden rates, shop efficiencies, administrative expenses, profit margins, etc.

320-269 Manufacturing Process Planning I

The Manufacturing Engineer is using process planning to determine the order or sequence of operations necessary to manufacturing a part. This course will be involved with some of the basic concepts of process planning used in the hardware industry.

Preliminary part analysis, dimensional analysis, tolerance analysis, tolerance charts and the theory and practice of locating workpieces will be discussed. Using Routing and Operation sheets the student will be involved in processing relatively simple parts to be manufactured by machining methods.

320-270 Microcomputer Controls 1

The PET microcomputer will be interfaced to the "real world" via the I/O port, in conjunction with A/D and D/A converters.

Programming will be in the BASIC language, with access to certain machine language subroutines.

Applications will include: temperature measurement using thermistors; control of motors and pumps via solid-state relays; measurement of pH.

320-271 Machine Design 2

This is a continuation of the course in Machine Design 1, except more sophisticated methods are used.

The course is directed to the same goal as in Machine Design 1, that is, to provide the student with a good training in the logical application of theory to the design of industrial products.

320-272 Thermodynamics

An introductory course in basic engineering thermodynamics designed to acquaint the student with its fundamental concepts and processes for the understanding of the various pertinent engineering applications in use and to solve simple problems related to this field.

320-273 Motion Study

The student will be able to select and combine the required times derived from work factor and M.T.M. (Methods Time Measurement) to produce the standard time for an operation. The student will measure and analyze data, develop formulae for standard data, implement a work sampling program and recommend a plan of action for improvement of methods and productivity.

320-275 Solar Project

The student will carry out a background study on some aspect of solar energy of his own choice, to be approved and directed by a staff member. The study should result in a written, detailed report to be presented in the 6th Semester under Solar Report.

320-270 Industrial Security

The graduate will be able to design a program of security for industrial plants and building complexes relating to all the security functions of guards, fire protection, emergency and disaster, plan physical security, personnel security, security of documents and investigations. He will learn how to plan for physical barriers, electronics surveillance components, the overall security system, security lighting, and storage of valuables.

320-277 Heating, Ventilating & Air Conditioning

The course is to enable the student to solve elementary problems in heating, ventilating, air conditioning, and plumbing which can be encountered in their chosen field of employment. It encompasses the theory of heat, properties of air, comfort conditions, heating and cooling load determination, refrigeration cycle, residential environmental control systems, and residential plumbing.

320-278 Cost and Optimization Engineering

The application of economic evaluation methods such as Life Cycle Costing and straight line depreciation, as well as scheduling techniques such as Critical Path and PERT. Computer simulation of systems for the purposes of optimization.

330-012 Survey Camp 1:

The student will work on different practical projects to better his/her knowledge from the first, and second semester. Projects will include de-tracing of a boundary, volume from contours, use of an autoreduction tachometer, and indirect layout of an obstructed line.

330-038 Surveying 1

The student shall be able to measure distances with a steel ribbon tape, use the engineer's transit to measure angle by repetition, use the dumpy level to determine differences in elevation, locate permanent features on the earth's surface with respect to traverse lines, use the method of spot levelling to determine elevations of selected points and do the calculations related to the above objectives.

330-039 Surveying 2

The student will be able to operate an optical theodolite and an automatic and tilting level, determine trigonometric elevations, do the stadia surveys, survey the profile and cross sections, draw the plan, of location surveys and stadia topography. He/she will be able to perform calculations related to the above mentioned surveys.

330-053 Sanitary Technology

The student will be able to specify the methods of collection, treatment, and distribution of domestic water to a community. He/she will be able to describe the methods used in collection and treatment of waste water from households and industry. He/she will be able to comply with the pollution control regulations in Ontario, in all designs.

330-059 Transportation Planning

The student will be able to perform as a member of the Transportation Planning Group in the capacity of a junior member by being able to collect data related to traffic, density, economic activity, assist in their analysis and preparation for computer input as well as being able to prepare drawings, graphs, charts, etc.

330-065 Adjustment of Observatons

The student will be able to apply the theory of errors, which includes intervals of confidence, limits for maximum allowable errors, testing of samples and outlier test, make the adjustment of direct observations and calculate the characteristics of accuracy, calculate weights for observations of different accuracy, use the parametric method for the adjustment of quantities that cannot be observed, calculate ellipse of errors, make adjustment by condition method and calculate the characteristics of accuracy from the variance-covariance matrix.

330-070 Town Planning

The student will be able to perform as a junior member of a town planning team having studied various aspects of town planning which include services (water, sewer, transportation), urbanization (trends, past, present and future), urban transportation environment (quality of life in city core, community, or neighbourhood), urban Canada, as well as having conducted a brief study of some urban area.

330-077 Fluid Mechanics 1 (SI Units)

Using the properties of fluids, fluid statics and the underlying framework of concepts, definitions, and basic equations for fluid dynamics, the student will be able to solve problems associated with flow of water in pipes and open channels and their measurements (Weirs, Venturi, Orifice and Watermeters).

330-078 Fluid Mechanics 2

The student will be able to analyze the stability of water retaining structures like gravity dams, spillway gates and sluice gates. He/she will also be able to solve problems associated with open channel flow transition design and backwater curves. He/she will be able to explain the working principle of water turbines, centrifugal pumps and reciprocating pumps.

330-080 Soil Mechanics

On completion of this course in the fundamentals and basic principles of soil mechanics, the student will be able to assist in routine laboratory and site testing of soils for its application in the construction industry.

330-081 Highway Technology

The student will be able to design and layout horizontal and/or vertical alignment of roads. He/she shall be able to determine the geometric characteristics of the road on the basis of function, safety, and traffic volume carried by the road.

330-082 Municipal Services 1

Using the principles of hydrology (rainfall and stream flow characteristics) the student will be able to compute the run off, time of concentration and other data required in the design of concrete culverts. He/she will also be able to perform hydraulic computations for pipe flow and open channel flow. With the aid of tables, nomographs and charts he/she will be able to determine the strength of the pipes and select the required appropriate pipe.

330-083 Municipal Services II

The student will be able to design and draw storm and sanitary systems and prepare detailed drawings for manholes, catch-basins and other structures in the sewer system. He/she will also be able to analyze a network of water distribution systems, using a computer program package (Hardy-Cross Method).

330-087 Foundations Technology

The student will be able to design simple shallow and deep foundations and check the stability of retaining walls, cuts and embankments. He/she will be able to conduct the more sophisticated laboratory tests on soils, such as the triaxial testing.

330-089 Specifications

The student will be able to read, interpret and apply the specifications to the project for which they were compiled in order to control the progress of a project, and the quality of the finished product.

330-090 Estimating

The student will be able to organize the work involved in carrying out an estimate. This includes the organization of estimating procedures, calculating overhead, interest, rent and contingencies for the construction of sizable, but uncomplicated, projects.

330-096 Advanced Surveying 1

Using the practical and theoretical knowledge acquired in Surveying 1 and 2, the student shall work on projects that require advanced survey techniques. He/she will be able to do the surveys for layout of road widening, surveys for bridge design, residential sub-division layout, use barometers for determination of elevations, perform the standard adjustment of survey instruments and use the geodetic control to layout complex survey projects.

330-098 Geodesy:

The student will be able to do precise angular measurements and analyze errors. Geodetic surveys, triangulation, trilateration and precise traversing, spherical calculations, calculation of the position on the reference ellipsoid, solve inverse problem, use MTM and UTM map projections to do the transformation of geodetic co-ordinates into plane co-ordinates and vice versa, use of the combined scale factor and T-t correction, solve practical problems involving meridian convergency and theory of precise elevation.

330-099 Survey Camp 2:

In a concentrated period of two weeks, after the 4th semester, the student will complete all the field and office work (calculations, mapping, etc.) associated with large projects for which there is insufficient time during the semester, such as precise levelling with planparallel plate, underground surveys, etc.

330-101 Cartography

Student should be able to: (a) expose and develop photographic images on film or glass; (b) prepare final accurate esthetic maps and plans from draft copies on film, scribecoat and peelcoat, and use press on letters and ink; (c) prepare and prove overlays for lithographic printing of multicoloured reproduction.

330-103 Architectural Drafting 3

Using the Ontario Building Code and Canadian Code for Residential Standards and broader concepts of design, the student will be able to design and produce a complete set of working drawings with higher quality linework, letterings and accuracy of more complex drawings in Imperial measurements for a residential home for senior citizens.

330-109 Site Management Technology

The student will be able to assist in the preparation of quantity and cost estimates from detailed drawings in a construction site. He/she will also be able to assist in obtaining information for feasibility studies and for bids. Assist in the planning of construction schedules using bar charts and/or critical path method. Comply with safety laws, Workmen's Compensation Regulations and Occupational Health Regulations. Prepare daily, weekly and monthly progress reports and certificates for payments to contractors.

330-128 Practical Photogrammetry

The following topics will be studied: review of inner, relative and absolute orientation; extensive practice in the set-up of stereo models on a variety of instruments; the use of stereo plotting instruments in the compilation of a stereo-asted planimetric and topographic maps; practice in the measurement of plates on a stereocomparator for analytical triangulation.

330-141 Explosives Technology 1

The student will be able to describe the manufacture, properties and safe handling of conventional dynamites, slurry explosives and blasting agents. He/she will be able to select and assist in hooking up a variety of delay and non-delay initiation systems. Coupled with technical visits to both quarry and construction sites, he/she will with supervision, be able to load and shoot a simple round.

330-142 Explosives Technology 2

The student will be able to describe a wide range of blasting procedures currently employed in construction, quarrying and mining. Further, he/she will be able to outline the limitations of various types of hand held and crawler mounted rock drills and be able to select both type and number of machines as required.

330-144 Technical Report

The student will be able to: choose, research, prepare, write up and type a 4000 to 5000 work report relating to the development, manufacture storage or field use of explosives.

330-148 Construction Technical Drawing

The course introduces to the student the basic drafting techniques as well as the proper use of drafting materials, tools and instruments. The student will demonstrate competence and ability in the meaning of different drafting notations and will be able to read engineering problems from blueprints for practical construction purposes.

330-154 Explosive Technology 3

The student will be able to use seismic and sound level equipment used in monitoring blasting vibrations; also design blasting systems to contain vibration and noise within safe limits.

Further, he/she will be able to estimate drilling, blasting and related costs as encountered in quarrying and construction.

330-155 Explosives Technology 4

The student will comply with the Federal Explosives Act, the Construction Safety Act and interpretive regulations ranging down to the Municipal level relating to the use and storage of explosives. Further, he/she will be able to select drilling and compressed air equipment suitable for surface or underground operations and describe rod handling systems and redressing bits.

330-157 Hydrography Survey 1

To acquaint the student with the elements of hydrography to the extent that he or she will be capable of performing basic activities associated with actual field operations, including data collection and processing, associated mathematical computations for planning a hydrographic survey, establishing a suitable sounding datum, conduct sounding operations.

330-159 Navigation, Chartwork and Pilot

The student will be able to describe government regulations, boating terminology, chartwork and coastal navigation practices, safety, distress signals, search and rescue organizations, the responsibility of the navigator, radio communications and procedures, weather observation and reporting and electronic aids to navigation.

330-163 Oceanography and Metrology

The student will demonstrate an understanding of the structure and dynamics of the atmosphere, by being able to interpret marine and continental weather forecasts in terms of local weather observations. The student will also be able to describe the general structure and dynamics of the oceans, including the circulation pattern, the nature of water waves, and the structure of the ocean floor.

330-167 Geology and Geophysics

The student shall be able to describe the distribution and origin of the major tectonic features of the earth's crust, with special emphasis on ocean features. You will also be able to describe the formation and rates of change of offshore seabed, as well as earth's gravity and magnetism associated with seabed geology. You will also be familiar with the principles and operation of seismometers, magnetometers and gravimeters.

330-168 Hydrographic Survey 2

The student will be able to describe the electronic aspects of Hydrographic Surveying, to include radio waves, antennae and signal propagation for long range navigation, short range positioning and sonar systems, as well as electronic and digital circuitry.

