Mechanical Engineering Technician
Mechanical Engineering Technology
Mechanical Engineering Technician
-Non-Destructive Evaluation

DURHAM COLLEGE
SUCCESS MATTERS

School of Science and Engineering Technology

Program Guide 2010

Table of Contents

Please note the following important information:
Durham College strives to ensure the accuracy of the information in this publication. Please note that the academic curriculum is continually reviewed and revised to ensure program quality and relevancy. As such, the college reserves the right to modify or cancel any course, program, fee, procedure, timetable or campus location at any time. Please consult our website at www.durhamcollege.ca for the most current information.

Printed: August 2010

Welcome Students

A Message from the Dean and Vice President, Academic

Thank you for choosing Durham College's School of Science and Engineering Technology to further your education. It is a great pleasure for the faculty and staff to guide and assist you in reaching your goals. Your chosen program has been designed to provide you with the theoretical and hands on experience which will enhance and enrich your resume. Durham College provides a great many services for students so please do not hesitate to take advantage of them. Your professors are all dedicated professionals chosen for their knowledge and excellence in your field of study. They will be more than happy to share this knowledge and guide you along your journey.

The School of Science and Engineering Technology takes pride in our mission to encourage a progressive, motivating and experiential learning environment which produces exceptional graduates who exceed employer and industry standards. We welcome you and wish you every success!

Sue Todd

Susan Todd
Dean, School of Science and Engineering Technology

Congratulations on choosing Durham College and taking a very important step in preparing for your future. Durham College is known for high quality programs, leading edge technology, an award winning library and a student-centered approach to learning. Supporting our mission that the student experience comes first, Durham College is committed to providing students with quality learning experiences and support in finding fulfillment in education, employment and lifelong learning.

Our programs are continually shaped by market needs and delivered by exceptional teachers with real-world experience. The program you have chosen has been designed to help you develop the necessary skills and knowledge to support your success in your chosen career path. Our dedicated and professional staff and professors are committed to helping you achieve your educational goals and your career aspirations.

Durham College strives to be accountable to students and employers through the preparation of work-ready graduates who will continue to live our "success matters" focus in their professional work environment.

We are pleased you have chosen to study at Durham College and we look forward to supporting your learning journey – work hard, have fun, enjoy your college experience and campus life.

I wish you much success with your studies.

Judy Robinson,
Vice President, Academic

Aug. 9, 2010

SCHOOL OF SCIENCE AND ENGINERING TECHNOLOGY
OSHAWA CAMPUS

Administration/ Support Staff Name	Office #	Phone Voice Ext.	Mail	E-mail Addresses	Position
Todd, Susan (A)	H140B	2319	2319	susan.todd@durhamcollege.ca	Dean
Dillon, Linda (S)	H140E	2545	2545	linda.dillon@durhamcollege.ca	Administrative Coordinator
Green, Maureen (S)	H140A	2383	2383	maureen.green@durhamcollege.ca	Student Liaison/Admin.Support
Knihnisky, Steve (S)	H230B	2378	2378	steve.knihnisky@durhamcollege.ca	IMC Technician and Integrated Automation II
Lewis, Amy (S)	A210	2210	22102	amy.lewis@durhamcollege.ca	Science Lab Technologist
MacKay, Dave (S)	H220	2767	2767	dave.mackay@durhamcollege.ca	Electronics Technologist and Electricity I
Myers, Jeff (S)	H166D	2385	2385	jeff.myers@durhamcollege.ca	Mechanical Technologist, CAM 1
Oberg, Stacey (S)	A210	2210	22101	stacey.oberg@durhamcollege.ca	Science Lab Technologist
Smith, Mary (S)	H140	3060	3060	mary.smith@durh**amcollege.ca**	Administrative Support
FACULTY:					**Subjects – Fall 2010**
Agnew, Allan	1100 Simcoe	2421	2421	allan.agnew@durhamcollege.ca	Calculus
Allison, Michael (CF)	UA 4061	2991	2991	michael.allison@durhamcollege.ca	Chromatography I, Spectroscopy I
Antle, Eugene	I211	2468	2468	eugene.antle@durhamcollege.ca	Stat. Quality Control I, Stat. Methods in Q.C.
Benninger, Laura (CF)	UA 4027 H140H	3631 6556	3633 6556	laura.benninger@durhamcollege.ca	Analytical Chemistry I Field Placement (Tues, Thurs 12:00-2:00)
Bertrand, Louis	C208	2785	2785	louis.bertrand@durhamcollege.ca	Digital Circuits II, Electronic Circuits II, Law & Ethics, Microprocessors I, Field Placement
Bongando, Bony (CF)	H239B	3741	TBA	bony.bangondo@durhamcollege.ca	Chemistry I, Chemistry for Technicians
Bracken, Wendy (CF)	H239E	3689	36892	wendy.bracken@durhamcollege.ca	Mathematics I
Braithwaite, Rob (CF)	H239B	3741	37411	rob.braithwaite@durhamcollege.ca	Tool Design
Brooks, Brent	H230A	2416	2416	brent.brooks@durhamcollege.ca	Automation Systems, Integrated Automation II, Electricity I, Field Placement
Calhoun, Maureen, (Coord.)	H140C	2168	2168	maureen.calhoun@durhamcollege.ca	Analytical Chemistry I, Industrial Chemical Processes, Physical Chemistry
Coxworth, MaryEllen **Reports to Gen Ed. School**	A308	2274	22741	maryellen.coxworth@durhamcollege.ca	Communications for Success
Daniel, Chris	C208	3653	3653	chris.daniel@durhamcollege.ca	CAD III, Mechanics of Materials, Physical Science, Field Placement
Daniel, Joe	H138	2649	2649	joe.daniel@durhamcollege.ca	Computer Applications I, Industrial Controls I
Dimartino, Sebastian (CF)	H239E	3689	36891	sebastian.dimartino@durhamcollege.ca	Computer Applications I, Computer Organization
Dragomatz, Don was	C314	2298	22982	don.dragomatz@durhamcollege.ca	Engineering Drawings, Engineering Graphics I, Measurement I
Dragomatz, Terry	A305	2446	2446	terry.dragomatz@durhamcollege.ca	CAD I, CAM II
Eustace, Richard	Whitby	4096	40961	richard.eustace@durhamcollege.ca	Manufacturing Sciences
Fuentes, Lauren	C312	2296	22961	lauren.fuentes@durhamcollege.ca	Circuit Analysis, Electronic Circuits II
Grenier, Denis	H216	2248	2248	denis.grenier@durhamcollege.ca	Introduction to CAD
Hartford, Ian (CF)	H239C	3740	TBA	ian.hartford@durhamcollege.ca	Spectroscopy I, Chromatography I
Henderson, Bruce (CF)	H239D	3739	TBA	bruce.henderson@durhamcollege.ca	Chemistry I, Industrial Chemical Processes, Physical Chemistry, Analytical Techniques
James, Beau	A309	3738	37381	beau.james@durhamcollege.ca	Electricity I, Operating Systems
Jelavic, Matthew	C208	2061	2061	matthew.jelavic@durhamcollege.ca	Fluid Power II, Fluid Mechanics
Jessup, Tanya	C208	2285	2285	tanya.jessup@durhamcollege.ca	Biology, Mathematics Water/Food Tec, Analytical Techniques
Johanson, Lauriston (CF)	C108	2626	TBA	lauriston.johanson@durhamcollege.ca	Tech. Communications for Water Quality
Johnston, Denise (CF)	C108	2614	12614	denise.johnston@durhamcollege.ca	Communications for the Workplace
Kelly, Kevin	A309	3738	37382	kevin.kelly@durhamcollege.ca	Analytical Instrumentation, Chromatography I, Pharmacology
Kovacic, Frank (CF)	H239A	3742	37421	frank.kovacic@durhamcollege.ca	Mathematics for Technology I

Administration/ Support Staff Name	Office #	Phone Voice Ext.	Mail	E-mail Addresses	Position
Kudla, Sandra	H122	2062	2062	sandra.kudla@durhamcollege.ca	Anatomy & Physiology, Dialysis I, Biomed. Terms & Devices II, Math for Technology I
Lagerwey, Michelle (CF)	A120C	2467	24672	michelle.lagerwey@durhamcollege.ca	Measurement I
Mehrnia, Iraj (CF)	H140H	6556	TBA	iraj.mehrnia@durhamcollege.ca	Chemistry I, Good Manufacturing Practices
Motum, Ron (CF)	A243	2276	22753	ron.motum@durhamcollege.ca	Chemistry for Technicians
Myers, Joyce	A212	2381	23812	joyce.myers@durhamcollege.ca	Intro. Microbiology, Microbial Applications II
Patel, Pravin (Coord.)	H140D	2221	2221	pravin.patel@durhamcollege.ca	Computer Applications & Simulation
Prior, Andrew	Whitby H239C	4071	40712	andrew.prior@durhamcollege.ca	Manufacturing Sciences, Manufacturing Processes
Proulx, Amy (CF)	A120C	2467	TBA	amy.proulx@durhamcollege.ca	Processing Operations I, Field Placement
Richardson, John (CF)	H239A	3742	TBA	john.richardson@durhamcollege.ca	Mathematics for Technology I
Schuett, Dave Coord.	C208	3655	3655	dave.schuett@durhamcollege.ca	Physical Science
Simmonds, Fleurette (CF)	C108	2344	TBA	fleurette.simmonds@durhamcollege.ca	Communications for Success
Smith, Russell (CF)	C108	2637	2637	russell.smith@durhamcollege.ca	Organizational Behaviour
Smyth, Roy	Whitby	4066	40661	roy.smyth@durhamcollege.ca	
Snelgrove, Darren (CF)	H239D	3739	TBA	darren.snelgrove@durhamcollege.ca	Chromatography I, Analytical Techniques
Stender, Corrie	A243	2276	22762	corrie.stender@durhamcollege.ca	Environmental Science, Field Placement, Water & Waste Water Eng.
Stevenson, Ross	H140G	3013	3013	ross.stevenson@durhamcollege.ca	Environmental Enforcement, Industrial Waste
Subbarao, Gorantla	A242	2275	22751	rao.subbarao@durhamcollege.ca	Digital Circuits II, Signals and Systems
Suppelsa, Doug (CF)	A309	3738	??	doug.suppelsa@durhamcollege.ca	Waste Water Collection & Treatment
Sweetman, Teresa	A212	2381	23811	teresa.sweetman@durhamcollege.ca	Introductory Microbiology, Water Microbiology II, Analytical Techniques
Taylor, Gregg	A307	2415	2415	gregg.taylor@durhamcollege.ca	Spectroscopy I, Chromatography I, Organic Chemistry II
Taylor, Janet (CF)	A308	2274	22742	janet.taylor@durhamcollege.ca	Organic Chemistry II
Thompson, Craig (CF)	H239 Metal	3740	37401	craig.thompson@durhamcollege.ca	Chemistry I
Tidman, Rick	H122	2065	2065	richard.tidman@durhamcollege.ca	Intro to Biomedical Eng Tech., Biomedical Tech Management, Biomedical Instrumentation I, Medical Imaging Systems I, Safety Standards/Risk Mgmt I
Trelinski, Mike (CF)	A107	2063	20632	mike.trelinski@durhamcollege.ca	Non Destructive Testing UT I
Trieselmann, Bruce	A306 Lab	2202 3281	22021	bruce.trieselmann@durhamcollege.ca	Biochemistry I, Advanced Protein & DNA Techniques
Trieselmann, Nadia (CF)	A306 Lab	2202	22022	nadia.trieselmann@durhamcollege.ca	Adv. Protein & DNA Techniques, Cell Biology
Van Schyndel, Tony	H216	2411	2411	tony.vanschyndel@durhamcollege.ca	Mathematics for Technology I, Telecommunications I
Walchuk, Kevin (CF)	C108	2037	TBA	kevin.walchuk@durhamcollege.ca	Communication for the Workplace
White, John	A242	2275	22752	john.white@durhamcollege.ca	Chemistry I, Community & Environment
White, Sarah (CF)	H239 Metal	3740	37402	sarah.white@durhamcollege.ca	Health & Safety, Analytical Techniques
Wilson, Katherine	C208	2617	2617	katherine.wilson@durhamcollege.ca	Topics in Environmental Science, Environmental Sampling, Field Placement
Wraight, Paul	H239F	3737	3737	paul.wraight@durhamcollege.ca	Mathematics I for Technician, Mathematics III for Technician
Yacknowiec, Dennis (CF)	Whitby 1103	4072	40681	dennis.yacknowiec@durhamcollege.ca	Water Hydraulics
Zaidman, Katy (Coord.)	H140F	3151	3151	katy.zaidman@durhamcollege.ca	Metallurgy I, Metallurgy for Non-Destructive
Zirnhelt, John (CF)	A107	2063	20631	john.zirnhelt@durhamcollege.ca	Intro to Non-Destructive Testing, Radiation Safety, Fundamentals of Welding Inspection