330-169 Marine and Offshore Law

The student shall be aware of the historical treatment of the law of the sea to the present. He/she shall know the historical and modern trends in determining continental shelf limits and territorial sea limits. He/she shall have a knowledge of maritime contracts relating to dredging, salvage and wrecks. A general knowledge of crown rights and riparian owners, as well as collision law, salvage law and pollution control is needed as well as law of sea conferences.

330-173 Traffic Survey Methods

Upon completion of the course, the student will be able to use a variety of traffic survey instruments, various methods of data collection and will be able to analyse and report the information collected for use in different kinds of traffic and transportation studies.

330-174 Theory of Traffic Flow

The student will be able to perform calculations regarding the safe motion of vehicles. This includes friction forces between tires and asphalt, acceleration and deceleration rates, stopping distances, centrifugal forces, superelevation, and safe highway curves.

330-176 Demand Actuated Travel

With emphasis placed on the transportation planning process as a total process requiring the integration of many of the interacting characteristics of the urban environment, the student will, through studies, establish definite relationships between person or vehicle travel and land use. The student will be able to forecast within acceptable margins of accuracy, future trip generation and demand for travel by all modes in existing or future developments and their assignment on existing and proposed network systems.

330-177 Data Collection and Analysis

The student will be able to prepare and execute sampling operations in order to establish statistically supported data. Subsequently the data are used as documented input into the process of a transportation planning study or any other type of planning operation.

330-180 Urban Transportation and Mass Transit

The student will be able to recognize the specific transportation needs of major urban areas and to develop transportation schemes using all needed modes of transportation. He/she will become familiar with research results regarding the possible development of new modes of urban travel. He/she will be able to maximize economy and minimize energy consumption. The latest developments in mass transit theory, practice and economics will be applied to model scale study.

330-181 Mathematical Models for Transportation Planning

The student will be able to create and apply mathematical models, statistical or graphical, in developing Transportation Planning Modelling Techniques to overcome the difficulties of the expansion of small data samples to represent universal behaviour.

330-198 Alternate Modes of Transportation

The student will be able to examine the use of conventional forms of transportation modes in innovative ways, i.e. bus lanes, busways, articulated buses, bimodal bus etc. Mass transportation systems are classified in accordance to their function, capacity, technology, etc. and their applicability then examined in various scenarios i.e. short distance micro-people mover systems in airports to long distance inter-city express trains.

Examples of innovative transportation modes in each of the classifications are reviewed with respect to their status of experimentation implementation technology, current commercial use, etc.

330-199 Transportation Planning Project

The student selects a real life transportation project which he/she will carry out to a meaningful extent and reports his/her findings. The project must be related directly to transportation and must involve at some phase of it, collection and analysis of data, origination of alternative schemes, comparative evaluation, selection of proposed plan, preparation of written report and oral presentation.

330-200 Air Transport and Airport Planning

The student will be able to help in the formulation of a new air transportation plan for an air hub and help in the design of a new airport system, including the runway design, terminal design, and ground transportation system.

330-203 Engineering Surveys

The student will be able to apply a variety of surveying methods for engineering projects with the stress placed on the analysis of the accuracy of observations and results, analysis of the accuracy of polar and rectangular co-ordinates, precise interlining, determination of the space inaccessible distance, survey for the deformation of structures, solution of curves in rectangular co-ordinates and the use of the law of propagation of errors.

- 330-204 Hydrographic Survey 3**
 The student will be introduced to problems associated with coastal engineering in inshore areas, particularly in harbour and marina maintenance, construction and planning. Problems such as siltation, erosion, sediment transport and deposition, coastal zone management, design and construction of harbour engineering works, channel improvement, dredging, removal of wrecks and obstacles, legal aspects, tidal effects, and special purposes surveys are discussed.
 Visits to local landfill sites will be arranged for first hand information on local projects.
- 330-205 Transportation Design System**
 Having completed the course the student will have an overall knowledge of the various transportation systems. He/she will be able to weigh the advantages of the various modes of transportation under given circumstances.
- 330-213 Modern Architecture History and Design 1**
 This course consists of Western Architectural History. The student will be able to trace the history of Western Architecture from the Egyptian periods to the early nineteenth century.
- 330-214 Modern Architecture, History and Design 2**
 This course consists of part Architectural History and part Architectural Design. The student will be able to trace the roots of twentieth century architecture, and discuss the many aspects that influenced architectural development during the period from 1850 to the present day. The student will be able to discuss, and illustrate, certain present day conditions that influence architectural design such as sociological needs, orientable geographical location, etc.
- 330-218 Mechanics of Materials**
 The student will be able to combine the individual subjects of the *Basic Strength of Materials* course to focus on the design of elementary components under flexure, shear and deflections.
- 330-219 Advanced Strength of Materials**
 This is an extension and advanced treatment of the *Basic Strength of Materials* course but with greater focus on the design of simple structural components under axial load and combined bending, stress effects and deformations. It also introduces the student to statically indeterminate systems in preparation for the 5th and 6th semester structural programs.

330-220 Architectural Detailing 1

The student, by drawing architectural details, will acquire a full knowledge of the hidden and complex parts of a building such as expansion joints, steel joists, steel beams, concrete and steel columns, fireproofing steel block walls, frame walls, roof rafters, fireplaces. The techniques of detailing will be studied along with drawing standards.

330-222 Graphic Statics and Civil Drawing

With the earlier knowledge gained from the Statics course, coupled with the drafting skills acquired from Construction Technical Drawing, the student will determine graphically the forces acting within a structural system and its overall stability and reactions.

The second part of this course Civil Drawing familiarizes the student with symbols, terminology and drafting techniques for projects of a civil engineering nature by interpreting and drawing to suitable scales of prepared layout plans.

330-224 Model Making 2

The student will become involved with the construction of models such as multi-storey structures, studying urban pedestrian spaces, model studies of more advanced structural forms and systems, and an exterior presentation scale model of greater complexity.

330-226 Survey Law 2

The student will be able to describe the development of the systems of land registration in the Province of Ontario and the Statutes related thereto, such as the Registry Act, the Land Titles Act.

330-227 Introduction to Structural Design

The student will be able to design individual simple structural members, of timber, concrete and/or steel, according to the building codes. These members include beams, girders, joists, columns, frames, as well as any combination of these simple structures.

330-228 Building Codes and Regulations I

Students will study the Ontario Building Code with specific emphasis on Part 3 which covers size and occupancy requirements for fire safety; requirements for fire safety within floor areas, exits, service rooms and health requirements. Students will also learn how to interrupt the Bylaw sections with respect to various building types and construction.

330-229 Materials and Methods of Construction 1

In this section of Materials and Methods of Construction, the student will become familiar with reference materials, codes and methods of construction, gain understanding about soils, foundations and site work, and acquire knowledge about concrete and its importance as a construction material.

- 330-230 Materials and Methods of Construction 2**
In this second section of Materials and Methods of Construction, the student will acquire knowledge about masonry, metals, wood and plastics products with emphasis on their properties and applicatons.
- 330-231 Materials and Methods of Construction 3**
In this third section of Materials and Methods of Construction the student will acquire knowledge about thermal and moisture protection, doors, windows, glass and architectural finishes.
- 330-333 Advanced Survey 2**
The student shall work on practical projects such as determination of a clearance of a hydro line, co-ordinates of an inaccessible station, determination of an unknown radius of existing highway or railway, interlining on long lines and barometric elevations.
- 330-336 Survey Drawing 1**
The student will be able to do free hand lettering and sketching in pencil as well as use Leroy equipment for mechanical lettering of survey plans.
- 330-337 Survey Drawing 2**
The student will be able to produce various survey plans, using field notes of actual surveys and performing necessary calculations.
- 330-338 Survey Computation**
The student will be able to solve the quadrilateral by general sine law, use co-ordinates to calculate intersections of lines and circles, use polar co-ordinates, calculate the co-ordinates of a right angle offset, calculate the co-ordinates from observed distance, calculate the traverse with an inaccessible terminal and traverse tied into an azimuth and position control and do the simple transformation of co-ordinates. Problems will be solved by the use of hand calculators and on computers, using CoGo programming language.
- 330-339 Survey Law 1**
The student will be able to describe the evolution of the survey profession in the Province of Ontario and the Statues related thereto, namely The Surveyors Act and The Surveys Act.
- 330-341 Drawing and Descriptive Geometry:**
The student will be able to: (a) use basic principles of descriptive geometry for solving three-dimensional spatial problems, involving, points, lines, planes, simple curves and solids, in two dimensional projection planes by method of orthographic projection; (b) demonstrate elementary drafting skills and the ability to visualize, solve and interpret a variety of technical and engineering problems as presented in standard engineering drawings.

- 330-342 Architectural Detailing 2**
The student will further his/her knowledge from Semester 1 by acquiring a full knowledge of the complex parts of commercial industrial buildings, and which require accentuated linework.
- 330-344 Structural Drafting**
The student, using the basics of structural drafting, will be able to produce structural drawings, including plans, sections and details of wood, steel and reinforced concrete structures for given buildings.
- 330-345 Theory of Structures**
The student will be able to identify the stability of structures and the mode of determinancy of its components. Statically indeterminate members and frames will be analyzed for bending stress, shear and deflection under combinations of live and dead loads.
- 330-346 Structural Design and Drawing**
On completion of the course, the student will be able to assist in the design of simple structures in timber, steel and reinforced concrete and prepare working drawings in compliance with the National Building Code, for the construction thereof.
- 330-347 Legal Surveying**
Based on the knowledge obtained in the courses on Survey Law and the principles of evidence, the student will develop the basic skills required to carry out legal surveys, under the direction of an Ontario Land Surveyor.
- 330-349 Plumbing and Fire Protection Systems**
The student will study standard plumbing engineering methods, which are used to satisfy the needs of architects, contractors, builders, municipal building inspectors and underwriters.
- 330-351 Environmental Geology**
The student will be able to relate topographical features of North America to the geological systems; classify rock crystals; identify and explain the formation of igneous, sedimentary and metamorphic rocks; describe syngenetic and epigenetic deposits, also secondary enrichment. Able to identify trees native to Ontario.
- 330-352 Control and Electronic Surveys 1**
The student will be able to operate efficiently a one second direction theodolite (direction method) for horizontal angular measurements, observe zenith distances and use EDM instruments for distances in control nets. They will be able to apply meteorological corrections and do the reductions using graphs and charts.
- 330-353 Control, Electronic Survey 2**
The student will be able to calculate plain rectangular co-ordinates of control stations from data collected in the Fall semester, he/she will be able to calculate elevations from reciprocal zenith distances, use the method of intersection and resection for position determination and calculate the ambient refractive index for EDM distances.

330-354 Astronomy
The student will be able to apply astronomy for the determination of azimuth, latitude and longitude. He/she will use time and, where appropriate, altitude observations on Polaris, another star and the sun. The student will be able to identify an unknown star from a star list by observation at a known position along a pre-determined azimuth.

330-360 Architectural Design Drafting 1
Given the presentation drawing of a house and restrictions in cost and design, the student will be able to produce working drawings with good linework lettering and accuracy, making full use of building codes and restrictions of C.M.H.C. for residences.

330-361 Architectural Design Drafting 2
The student will further the knowledge gained during the first semester by improving drafting, detailing and designing skills, through the design of a small factory. The work will consist of a complete set of presentation and working drawings for a two storey office section and a single storey plant area, using a steel structure with masonry infill and aluminum windows.

330-193 Architectural Design Drafting 4
Using the Ontario Building Code and a broader concept of design or more complex buildings with higher quality of linework, lettering and accuracy to the standards of an architectural technologist, the student will be able to design and produce working drawings for a five story office complex plus two underground parking floors. The building to be precast concrete columns and walls. Drawing to be in metric.

330-364 Architectural Design Drafting
Using the Ontario Building Code, and a broader concept of design, with improved linework lettering and accuracy, the student will be able to design and produce a complete set of working drawings with higher quality linework, lettering and accuracy in metric (mm) for (a) a row of two storey townhouses (b) marina and (c) various concrete details.