A = Administration; S = Support Staff; FACULTY = Professors; Coord. = Program Coordinator,
CS = Contract Support Staff, CF= Contract Faculty

Lab Extensions:
H165 - 3881, H222 - 3883, H223 - 3884, H230 - 3885, H226 - 3535
A106 - 3565, A120 - 3566, H160 - 3879, H155 - 3878, H164 - 3880, H171 - 3882, H172 - 3434, H230 - 3885
A206 - 3852, A209 - 3859, A213 - 3569, A240 - 3594, I110 - 3886, UB4050 - 3281

No Phones Currently:
A108, A123, A124, H166

SW216 – School of Communications
Linda Bowden, Kevin Walchuk, Gil Brathwaite, MaryEllen Coxworth, Joanne Hill, Thomas Honey, Denise Johnston, Rhonda Lawson, Russell Smith

WHITBY CAMPUS
Colin Cunningham, Richard Eustace, Andrew Prior, Roy Smyth, John Tayles. Dennis Yacknowiec

DURHAM COLLEGE SUCCESS MATTERS	**THE STUDENT EXPERIENCE COMES FIRST AT DURHAM COLLEGE**

Important to All

Students and staff at Durham College are committed to academic excellence by:

- Demonstrating respect for one another and property
- Maintaining a clean and safe environment
- Taking an active role in the learning process
- Providing and receiving support when necessary
- Attending classes and/or appointments regularly and on time
- Modeling skills, attitudes and expectations of the workplace

Support Staff

- Provide professional quality customer service to students and staff
- Direct students and staff to appropriate resources
- Support and assist students in their learning and career goals
- Promote services that enhance student success

Faculty

- To be positive, enthusiastic, patient and flexible
- To be in the class early and prepared to begin on time
- To keep current in academic and professional knowledge
- To be prepared for activities, exercises and demonstrations
- To be available and show willingness to help students
- To ensure that all students get equal assistance and time
- To perform evaluations according to established criteria and within a reasonable time frame
- To return and take up any assigned homework, assignments, tests and projects promptly
- To identify students requiring remedial assistance, and to direct those students to the appropriate services
- To write constructive and helpful statements when evaluating student assignments
- To use a variety of teaching, questioning, and assessment techniques
- To motivate and engage learners in active and collaborative learning
- To encourage student participation and feedback wherever possible
- To effectively use learning technology
- To outline professional responsibilities, career alternatives, and avenues for further education following graduation
- To provide a course outline to each student at the beginning of the course, to review the outline with the students, and to adhere to the outline
- To adhere to Durham College policies, procedures and guidelines
- To place the safety and well being of the student above all other objectives, including fulfilling education obligations

Students

- To be prepared for class and professional practice activities. This will include reading appropriate textbook assignments prior to class and completing any homework assignments
- To be in class and arrive on time
- To participate in class activities
- To demonstrate respect for all persons and the learning environment
- To be trustworthy, honest, and accountable for own behaviour
- To complete tests, assignments and evaluations as required, striving for excellence
- To demonstrate effective communication skills
- To understand all course requirements and to follow them
- To seek assistance immediately if unable to follow the subject requirements for any reason
- To read and adhere to Durham College policies, procedures and guidelines

Administration

- Meet or exceed standards of excellence
- Manage budgets and resources
- Support students and staff in meeting their responsibilities
- Support/direct approved operational procedures
- Communicate relevant information in a timely fashion
- Be current in their field of leadership in a college environment

Important Dates 2010 – 2011

Please note the dates of your semester examinations. ***Please ensure that you do not schedule vacation or employment during these times.***

FALL 2010 SEMESTER

July 5, 2010	Fees due date for first year students
	Web registration - for 2nd year students who have paid for fall semester - begins.
July 7, 2010	Web registration - for 3rd year students who have paid for fall semester - begins.
July 12, 2010	Web registration - for 1st year students who have paid for fall semester - begins.
July 16, 2010	Fees due date for returning students.
August 30, 2010	Registration for part-time Oshawa campus students begins and window opens for timetable changes.
	Apprenticeship Classes begin.
September 6, 2010	Labour Day (no classes)
September 7, 2010	Orientation for first-year students.
September 8, 2010	Classes begin for most programs.
September 14, 2010	Last day for late program registration.
	Last day for fall semester course or program changes.
September 21, 2010	Last day for full-time students to withdraw with full refund, less $100 administration fee. [1, 2]
	Last day for refund eligibility when dropping to part-time.
	Last day for part-time students to withdraw with tuition fee refund less an administration fee. [1, 2]
	Last day to submit a Prior Learning Assessment and Recognition (PLAR) request for fall semester subjects.
September 30, 2010	Student Health Insurance Plan "Opt-out" deadline.
October 4, 2010	Due date for 2nd instalment of Fall fees.
October 5, 2010	Last day for application for fall semester subject exemption/credit.
	Last day for withdrawal from a fall semester subject with no academic record. Subjects dropped after this date, will be recorded on the academic transcript with a "W" to indicate withdrawal.[1, 2]
October 11, 2010	Thanksgiving (no classes).
October 21, 2010	Fall Convocation
October 25, 2010	Deadline for submission of adjusted marks to clear INC grades from Summer 2010. INC grades after this date will revert to a fail.
November 18, 2010	Scholarship Ceremony
November 12, 2010	Winter 2011 semester fees due date.

November 12, 2010	Last day to withdraw from a fall semester subject with no academic penalty. After this date, all subjects will be graded and recorded on the student's transcript.[1, 2]
December 10, 2010	Last day of classes for most programs.
December 13 to 17, 2010	Fall semester final examinations/evaluation(s) for postsecondary students. Students are reminded not to schedule vacation or employment hours during these times. January 5 and 6, 2011 scheduled as tentative snow dates for the Oshawa campus.
December 23, 2010	Grades are available to view electronically as of 4 p.m. Note: official distribution date for the purpose of academic appeals is January 5, 2011.
	Full-time students may process timetable changes for the winter semester through MyCampus as of 4 p.m.
December 24, 2010 – January 2, 2011 inclusive	Campus closed for the holiday season.

WINTER 2011 SEMESTER – JANUARY START

November 12, 2010	Winter 2011 semester fees due date.
November 22, 2010	Web registration for Fall start 1st year students for winter 2011 semester courses begins.
November 29, 2010	Web registration for 2nd and 3rd year students for winter 2011 semester courses begins.
December 6, 2010	Web registration for Winter start students begins.
January 3, 2011	Registration for Oshawa campus part-time students begins.
	Apprenticeship Classes begin
January 5, 2011	Classes begin for most programs.
	Official grade distribution date for the purpose of Academic Appeals.
January 11, 2011	Last day for late program registration.
	Last day for winter semester course or program changes.
January 11, 13 and 15, 2011	Dates for missed exams from Fall Semester 2010
January 18, 2011	Last day for full-time students, who started their program in September 2010, to withdraw with a refund of winter tuition fees.[1, 2] Ancillary fees and school supply fees are not refundable.
	Last day for full-time students, who started their program in January 2011 to withdraw with a refund of full fees paid less $100 administration fee.[1, 2]
	Last day for refund eligibility when dropping to part-time.
	Last day to withdraw from part-time studies with tuition fee refund less an administration fee per subject.
	Last day to submit a Prior Learning Assessment and Recognition (PLAR) request for winter semester subjects.
January 31, 2011	January start students only: Student Health Insurance Plan "Opt-out" deadline.
January 31 to Feb 4	Winter Break week for Electrical Block Intermediate & Advanced apprenticeship students only.

February 1, 2011	Last day for application for winter semester subject exemption/credit.
	Last day to withdraw from a **January start** subject with no academic record. Subjects dropped after this date, will be recorded on the academic transcript with a "W" to indicate withdrawal.[1, 2]
February 4, 2011	Due date for 2nd instalment of Winter fees.
February 18, 2011	T2202As available online via MyCampus as of 4 p.m.
February 21, 2011	Family Day (no classes).
	Deadline for submission of adjusted marks to clear INC grades from Fall 2010. INC grades after this date will revert to a fail.
February 21 to 25	Winter Break week; no classes with the exception of OFAD February start students and Apprenticeship students.
February 28 to March 4	Winter Break week for Apprenticeship students with the exception of Electrical Block Intermediate and Advanced students.
March 18, 2011	Last day to withdraw from a **January start** subject with no academic penalty. After this date, all subjects will be graded and recorded on the student's transcript.[1, 2]
March 14 to 18, 2011	Winter Break week for OYAP Apprentices only (except Hairstylists – please see your school office).
April 8, 2011	Last day to apply to graduate – courses ending April 2011.
April 14 2011	Last day of classes for most January start programs.
April 15 to 21	Winter semester **(January start)** final examinations/ evaluation(s); students are reminded not to schedule vacation or employment hours during these times.
April 22, 2011	Good Friday (no classes).
April 29, 2011	Grades are available to view electronically as of 4 p.m. Official distribution date for the purpose of academic appeals.
May 10, 12 and 14, 2011	Dates for Missed Exams from Winter Semester 2011.
June 16 & 17, 2011	**Convocation (Times and location TBA)**

WINTER 2011 SEMESTER – FEBRUARY START

December 10, 2010	Winter 2011 - February start - semester fees due date.
December 6, 2010	Web registration for February start students begins.
January 31, 2011	February start classes begin.
	Registration for Oshawa campus part-time students begins.
February 4, 2011	Last day for February start late program registration.
	Last day for February start course or program changes.
February 11, 2011	Last day for full-time students, who started their programs in February 2011 to withdraw with a refund of full fees paid less $100 administration fee.[1, 2]
	Last day for refund eligibility when dropping to part-time for February start only.
	Last day for February start students to submit a Prior Learning Assessment and Recognition (PLAR) request for winter semester subjects.
February 21, 2011	Family Day (no classes).

	Deadline for submission of adjusted marks to clear INC grades from Fall 2010. INC grades after this date will revert to a fail.
February 28, 2011	February start students only: Student Health Insurance Plan "Opt-out" deadline.
February 28, 2011	Last day for application for semester subject exemption/ credit.
	Last day to withdraw from a February start subject with no academic record. Subjects dropped after this date, will be recorded on the academic transcript with a "W" to indicate withdrawal.[1, 2]
March 4, 2011	Due date for 2nd instalment of Winter fees - February start students only.
April 7, 2011	Last day to withdraw from a February start subject with no academic penalty. After this date, all subjects will be graded and recorded on the student's transcript.[1, 2]
April 22, 2011	Good Friday (no classes)
May 2 – 6, 2011	Winter semester (February start) final examinations/ evaluation(s); students are reminded not to schedule vacation or employment hours during these times.
May 6, 2011	Last day of classes for most February start programs.
May 12, 2011	Grades are available to view electronically as of 4 p.m. Official distribution date for the purpose of academic appeals.
October, 2011	**Convocation (Time and location TBA)**

WINTER 2011 SEMESTER – MARCH START

December 6, 2010	Web registration for March start students begins.
January 7, 2011	Winter 2011 - March start - semester fees due date.
February 28, 2011	March start classes begin.
	Registration for Oshawa campus part-time students begins.
March 4, 2011	Last day for March start late program registration.
	Last day for March start course or program changes.
March 11, 2011	Last day for full-time students, who started their programs in March 2011 to withdraw with a refund of full fees paid less $100 administration fee.[1, 2]
	Last day for refund eligibility when dropping to part-time for March start only.
	Last day for March start students to submit a Prior Learning Assessment and Recognition (PLAR) request for winter semester subjects.
March 25, 2011	Last day for application for semester subject exemption/ credit.
	Last day to withdraw from a March start subject with no academic record. Subjects dropped after this date, will be recorded on the academic transcript with a "W" to indicate withdrawal.[1, 2]
March 31, 2011	March start students only: Student Health Insurance Plan "Opt-out" deadline.
April 1, 2011	Due date for 2nd instalment of Winter fees – March start students only.
April 22, 2011	Good Friday (no classes)
May 5, 2011	Last day to withdraw from a March start subject with no academic penalty. After this date, all subjects will be graded and recorded on the student's transcript.[1, 2]
June 3, 2011	Last day of classes for most March start programs.

June 6 - 10, 2011	Winter semester (March start) final examinations/ evaluation(s); students are reminded not to schedule vacation or employment hours during these times.
June 15, 2011	Grades are available to view electronically as of 4 p.m. Official distribution date for the purpose of academic appeals.
October, 2011	**Convocation (Time and location TBA)**

SPRING 2011 SEMESTER

March 11, 2011	Spring 2011 semester fees due date.
April 4, 2011	Web registration for Spring/Summer programs begins.
May 9, 2011	Most Spring classes begin.
	Registration for Oshawa campus part-time students begins.
May 13, 2011	Last day for late program registration.
	Last day for most spring semester course or program changes.
May 20, 2011	Last day for full-time students, who started their programs in Spring semester to withdraw with a refund of full fees paid less $100 administration fee.[1, 2]
	Last day to submit a Prior Learning Assessment and Recognition (PLAR) request for most spring semester subjects.
	Last day to withdraw from most spring semester subjects with no academic record. Subjects dropped after this date, will be recorded on the academic transcript with a "W" to indicate withdrawal.[1, 2]
	Last day for application for spring semester subject exemption/credit.
May 23, 2011	Victoria Day (no classes).
May 31, 2011	Student Health Insurance Plan "Opt-out" deadline.
June 10, 2011	Last day to withdraw from most spring semester subjects with no academic penalty. After this date, all subjects will be graded and recorded on the student's transcript.[1, 2]
June 24, 2011	Last day of classes for most Spring start programs.
June 27, 2011	Deadline for submission of adjusted marks to clear INC grades from January start Winter 2010 semester. INC grades after this date will revert to a fail.
June 29, 2011	Grades are available to view electronically as of 4 p.m. Official distribution date for the purpose of academic appeals.

SUMMER 2011 SEMESTER

May 13, 2011	Summer 2011 semester fees due date.
July 1, 2011	Canada Day (no classes).
July 4, 2011	Summer classes begin.
July 8, 2011	Last day for late program registration.
	Last day for most summer semester course or program changes.
July 15, 2011	Last day for full-time students, who started their programs in Summer semester to withdraw with a refund of full fees paid less $100 administration fee.[1, 2]

	Last day to submit a Prior Learning Assessment and Recognition (PLAR) request for most summer semester subjects.
	Last day to withdraw from most summer semester subjects with no academic record. Subjects dropped after this date, will be recorded on the academic transcript with a "W" to indicate withdrawal.[1, 2]
	Last day for application for summer semester subject exemption/credit.
August 5, 2011	Last day to withdraw from most summer semester subjects with no academic penalty. After this date, all subjects will be graded and recorded on the student's transcript.[1, 2]
August 1, 2011	Civic Holiday (no classes).
August 19, 2011	Last day of classes for most Summer start programs.
August 24, 2011	Grades are available to view electronically as of 4 p.m. Official distribution date for the purpose of academic appeals.
October, 2011	**Convocation (Time and location TBA)**

NOTES:

1. Official Withdrawal forms must be completed by the student and submitted to the Office of the Registrar.
2. The administration fee for international students will vary.

These dates represent the best information at time of publication. The College reserves the right to make changes subject to amendments to existing legislation, Collective Agreements, or as required by the College. Dates may vary slightly from program to program.

Program Information

Mechanical Engineering Technician/Technologist
2 and 3 Year Diplomas

Mechanical engineering is one of the most diverse disciplines in all technology related fields. As a result, Mechanical Engineering Technicians and Technologists can be found in most industries.

Our Mechanical Technician and Technologist streams unite classroom studies and hands-on laboratory work, providing students with valuable experience in design and development, using scientific, mathematical and engineering principles and skills. Students gain a vast body of knowledge in subjects such as Computer-assisted Design, Manufacturing (CAD/CAM), Programmable Logic Controllers (PLC) and many other relevant mechanical/manufacturing disciplines.

Upon successful completion of these programs, graduates will be able to apply the principles and theories of science, engineering, and mathematics to solve technical problems in energy, manufacturing, construction, inspection, quality control and maintenance by assisting in product design, development, and production. Graduates of Mechanical Technician/Technologist programs work in a broad range of employment settings. These encompass large and small organizations in a variety of industrial sectors, including: energy, automation, telecommunication, automotive, aerospace, and tooling.

Our graduate technicians/technologists are eligible for membership in the Ontario Association of Certified Engineering Technicians and Technologists (OACETT). You can obtain further information by visiting www.oacett.org. You can also become certified as either a technician or a technologist after passing the Professional Practice Examinations (PPE). Writing the PPE enables you to meet the high professional standards set by your association in the area of ethics and responsibility to the public and your employer. You may write the PPE any time after you join OACETT as an associate member.

Mechanical Engineering Technician

2 Year Diploma

Program Description:

This two year program combines strong conceptual thinking with practical knowledge of machines and manufacturing principles, including educating students in the diversity of mechanical technology.

Graduates of the two-year Mechanical Engineering Technician program are prepared to perform functions to support the design and production of components in mechanical/manufacturing environments as well as carry out manufacturing and quality control procedures and tests. They are also able to apply communication, documentation, computer applications, information technology, and teamwork skills to support the engineering activities of an organization.

This program prepares students to work independently and to provide technical support and service as a valued member of the engineering team. The mechanical engineering team consists of trades people, technicians, technologists and engineers. Mechanical Engineering Technicians will learn the necessary skills to help design, draw, build, and test mechanical systems, machinery, processes, and tools.

Advanced Standing

Students with post-secondary credits may be considered for advanced standing on an individual basis.

Employment Opportunities:

Graduates are prepared for work in manufacturing and mechanical related areas, including such roles as mechanical technician, CAD operators, mechanical testing, product design and many more opportunities.

- CNC programming
- Computer Aided Drafting
- Dimensional metrology
- Quality control
- Hydraulic and pneumatic control specialist
- Technical sales
- Technical support
- Consulting services

Qualified graduates of this program may be eligible to apply their academic credits towards further study.
For further information, please see the Durham College Transfer Guide on the website.

Synopsis of the Vocational Learning Outcomes for Mechanical Engineering Technician

The graduate has reliably demonstrated the ability to:

1. analyze and solve routine technical problems* related to mechanical environments through the application of engineering principles.*
2. conduct routine analysis* of mechanical components, processes, and systems through the application of engineering principles* and practices.*
3. interpret and prepare graphics* and other technical documents* to appropriate engineering standards.
4. use computer hardware and software to support the engineering environment.
5. assist in the specification of manufacturing materials, processes, and operations to support the design and production of components.
6. apply knowledge of machinery, tools, and other equipment used in manufacturing, assembly, and repair processes.
7. conduct quality control and quality assurance procedures as required.
8. recognize the environmental, economic, legal, safety, and ethical implications of mechanical engineering projects.
9. use and maintain documentation, inventory, and records systems.
10. develop strategies and plans to improve job performance and work relationships.

Note: The learning outcomes have been numbered as a point of reference; numbering does not imply prioritization, sequencing, or weighting of significance.

Mechanical Engineering Technology
3 Year Diploma

Program Description:

Using a combination of theory and laboratory instruction, this three-year advanced diploma program produces graduates who can apply scientific and engineering principles to solve mechanical engineering problems. Students are prepared to work independently or as a valued member of the engineering team. The mechanical engineering team consists of trades people, technicians, technologists and engineers.

Graduates of this program are able to: create, modify, and improve engineering designs using conventional and computer-based methods; perform engineering tests that support product development; use Computer Aided Engineering (CAE) software/systems to conduct engineering design and analysis; design and troubleshoot automated control systems and analyze problems involving machine design, fluid dynamics and tool design.

In the third year of this program students are provided with the opportunity to demonstrate their knowledge and problem-solving skills in a simulated industrial setting in the Integrated Manufacturing Centre (IMC), Durham College's world class training facility, unique to post-secondary training in Canada.

Advanced Standing

Students with post-secondary credits may be considered for advanced standing on an individual basis.

Employment Opportunities:

- Nuclear operator
- CAD/CAM designer
- Process engineer
- CNC programming
- Co-ordinate measurement specialist
- Quality control specialist
- Hydraulic and pneumatic control specialist
- Technical sales
- Technical support
- Consulting services
- Engineering supervision

Opportunities for Degree Completion or Additional Credentials

Qualified graduates of this program may be eligible to apply their academic credits towards further study.
For further information, please see the Durham College Transfer Guide on the website.

Durham College graduates from the Mechanical Engineering Technology program with a minimum average of 70% in the final year, may apply to the **Lakehead University Bachelor of Engineering degree program. Following a series of transition courses taken during the summer, students will be eligible to enter the third year of the four year degree program. For further information please visit:
http://engineering.lakeheadu.ca/wp/?pg=119

Durham College graduates from the Mechanical Engineering Technology program, may apply to the **Cape Breton University Bachelor of Engineering degree program in Manufacturing for degree completion. Students must complete 30 credits of course work. This normally requires a minimum of one academic year of full time study to complete. For further information please visit: http://www.cbu.ca

Durham College graduates from the Mechanical Engineering Technology program, may apply to the **Cape Breton University Bachelor of Engineering degree program in Petroleum for degree completion. Students must complete 36 credits of course work. This normally requires a minimum of one academic year of full time study to complete. For further information please visit: http://www.cbu.ca

Synopsis of the Vocational Learning Outcomes for Mechanical Engineering Technology

The graduate has reliably demonstrated the ability to:

1. analyze* and solve complex technical problems* related to mechanical environments through the application of engineering principles.*
2. design and analyze* mechanical components, processes, and systems through the application of engineering principles* and practices.*
3. analyze* and prepare graphics* and other technical documents* to appropriate engineering standards.
4. use computer hardware and software to support the engineering environment.
5. apply knowledge of manufacturing processes to the design of components.
6. apply knowledge of materials and engineering principles* to manufacturing operations and processes.
7. apply knowledge of machinery, tools, and other equipment used in manufacturing processes.
8. specify, coordinate, and conduct quality control and quality assurance procedures.
9. recognize the environmental, economic, legal, safety, and ethical implications of mechanical engineering projects.
10. use and maintain documentation, inventory, and records systems.
11. participate in the management of an engineering project.
12. develop strategies and plans to improve job performance and work relationships.

Note: The learning outcomes have been numbered as a point of reference; numbering does not imply prioritization, sequencing, or weighting of significance.