330-365 Architectural Design Drafting 6
Using the Ontario Building Code and a broader concept of design on more complex buildings with higher quality linework, lettering and accuracy to the standards of an architectural technologist, the student will be able to (a) design and produce working drawings for a gas station — service centre. (b) produce presentation drawings showing interior design and furnishings of a residence. (c) produce presentation drawings of a specific type of residence.

330-366 Rendering Techniques
The student will be able to produce (i) plan and elevational presentation drawings using basic pencil techniques, including different technical and artistic aspects such as (ii) technical shading, rendering of different building materials and landscaping, one-point, two-point and three-point (vanishing point) perspective drawings, with supporting elements, such as landscaping cars and people.

330-367 Surveying.

The student will be able to perform the distance measurements with the steel tape, angular measurements with the engineering transit, determination of elevations with the use of dumpy level, location of permanent objects with respect to traverse lines and the plotting of a plan of surveys performed. The student will also be able to do some basic calculations related to plan surveying.

330-369 Model Making I

Through the construction of a scale model, the student will expand his/her knowledge and appreciation of various aspects of architectural technology and design. As an extension of the student's work in the drafting studio and/or other courses, the model will be utilized to explore and present such architectural aspects as structural and architectural forms, construction and building systems and techniques, space relationships, massing, fenestration, colour schemes, site planning, contours and landscaping.

330-372 Air Photo Interpretation

The student will be able to acquire and use airphotos, and perform general airphoto interpretation for terrain evaluations.

The student should be able to identify all unconsolidated and consolidated landforms and relate their pattern elements to the corresponding ground conditions as they affect route and site selection.

330-373 Construction and Building Materials

The student will be able to describe the manufacture, performance, quality and application of materials used in building construction, as well as perform control tests on some of these materials, i.e. concrete, masonry, steel.

330-374 Highway Design

The student will be able to operate in the capacity of a Junior Technologist Assistant in a Traffic Operations Office.

He/she will take field measurements and collect such other data required for the investigation into the operation of a road, highway, expressway or freeway, in the solution of traffic problems.

He/she will analyze and evaluate the data to make tentative recommendations regarding the efficient or non-efficient operation of the facility according to the latest highway design practice.

330-378 Advanced Air Photo Interpretation

The student will study the acquisition of aerial photos and a number of useful A.P.I. applications such as estimations of terrain elevations, depth to water table and depth to bedrock; drainage studies; location of granular material. Realistic labs will familiarize the student with efficient techniques and probabilities of correct interpretations.

330-382 Technical Project

The student will present the results of his/her observations, study, and research a specific technological subject in his/her specialty. The form of presentation, language, and supporting arguments weight equally with the technical content. The student learns to conduct independent investigation on a subject of specific rather than general interest, and to make known their findings to others.

330-036 Photogrammetry I

Student should be able to: (a) see aerial photos in stereo with stereoscope; (b) determine tower heights, photo tilt and scale from single photos; (c) determine elevation of ground from photo pairs, stereoscope and parallax bar; (d) prepare a model ready for map compilation in a stereo plotting instrument.

330-384 Photogrammetry 2

Student should be able to: (a) operate a stereo plotting instrument to compile a map; (b) plan a photographic mission; (c) rectify photographs with a rectifier using analytical and empirical methods; (d) construct a mosaic; (e) measure models for purposes of aerial triangulation.

330-385 Advanced Photogrammetry

Student should be able to: (a) locate suitable positions for and mark pass and tie points on photographic plates for triangulation; (b) measure plate co-ordinates for analytical triangulation with a stereo comparator; (c) write and operate a Fortran computer program to refine plate co-ordinates; (d) understand and use an analytical strip triangulation and a strip and block adjustment computer program.

340-029 Unit Operations 1

By applying the principles and techniques of unit operations which will include transport processes (in Operations 1) and separation processes (in Unit Operations 2) the student will be able: 1) to understand Chemical Engineering Unit Operations 2) to evaluate the productivity of an industrial process 3) to recommend modifications to a process to increase its productivity 4) to prepare a preliminary process design.

340-030 Unit Operations 2

By applying the principles and techniques of unit operations which will include transport processes (in Operations 1) and separation processes (in Operations 2) the student will be able: 1) to understand Chemical Engineering Unit Operations 2) to evaluate the productivity of an industrial process 3) to recommend modifications to a process to increase its productivity 4) to prepare a preliminary process design.

340-037 Industrial Instrumentation 1

To introduce the basic concepts of control theory so that simple control systems can be explained, and some calculations can be performed to evaluate operations. To discuss the principles of different forms of controls with their advantages and disadvantages. To introduce Bode-diagrams and optimum setting. To analyze applications of controls in industrial processes.

340-038 Industrial Instrumentation 2

To give the student a basic understanding of: a) the measurement of different process variables b) the principles of measurement and the complexity of their application c) the environmental conditions: corrosion, remoteness, etc. d) the pro's and con's of the different instruments, for proper selection.

340-043 Bioscience

To impart on the student the basic and common elements of living things with emphasis on the characteristics of mammalian biology and in particular human biology and physiology.

340-051 General Chemistry 1

To review some fundamental principles of Chemistry as a preparation for more advanced courses. Laboratory experiments introduce gravimetric, volumetric and some instrumental methods of practical industrial analyses.

340-052 Stoichiometry

By mastering the basic principles of Chemical Stoichiometry, the student will be able to logically analyze and solve chemical problems with ease and to gain greater understanding of the chemical principles.

340-054 General Chemistry 2

To continue to learn fundamentals and principles of Chemistry, including concentration of solutions, neutralization, rates of reaction, equilibrium, oxidation - reduction, ionization and pH.

340-055 Organic Chemistry 1

To introduce nomenclature, preparation, reactions and uses of the aliphatic hydrocarbons and aromatic hydrocarbons.

340-056 Organic Chemistry 1 Laboratory

Students will perform various separation procedures and tests and reactions in order to prepare compounds discussed in the lectures.

340-059 Analytical Chemistry 1 Laboratory

The student will learn the basic routine laboratory techniques of chemical analysis. He/she will analyze such samples as ores, cement, food stuffs, etc., by titrimetric and gravimetric analysis. Students will record and interpret experimental data, calculate results based on the data, research standard procedures and adopt the method best suited for a specified purpose. Correct safe laboratory practices and techniques are continuously assessed.

340-060 Organic Chemistry 2

To introduce the chemistry of aliphatic and aromatic compounds, and organic reactions in terms of functional groups.

340-061 Organic Chemistry 2 Laboratory

Students will conduct experiments on aromatic compounds and synthesize compounds to illustrate reactions discussed in the lectures.

340-062 Lab Instrumentation:

The student will learn the general principles of modern physical techniques used in analytical work in chromatography, spectroscopy and electrochemistry.

340-063 Lab Instrumentation Application

The student will be able to demonstrate proper use of various instruments and carry out analytical work in chromatography (paper, gas-liquid, thin layer, electrophoresis), spectroscopy (IR, visible, UV, AH, flame photometry and nephelometry), and electrometric methods (potentiometric, voltammetric, and electrolytic). The student will be able to select the proper instrument, record and interpret data for various organic and inorganic industrial analyses.

340-064 Analytical Chemistry Application

The student will expand his/her practical analytical skills through the analysis of industrial samples which require more elaborate methods of sample preparation and more complex back titration, indirect analysis, determination of functional groups in organic samples, wet combustion, distillation of volatile acids and bases followed by subsequent titration are a selection of the analysis which the student is expected to perform. The emphasis is placed upon - correct laboratory techniques - recording and interpretation of data - researching and adopting experimental procedures for various industrial samples - safety.

340-066 Analytical Chemistry 2 Lecture

The student will learn air and water pollution chemistry and will expand his/her knowledge in both chemical and instrumental analysis. In pollution chemistry topics he/she will learn include: primary pollutants and secondary products, control strategies, quality standards, method of sampling and analysis. The student will be able to interpret spectroscopic information, analyse polarographic and nuclear laboratory experimental results.

340-067 Analytical Chemical 2 Laboratory

The student will be able to analyze air (NO_2) and water pollutants, industrial products and wastes for trace metals, non-metallic impurities and pesticides by using conventional chemical or instrumental methods of analysis.

340-068 Industrial Microbiology Lecture

The student will be able to supply the theoretical background for applications in the field of Industrial Microbiology particularly with reference to the food processing and fermentation industries, culture maintenance and preservation, biological assay procedures, and testing of industrial materials for resistance to microbiological damage.

340-071 Industrial Organic Chemistry Laboratory

Preparation of industrially important organic compounds such as insecticides, dyes, antipyretics, fragrances and polymers including polystyrene, nylon 66 and thermosetting resin (Urea formaldehyde). Students are expected to conduct organic synthesis on a semi-pilot scale. Laboratory reports demonstrating proficiency in technical writing are an essential part of the course.

340-073 Biochemistry Laboratory

The student will carry out experiments in biochemistry which will relate to the theoretical material covered in biochemistry lectures and have application in the fields of clinical and industrial biochemistry. Separations (chromatography, gel filtration, ion exchange, electrophoresis), analysis of food and body fluids (carbohydrate, vitamins, fats, hormones, etc.) and analysis of enzymatic reactions (respirometry, clinical enzymology) are included.

Prerequisite: Biochemistry 340-072.

340-074 Microscopy and Photomicrography Option

This course presents students with the basic principles of light and electron microscopy, preparation of material for examination under the microscope and photomicrographic techniques for recording observations made under the microscope.

Prerequisite: Microbiology 1

340-079 Chemical Engineering Laboratory I

The student will be able to do the following: calculate material and energy balances for industrial units; operate process systems and units; write manuals for the proper and systematic start-up and shut down, and optimum operation of a unit; select proper auxiliary equipment and instrumentation for the optimum operation of a unit; develop process information and data for the design of process systems and units.

340-080 Chemical Engineering Laboratory 2

The student will be able to do the following: calculate material and energy balances for industrial units; operate process systems and units; write manuals for the proper and systematic start-up and shut down, and optimum operation of a unit; select proper auxiliary equipment and instrumentation for the optimum operation of a unit; develop process information and data for the design of process systems and units.

340-109 Physical Chemistry

The student will be able to solve a variety of problems through application of the principles of Physical Chemistry: the gas laws, acid-base equilibria, thermochemistry and the three laws of thermodynamics.

340-118 Chemistry of Explosives

The student will be able to: determine empirical and true molecular formulae, balance equations and perform chemical arithmetic; explain the atomic theory of matter, calculate heat of reaction, define and apply the gas laws; explain how the activity series involved; treat water for hardness removal, remove noxious agents from air and water; make up solutions of known molarity, molality and normality and determine their pH values, the electro chemistry to electro deposition, define mass action, Le Chalelier's Principle determine equilibrium concentrations; make a critical examination of explosives as to their physical properties, velocity of detonation, sensitivity to impact and initiation; formulate compositions to satisfy fume requirements; and analyse ANFO mixtures and calculate explosive brisance and strength.

340-120 Electrochemical Measurements for Chemical System.

The student will apply fundamentals of electronics to typical measuring instruments which are relevant in the chemical and biological field. Both AC and DC applications will be stressed in appropriate laboratory exercises.

340-123 Microbiology, Introductory

The student will learn the basic concepts and techniques in this introductory course. The ability to use the light microscope, prepare and stain smears, make growth media, apply the techniques of pure culture and enumerate micro-organisms is developed upon a strong theoretical background.

340-124 Microbiology, Methods of

The student will study the basic techniques required in the identification of micro-organisms. Background in taxonomy and biochemistry will be provided to enable the student to understand the principles which underlie the laboratory techniques. Areas of study include microbial nutrition, energy transformations, microbial ecology and rapid methods for the identification of micro-organisms.

Prerequisite: Microbiology I.

340-125 Microbiology, Environmental

The objective of the course is to give the students a knowledge both practical and theoretical, of medical microbiology including parasitology, mycology, bacteriology and virology.

340-126 Environmental Studies

An introduction to air and water pollution, emphasizing the analysis and physical and chemical principles.