Mechanical Engineering Technician – Non-Destructive Evaluation

2 Year Diploma

Program Description:

The Mechanical Engineering Technician-Non-Destructive Evaluation program at Durham College prepares students for exciting careers in the highly specialized field of Non-Destructive Evaluation. This program prepares students with the education, training and practical experience necessary to successfully begin their careers in the field of non-destructive testing (NDT).

Non-destructive inspectors engage in the examination and scientific testing of objects such as cars, trains, airplanes, spacecrafts, towers, bridges, ships, power plants, amusement park rides and many other interesting career choices. A student in this program learns how to examine these objects without causing any damage or impairment to its use (hence the term non-destructive). The purpose of testing in this fashion is to detect any possible internal or external defects or to examine the properties of the object.

The Mechanical Engineering Technician-Non-Destructive Evaluation program is offered in two streams: coop and standard format (non-coop). Coop placements are competitive in nature and as such, cannot be guaranteed. Students wishing to participate in coop are required to have obtained 70% or higher in all their related NDT courses. Core subjects offered within the Mechanical Engineering Technician program are also offered in this program.

Upon successful completion of this program, students have sufficient theoretical and practical knowledge for the examination of objects/materials without impairing or destroying their usefulness. Students will also be prepared to take certification exams as administered by the Canadian General Standards Board (CGSB). Graduates are also eligible for membership with the Ontario Association of Technicians and Technologists (OACETT) as a graduate technician.

*Ministry of Training, Colleges and Universities vocational outcomes are not available for this program.

Opportunities for Degree Completion or Additional Credentials

Qualified graduates of this program may be eligible to apply their academic credits towards further study.
For further information, please see the Durham College Transfer Guide on the website.

Employment Opportunities

- Aircraft and aerospace
- Power generation and utilities
- Pulp and paper
- Chemical and petrochemical
- Bridge and building fabrication/erection
- Quality assurance and quality control
- Insurance companies
- Electronics and microelectronics
- Defence and military
- Rail
- Foundry
- Marine and vessel construction
- Historical renovation

Course Outlines

For each course, a Course Outline that describes course learning outcomes, course content, learning activities, evaluation methods, timelines and support resources is available online.

This is a binding document. Any changes will be agreed upon by students and the professor and requires approval from the Dean of the School. For further details, please refer to the Course Outlines Policy and Procedure documents (http://www.durhamcollege.ca/academicpolicies). Course outlines are important documents. Please refer to them during the semester and keep them safely afterward. For students who go on to other post secondary institutions or post diploma programs, these will be essential documents.

Please note that students are expected to download copies of their course outlines from MyCampus prior to the **first** class in each course. Instructions for downloading are located on MyCampus at www.durhamcollege.ca/mycampus .

General Education

Durham College strives to ensure that students who graduate are immediately employable in their field of study; able to succeed in employment through the ability to continuously learn; and are capable of contributing positively to the society in which they live and work. Therefore, each program of study will strive to provide students with the skills related to a specific field of study (vocational skills), essential employability skills, and general education.

General education courses strengthen students' skills in areas such as critical analysis, problem solving and communication in the context of an exploration of topics with broad-based personal and/or societal importance. Normally, programs of instruction leading to either an Ontario College Diploma or an Ontario College Advanced Diploma include three general education courses. Such courses are identified on the program of study using the designation of "G". General Education courses are typically a combination of mandatory and elective courses and students are expected to cover a minimum of two of the five themes. The General Education Committee, which is a subcommittee of Academic Council, reviews and approves programs and courses for General Education compliance.

Durham College
Academic Policies & Procedures

To view the Durham College Academic Policies & Procedures, please go to:
www.durhamcollege.ca/academicpolicies

Oshawa Campus Program Specific Policies & Procedures

1. Course Completion/Attendance

   Minimum course completion and attendance requirements will be specified in the course outlines. Students must be present and complete a lab before a report can be accepted unless alternative work is assigned. Students must attend their assigned lab period unless excused by the professor (due to exceptional circumstances). Please refer to the Student Handbook for other guidelines.

2. Handing in/Returning of Reports/Assignments

   Deadlines will be clearly specified in each course outline. Academic penalties for late assignments will be specified in course descriptions. This may be up to non-acceptance of assignment and a mark of zero. A secure method of handing in and returning reports will be specified by each professor. Faculty will return tests/assignments to students within a **three** week time frame. Confidentiality will be maintained and tests, grades, or assignments will not be posted or left in areas for students to pick up.

3. Safety in Labs

   Before students begin working in the laboratories they must undergo **documented** safety training and evaluation. This is available on line through WebCt and must be completed before admittance to any laboratory. Students who endanger themselves or others in the lab will receive a warning and a written report (Academic Alert Form). After the second occurrence the student will be required to meet with the dean. After the third occurrence the student will be asked to withdraw from the course. Please refer to the Lab Safety Regulations for detailed expectations.

4. Missed Laboratories

   If a student misses a lab due to illness, documentation must be provided. If documentation cannot be provided, the student will receive a mark of zero for the missed lab. If a student misses labs due to compassionate reasons, a note from the program manager/coordinator will be required. Students will not write up a laboratory report for labs they did not attend.

5. Lab Cleanliness

   Everyone is expected to leave the labs clean and neat. Course outlines may specify an academic reward/penalty to encourage this. Students will not be signed out of the laboratory until their work area is clean and tidy.

6. Cheating

   Efforts will be made to deny opportunities for cheating. These may involve changing rooms, having more than one invigilator, providing exam booklets, disallowing personal items etc. Any student caught cheating will be dealt with under the Durham College Academic policy.

7. Placement

   Students must have a 2.0 GPA and no failures or outstanding courses in order to qualify for placement in third year. Students must successfully complete a minimum of 100 hours, and provide the proper documentation to Maureen Green in the Technology Office (H140) before the end of April in the graduating year.

8. Examinations

   a) Graduating students requesting exemption from final exams because of employment must provide their dean or designate with a letter from their potential employer explaining the situation. The opportunity must be for a full time permanent position in a program related field. The student's grades must be reviewed in order to ensure that the student is in good standing, maintaining a minimum 2.0 GPA and eligible to graduate with Aegrotat already on file.

   b) Students writing exams in the Student Academic Learning Centre, see Table of Contents for specific information page.

9. GPA

   Students must have a 1.5 or greater GPA at the end of year one to proceed to year two. Students with a GPA less than 1.5 will be advised to repeat year one, but may get credit for any courses with a 60% or better. Second year students with a GPA less than 1.75 will be advised to repeat year two. Note: these are the minimum requirements. All students want to maintain a 2.0 GPA to ensure academic success. All students must have a 2.0 GPA and no failures to graduate from the program. Students in a 3 year program will be required to complete a Field Placement component (minimum 100 hours) to be eligible to graduate. Please refer to your Student Handbook for more information on GPA.

Academic Integrity

Academic integrity refers to the pursuit of scholarly activity in an open, honest and responsible manner. Acts that undermine academic integrity, such as plagiarism, cheating and misrepresentation of work, contradict Durham College's core values.

To ensure the highest academic standards, students are accountable for the work they produce, and student work must be the product of his or her efforts. Durham College has purchased a license with Turnitin.com, an online service to detect unoriginal work and citation errors. The Academic Integrity Policy and Procedure documents (http://www.durhamcollege.ca/academicpolicies) provide a comprehensive explanation of Durham College's expectations regarding academic integrity.

Requirements for Promotion

Evaluation and Promotion

Academic courses are evaluated using a variety of methods such as tests, essays, labs, written or verbal assignments, in-process activities, group work and/or final examinations. The evaluation criteria for each course are noted in its course outline. Students are advised to familiarize themselves with these criteria early in the semester. Please refer to the Grading and Promotion Policy and Procedures documents (http://www.durhamcollege.ca/academicpolicies) for a complete overview of grading and promotion practices.

Academic Probation

Students who are not progressing satisfactorily according to criteria published in their respective program guides may be placed on academic probation, at the discretion of the school Dean or designate. Such students may be allowed to continue their studies on a Letter of Permission (an academic student contract) which will specify conditions which must be met to continue in their programs. Students who do not meet the conditions of their academic probation may be required to withdraw from full-time studies.

Aegrotat

Aegrotat refers to a 'compassionate pass' in a course in which, due to **emergency circumstances** related to health and wellness, a student was unable to complete all of the evaluation requirements. Emergency circumstances that may warrant the designation of an Aegrotat include, but are not limited to: injury, illness and/or bereavement. Documentation supporting the request for an Aegrotat designation may be required.

The awarding of an Aegrotat credit is noted in a student's transcript as AEG and is therefore not included in the calculation of a student's grade point average. A student shall receive Aegrotat standing only once in a five year period.

Further information about Aegrotat standing can be found in the Aegrotat Policy and Procedure documents (http://www.durhamcollege.ca/academicpolicies).

Missed Final Examinations

A final examination is a discretely designed assessment administered in Week 15 of a 14 week semester. Students who, as a result of **non-emergency circumstances**, miss one or more final examinations during a single examination period may be eligible to apply to defer/reschedule the writing of these assessments.

To be eligible, students must have no less than a cumulative 1.5 GPA, apply for consideration using the appropriate forms and pay a fee. This privilege can only be used by a student once in a five-year period. External accreditation requirements, the availability of appropriate examination facilities and other constraints necessitate that not all courses will be eligible.

For more details, students should speak with their Student Liaisons or review the Missed Final Examination Policy and Procedure documents (http://www.durhamcollege.ca/academicpolicies).

Field Placement……3 year programs

Field training provides valuable experience in the workplace. When on field placement, students must realize that their behaviour reflects upon the entire student body and the image of the college. Students are expected to act in a professional manner. This includes punctuality and regular attendance.

Evaluation criteria and weighting

In order to be eligible to graduate:

- The student must successfully complete a minimum of 100 placement hours before May 1, 2011
- The student must have the employer complete the "student evaluation form" and submit the form to the Student Liaison in the Technology Office (H140A) on or before May 1, 2011. **The evaluation must indicate a satisfactory rating.** Please be aware that employers may also be contacted by the Student Liaison or the Program Coordinator.
- If a student does not successfully complete his/her placement requirements he/she will not be eligible to graduate.
- The student must also submit a completed tracking form (Task Log) to the Student Liaison in the Technology Office (H140A) on or before May 1, 2011. This tracking form (Task Log) is attached to the employer evaluation form in your placement package.

Terms and conditions of placement

Students must have a > 2.0 GPA and have successfully completed all of their first and second year courses before they can begin their placement. Exceptions may be made with the written consent of the Dean. Placement must be completed before final grades are due in order to graduate.
Placement comes in different formats for different programs. The minimum requirement is that each student obtains at least 100 hours of program related, practical work experience in his/her chosen field. The placement options are:

1. One day a week for a minimum of 100 hours. (This is usually 14 weeks)
2. A summer position related to your field of study.
3. An "internship" for 4, 8, 12 or 16 months.
4. A prior work experience with proper approval and documentation.

Students are responsible for their own transportation, safety glasses and safety boots. Placement should be treated as a job and proper work attire should be worn. If sick, it is the student's responsibility to call his or her workplace supervisor. In addition, any work issues should be discussed with support person first. If there is no resolution, please speak to the Program Coordinator or Maureen Green, the Student Liaison in H140A

Academic Advising - Student Liaison

Durham College is committed to the success of all students during their educational experience. There are many resources available to support students on this journey. Academic Advising is a comprehensive service that is aimed towards meeting students' needs, increasing student satisfaction, improving retention and enhancing the quality of academic life. Each school has a **Student Liaison** to facilitate academic success. These representatives can assist students to:

- identify career goals and make sound academic decisions;
- develop academic plans to promote success in the event of failed subjects or low grade point
- average (GPA);
- make decisions regarding full-time/part-time studies;
- review graduation requirements;
- set up academic plans with individual students upon request;
- find equivalent credits;
- transfer to another program;
- select electives and options if applicable;
- access other college services to support student success.

While drop-ins may be possible for specific answers to short-term questions about courses, schedules, and procedures, it is advisable for students to set up one on one appointments with their Student Liaison. Appointments may be made in person or by phone. Please visit your School office for further information.

Your Student Liaison is:

Name: Maureen Green

Office #: H140A (Technology Office)

E-mail address: maureen.green@durhamcollege.ca

Telephone: (905) 721-2000 Ext. 2383

Appointment time available: 8:30 a.m.– 4:30 p.m.

CENTRE FOR STUDENTS WITH DISABILITIES

Supporting students to REACH their full potential

E-mail: disabilities@durhamcollege.ca

About the CSD

The Centre for Students with Disabilities (CSD) at Durham College provides services to students who are blind or have low vision, who are deaf or hard of hearing and those with physical, medical, psychiatric and learning disabilities. These services are designed to support students and the college in our responsibility to meet our legal obligations under the Ontario Human Rights Code and the Accessibility for Ontarians with Disabilities Act by ensuring that we have the supports in place to allow students with disabilities to fully participate in all aspects of the academic environment. Our services are confidential.

Registering for Accommodations

Accommodations are organized in co-operation with the student and as required, with the faculty on an individual basis. They are based on review of the medical or psycho-educational documentation completed by the appropriate medical professional or psychologist familiar with the student's particular diagnosis. The student is responsible for self identifying and submitting documentation of a permanent or temporary disability to the CSD in B297. Assistance in obtaining the appropriate documentation may be available. Accommodations may include extra time and/or technology supports for tests and exams, assistance obtaining records of class lecture material, reduced course load, material in alternate format, assistive technology assessment and training and learning strategies.

Things to Remember for Tests and Final Exams

In order to receive test and exam accommodations through the CSD, students ***must*** have completed the CSD Registration process including providing appropriate documentation. This can be a timely process – **contact the CSD as early as possible to ensure your accommodations and a seat in the test centre.**

Test Registration forms are available on our **CSD website** –**click on Test Centre Request Forms**. The Test Registration forms are also available in the CSD Test Centre (Room B216) as well as our main CSD Office (Room B297).

Completed test forms and notifications to your professors, **for each test,** need to be submitted to the CSD Test Centre (5) business days before the scheduled test, in order to reserve a space. **Accommodated tests cannot be guaranteed if a student registers less than 5 business days in advance of the test date. The alternative may be to write with the class.**

CSD Final Exam sign-up ***DEADLINES*** are ***ALWAYS*** several weeks ***BEFORE*** the final exam period. The deadlines as well as the CSD final exam information, explaining our online sign-up process, will be posted on My Campus each term.

It is the student's responsibility to check My Campus frequently as all important test and exam information including registration deadlines will be posted to My Campus.

The CSD may be **unable** to accommodate students who do not sign-up by the final exam sign-up deadline.

To Find Out More About CSD Services…

For further information please call 905-721-3123, drop by at B297 to set up an appointment or visit our website at www.durhamcollege.ca/csd.

Student Academic Learning Services (SALS)

Success Matters start here! The staff and faculty at the Student Academic Learning Centre can help you achieve your educational goals. We can help you with writing, English (ESL), math, statistics, biology, chemistry, physics, and accounting.

You can use the centre to:

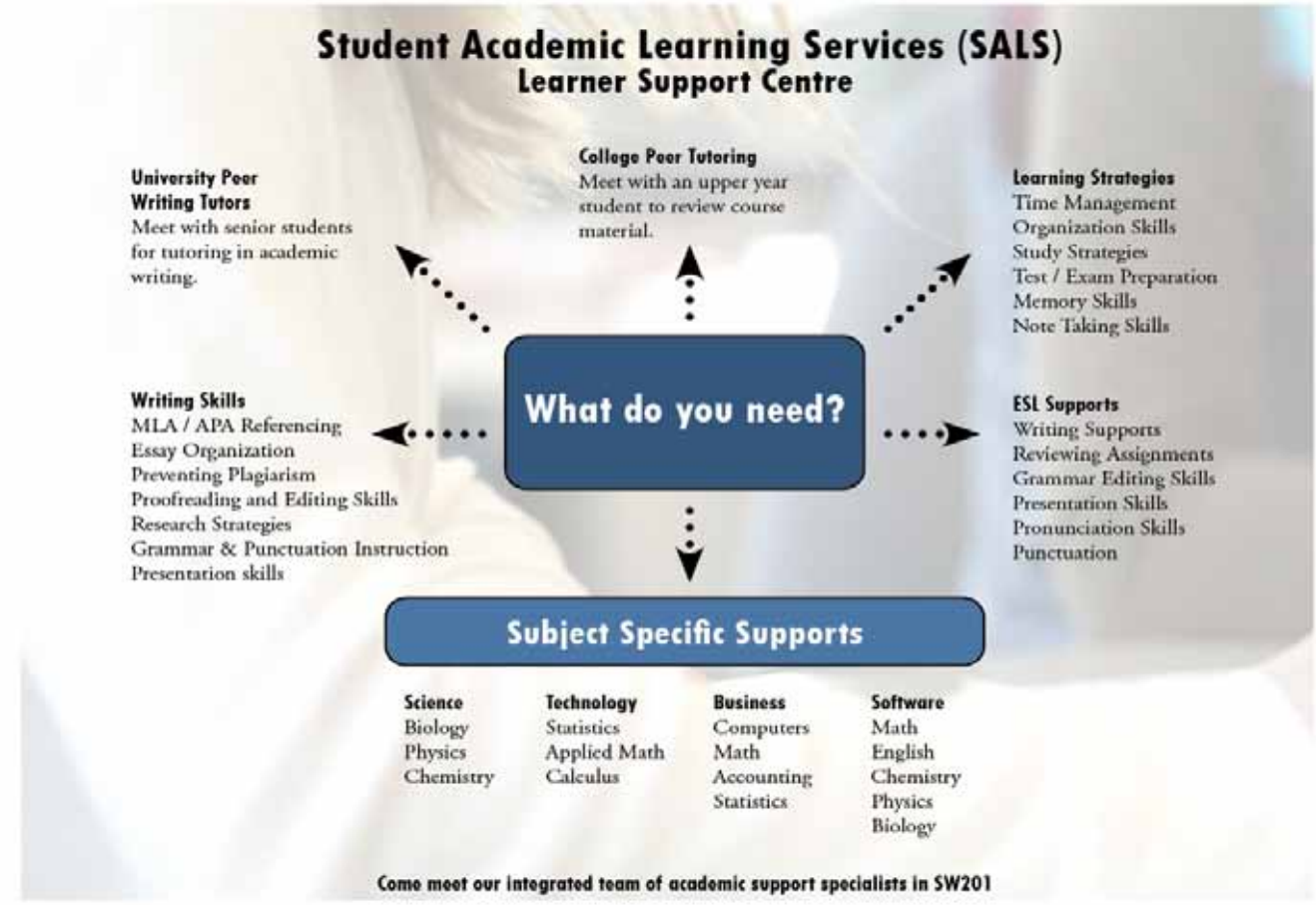
- Get peer tutoring help
- Learn how to study smarter, not harder
- Improve your reading skills and take better notes
- Increase your English (ESL) proficiency
- Improve your marks from a 'B' to an 'A'
- Learn strategies to manage your time & prepare for tests
- Improve your writing skills
- Have a quiet study space to do your work

Did you know?

There were **22,735 student visits** to the centre last year.

All of the services at the centre are already **included in your fees.**

We will move from SW 201 to the new **Student Services building in late 2010.**



www.durhamcollege.ca/lsc

The Library

The Library is here to help you succeed!

Stop by for help to research a topic, complete an assignment, or when you just need a quiet place to study. The Library on the north side of the Polonsky Commons and is easy to find. Both wired and wireless computer access is available along with 10 small group study rooms. Although food is not permitted in the library, drinks in covered containers are allowed and you can buy a Starbuck's coffee to go at the Library Café.

Students & faculty at the Whitby location may also use the library in person, via internet, or request books to be sent to them at Whitby.

Most of the Library's resources are in digital format and are available 24x7 through the Library's web page. You can access them from on or off campus by logging in with your student number and computer password. The digital resources include e-books, magazines, journals, newspapers, statistical databases.

Visit the library virtually at www.durhamcollege.ca/library to:

- Research a Topic,
- Find books and articles,
- Renew materials,
- Request an interlibrary loan,
- Book a group study room,
- Get online help from a librarian
- Check on the hours the library is open

Your campus photo ID card is also your library card and is required to check out books and Reserves.

The librarians work closely with your professors to provide class presentations directly linked to your assignments. Additional sessions on using specialized resources are also offered throughout the year and help is also available on the library website. You may contact the Reference staff by phone or e-mail, and you are always welcome to visit our Reference desk in person. We look forward to helping you!

Check the website for library hours.

Circulation desk (905) 721.3082
Reference desk (905) 721.2000 ext. 2390
Email: reference@dc-uoit.ca

College Publications

At Durham College, several publications provide the information you need before you start classes.

Program Guide

Durham College's Program Guides are a handy reference guide for everything students might want to know about their academic program. The program-specific guides provide essential information related to the program of study, policies, program requirements, faculty contact information, important dates, grading criteria, etc., as well as a starting point to help students find and navigate their way through academic and student support services.

Program Guides are distributed in print format to every registered student in the first class of the Fall semester and are available electronically on the college website. It is important that students read this guide at the beginning of their studies as it contains pertinent information for academic success and will be useful throughout the duration of the program.

Note:

- This guide is not intended to be a complete statement of all procedures, policies, rules and regulations at Durham College.
- The College reserves the right to change or cancel any provisions, requirements or subjects at any time.
- Student Liaisons and/or Faculty Advisors will assist in planning programs, but it is the student's responsibility to meet the academic requirements for completion of certificates and diplomas.

Continuing Education Course Book

Continuing Education publishes course calendars – Fall, Winter/Spring, listing courses for credit towards Post-Secondary Programs, and personal and professional development. The same course outlines are used for full-time and Continuing Education courses.
Courses may be accessed through classroom setting, correspondence (distance education) or online courses (Internet).

If you are unable to access a day-time course (timetable conflicts, repeat of a course, etc.) or want to get a head start on your next semester, check out Continuing Education's current course book and register at the Office of the Registrar early to ensure a seat is reserved for you.

Please check our website for comprehensive information @ www.durhamcollege.ca.

Scholarships and Bursaries

Awards, amounts and availability are subject to change at the discretion of the Student Awards office or the donor. All awards are based on information available at the time of publication.

Application process: Information on all scholarship, bursaries and awards for registered Durham College students including application, submission and deadline details will be posted on the DC Student tab of the MyCampus section of the College website. Students are advised to check MyCampus regularly for updates.

Eligibility: Students who are currently enrolled at Durham College are eligible to apply for scholarships and bursaries. Many awards have specific guidelines and students are advised to read all information about the award before applying.

Scholarships: Scholarships are awarded to students who have achieved academic and personal excellence. Some scholarships are awarded solely on academic performance. Others are based on a combination of academic achievement and proven personal excellence including leadership and community involvement.

In-Course scholarships: In-Course scholarships are awarded to returning full-time students in post secondary programs who have demonstrated academic excellence in their studies. Students must have been registered in full-time studies in the same program in consecutive years to be considered. In-Course Scholarships are solely based on GPA and no application is necessary unless otherwise noted. Recipients are notified via MyCampus e-mail.

Awards: Awards may be based on scholastic achievement and/or financial need. There may be other requirements for qualification such as membership in certain organization, enrolment in specific programs, leadership abilities and/or community service. Students must be in good academic standing to be considered.