340-127 Analytical Chemistry I

The student will acquire the basic principles of "wet" analytical chemistry and calculate solution strength, percent composition, solubilities, ionization constants, and factor relationships based on neutralization reactions, titrimetric precipitations, complexometric titrations, oxidation and reduction and gravimetric analysis.

340-133 Process Industries and Plant Safety

To familiarize the student with various Chemical Process Industries, in terms of principles of chemical engineering, economics, and safety.

340-134 Chemical Thermodynamics and Kinetics

The student will be able to use Gibbs free energy and other chemical thermodynamics functions to solve problems related to chemical processes. He/she will also use chemical kinetics to determine and explain the rate of chemical and biological processes.

340-135 Industrial Organic Chemistry

The student will be expected to relate typical industrial reactions such as: halogenation, nitration, sulphonation, oxidation and polymerization to processes and practices in the petrochemical, agrichemical, explosives, edible oil, fragrances, detergents, plastics and pharmaceutical industries. Multi step synthesis and explanations of reaction conditions and reaction mechanisms are also required for the successful student.

340-136 Biochemistry Lecture

The student will be able to supply the theoretical background for applications in the biochemical field. The chemistry of compounds of biological significance (proteins, carbohydrates, lipids, DNA, RNA, colloids, enzymes, vitamins, hormones, etc.) is included. The chemical nature and reactivity of these compounds will be related to the techniques of isolation, purification and assay.

350-016 Troubleshooting

This course describes an orderly procedure that should be followed when troubleshooting electronic equipment. The student will learn to use test equipment effectively to locate faults in vacuum tube, transistor, integrated circuit and digital equipment. He/she will be tested on his/her ability to use basic test equipment.

350-051 High Frequency Circuits

The circuitry of receivers and transmitters used for both broadcast and communication, both AM and FM is analysed. Emphasis is placed upon the study of the tuned coupling networks in RF and IF stages. The basic continuous wave transmitter is also discussed. Alignment of both receiver and transmitter circuitry is conducted in the laboratory.

350-078 Communication Systems

Noise and ways of specifying it in communications systems are analysed along with the basic theory and requirements of pulse code modulation, the operation of modems and the effect of the telephone network on modem data and error rates.

350-083 Electronic Circuits and Applications 1

An introductory section on the basic concepts of electricity and current flow leads to an analysis of DC series, parallel, and series-parallel resistive circuits. The characteristics of capacitors and diodes are investigated, and the results applied to AC-DC rectifier circuits and clipping and clamping circuits. The theory of operation of the VOM and oscilloscope are studied and these instruments are used in the laboratory.

350-092 Logic 1

The goal of this course is to introduce the student to the elements of digital logic systems found in industrial control and computer applications of logic elements such as gates, flip-flops, counters, shift registers, and display devices.

350-093 Logic 2

This course is designed to develop the student's competence in logic systems encountered in control and computer applications. The student will learn (a) the operations and applications of counters, shift registers, arithmetic units, D/A and A/D converters. (b) effective simplification methods of logic circuits to minimize system complexity and related cost.

350-094 Electronic Production Technology 1

This course is the first part of a two-semester subject, "Electronic Production Techy". In this "design part" of the subject a student masters the basic skills of Electronic Drafting and Printed Circuit Layout Techniques and becomes familiar with a cross-section of drafting conventions and practices. A suitable project (small amplifier, power supply, colour organ, or similar) will be selected by the instructor and complete set of drawings to good commercial standard must be produced. Each drawing assignment is a practical application of lecture theory, and a student gradually develops drafting skills and Elic design understanding as this course progresses.

350-102 Electronic Circuits and Applications 2

An investigation of semiconductor action leads into the theory of operation of the bipolar transistor. Transistor bias requirements and suitable bias circuits are analysed, and the characteristics of large and small signal amplifiers are then examined in detail. The effects of feedback are investigated and the result applied to explain the operation of feedback oscillator circuits.

350-103 Electronics Circuits and Applications 3

This is a course on electronic circuits and their practical applications. The emphasis is on the differential amplifier, the operational amplifier and the field effect transistor. The course includes laboratory work on the topics covered.

350-104 Electronic Circuits and Applications 4

The student will be introduced to discrete and integrated semiconductor components of the photoelectric and thyristor families. He/she will learn to use many of the described devices in typical industrial applications.

350-105 Electronic Circuits and Applications 5

This is a course on electronic circuits as applied to industrial instrumentation. The need for, and the techniques of signal conditioning are examined, selected transducers are discussed, and specialized instrumentation is examined. Complementary laboratory work is assigned.

350-106 Electronic Circuits and Applications 6

A practical design course that examines amplifier, oscillator and filter circuits used as building blocks for most transmitter and receiver circuits. The characteristics of transistors at high frequencies will be examined and designs will be made that achieve stable, low noise gains.

- 350-107 Circuits and Measurements**
This course provides the student with a sound understanding of the effect of resistance, inductance and capacitance in series and/or parallel DC and AC circuits. Measurement techniques related to these circuits are also covered.
- 350-148 Applied Electro-Magnetics**
The student studies basic field theory as introductory information to the concepts of electro-magnetic radiation. Simple radiators, arrays of sources and fields due to ground reflection are studied, as well as propagation in free space and near the surface of the earth.
- 350-149 Control Systems**
Mastery of the basic concepts of servo feedback control theory and application to selected practical topics.
- 350-150 Opto Electronics**
This is an application oriented course on Opto-Electronics and Lasers. The program includes both classroom work and integrated laboratory experiments. The area of studies will include: photodetectors and photodetection techniques, laser physics, geometrical optics, lasers, fibre optics and their use in communication, data processing and industry.
- 350-151 Video Systems**
The operation and interconnection of major units in a closed circuit video system are examined, along with the use of standard video test signals to check the performance of such a system. The characteristics of the television signal are analysed and signal processing and distribution in CATV systems is investigated.
- 350-153 Microwave Techniques**
The course introduces the student to the principles and rather unique techniques of microwaves and provides insight into various practical aspects of microwave energy. Selection of suitable waveguides, matching of discontinuities and design of quarter-wave transformers will also be discussed.
In selected laboratory experiments the student shall make slotted line and swept-frequency measurements, realizing the broad utilization of mechanical, electrical, and electronic technology in this field.
- 350-175 Principles of TV**
The television course examines the signals and waveforms of the NTSC black and white and colour service. The student will follow these signals through the chassis of a modern TV receiver and will explain the operation of each circuit encountered.
The student is introduced to numerous control system components of an electronic, electrical, and electromechanical nature used for measurement automation, and process-control systems. The student will learn to combine and use these components in simple industrial applications enhanced by laboratory projects.

350-178 Electrical Drafting

The student will be able to demonstrate his/her knowledge of various practices used in Electrical Drafting for residential, commercial industries and construction, through drafting assignments, involving a variety of electrical drawings, symbols and basic theory, in order that he/she will be able to interpret electrical drawings accurately and thereby be able to communicate effectively with professional designers and installers.

350-179 Microcomputer Systems I

This course deals with the basics of microprocessor hardware, programming, and interfacing through standard programmable I/O devices. The student will learn to program and interface typical 8080/8085 based computers to perform simple processing and I/O functions. He/she will also obtain a general knowledge of other popular microprocessors.

350-180 Microcomputer Systems II

In this course the emphasis is on developing software skills. The student will learn effective programming techniques utilizing the resources of a typical disk-based microcomputer operating system. He/she will become familiar with the use of the CPM editor, assembler, linker/leader, and debugging software tools.

350-181 Microcomputers Systems III

Based on the previous two courses, this course carries on with a more detailed study of microcomputer structures, timing diagrams, interfacing static and dynamic memories, disk drives and CRT displays. Upon completion the student should be able to design simple microprocessor based products.

350-183 Telecommunications Systems

The operation and characteristics of the analog telephone system are investigated, along with FDM systems, narrow and broadband operation of transmission lines, cable types, and low speed asynchronous modems.

350-184 Motors and Controls

After a brief confrontation with the general concepts of electrical power distribution, the student will be introduced to characteristics, operation, and application of DC and AC motors.

The student will analyze typical industrial control circuits in selected laboratory experiments.

350-185 Electro-Mechanical Techniques

This course provides an understanding of behaviour, operation, application, and some theory of electro mechanical devices employed in electronic equipment. Also, properties of common materials used, corrosion, cathodic protection, and fastening methods in the electronic field are discussed.

- 350-186 Technical Project**
The achievement of competence in the design and assembling a piece of electronic equipment or subsystem. The student is required to utilize expertise gained in successfully completing the appropriate electronics courses.
- 350-187 Medical Equipment Maintenance 1**
This course serves as an introduction to the problem of maintaining a safe and efficient electrical environment for hospitals. Emphasis is placed on electrical hazards and their measurement and on instruments such as the electro-cardiograph used to monitor the human heart.
- 350-188 Medical Equipment Maintenance 2**
This course forms a continuing study of electronic equipment found in hospitals. The student will learn the operation and troubleshooting of electrical safety equipment and medical equipment consisting of ultrasonic heart detectors, cardiac defibrillators, ECG monitors and telemetry equipment.
- 350-189 Medical Equipment Maintenance 3**
The student studies the applications of a digital computer in the hospital and learns the operation and maintenance of laboratory equipment such as pH meters and spectrophotometers. The generation of diagnostic X-rays will be discussed and the operation of associate equipment such as image intensifiers, TV cameras and video tape recorders will be explained.
- 350-190 Electrical Controls 1**
The course introduces mechanically oriented students to electrical circuit theory, as well as the theory of D.C. and A.C. current, transformers and the introduction of the theory of electric motor operations. The student will solve related problems and analyse typical circuits, using instruments in selected laboratory experiments.
- 350-191 Electrical Controls 2**
The course involves the study of the various types of electric motors, their supply systems, starting/protective devices used in the applicable industry, including the design and interpretation of schematic wiring diagrams, as these apply to motor control and related circuitry.
The student will analyse typical control circuits in selected laboratory experiments.
- 350-192 Electrical Control 3**
The course will provide the student with basic electronic knowledge including diodes, various transistors, and SCR's. Circuits such as power supplies, Class A and B amplifiers, and operational amplifiers are included.

350-194 Electronic Production Technology 2

This is the second "construction" part of a two-semester subject in Electronic Production Technology. The student will gain experience in hand and dip soldering and in complete printed circuit production including, circuit layout negative film and P.C. board making. Manufacturing practices and processes will be taught. The student will construct an electronic unit as the main project, wiring individually or as a team member in assembly line fashion, depending on the type of project. A final product will be built to good quality commercial standards and a complete specification book must be presented with each unit after testing procedures are finished.

350-200 Techniques of Design

This course will acquaint students with the steps required to design electronic equipment. Designs with bipolar and field effect transistors and operational amplifiers will be examined along with tolerance and cost problems.

354-204 Industrial Electronics 2

This course is a continuation of Industrial Electronics 1. It continues to develop an understanding of the operational characteristics and parameters of basic electronic devices through lecture experimentation and mathematical analysis. Such devices include triodes, transistors, thyratrons, silicon controlled rectifiers, triacs and their applications in basic electronic circuits relevant to industrial applications.

354-205 Electrical Design 2

This course is a continuation of Electrical Design 1. It includes the development of single line diagrams, three line diagram, elementary and wiring diagrams, panel layouts and assembly, including the necessary bills of material and purchasing procedures.

354-301 Electrical Circuits and Applications 3

Alternating current theory: the sine wave and its properties, vector representation, polar and rectangular co-ordinates, non-sinusoidal waves and harmonics. Measurement of a.c. quantities and the oscilloscope. Inductive and capacitive reactances, impedance, complex a.c. circuits. Circuit response as a function of frequency, non-sinusoidal waves and wave filters. Skin effects, eddy currents and hysteresis losses. Power in a.c. circuits.

354-304 Industrial Electronics 3

The basic concepts developed in Industrial Electronics 1 and 2 are now taken and applied to typical industrial circuits such as electronic timers, photo detectors, speed control devices and other industrial circuits. These circuits are then analyzed to identify components, basic circuits and their effect in the overall operation. This develops an understanding of the total circuit operation, identification of, and correction for typical circuit problems.

354-401 Electrical Circuits and Applications 4

Three-phase systems of voltages, common supply voltage levels and connections, system rounding, balanced, unbalanced and parallel loads, phase and line voltage and current relationship. Power in three-phase circuits and their metering, use of instrument transformers.

354-404 Industrial Electronics 4

This is an advanced course in control systems and serve technology. Major emphasis is placed on the transient and steady state analysis of systems to analyze the effects of feedback on system operation and stability. Laboratory projects analyze and evaluate typical control systems.

370-010 Energy Conservation

Designed to give the student an in-depth appreciation of the importance of energy conservation to the practical application of solar energy, with emphasis on the available techniques of energy conservation.

370-013 Solar Systems Design

An in-depth study of the calculations required in the design of solar systems with special emphasis on the interpretation of meteorological data, leading to the methods of selection of various system components such as collector panels, storage media and auxiliary energy sources based on the heating and cooling requirements of the system and the solar energy available.

370-020 Residential Systems

The student will be able to size, select and specify residential forced air heating and cooling equipment. Gas, oil and electric energy systems are compared with respect to their designs, rating, components, control requirements and installation. The course includes blowers and motor sizing, humidification equipment, and electronic cleaning methods.

370-024 Electricity 1

The first course in electrical theory introduces mechanically oriented students to electrical circuit theory. Use of basic electrical instruments to make voltage, current and resistance measurements is stressed. D.C. circuit work is dealt with in detail with an introduction to, alternating current circuitry.

370-025 Solar Energy 1

The student will be able to apply the basic principles of solar energy thermal processes to the development of solar heating systems and their components. The course will include such applied chemistry and manufacturing processes as will assist in the selection of suitable materials.

370-026 Electricity 2

After a brief introduction to the general concepts of electrical power distribution, the student will be introduced to the characteristics, operation and application of AC motors. The student analyzes typical industrial control circuits in selected laboratory experiments.

370-027 Occupational and Environmental Pollution Control:

The identification of the various types of environmental pollution and its sources as caused by or effects industry and the recommended corrective measures consistent with Federal and Provincial abatement policies will be studied in the first part of the course. During the remainder of the course, the student will learn to identify the various types of sound and vibration sources and causes, interpret the findings and recommend corrective measures.

- 370-028 Solar Laboratory:**
The student will perform a number of designated laboratory exercises which will illustrate and enhance the principles studied in Solar Energy. Written reports of observations and conclusions will be required.
- 370-029 Computer Programming and Controls**
The student will learn how to program a computer in BASIC language to solve mathematical and scientific problems such as heat load and collector efficiency. The course will also familiarize the student with the fundamentals and operation of process control computers, including interfacing with field devices.
- 371-033 Marine Contracts Insurance and Taxation**
Introduction to common law and contract law with respect to litigation and court procedures. The taxation portion of this course will study the Canadian Tax Act and its effect on the individual taxpayer as well as business tax (federal and provincial).
- 370-034 Solar Report**
This course is a continuation of Solar Project (Semester 5). The student will present his/her report in class for discussion. Copies of the report are to be distributed to all students; a test on the report will follow.
- 370-103 Instrumentation 1**
An introduction to instrumentation with an emphasis on thermostats, dampers, humidistats, controllers and control valves as related to solar systems and conventional heating and cooling systems. Special emphasis on furnace and system controls, operation and trouble shooting (electrical and pneumatic).
- 370-203 Instrumentation 2**
Builds upon the knowledge gained in Instrumentation 1 with more emphasis on instrumentation systems and the control of solar systems by logic methods as well as analog methods.
- 371-002 Sails and Rigging**
A basic introduction to the fundamentals of traditional and contemporary yacht masting and rigging practices and to the construction, maintenance, repair and utilization of yacht sails.
- 371-031 Navigation**
The navigation course provides the student with coastal procedures and techniques to the CYA "Navigation Standard". The final section of the program consists of an introduction to Celestial Navigation.

371-032 Sailing School and Charter Fleet Operation

In three parts, this course examines the organizational and operational aspects of running a Sailing School, investigates the mechanics of a Charter Fleet operation and will examine yacht delivery.

371-034 Yacht Brokerage, Marine Sales and Marketing

With case studies and industry speakers this will be a marketing course to study the various approaches to management, planning and control of a retail sales establishment.

371-035 Introduction to Micro Processors

An introduction to the business and technical applications of micro-computers and programmable calculators and associated software in the contemporary small-business context.

371-046 Mathematics I

Math I is a continuation of fundamental principles involving algebraic manipulation, exponential applications, linear equations and trigonometric functions. The student is expected to analyze more complex problems involving these principles and to perform accurate computation.

371-105 Yacht Design I

A basic introduction to the fundamentals of yacht design, with emphasis on the basic concepts of buoyancy, flotation and stability.

371-110 Seamanship I — Small Boat Handling Power and Sail

A basic course, this on-the-water program is designed to acquaint the student with the handling characteristics of small sail and power vessels in varying confined and lake conditions. The sailboat portion provides instruction to the Canadian Yachting Association White Sail Level II.

371-113 Gas and Diesel Motors for Yachts

Examines the components, principles, operation, selection, basic maintenance and adjustment of two and four stroke cycle gasoline and diesel yacht motors.

- 371-115 Electrical Circuits and Applications**
 This course familiarizes the student with the basics of direct and alternating current circuits, their theory, design, installation, maintenance and repair. The course emphasizes the practical applications of such circuits in yachts, on docks, in marinas and yacht clubs.
- 371-116 Standard Operating Procedures and Office Routine**
 Many viable businesses fail each year because they did not have control of daily operations. Starting with practical bookkeeping, control will be studied in theory and in practice.
- 371-205 Yacht Design II**
 An intermediate course in understanding yacht design, with emphasis on the hydrodynamics of sail and power yachts and upon understanding design drawings.
- 371-210 Seamanship II Power and Sail Yacht Handling**
 This course is designed to provide the student with practical experience handling larger yachts, under both sail and power. The sailboat portion provides instruction to the Canadian Yachting Association Basic Cruising Standard.
- 371-213 Outboard Engines and Marine Drive Trains**
 A hands-on course, using live engines which will involve students in the selection, installation, maintenance and repair of small and medium sized two stroke cycle outboard motors. This course will also include a study of marine drive units and equipment used on outboard and inboard outboard engines.
- 371-214 Marina and Boatyard Organization and Repair**
 A series of field trips to construction and repair yards will be the basis for a study of layout and construction of a boat yard. Production scheduling (Theory and Practice) will be studied.

371-305 Yacht Design 3

An advanced study of small-craft design procedures and their relationship to boat construction practices, emphasizing hands-on student participation, field observation and independent group projects, organized largely in seminar format.

371-311 Fall Decommissioning

Placement in boatyards for fall haulout will be the focal point of fall decommissioning. With skills learned in previous courses, the student will practice in a major haulout. Planning and scheduling will also be studied.

371-313 Inboard Marine Engines

This will emphasize the hands-on aspect of inboard, gas and diesel two and four stroke cycle engine maintenance, repair, overhaul and installation with the majority of work done on live units.

371-316 Small Business Start-Up

Whether to incorporate or not, will be one of the major issues discussed. The mechanics of starting a small business will be studied using case, studies and research projects.

371-411 Spring Commissioning

Planning and implementing a major spring launch will be culminated in placement in a local marina/yacht club, for spring commissioning. Staff, timing, layout and techniques will be discussed and practiced.

371-416 Purchasing and Inventory Management

Using production scheduling and control as a basis for purchasing inventory, the aspects of supply and demand, carrying costs and 'out of stock' situations will be studied. Retail Inventory Control will be emphasized in the second half of the course.

371-714 Marina/Yacht Club Management

Case studies and field visits will be used to compare management styles of small and large yacht clubs and marinas. Many guest speakers from the industry are scheduled.

380-002 Math II

This Math course covers the following areas: 3 linear equations in 3 unknowns; semi-log and log-log graphs; additional types of equations and systems of equations; equations of high degree; plane analytic geometry; operator; progression and the Binomial theorem; trigonometric identities.

380-010 Heat, Light and Sound

The student will demonstrate an understanding of the basic concepts of Heat, Light, Sound by being able to solve word problems and conduct certain experiments which require the applications of the concepts. These concepts include thermometry, calorimetry, heat transfer, thermal properties of gases, mirrors and lenses, refraction, doppler effect.

380-022 Fortran Programming

A computer programming course using the WATFIV compiler, covering the following topics: real, integer and mixed-mode arithmetic; input and output; control statements; Do loops, subscripted variables, subroutines; logical operations; double precision; complex operations and character manipulation.

The programming applications will be geared to the specific needs of the particular diploma you are taking.

380-046 Mathematics I

This math course contains a brief section on computational skills, one on trigonometry and one on algebra. The first section covers topics such as approximate numbers and dimensional analysis. The trigonometry section covers right triangles, vectors and trig graphs. The algebra section covers basic algebraic operations, linear equations in one and two unknowns, quadratic equations, the properties of logarithms and ratio, proportion and variation.

380-064 Chemical Math (Bioscience Option)

Techniques of integration; calculus solution of differential equations. Laplace transform solution of D.E.; infinite series; numerical integration techniques; and solution of equations using Newton's approximation.

380-064 Chemical Math (Industrial Chemistry Option)

Techniques of integration, Calculus solution of differential equations; Laplace transform solution of D.E. characteristics of control systems such as integral, first order lag, dead time and second order lag, construction of Bode diagrams.

380-083 Municipal Services II

The student will be able to design and draw storm and sanitary sewer system and prepare detailed drawings for manholes, catch-basins and other structures in the sewer system. He/she will also be able to analyze a network of water distribution system, using a computer program package (Hardy-Cross Method).

380-171 Calculus I

An introductory Calculus course to include the following topics: average rates of change; instantaneous rates of change; maximum and minimum problems; differentials and small changes; product, quotient and composite function rules and implicit differentiation; related rate problems; indefinite and definite integration; areas under curves and applications of integration. Applications will be geared to the particular program you will be taking.

380-172 Calculus II

The first part of the course covers Fortran programming and computer applications to calculus, including numerical differentiation and integration and graph plotting. The remaining part covers the application of the calculus and S-operator methods to the solutions of simple passive electric circuits.

Second level Calculus courses have specific objectives for each program.

380-172 Chemical Technology—Industrial Chemistry Option

The course covers: techniques of integration; calculus solution of differential equations; Laplace transform solution of D.E.; characteristics of control systems such as integral, first order lag, dead time and second order lag; and construction of Bode diagrams.

380-172 Chemical Technology—Bioscience Option

The course covers: techniques of integration; calculus solution of differential equations; Laplace transform solution of D.E.; infinite series; numerical integration techniques; and solution of equations using Newton's approximation.

380-172 Civil and Transportation Planning; Hydrographic and Survey Technician

The student will be able to demonstrate basic mathematical skills, and use them appropriately in specific applications, in the differentiation of trigonometric, exponential and logarithmic functions, and certain integration techniques to include substitution, basic log and exponential forms, basic trig forms, integration by parts, and integration using tables.

380-172 Electronics Technician

Designed specifically for electronics students, this course covers: time domain circuits; DC-AC waveforms; programming applications in BASIC and FORTRAN to evaluate solution of AC and DC circuit problems; Laplace transforms and circuit analysis by Laplace Transforms.

380-173 Calculus III

The first part of the course covers the analysis of active and passive circuits by Laplace Transforms, impulse and step response and poles, zeroes, and the S-plane. The remaining part covers Maclaurin, Taylor and Fourier series and computer applications to the above topics.

380-174 Calculus IV

This course covers elementary 3-D vector analysis, differentiation and integration by tables, partial derivatives, double integrals and differential equations and some computer methods of their solution.

This course enlarges upon concepts encountered in the first semester mechanics course and introduces graphical kinematics (a branch of

380-175 Mathematics (Dynamics)

Dynamics is the study of objects in motion.

This course enlarges upon concepts encountered in the 1st semester, Mechanics course and introduces graphical kinematics (a branch of mechanics that deals with pure motion).