Bursary Program: Durham College supports access to post secondary education following these principles:

- No qualified Ontario student should be prevented from attending Ontario's public colleges and universities due to lack of financial support programs.
- Students in need should have access to the resources they need for their postsecondary education.

Bursaries may be available to full time post secondary students requiring additional financial assistance to cover their educational costs. When students' personal and family resources are not sufficient to cover costs they are expected to apply for OSAP. Before applying for a bursary, students should investigate all other forms of financial assistance. Other resources may include scholarships, family support, student line of credit and part time employment.

All students must complete the online Student Financial Profile application for consideration for bursary funding. Information, application instructions and submission deadlines for the Student Financial Profile may be found on the MyCampus website under the DC Student tab. The student is notified of the application results via MyCampus email.

Durham College Access Bursary Program
This bursary is available to Ontario students offered admission to a full time, first year program at Durham College in September 2009. This program is intended to assist students with financial need.

Returning Student Bursary Program
Returning students must complete the Student Financial Profile application for consideration for bursary funding.

For further information on scholarships, bursaries and awards, please email studentawards@dc-uoit.ca.

Awards Open to Students in All Programs

Title of Award	**Award Value ($)**
Albis Award	$500
Business & Professional Women of Durham Award – *In Course (Application Required)*	$500
Campus Living Centre Residence Award	$250
Canadian Federation of University Women Oshawa and District Award	$500
CAW Family Auxiliary 27 Award	$250
Durham College Access Bursary	Various amounts
Durham College Alumni Association Award	$1200
Durham College Alumni Association Award – *In Course (Application Required)*	$500
Durham College Bursary	Various amounts
Durham College Endowed Award – *In Course*	$500 or $1000
Durham College International Student Scholarship	$1500
Durham College Scholarship – *In Course*	$500 or $1000
Durham Region Chairman's Award	$1000
Durham Region Chairman's Scholarship	$1000
Durham Regional Police Services Board Bursary – *awarded every other year*	$1000
Fairfax Financial Holdings Ltd. Scholarship	$3500
Garfield Weston Award	$2500 + up
Greenbriar Foundation Award	$1000
Harold "Pat" Dooley Bursary	$900
International Student Emergency Bursary	Various amounts
June White Memorial Entrance Award	$500
Lenovo (Canada) Inc. Access Awards	$500
Lifelong Learning Award – *In Course (Application Required)*	$500
Lifelong Learning Bursary	$500
Lois and Gary Polonsky Award	$1000
Lois Sleightholm Award	$2000
Marjorie Elizabeth Willoughby Award	$3000
McErlean Family Award	To be determined
Ontario First Generation Bursary	$3000
Ontario International Educational Opportunity Scholarship	$2500
OPG Employees' and Pensioners' Charity Trust	$1000
Oshawa B'Nai B'Rith Lodge Scholarship	$300
Oshawa Double B Sports Club Bursary	$800
Retired Teachers of Ontario District 28 Award	$500
Ross Mackie Award	$2000
UA Local 463 Award	$400
Wordham Family Award	To be determined
Your Student Association Award	$400

School of Science and Engineering Technology

Andrew Foundation Award – *In Course*	Electronics Engineering Technician/Technology	500
Award for Excellence in Electrical Technician - Instrumentation and Control	Electrical Technician – Instrumentation and Control	300
Award for Excellence in the Automotive Technician Program	Motive Power Technician – Service and Management	500
Bruce MacMillan Memorial Award	Robotics or related field in technology	400
Canadian Healthcare Engineers Society, Ontario Chapter Award	Biomedical Engineering Technology	To be determined

Canadian Institute of Food Science & Technology-Toronto Section Award	Pharmaceutical and Food Science Technology	1000
Carole and George Fletcher Foundation Scholarship	Programs which are recognized and eligible for membership in OACETT	350
CINDE – Student Scholarship	Mechanical Engineering Technician Non-Destructive Evaluation	1000
Dr. G. E. Willey Memorial Award – *In Course*	Mechanical Engineering Technician Non-Destructive Evaluation	1000
Durham Region Heavy Contractors Association Award	Programs directly related to the construction industry	1600
Durham Region Home Builder's Association Award	Skilled Trade programs	880
General Motors of Canada Bursary	Engineering, Technology and Skilled Trades	1000
General Motors of Canada Scholarship - *In Course*	Engineering, Technology and Skilled Trades	1000
Jamie Striemer Memorial Award	Skilled Trades programs	1000
Marigold Ford Lincoln Sales Ltd. Award – *In Course*	Mechanical Engineering Technology	500
Master Insulators' Association Bursary	HVAC	1000
OACETT Durham Chapter Award – *In Course*	Programs which are recognized and eligible for membership in OACETT	500
Ontario Food Protection Association Award – *In Course*	Pharmaceutical and Food Science Technology	1000
Ontario Power Generation Award	Electrical /Electronics/Instrumentation/Mechanical/Non-Destructive Evaluation/Power Engineering Technician, Chemical Technician or Technology Program	1000
Patheon Inc. Award – *In Course*	Pharmaceutical and Food Science Technology	500
Pine Ridge Corvette Club Award – *In Course*	Motive Power Technician - Service and Management	500
UA Local 463 Award	Preference to Skilled Trades program	400
Walkerton Clean Water Centre Award	Water Quality Technician	1750
Xerox Canada Award	School of Technology program	700

School of Business, IT & Management

Award for Excellence in Accounting	Business Administration - Accounting	$500
BDO Dunwoody LLP Award – *In Course*	Business Administration - Accounting	$500
Certified General Accountants Association of Ontario Award	Business Administration - Accounting	$150 + CGA $2500 tuition credit
Eva Loraine Cornish Memorial Award	Business Administration	$800
General Motors of Canada Bursary	Business Administration – Operations Management	$1000
General Motors of Canada Scholarship – *In Course*	Business Administration – Operations Management	$1000
Golf Association of Ontario Award – *In Course*	Professional Golf Management - Business Administration	$1000
Human Resources Professionals Association of Durham **Award – *In Course***	Business Administration – Human Resources	$1250
Ian J. Ball Award – *In Course*	Business Administration – Marketing	$500
Jeffrey and Julia Boyce Business Award	All Business Administration programs	$2000

Messier-Dowty Inc. Award – *In Course*	Business Administration – Operations Management	$500
Millwork Home Centre Award – *In Course*	Business Administration – Marketing	$500
Oshawa Community Credit Union Award	Alternates yearly between School of Business & Information Technology students and School of Health and Community Services, Nursing Program students	$500
Paul Vessey Premier's Award – *In Course*	Business Administration – Marketing	$1000
Roberts, Marlowe, Jackson, Jackson & Associates Award – *In Course*	Business Administration - Accounting	$500
Rotary Club of Oshawa Award – *In Course*	Business Administration – Human Resources	$1000
Xerox Canada Award	School of Business or Information Technology program	$700

School of Career Development & Continuing Education

Daryl and Cindy Austin Award	Dental Reception and Administration	$500
Durham College Award for Continuing Education – *In Course*	Continuing Education	$500
Optimist Club of Whitby – Teachers' Award – *In Course*	School of Career Development	$500

School of Interdisciplinary Studies & Employment Services

Special Olympics 2008 Spring Games Award	Community Integration Through Cooperative Education	To be determined

School of Media, Art & Design

Dann Torena Memorial Award – *In Course*	Graphic Design	$500
Frank Cowan Company Limited Award – *In Course*	Public Relations	$1000
Lewis Beaton Trust Award – *In Course*	Advertising	$1000
Ralph Sagar Award	Animation – Computer Arts	$900
Robert McLaughlin Gallery Award – *In Course*	Graphic Design	$500
Rotary Club of Oshawa Award – *In Course*	Public Relations	$1000
Shawn Simpson Memorial Award – *In Course*	Journalism – Print & Broadcasting	$500
Sodexo Services Canada Ltd. Award – *In Course*	Public Relations	$1000

School of Health & Community Services

Daryl and Cindy Austin Award	Dental programs	$500
Dwayne Moses Memorial Award	Human Services Counsellor	$800
George & Gennie Chaput Award for Excellence in Patient Care	Practical Nursing	$1000
Joyce Marshall Bursary	Early Childhood Education	$1000
Lovell Drugs Limited Award – *In Course*	Practical Nursing	$1000
Nursing Faculty Memorial Award	Practical Nursing	$500
Oshawa Community Credit Union Award	Alternates yearly between School of Business & Information Technology students and School of Health and Community Services, Nursing Program students	To be determined
Victorian Order of Nurses Award – *In Course*	Practical Nursing - For outstanding commitment to patient care	$500

School of Justice & Emergency Services

A. Alan H. Strike Award – *In Course*	Legal Administration	$500
Durham Police Appreciation Committee Award	Police Foundations	To be determined
Midge Day Memorial Award – *In Course*	Legal Administration	$500
Prosecutor's Association of Ontario Award	Court and Tribunal Agent/Paralegal	$500
Robert Anderson Memorial Award – *In Course*	Police Foundations or Law and Security - for excellence in Criminal and Civil Law	$250
Roger Pardy Memorial Award	Police Foundations	$800
Steven Shumovich Memorial Award – *In Course*	Legal Administration	$500

Convocation Awards

Founder's Cup	$200
Durham College Medal: Top Student – Three year Program	$500
Durham College Medal: Top Student – Two year Program	$500
Durham College Medal: Top Student – One year Program	$500
Durham College Medal: Top Student – Apprenticeship Program	$500
Governor General's Academic Medal and W. Bruce Affleck Memorial Scholarship	$2000
President's Leadership Award	$500

Transfer Guide
Diploma to Degree Pathways

Turn your Durham College diploma into a degree!!

If your post-secondary education plans include a diploma and a degree, you can take advantage of many degree completion programs offered through partnerships negotiated by Durham College with many universities, including UOIT, our campus partner.

A Durham College diploma can earn you credit toward a university degree. University admissions policies and partnership transfer agreements between Durham College and a number of universities facilitate university admission for Durham College graduates from specific programs by giving credit for college study. Graduates may receive credit for several courses or for a year or more toward a university degree. These opportunities are detailed, by program, on the **Durham College Transfer Guide (http://www.durhamcollege.ca/EN/main/programs_courses/transferguide.php)**

Interested students looking for further information are encouraged to consult with their program faculty or the admissions office of the receiving institution.

If you do not see your program on the chart, you may find pathway opportunities and information on collaborative programs, articulation agreements and credit transfers between Ontario universities and colleges available on the Ontario College University Transfer Guide website at www.ocutg.on.ca.