Also covered will be kinetics (deals with actions of forces, changing the motion of masses) and work, energy and power.

380-176 Mathematics 3 (Management Applications)

The main emphasis in this course is in solving mathematical problems encountered in business and industry. It includes an introduction to statistics. The student will be able to: solve inventory control problems; solve problems involving the applications of linear, quadratic, exponential and logarithmic functions; solve problems involving compound interest and annuities; set up depreciation and amortization schedules; solve linear programming problems and problems involving matrix algebra; calculate the measures of central tendency and the measures of variation; construct frequency distributions and their pictorial presentations; perform probability calculations on normal distributions, and perform the various methods available for curve fitting.

380-179 'Basic' Programming for Technology Applications

A computer programming course using BASIC and covering the following topics: assignment statements; strings; input/output statements; GO TO statements; branching and looping; subscripted variables; functions and subroutines. The programming applications will relate to technical problems.

380-182 Statistics

An introductory Statistics to include the following topics: measures of central tendency; measures of variation; frequency distribution and their pictorial presentations; Binomial distributions; normal distributions; Poisson distributions; sampling distributions; confidence intervals and curve fitting.

380-191 Mechanics and Waves

The student will demonstrate an understanding of the basic laws of mechanics and magnetism by being able to solve problems and conduct certain experiments which require the applications of these laws. Included in these laws are Newtons Laws of Motion, translational and rotational equilibrium, accelerated motion, work, power, impulse and momentum.

Additional topics applying to the Chemical and Electronics options include:

Electronic Option

Electric Fields & Forces

Electrical Potential

Magnetism & Magnetic Fields

Forces & Torque in Magnetic Fields

Chemical Option

Uniform Circular Motion

Projectile Motion

Simple Machines

Elasticity

Fluids at Rest

Fluids in Motion

380-192 Computer Programming for Chemical Technology This course covers: 1) FORTRAN language on the IBM 4341 system; 2) BASIC language on the PET microcomputer; interactive programming; 3) Interfacing the PET to the real world, through the parallel user port.

General Studies - Course Descriptions

ART AND FILM

955-302 **Movie Themes and Their Directors**

This course will provide students with an opportunity to view popular, feature films seriously. We shall examine the work of three outstanding directors. By viewing an early and a recent film of each, we shall try to determine whether or not they have matured in their film-making. The emphasis will be on the themes and statements each of the directors is making, rather than on the technical aspects of the film. (Enrollment restricted).

Prerequisite: 941-104 or Equivalent

955-128 **Film and the Arts in Canada**

An inter-disciplinary study of Canada's people — their thoughts and ideas as seen through the traditions, films, art, folklore and literature they have created.

The course allows the student to acquire a perspective on Canada's past, present and future through a study of various themes and issues that have been of interest to the Canadian imagination. A special consideration will be to investigate how Canadian literature has been influenced by this country's unique geography, wilderness and landscape.

955-102 **Film Study**

This course is an introduction to the art and history of film. We will examine film as a 20th century medium which reflects and perhaps influences the experiences of modern man. There will be a special focus on genres in contemporary North American film as well as a look at the "foreign" film industry. Works of established film makers will be used to provide concrete examples which will lead to a discussion of the structure, grammar, aesthetic, history and social significance of film.

926-501 **Economics: An Introduction to Principles**

Economics is the scientific study of man's struggle with scarcity. This course introduces the general principles of basic economic problems of all societies. Some topics which will be discussed: basic concepts of economics, the market system, determination of price and cost, and supply and demand.

If this is a compulsory subject in a student's programme, it may not be selected as a general studies elective course.

932-505 Survival Kit for the XXI Century

As the XXth Century heads into its final two decades, major and serious questions face the people of planet earth. This course will examine ways by which we can survive in the XXI Century. Important topics for discussion are those related to environmental, political, social and economic issues which will affect our lives.

933-204 Labour Studies

Unions have made a forceful impact on Canadian society in recent years, but few of us know how they established their place in modern life. How did unions win recognition in Canada? What are the laws governing the organizing of a union, the process of negotiating a contract, and the right to strike? This course will also examine key issues which affect us all — as citizens, consumers, employees, and perhaps future union members.

GEOGRAPHY

927-101 Political Geography: The Geography of International Affairs

This course involves a study of the nation-state, its geographical nature, its policies and the factors, internal and external, that determine its power. The objectives of the course are to bring into focus the world of current national and international events free from the myth and ideology from which such events are all too often viewed. Topics include locations, boundaries, law of the sea, population, resources and international disputes. A large part of the course will consist of a discussion of current international events among students from many parts of the world.

927-111 Physical Geography

This course is a study of the geography of the physical world and of the earth as the interaction of systems. Specific topics include the earth-sun system, climate and weather, the water cycle, earth plates and earthquakes, rocks and soils, the physical and biological systems and the science of ecology.

HISTORY

933-108 History: Western Canada

In these days of Alberta-Ottawa squabbles over oil and gas, complaints about lack of understanding by Easterners of the Canadian West are often loudly voiced. With this course we will examine the fascinating history of these two regions of Canada, British Columbia, and the Prairie Provinces, from the Indian inhabitants through fur-trading days and up to the present. We shall be exploring in particular the differences between the West and other regions of Canada, such as the rise of strong protest groups, the prohibition movement, feminists, the social gospel movement, and other areas in which the West has been in the forefront.

LANGUAGE ARTS

941-109 The Mind Game

Tired of being manipulated? Confused by advertising, politicians and media? Want to be able to get to the root of issues? This course will develop your ability to Think: to isolate the extraneous and to focus on the information necessary to make a decision. It will teach you to spot fallacies in reasoning, to form your hypothesis and support it, and to straighten out your thinking process.

It provides the student with an understanding of the mechanism of the mind, techniques of approaching problems and of formulating solutions or opinions and develops methodology for assessing information input.

941-110 Effective Speaking

Effective Speaking stresses oral communication because this is the mode by which first impressions, often lasting, are created. The job applicant who speaks in a slipshod manner may very well be judged a lazy, apathetic person. If his articulation is poor and he uses incorrect grammar he may be considered illiterate and thus his opportunities are limited. In a society where the effective persuader is richly rewarded and the deficient severely penalized, effective speaking techniques become essential. This course attempts to help the student perfect these skills so he can perform efficiently in both vocational and social situations.

941-114

Effective Reading

Effective Reading is a course designed for the college student who possesses average reading skills but who realizes that increased proficiency in reading will add to his success both in college study and in his career work after graduation.

Effective Reading will help the student to deal more efficiently with printed material of every variety. The student will increase his comprehension of what he reads and enhance his understanding of language usage. He will learn to adapt his approach in reading to the type of material and the purposes for which he reads, and will learn how and when to use such rapid-reading processes as skimming and scanning.

LANGUAGES

962-101 & 962-201 French, Conversational 1 & 2

Learning French as a second language is of great importance not only as a means of communication but also as an aid to understanding the French culture. The courses are designed for active participation by the student. Aided by textbooks, video tapes and special pronunciation tapes, they deal primarily with French as used in everyday situations.

In French 1, the student acquires basic vocabulary and grammatical skills essential to using simple structures. French 2 develops the fundamentals to more complex structures such as expanded questions and answers in past and future tenses.

LITERATURE

941-311 Scribbler's Club

Creative writing is an odyssey of self-discovery that aims to condense, select and reshape personal "truths". It is also a confused, slow, irrational process, which is why scribblers of poetry and prose often feel uncomfortable with their endeavours or, worse yet, abandon the scribbling habit entirely.

This course proposes to assist the students who may be budding craftsmen.

955-101 Children's Literature

This course has been designed to give the student, who is interested in children and what they read, or have read to them, a detailed understanding of the multi-faced world of children's literature. Books which appeal to early childhood, the primary school child and the young adolescent will be discussed. The form, content and illustrations of picture books, fairy tales, folk tales, myths, fables, legends, fantasy, poetry and realistic fiction will be examined from a critical point of view. Specific emphasis will be placed on how to select and use books practically and creatively with children.

955-103 Crime and Punishment in Literature

Evil has always been a pervasive part of the human condition. Throughout history, evil often manifests itself in what we call "crime". To protect their structure, cultures have been obliged to create laws and to punish those who break the laws. Writers have always been fascinated by this conflict between the individual and society and have tried to capture its essence in imaginative works of literature. Through specific examples of myth and fiction, we will study individuals and groups that seem to have defied the laws of society. We will see some very unusual crimes and some equally unusual punishment.

955-104 Literature and Psychology: Moral Crisis

The writer and the psychologist are both moved by the desire to understand the drives and forces within the human nature. This course will analyze various literary and film works and the insights achieved by both approaches to man's understanding of the self and the moral crisis.

The student will be provided with a greater sense of the psychological dimensions of the moral crisis, that moment in one's life when any decision is vital to the integrity of the self.

955-107 Bestsellers: Contemporary Society in Literature

"Bestsellers" will examine both 'popular' and 'serious' contemporary novels in order to discover what and how writers tell us about human nature and how these thoughts might relate to our own lives. The novels selected will involve narrations about men and women together and alone in various situations and settings. These stories should serve as a basis for developing some psychological, sociological and philosophical notions about today's world.

955-108 Sleuths and Spooks

Stories of crime and punishment form one of the richest traditions in modern popular literature. This course will offer a brief survey of three distinct varieties of crime fictions — the traditional drawing-room detective story, the "gumshoe" character study, and the contemporary spy novel — through a selection of six core texts and several film classics. Works by authors such as Doyle, Christie, Chandler, Hammett, Greene, and LeCarre will be examined.

955-132 Fantasy and the Subconscious

This is a course for those who are not afraid to delve beneath the surface appearance of things to seek out the profound meanings of life. Through reading and discussion, the student will discover how existence is shaped by myths, fantasies, memories, dreams, metaphors and symbols.

955-138 Censorship in the 80's

The writer and artist are both concerned with the challenge of exploring human realities. This course will study the reasons why societies — and individuals — often confront such exploration with different forms of social and psychological censorship. Very subtle and frank examples of censored works (especially those that have disturbed social and personal values) will be analyzed.

955-141 Myth and Mysticism

This course provides an odyssey along the literary pathways of myth, magic, fantasy and mysticism into the realms of the irrational and the unknown. Using the symbols of psychology, mythology and religion as a frame of reference it will explore the works of revolutionaries of spirit and imagination, the visionaries and mystics such as Franz Kafka, Antoine de Saint Exupery, Hermann Hesse, William Blake, Walt Whitman, William Butler Yeats, Emily Dickinson and John Keats.

Note: This course is not open to students who have completed **Literature of Mysticism.**

955-142 Men, Gods and Heroes: Myths of Adventure

In this course you will read and discuss ancient and modern myths of adventure. The challenges confronted by great heroes and heroines of all times and cultures touch and illumine our human obsession with the search for meaning in life and in oneself.

You will study the symbolic and personal value of mythology's journey of adventure, the quest for life, as it parallels the human growth process. Each hero explores mysterious places, tangles with enigmatic friends and foes, and battles monstrous opponents in his search. Sharing his triumph and anguish, you will chart the life-pattern that moves us all toward self-fulfillment.

955-143 The Experience of Human Love

This is a study of human love as it is depicted in literature and film. Emphasis will be on the couple's dreams and aspirations, the stumbling blocks that cause them to resort to the "games people play" and the struggle that leads to the maturing of the ability to love.

The course aims to increase sensitivity in this all-important area by exposure to the insights of fine writing and films.

955-150 Heroic Fantasy

The world of fantasy provides the reader with an extra facet to expand his mind and push back everyday living. Fantasy provides the reader with a workshop for creative thinking.

This course will explore various genres of fantasy, from science fiction to fairy tales. The student will delve into man's need for fantasy literature and the desirability of this need. He will also read and evaluate many of the outstanding books in the fantasy field.

955-162 Magazines as Literature

"Periodical Literature" will concentrate on the current international field of quality journalism. The core of the course centres around the American and British elite, the best journalism available in all areas — politics, entertainment, fashion, sports, and human interest. Other aspects of the press will be discussed — layout, design, photography. The popular press (Time, Newsweek, etc.) and the role of specialty magazines, will frequently form a basis for classroom discussion.