PROGRAM OF STUDY 2010/2011 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **22-Jul-10** **-WEEKLY BREAKDOWN-**

MECHANICAL ENGINEERING TECHNICIAN

	COURSE NAME	MOD	CODE	PREREQUISITES	COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 1									
	COMMUNICATIONS FOR SUCCESS		COMM 2103			2	1		
	COMPUTER APPLICATIONS		COMP 1101			0	2		
	ENGINEERING DRAWINGS		DRFT 1107			2	0		
	ENGINEERING GRAPHICS I		DRFT 1131			0	3		
	MANUFACTURING SCIENCES		MANF 1131			2	2		
	MATHEMATICS I FOR TECHNICIAN		MATH 1124			4	0		
	PHYSICAL SCIENCE		PHYS 1131			3	0		
						13	**8**		
SEMESTER 2									
	CAREER MAPPING		COMM 2132	COMM 2103		2	1		
	ENGINEERING GRAPHICS II		DRFT 2131	DRFT 1131		0	3		
	BASIC ELECTRICAL CONTROLS		ELEC 1133	MATH 1124		2	2		
	FLUID POWER I		FLUD 1131			2	1		
	MATHEMATICS II FOR TECHNICIAN		MATH 2124	MATH 1124		3	0		
	APPLIED MECHANICS FOR TECHNICIAN		MECH 2104	MATH 1124	PHYS 1131	3	0		
						12	**7**		
SEMESTER 3									
	CAD I		CAD 3132	DRFT 2131		1	3		
G	ENVIRONMENTAL PROTECTION AND GLOBAL		GNED 1501			3	0		
	MANUFACTURING PROCESSES		MANF 3131	MANF 1131		3	0		
	MATHEMATICS III FOR TECHNICIAN		MATH 3124	MATH 2124		3	0		
	MEASUREMENT I		MEAS 4134	MATH 2124	DRFT 1107	2	2		
	METALLURGY I		METL 1131			2	2		
						14	**7**		

PROGRAM OF STUDY 2010/2011 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **22-Jul-10** **-WEEKLY BREAKDOWN-**

MECHANICAL ENGINEERING TECHNICIAN

	COURSE NAME	MOD	CODE	PREREQUISITES	COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 4									
	CAD II		CAD 4132	CAD 3132		1	3		
	CAM I		CAM 4132	MANF 3131	CAD 3132	1	2		
	ENGINEERING DESIGN ELEMENTS		DRFT 3131	DRFT 2131		2	0		
G	GENERAL EDUCATION ELECTIVE		GNED 0000			3	0		
G	LAW & ETHICS		GNED 1402			3	0		
	METALLURGY II		METL 2131	METL 1131		2	2		
	STATISTICAL METHODS IN CONTROL		STAT 3136	MATH 2124		2	1		
						14	**8**		

NOTES:
ELE - ELECTIVE - Students may take one or many subjects, depending on the requirements of their program. ELET - represents a typical subject load and IS included in the total hours per week, to reflect the total hours per week required.
OPT1/OPT2/OPT3 - OPTIONS - Students choose subjects. OPT1 subjects are included in total hours per week.
G - GENERAL EDUCATION - Subjects marked at the left margin with G are "General Education" subjects.

All Students will have to do a math assessment and may have to complete academic upgrading

PROGRAM OF STUDY 2010/2011 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **22-Jul-10** **-WEEKLY BREAKDOWN-**

MECHANICAL ENGINEERING TECHNICIAN - NDE

	COURSE NAME	MOD	CODE	PREREQUISITES		COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 1										
	COMMUNICATIONS FOR SUCCESS		COMM 2103				2	1		
	ENGINEERING DRAWINGS		DRFT 1107				2	0		
G	GENERAL EDUCATION ELECTIVE		GNED 0000				3	0		
	MATHEMATICS I FOR TECHNICIAN		MATH 1124	MAP4C			4	0		
	INTRODUCTION TO NONDESTRUCTIVE TESTING		NDTE 1100				4	0		
	PHYSICAL SCIENCE		PHYS 1131				3	0		
	RADIATION SAFETY		RAD 1131			NDTE 1100	3	0		
							21	**1**		
SEMESTER 2										
	BASIC ELECTRICAL CONTROLS		ELEC 1133	MATH 1124			2	2	0	
	FLUID POWER I		FLUD 1131				2	1		
G	ENVIRONMENTAL PROTECTION AND GLOBAL		GNED 1501				3	0		
	MATHEMATICS II FOR TECHNICIAN		MATH 2124	MATH 1124			3	0		
	APPLIED MECHANICS FOR TECHNICIAN		MECH 2104	MATH 1124	PHYS 1131		3	0		
	NON DESTRUCTIVE TESTING - LIQUID PENETRANT		NDTE 1102	NDTE 1100		NDTE 2101	1	2		
	NON DESTRUCTIVE TESTING - MAGNETIC PARTICLE		NDTE 2101	NDTE 1100		NDTE 1102	1	2		
							15	**7**	**0**	
SEMESTER 3										
	CAREER MAPPING		COMM 2132	COMM 2103			2	1		
	MATHEMATICS III FOR TECHNICIAN		MATH 3124	MATH 2124			3	0		
	MEASUREMENT I		MEAS 4134	MATH 2124	DRFT 1107		2	2		
	METALLURGY FOR NON DESTRUCTIVE		METL 1132				2	3		
	NON DESTRUCTIVE TESTING-UT ULTRASONIC I		NDTE 3101	PHYS 1131	MATH 2124		3	1		
	FUNDAMENTALS OF WELDING INSPECTION		WELD 3100	PHYS 1131	NDTE 1100		4	0		
							16	**7**		

PROGRAM OF STUDY 2010/2011 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **22-Jul-10** **-WEEKLY BREAKDOWN-**

MECHANICAL ENGINEERING TECHNICIAN - NDE

	COURSE NAME	MOD	CODE	PREREQUISITES			COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 4											
G	LAW & ETHICS		GNED 1402					3	0		
	NON-DESTRUCTIVE TESTING - ULTRASONIC II		NDTE 3102	NDTE 3101				1	1		
	NON DESTRUCTIVE TESTING - EDDY CURRENT		NDTE 4101	NDTE 3101	ELEC 1133			3	3		
	NON DESTRUCTIVE TESTING - RADIOGRAPHY		NDTE 5101	PHYS 1131	MATH 3124	RAD 1131		3	0		
	STATISTICAL METHODS IN QUALITY CONTROL		STAT 3136	MATH 2124				2	1		
								12	**5**		

NOTES:
ELE - ELECTIVE - Students may take one or many subjects, depending on the requirements of their program. ELET - represents a typical subject load and IS included in the total hours per week, to reflect the total hours per week required.
OPT1/OPT2/OPT3 - OPTIONS - Students choose subjects. OPT1 subjects are included in total hours per week.
G - GENERAL EDUCATION - Subjects marked at the left margin with G are "General Education" subjects.

After completion of semester (4) students may choose to do an optional internship; see program coordinator for more information.

All students will be required to do a math assessment test and may be required to complete academic upgrading

PROGRAM OF STUDY 2010/2011 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **22-Jul-10** **-WEEKLY BREAKDOWN-**

MECHANICAL ENGINEERING TECHNOLOGY

	COURSE NAME	MOD	CODE	PREREQUISITES	COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 1									
	COMMUNICATIONS FOR SUCCESS		COMM 2103			2	1		
	COMPUTER APPLICATIONS		COMP 1101			0	2		
	ENGINEERING DRAWING		DRFT 1107			2	0		
	ENGINEERING GRAPHICS I		DRFT 1131			0	3		
	MANUFACTURING SCIENCES		MANF 1131			2	2		
	MATHEMATICS FOR TECHNOLOGY I		MATH 1131			4	0		
	PHYSICAL SCIENCE		PHYS 1131			3	0		
						13	**8**		
SEMESTER 2									
	CAREER MAPPING		COMM 2132	COMM 2103		2	1		
	ENGINEERING GRAPHICS II		DRFT 2131	DRFT 1131		0	3		
	BASIC ELECTRICAL CONTROLS		ELEC 1133	MATH 1131		2	2		
	FLUID POWER I		FLUD 1131			2	1		
	MATHEMATICS FOR TECHNOLOGY II		MATH 2131	MATH 1131		4	0		
	APPLIED MECHANICS		MECH 2103	MATH 1131	PHYS 1131	3	0		
						13	**7**		
SEMESTER 3									
	CAD I		CAD 3132	DRFT 2131		1	3		
	FLUID MECHANICS		FLUD 4131	MECH 2103		3	0		
G	ENVIRONMENTAL PROTECTION AND GLOBAL		GNED 1501			3	0		
	MANUFACTURING PROCESSES		MANF 3131	MANF 1131	MANF 1101	3	0		
	CALCULUS		MATH 3132	MATH 2131		4	0		
	METALLURGY I		METL 1131			2	2		
	MECHANICS OF MATERIALS		MTRL 2132	MECH 2103		3	0		
						19	**5**		

PROGRAM OF STUDY 2010/2011 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **22-Jul-10** **-WEEKLY BREAKDOWN-**

MECHANICAL ENGINEERING TECHNOLOGY

	COURSE NAME	MOD	CODE	PREREQUISITES	COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 4									
	CAD II		CAD 4132	CAD 3132		1	3		
	CAM I		CAM 4132	MANF 3131	CAD 3132	1	2		
	ENGINEERING DESIGN ELEMENTS		DRFT 3131	DRFT 2131		2	0		
G	LAW & ETHICS		GNED 1402			3	0		
	METALLURGY II		METL 2131	METL 1131		2	2		
	SYSTEMS MANAGEMENT I		SYSM 1131			2	1		
	THERMODYNAMICS		THER 1101	FLUD 4131	MATH 3132	3	0		
						14	**8**		
SEMESTER 5									
	CAD III		CAD 5132	CAD 4132		1	3		
	CAM II		CAM 5132	CAM 4132		1	3		
	FLUID POWER II		FLUD 2132	FLUD 1131		2	2		
	MEASUREMENT I		MEAS 4132	MANF 3131		2	2		
	FIELD PLACEMENT		PLAC 1100	GPA 2.0		0	0		
	STATISTICAL QUALITY CONTROL I		STAT 3134	MATH 2131		2	1		
	TOOL DESIGN		TOOL 5131	CAD 4132		2	2		
						10	**13**		
SEMESTER 6									
	ENGINEERING DESIGN PROJECT		CAD 6132	CAD 5132	MANF 1131	1	3	1	
	CAM III		CAM 6132	CAM 5132		1	3		
G	GENERAL EDUCATION ELECTIVE		GNED 0000			3	0	0	
	DYNAMICS OF MACHINES		MACH 3132	MECH 2103	PHYS 1131	3	0		
	MEASUREMENT II		MEAS 5132	MEAS 4132		2	2		
	FIELD PLACEMENT		PLAC 1100	GPA 2.0		0	0		
	STATISTICAL QUALITY CONTROL II		STAT 4133	STAT 3134		2	1		
						12	**9**	**1**	

PROGRAM OF STUDY 2010/2011 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **22-Jul-10** -WEEKLY BREAKDOWN-

MECHANICAL ENGINEERING TECHNOLOGY

COURSE NAME	MOD	CODE	PREREQUISITES	COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS

NOTES:
ELE - ELECTIVE - Students may take one or many subjects, depending on the requirements of their program. ELET - represents a typical subject load and IS included in the total hours per week, to reflect the total hours per week required.
OPT1/OPT2/OPT3 - OPTIONS - Students choose subjects. OPT1 subjects are included in total hours per week.
G - GENERAL EDUCATION - Subjects marked at the left margin with G are "General Education" subjects.

All students must complete a math assessment, students may be required to complete academic upgrading

Course Descriptions

ADVANCED PROTEIN AND DNA TECHNIQUES BIOT 4133 Advanced Protein and DNA Techniques is a one-semester course with four scheduled hours of laboratory exercises and one scheduled hour of lecture per week. This course is designed to train students to work independently and safely in the biotechnology laboratory by teaching comprehensive research techniques, methods for documentation and data analysis, and good laboratory practices. Students will learn and practice DNA techniques including Southern blotting. Students will also learn protein techniques including size exclusion chromatography, ion exchange chromatography, affinity chromatography, three-phase partition chromatography, SDS-PAGE and gel staining, western blotting and hybridization, and ELISA. The students will be taught to use bioinformatics tools and resources that can assist them with their research and the interpretation of their results.

ANALYTICAL CHEMISTRY I CHEM 3131 The course serves as an introduction to analytical methods and their applications. Sample preparation, method selection, techniques, calculations and data handling are addressed as they apply to different types of chemical analysis. This course introduces the chemical principles behind gravimetric and volumetric methods of analysis. Problem-solving is strongly emphasized. The laboratory portion of this course emphasizes good laboratory technique and practices. Accuracy and precision of analytical results as well as documentation and presentation of laboratory results are evaluated.

ANALYTICAL CHEMISTRY II CHEM 4131 This is a continuation of Analytical Chemistry I. Various volumetric methods are studied (acid/base, redox, complexation). More advanced concepts and theory are examined as they deal with each type of analysis. This course also serves as an introduction to instrumental analysis, addressing both electrochemical and spectroscopic methods from an analytical perspective. Problem solving is strongly emphasized. The laboratory portion of this course emphasizes good laboratory technique and practices. Accuracy and precision of analytical results as well as documentation and presentation of laboratory results are evaluated.