955-165 The Canadian Experience

This course will introduce the basic themes that preoccupy the Canadian artist. We will seek out the nature of the Canadian hero in our literature and discover the ways in which our conceptions of that hero dictate the choices we make in our lives. Through an analysis of the fiction, poetry and film of XXth Century Canada, we will discuss many realities and conflicts that are central to our culture.

955-169 Folklore — Ritual and Romance

What do rock festivals, April Fools Day and Spring holiday time have in common? Why do we play Noughts and Crosses, Ring Around the Rosie and Mother May I? Why does a father hand out cigars on the birth of a child? These customs, celebrations and games have their roots in folklore. Folktales are among the earliest and most exciting forms of literature: they represent man's early attempts to explore his ideas, fears, desires and customs. In this course the student will study the folklore of several countries. He will explore folk literature, dance, speech and crafts of many ethnic cultures. The student, as well as studying the methods utilized by folklore scholars, will be introduced to some collective experiences of Man.

955-174 The Short Story: Classic and Contemporary Short Fiction

The aims of this course are to read, talk and write about short fiction, i.e. stories which can usually be read, understood and appreciated in one sitting. Each story will be dealt with as something which illuminates our own lives as much as presenting the published thoughts of a writer. Though I shall provide a good deal of information on critical approaches and technique, the central focus of the course will remain on the stories themselves and the reader's experience of them.

955-175 Science Fiction — It's Your Future

When Mary Shelley wrote *Frankenstein* in 1817, it was inconceivable that man would ever be able to reproduce himself artificially; when Alvin Toffler wrote *Future Shock* in 1970, the technology to build a humanoid was available; in 1978 cloning was an established fact; by 1984 we may all be automata.

This mini-history of the developing scientific imagination will be cloned (duplicated) during the course. Ideas and facts from technology, business, biology, sociology and art will be the starting points for discussion of the stories. We shall try to find the fine line between fact and fiction.

955-232 Dreams and Literature

Between dreams and literature there are peculiar and intimate connections. This course will introduce students to methods of dream analysis, and this knowledge will be applied to the study of fairy tales, romances, mysteries and realistic novels.

Students will witness the ways literature, as a form of dreaming, manipulates and fulfills hidden wishes. Since literature mirrors one's own emotional and psychological conditions, there is no need to avoid literature or fear the criticism of it.

PHILOSOPHY

923-201 Philosophy: Logic and Logical Thinking

This course will help the student to develop correct thinking patterns and to distinguish good arguments from bad ones. By studying the laws and principles of logic the student will learn the differences between arguments that actually prove what they are supposed to prove and those that do not. The main objectives of the course are to familiarize the student with the rules and standards of sound reasoning, without which meaningful communication is impossible, and to help the student learn to avoid formal and informal fallacies.

932-101 Philosophy: An Introduction

In this course we will study what the greatest thinkers of East and West had to say on the basic topics of philosophy. We will discuss God, Man, Religion, Ethics, Politics, Logical Thinking and Truth, and The Unknown Universe. The approach will be varied to include: lectures, seminars, discussions, films and guest lecturers. Each issue will be studied from at least three contrary positions, and from a variety of contemporary themes relevant to the topic, but viewed from within the students' vocational interests.

Some such themes will be genetic control, women's roles, the rights of children, futurology, the contemporary creative scene, facing sickness and death, and many others.

934-119 Values and Choices

Students will become more acquainted with their own sense of values — the things in life they wouldn't want to live without. The class will also explore what other well-known individuals and societies have valued and what results these beliefs have had on their lifestyles and opportunities. Interpersonal skills and powers of observation will be developed during discussions of responses to various art forms (painting, popular song, film and poetry) encountered.

935-101 Philosophy: Religions of the World

This course aims to familiarize the student with some of the major religions which exert a great influence upon mankind, as well as to make the student aware of and appreciative of the thought-patterns and significance of the phenomena of religion. The course consists of two parts:

- (1) A study of basic tenets, beliefs, practices, philosophies and histories of major religions.
- (2) A critical analysis of general questions relating to religion, such as existence of God, problem of evil, after-life, religious experience, religion vs. science and philosophy, etc.

935-201 Modern Cults

The burgeoning of ersatz religious groups in Western society is a modern phenomenon. This course will investigate some common cults — their theology, lifestyles, and influence among young people and in society in general. Since most of the cults practise a highly persuasive type of conversion, their recruiting techniques will be considered as well as their methods of mind control. The problem of deprogramming, with its present legal and political implications, will also be discussed.

POLITICAL SCIENCE

922-203 **Political Science: International Politics**

The aim of the course is to review and preview the politics of nation-states. The peoples of all countries see their own nations as "peace-loving" and their set of national priorities as "just" or correct. But the complexities of international relations make simple slogans untrustworthy and require comprehension of the ideological, strategic and economic forces which determine politics among nations in the modern era. Selected topics of study include the superpowers, detente, military strategy, nuclear warfare and arms control, international security and supranational organization.

PSYCHOLOGY

923-205 **Exploring Human Sexuality**

This course has been designed to encourage the open discussion of human sexuality in a safe, non-threatening environment which will facilitate participation in the free exchange of ideas.

924-101 **Psychology I: Introduction**

This course embraces such topics of general interest as biofeedback, non-verbal communication, weight control, aggression and violence, environmental influences on sexual behaviour, stress, conformity, ESP, sensory deprivation, advertising (open and subliminal), brainwashing, yoga and transcendental meditation, drugs and altered states of consciousness, hallucinations, and behaviour therapy. Case studies, "action projects", demonstrations, and discussions are used to convey psychology's basic discoveries about human behaviour.

924-118 Parapsychology

This course deals primarily with findings on the subject of parapsychology. It covers the four basic manifestations of PSI phenomena: telepathy, clairvoyance, recognition and psychokinesis. These topics are covered in the course in so far as they play an integral role in psychic awareness. The latter part of the course touches on the more popular and sensational aspect of ESP for the sole purpose of placing parapsychology in its proper perspective.

924-121 Psychology, Child

The purpose of this course is to introduce students to psychological knowledge about children and to heighten students' awareness and understanding of children as developing and experiencing persons. The course will take an in depth look at the changing child from prenatal period through the middle years as well as a brief look at adolescence. Major developmental theories, contributions of the major learning theorists and the child's changes in the cognitive, social, emotional and physical domains will be considered. An emphasis will be placed on understanding the child in dynamic interaction with his physical and social environment. The application of psychological knowledge about the child to the child's real life situations will also be stressed.

924-208 Psychology, Developmental

In this course, you will trace human development from conception to death. You will study both the physical growth of the human person and the psychological growth throughout life. Included will be: the interaction of heredity and environment, the brain and its relation to behaviour, age group characteristics and physiological and psychological problems that appear from early childhood through the aging process. You will learn how the individual learns to cope and adjust to stress and predispositions throughout life and how the use of mental health professionals is sometimes sanctioned.

924-210 Psychology 2: Social

This course examines such topics as conditioning and desensitization, learning, memory, hypnosis, acupuncture, genetics, types of learning, cognitive and emotional development, the purpose of play, person theory, defense mechanisms, repression, personality testing, abnormal sexual behaviour, mental illness, group therapy, role playing, transactional analysis, persuasion, propaganda, attitude change, applied psychology, and psychology's future. Case studies, action projects, demonstrations and discussions are used to convey psychology's discoveries about human behaviour.

924-502 Psychology, Abnormal

No one is immune to psychopathology. Everyone has his "breaking point". This course represents a blend of psychopathological theory and phenomenological analysis of the kind of concrete data found in case studies. Each case study represents a major psychopathological condition. Phenomenological conceptions are stressed in the working up of psychopathological profiles. Some of the profiles studied are: transient situational disorder, the neuroses, schizophrenia, manic-depressive psychosis, sexual deviations, alcoholism, and psychosomatic reactions. The different treatment methods are given limited attention, in that this course does not have as one of its aims the preparation of therapists.

934-101 Human Relations

This is a practical course in interpersonal relations. Looking at business, social and personal situations, the course examines: the effects of past experience and learnings on present behaviour, the part that emotions, values and human needs play in relations: verbal and non-verbal communications: and how people function in small groups. Classroom experiences will be combined with ideas from the behavioural sciences to provide an integrated understanding of human relationships.

SOCIOLOGY

923-101 Sociology: Introduction

In general terms, sociology is the study of human social- or group-behaviour. In this introductory course, students will survey briefly sociology's history and prominent figures. They will investigate sociology's view and interpretation of human social behaviour. The definition of a group, its formation and maintenance, and its establishment of a pecking-order will be discussed in terms of contemporary social issues.

923-124 Sociology, Population and Society

What will our world be like in the year 2000? The answer to this question will be greatly influenced by population changes in the world and in Canada. This course will overview social problems associated with population growth and change. Topics will include causes of high and low birth and death rates, theories of migration, modernization, the need for population control and the quality of life in society.

923-125 Mass Communications and Public Opinion

This course will focus on mass communication in our society, how it forms and molds public opinion, and affects the individual. Specific topics will include: public opinion; media/consumer trends in Toronto; current and future development and effects in media technology; computers and credit reporting systems (who knows your private information?); violence, music, lifestyles and political change.

925-101 Anthropology: Introduction

This is an introduction to a cross-cultural study of man's behaviour ranging from the way he bears and raises children to the way he perceives and handles death. Societies as diverse as the jungle people of the Amazon and the penthouse dwellers of a metropolis will be studied to compare and contrast their views of key questions. What is normality? What is natural? Is aggression innate? Are gods necessary?

925-105 The Canadian Family

The family, no matter how it is structured, is the most basic social institution in all societies. The way it is formed, how it operates, who is considered a member may be factors that differ from one society to another, but all societies expect a family form to be responsible for marriage, reproduction, child development, and through the process of procreation, ensure the survival of the society itself.

In most Western societies, including our own, very little attention is given to the training of young people in preparation for forming their own families. This course, then, will focus on family formations, how they can cope with stresses such as marital discord, child raising, family finances, family disputes, separations, divorces.

Communications - Course Descriptions

These courses are compulsory. See Page xviii

941-104 & 941-105 Language Skills

The primary aim of this course is to help students improve their writing. Since reading and writing are interdependent skills, the course will also devote some time to reading, but primarily as a source of information for writing. Assignments will often integrate practice in both reading and writing.

This course will emphasize sentence structure but will introduce the entire writing process. With each assignment, students will be taught to choose and limit their topic and define audience and purpose for writing.

941-102 & 941-115 Communications I

This course is designed to develop the writing skills which will help students meet the requirements of both college and their chosen vocation. Emphasis is placed on mastery of basic research and writing techniques for clear expository prose. There is also an opportunity provided for continued development of reading comprehension.

Prerequisite: 941-104 or equivalent

941-103 & 941-116 Communications 2

This level emphasizes research and vocational planning. Students learn to present ideas clearly, concisely, and effectively both in writing and in speaking. At this level, style, form and creativity are stressed. In addition to writing business correspondence and reports, students prepare a career-related document file.

Prerequisite: 941-115 or equivalent

In addition to the Communications courses, the Human Studies Division operates a Language Development Centre which provides tutorial assistance in English. Any student in the college may go to the Centre on a drop-in basis for help. Instructors also refer students for additional help in their regularly scheduled courses.

OTHER PROGRAMS AT HUMBER

This guide deals with just a few of the wide variety of full- and part-time programs offered by Humber College. If your exact needs are not met by one of these programs perhaps one of our other guides may help.

THE PROGRAM GUIDE is a brief description of all full-time programs at Humber. Generally speaking, it should be consulted first to narrow your program search to one or two programs.

THE APPLIED ARTS CAREER GUIDE describes, in detail, the full-time programs which are generally in the helping or community service areas.

THE BUSINESS CAREER GUIDE details the full-time programs in the fields of accounting, management, merchandising/marketing, data processing, and secretarial/word processing.

THE CREATIVE AND COMMUNICATION ARTS CAREER GUIDE covers the graphic and communication arts fields. The programs range from metal arts, furniture and product design to journalism and radio broadcasting.

THE HEALTH SCIENCES CAREER GUIDE opens up alternatives to nursing. Every full-time program from pharmacy assistant to funeral service is examined in detail.

THE TECHNOLOGY CAREER GUIDE uncovers the future. One, two and three year programs in the mechanical, construction, electronics, and electrical fields are clearly presented.

THE CONTINUOUS LEARNING GUIDE covers the full range of credit, general interest courses and certificates available on a part-time basis. It is available four times a year.

If you feel you may not be ready for a post secondary program you may want to consider one of our College Prep programs.

GENERAL ARTS AND SCIENCE

Certificate	2 Semesters
Diploma	4 Semesters

The student who enrolls in the G.A.S. program does so for a variety of reasons. For example, the student may want to continue with post-secondary education without a commitment to a definite career orientation, or may not have been accepted into a career program, but still wishes to earn valuable credits. Also, some students choose these academic courses to prepare them for further education in a university environment. Many universities in Canada and the U.S. recognize the G.A.S. program as providing credits sufficient to allow entry into their institutions.

The program is designed under the general philosophy of education. Students learn about themselves, their relationships with others and their obligations to society as responsible, contributing citizens. The program allows time to determine primary career interests.

The first semester program includes: Political Science, Psychology, Sociology, Philosophy, English Literature 1, Communications 1, either Career Planning or Mathematics for General Arts and Science. Semesters 2-4 expand upon the courses through a selection from the General Studies offerings for that term.

Two program options are available -- a one year certificate or a two year diploma course of studies which may be completed either day or evening. Part-time students must have their programs approved by the G.A.S. Co-ordinator.

LOCATIONS: North

Lakeshore 1

GENERAL STUDIES COURSES

Most post-secondary programs require students to complete an average of one General Studies course per semester. In the General Studies classes students will have an opportunity to discuss, with men and women from other programs in the College, the increasingly important issues raised by the Social Sciences, Literature, the Humanities and Modern Languages.

While students will be free to choose their own General Studies courses, the selection will be restricted by several factors including their campus, timetable, and the offerings for that term.

Short program students are not required to complete a General Studies course but may be required to complete Life Skills or a similar elective subject.

Continuous Learning students are required to take General Studies and Communications courses only if they are intending to graduate with a certificate or diploma.

ENGLISH COMMUNICATIONS

Except as designated in the program curricula, each post-secondary student is required to complete, or be granted credit for Communications I in order to graduate from a certificate program. To graduate from a diploma program, students must also complete Communications II. Students in the Health Sciences must complete a distinct communications syllabus in order to meet the requirements for graduation.

ESTABLISHING A STUDENT'S LEVEL

During the first week of classes, each student will complete the Humber College Language Proficiency Tests. These will be graded by the Communications faculty and will be used to determine the student's present level of performance.

On the basis of this evaluation, the student will

1. be required to take a course in Language Skills to upgrade his communication skills so that he/she can meet the performance objectives to enter Communications I;
2. remain in Communications I;
3. be credited with Communications I and advance to Communications II.

NOTE: Students may receive exemption/credit for either or both of the Communication courses on completion of a comparable course in Communications at a university or community college. (Transcripts and course descriptions are required.)

Please note that Communications I and II may not be taken simultaneously; Communications I must be completed before the student enters Communications II.

Short program students will be required to complete the Communications requirements as detailed on the DACUM chart for their program following orientation.

Continuous Learning students should refer to the relevant note under General Studies.

COLLEGE PREPARATORY PROGRAMS

16-64 weeks

If you have been out of school for a year or more, the College Preparatory program can prepare you for admission to a short skill or post-secondary program at any Ontario College of Applied Arts and Technology. The College Preparatory program is, however, not designed for credit toward a high school diploma.

LEVEL I & II

In Levels I and II emphasis is placed upon providing a thorough grounding in basic English and Mathematics. Level I is designed for students with very low literacy skills and focuses upon basic reading, spelling, grammar, writing, listening and speaking.

Level II develops your ability to read and comprehend vocational and general material, and compose simple paragraphs: speak clearly, coherently and effectively; and through listening, recall main ideas and relevant details as well as carry out a series of instructions.

You will also be able to solve basic problems in whole numbers, fractions, decimals, percent and metric measurement upon completion of Level II.

LEVEL III & IV

In Level III the scope of the program is broadened to include Science and an option (Life Skills, Typing or Drafting) as well as English and Mathematics. Emphasis is placed upon preparation for the job market, skill programs, apprenticeship programs or further study in Level IV.

The curriculum of Level IV provides an intensive preparation of the academic subjects essential for successful post-secondary study – English, Mathematics, Physics, Chemistry and, at the North Campus only, Biology which requires prior completion of Level IV Chemistry. Life Skills, Typing, Drafting, Economics or Sociology complete your program depending on the campus you elect to attend.

For mature students who have a specific post secondary goal within Humber College, a specially designed mini-program consisting of only those subjects required for entry into the post secondary program can be arranged.

LOCATION North Campus – Level IV
Lakeshore I Campus – Levels I to IV inclusive.
Keeslesdale Campus – Levels II to IV inclusive.

START DATES

At the North Campus classes begin in September and January. At the Lakeshore I and Keeslesdale Campuses, full-time classes begin every Monday; part-time classes begin the third week in September and the second week in January.

BASIC JOB READINESS TRAINING (B.J.R.T.)

12 week average

This program is designed to facilitate the student's re-entry into employment either directly following B.J.R.T. or a skills training program. Components of B.J.R.T. include personal life skills, applied life skills and work skills as related to day-to-day living.

ADMISSION REQUIREMENTS: Agency referral, Canada
Employment & Immigration
referral or self referral.

LOCATION: Lakeshore II/IRC
70 Queen Elizabeth Blvd. West

START DATES: Every Monday

ENGLISH AS A SECOND LANGUAGE

24 weeks

Designed to give new Canadians a working knowledge of the English language. this program permits the student to adapt previously learned skills and knowledge and apply them in an English-speaking environment. Emphasis is on oral work in order to enable a graduate to obtain productive employment.

ADMISSION REQUIREMENTS: Open

LOCATION: York-Eglinton Centre

START DATES: New Classes Start Monthly

ADVANCED ENGLISH AS A SECOND LANGUAGE

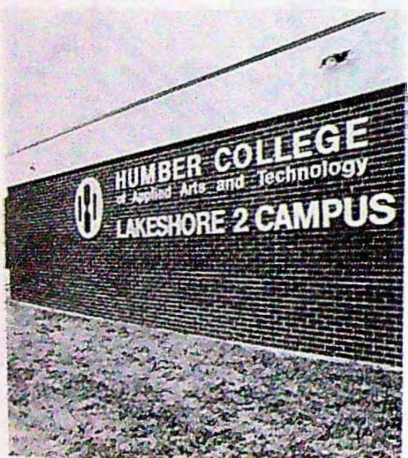
12 weeks or more

This program is particularly useful for skilled or semi-skilled tradesmen and women, or professionals from countries where English is a working or second language. The concentration is on reading, writing and the more advanced, employment-related skills required in Canada to practise previously acquired skills. It may also be used to gain admission prerequisites (in English) to other College Programs.

ADMISSION REQUIREMENTS: Must pass pre-test
Interview required

LOCATION: Lakeshore I

START DATES: Every Monday



NORTH CAMPUS

The North Campus is one of the largest in Ontario with an enrollment of more than 6000. The North Campus concentrates on post-secondary programs and Continuing Education, providing both in an exciting learning environment.

Public Transportation - Both the Wilson Avenue and the Finch Avenue buses provide a direct transportation route from the subway system to the campus. Mississauga transit provides a bus from the Westwood Mall.

LAKESHORE 1 CAMPUS

The Lakeshore 1 Campus is situated on the shore of Lake Ontario. A smaller campus of approximately 1100 students, it offers generally smaller and more personal classes. Programs offered include post secondary business, secretarial and applied arts programs as well as College Prep and short commercial skill programs.

Public Transportation - The Islington Avenue South Bus links the campus to the subway system. The Long Branch Car connects the campus with GO Transit.

LAKESHORE 2 CAMPUS

The Lakeshore 2 Campus deals mainly with short technical and apprenticeship skill programs but also offers a number of related post secondary programs. Unique co-operative training programs are offered in the critical metal machining industry through the Industrial Resource Centre.

Public Transportation - From the Kipling Subway Station, take the Kipling South bus to the Queensway, transfer to the Queensway bus, east along the Queensway to Plastics Avenue. A short walk down Plastics Avenue will get you to the campus.

KEELESDALE CAMPUS

This campus offers residents of York local access to English as a Second Language, College Prep, and a broad range of short commercial programs and Continuing Education courses.

Public Transportation - This campus can be reached by taking the Eglinton West Bus to Industry and Trethewey. From the Jane Street subway station, take the Jane Street bus to Trethewey, and then transfer to the Eglinton West Bus.



YORK- EGLINTON CENTRE

This campus offers residents of York local access to English as a Second Language, Teller Cashier, and Continuing Education courses. These courses are provided through 10 local neighbourhood learning centres.

Public Transportation - This campus is located on Eglinton Avenue West just east of Dufferin Street and can be easily reached by the Eglinton Avenue bus which connects with the subway system.

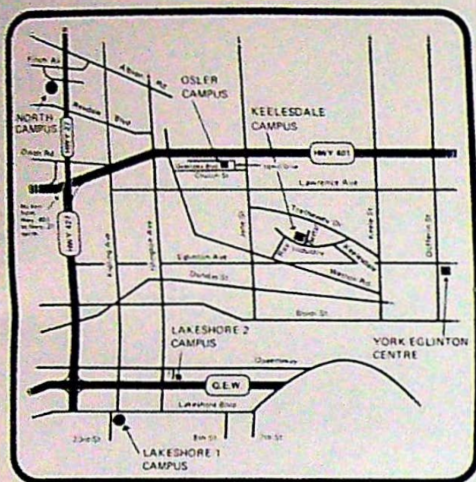


OSLER CAMPUS

The Osler Campus is primarily intended for the mature (over 25) Nursing student. It is also the only campus with residence facilities, offering housing for female students.

Public Transportation - This campus can be reached by taking the Jane Street bus to Church Street, just south of the 401. A short walk to Uphill Drive and Queenslea Blvd. is necessary.





HUMBER COLLEGE

North Campus
205 Humber College Blvd.,
Rexdale, Ont. M9W 5L7
Phone: (416) 675-3111

Lakeshore 1 Campus
3199 Lakeshore Blvd. W.,
Toronto, Ont. M8V 1K8
Phone: (416) 252-5571

Lakeshore 2 Campus
56 Queen Elizabeth Blvd.,
Toronto, Ont. M8Z 1M1
Phone: (416) 252-5571

York-Eglinton Centre
1669 Eglinton Ave. W.,
Toronto, Ont. M6E 2H4
Phone: (416) 781-5621

Keelesdale Campus
88 Industry Street,
Weston, Ont. M6M 4L8
Phone: (416) 763-4571

Osler Campus
5 Queenslea Ave.,
Weston, Ontario M9N 2K8
Phone: (416) 249-8301

Industrial Resource Centre
70 Queen Elizabeth Blvd.,
Toronto, Ontario M8Z 1A3
Phone: (416) 252-5671

TTC Information Number
Mississauga Transit Information Number
GO Transit Information Number

484-4544
279-5800
630-3933

DECLARATION OF WAIVER

Every attempt is made to ensure the accuracy of this information as of the date of publication (1982 11 01). While these brochures are updated periodically, information of this type tends to become outdated with time. Therefore, the College cannot assume responsibility for changes between issues in those areas beyond its control. Furthermore, it reserves the right to modify or cancel any program, option, course, program objective, fee, timetable or campus location without notice or prejudice.

It is the College's right to schedule classes any time, Monday through Saturday. All students should be aware that it may be necessary for them to take a course or courses during the evening hours or on Saturday.

Humber
College





TECHNOLOGY
career guide
1983-1984

Humber
College