ANALYTICAL INSTRUMENTATION LAB INST 2135 This is a one-semester laboratory course (three hours/week). Students will apply the theoretical knowledge gained from INST 2134 and run experimental analysis on various spectrographic and chromatographic instruments including, but not limited to: GC, HPLC, IR, UVVIS, and AA.

ANALYTICAL INSTRUMENTATION INST 2134 This is a one-semester theory course (two hours/week) designed to extend students' knowledge into methods of instrumental analysis. Students are introduced to basic spectrographic and chromatographic instrumental concepts and applications, including interpretation of analytical results. This theory course is followed by a lab practical course in the following semester.

ANALYTICAL TECHNIQUES TECH 1131 This one-semester course is designed to teach the student fundamental analytical techniques, which are required for satisfactory performance in any laboratory-related work. Techniques taught include proper use of the analytical balance, proper pipetting techniques, use of the burette, transferring solutions, use of the pH meter and the spectrophotometer. The course consists of 1 lecture hour and 2 lab hours.

ANATOMY & PHYSIOLOGY BIOL 1507 This course deals with normal anatomy and physiology. Topics include the integumentary, musculoskeletal, nervous and endocrine systems, as well as an introduction to microbiology. Three unifying themes, the interrelationships of body organ systems, homeostasis, and the complimentary of structure and function help students understand how the human body works.

APPLIED AUTOCAD ACAD 1101 This course introduces chemical and environmental students to computerized engineering drawing, which is a technical skill required in their field. Students will prepare applicable drawings. The applications and use of these drawings will be discussed and highlighted during the course.

APPLIED ENVIRONMENTAL MICROBIOLOGY MICR 2132 This course introduces students to the theory and application of environmental microbiology. In lectures and labs, students learn about aquatic, terrestrial and atmospheric ecosystems at the microbial level. Through practical applications, they learn to apply this information to water and wastewater treatment and testing. Other topics include biogeochemical cycles and energy flow within ecosystems, bioremediation, and biotechnology and its uses in the assessment and cleanup of environmental problems. Lab exercises reinforce the theoretical principles and introduce students to environmental laboratory methods that comply with current standards and practices.

APPLIED MECHANICS FOR TECHNICIAN MECH 2104 Applied Mechanics is the application of the principles of mechanics to the solution of problems commonly encountered in the industrial workplace. Students will study forces, the effects of forces on engineering members, and structures upon which they act. The course will concentrate mainly on static solutions where the body is at rest and rigid. Work, power and energy will also be examined. It is assumed that the student possesses an understanding of algebra and trigonometry before attempting this subject. Emphasis is placed on the problem-solving approach using mathematical and calculator methods.

APPLIED MECHANICS MECH 2103 This course analyses the static forces and moments that are created in a variety if structures due to externally applied forces. Classroom examples will focus on problems commonly encountered within the industrial workplace and problems will concentrate on static solutions where the body is both stationary and rigid. It is assumed that students possess an understanding of algebra and trigonometry before attempting this subject and emphasis is placed on a problem solving approach using mathematical and calculator methods combined with free body diagrams and sketches.

AUTOMATION FUNDAMENTALS OPER 3133 This course is designed to educate a student in the theory of operation and basic implementation of Programmable Logic Controllers (PLC) and HMIs (Human Machine Interface), as they relate to industrial control system operation and process monitoring. Common PLC instructions and programming techniques will be discussed along with devices compatible with PLC Inputs and Outputs. Students will learn how to utilize HMI development software for the creation of operational controls that interact with the PLC, as outlined by a predetermined operational specification. The investigation of HMIs will conclude with an introduction to the operation and configuration of a common SCADA software interface. The laboratory component of this course provides practical experience with software and control devices that can be directly related to industrial control systems found in industry.

AUTOMATION PROJECT AUTO 2100 This course is delivered to third-year, Semester 6 Industrial Automation and Robotics – Mechtronics students. The course covers two major areas in industrial automation – a student-created project and control system safety. Pairs of students are required to conceptualize, design, commission, document and demonstrate a functional automation project that integrates a PLC, industrial robot, human machine interface and industrial networks to perform an automated flexible task, utilizing an order entry system. Drawing upon the skills and knowledge acquired during the first five semesters of the program, students implement a functional automation project. Students must generate a proposal for their automation project in accordance with guidelines provided by their professor. The automation project focuses on the programming and integration of multiple automation technologies in the college's fully functional automation facility. Milestones are set to keep students on track through several stages from initial concept to completed project. Students are required to demonstrate their automation project during the final weeks of the semester.

The safety aspect of this course focuses on control system safety applications and components. Topics such as safety sensors, safety PLCs, two-strand safety circuits and pre-start health and safety reviews are covered.

AUTOMATION SYSTEMS AUTO 1100 This single-semester course is designed to introduce students to a broader range of automation systems and components. This course shall be studied concurrently with, and is complementary to, INTEGRATED AUTOMATION II (CONT 4101). The course begins with an introduction to, and the assembly of, a DeviceNet network with a SLC 5/04 system. The course proceeds with the integration and analysis of a bar code scanner on DeviceNet. Programming and integration of a vision system is also covered. The course continues with an introduction to, and the programming of, the ControlLogix family of PLC processors. The theory section of this course will be re-enforced through practical laboratory experiments. The course concludes with the integration of some of the above components to automatically extract and verify data in an automated process.

BASIC ELECTRICAL CONTROLS ELEC 1133 Basic Electricity is designed to educate a student in the theory of electricity fundamentals applied primarily to an industrial environment, at an introductory level. Key concepts of Ohm's Law are explored to provide students with a necessary foundation in the investigation of Direct Current (DC) and Alternating Current (AC) circuit theory. Electric motors and associated control devices are studied along with schematic reading and electrical symbols. The course concludes with an introduction to relay ladder logic. The laboratory component of this course provides practical experience with electrical devices that can be directly related to industrial control components found in industry. This course is a prerequisite for Operating Systems (OPER 3133).

BIOCHEMISTRY I BIOC 3131 Biochemistry I is a one-semester course with two scheduled hours of lecture and three scheduled hours of laboratory exercises per week. This course provides an introduction to food chemistry and nutrition, and the biochemistry of the biological molecules, particularly amino acids, proteins, and enzymes. Emphasis is placed on the structure, chemistry, and function of these molecules. Thermodynamics and the biochemistry of water, acids, bases, and buffers are also examined. The roles of biological molecules are discussed in the context of the organism by way of a survey of major metabolic processes. Laboratory experiments closely follow the progress of the lecture and are slanted towards practical applications in the food, pharmaceutical, and biotechnological industries.

BIOCHEMISTRY II BIOC 4131 Biochemistry II is a one-semester course with two scheduled hours of lecture and three scheduled hours of laboratory exercises per week. This course is a continuation of the study of biological molecules begun in BIOC 3131. Molecules discussed include carbohydrates, lipids, and nucleic acids. Particular emphasis is placed on the structure, chemistry, and function of these macromolecules. Gene expression (transcription, translation, and regulation) is also examined. The roles of biological molecules are discussed in the context of the organism by way of a survey of major metabolic processes. Laboratory experiments closely follow the progress of the lecture and are slanted towards practical applications in food, pharmaceutical, and biotechnological industries.

BIOLOGY BIOL 1131 This one-semester course consists of three lecture hours per week including 15 lab hours throughout the term. This course is designed to introduce students to basic biological concepts and their significance in helping to solve issues that affect modern society, and provides a foundation for senior courses in the Applied Sciences programs. This course focuses on the processes involved in biological systems. Students learn concepts and theories in the areas of cellular biology, genetics, homeostasis, and animal anatomy and physiology. This course demonstrates the concept of unity and diversity by showing that there are certain characteristics and mechanisms which are common to all living things, surveys the lifestyles of various organisms from bacteria to animals, and reaffirms the students' connection with all living things.

BIOMEDICAL INSTRUMENTATION I BMIN 5131 This course focuses on measurement and processing and their application to medical instruments and devices. Students learn about sensors and transducers used to measure and control electrical signals. The laboratory component of this course provides practical experience in trouble-shooting and involves the first part in the development of student designed medical device.

BIOMEDICAL INSTRUMENTATION II BMIN 6131 This course is a continuation of BIOMEDICAL INSTRUMENTATION I (BMIN-5131). It includes advanced analogue and digital measurement and processing and their application to medical instruments and devices. Topics include understanding noise, data analysis and medical instruments. The laboratory component of this course is a continuation of Biomedical Instrumentation I and provides advanced trouble-shooting skills and involves the completion of a student designed medical device.

BIOMEDICAL TECHNOLOGY MANAGEMENT BMGM 5131 Biomedical engineers are on the doorstep of managing all healthcare technology and instrumental in the evolving roll of the chief technology officer. This course focuses on the development of current management skills, decision criteria, analytical techniques, financial controls, quality and the search for innovative ideas in the application of a comprehensive approach to medical technology management. Skilful and competent technology management are key elements in the operations and future performance of healthcare.

BIOMEDICAL TERMS & DEVICES I BMDV 4131 This course introduces the basic terminologies, principles and clinical applications of biomedical equipment, including multi-parameter testers, simulators and analyzers.

BIOMEDICAL TERMS & DEVICES II BMDV 5131 This course builds on the concepts learned in BIOMEDICAL TERMS AND DEVICES I (BMDV 4131). In this course the biomedical technologist learns about physiological measurements with pressures; respiratory systems and equipment; the nervous system and methods of measuring nervous and brain function. It also includes an introduction to batteries and computers in biomedical environments.

BIOMEDICAL TERMS & DEVICES III BMDV 6131 Biomedical Terms & Devices III builds on the concepts learned in Biomedical Terms and Devices I and II. In Biomedical Terms and Devices III, students learn about physiological measurements with laser systems and equipment, the laboratory, electro surgery, physiotherapy and specialized rooms, battery management and medical RF interference in biomedical environments.

BIOPROCESSING BIOT 6131 Bio-processing is a one-semester course with one scheduled hour of lecture and three scheduled hours of laboratory time per week. This project-based course is designed to allow students in the final semester of the Biotechnology Technologist program to put into practice the skills and knowledge that they have developed in their program, while working in a team environment. The lecture time will be used to discuss the concepts applied in this course. In the laboratory student teams will conduct two concurrent term projects consisting of pilot versions of biotechnological processes used to produce commercial products. In one project the teams will express and purify a functional enzyme from a microorganism using chromatographic and affinity techniques. In the other project the teams will carry out a series of small-scale fermentations. In both projects students will run assays to test the quality and success of their processes and products.

BIOREGULATIONS BIOT 4131 Bio-Regulations is a one-semester course with three scheduled hours of lecture per week. This course will provide students with an in depth understanding of vital legislation, procedures and policies that exist to regulate all biotechnology-related workplaces. Federal, Provincial and Municipal legislation as it applies to biotechnology will be examined. Types of legislation and how changes are

made is reviewed. Students will also become familiar with Workplace Hazardous Material Information System, Genetically modified foods, HACCP, Good Documentation Practices (GDPs), Good Clinical Practices (GCPs), and Good Laboratory Practices (GLP). The Food and Drugs Act and Good Manufacturing Practices for Pharmaceuticals will be studied in detail. ISO 9000 and 17025 are introduced.

C PROGRAMMING FOR TECHNOLOGY CPRG 2101 This course introduces structured programming principles to non-programmers studying in the technology field. Students use the ANSI (Standard C) programming language. Emphasis is placed on technology-oriented examples and problems. Topics include data types, structured programming logic and control structures, arrays and functions and programming for real-time applications.

CAD FOR ELECTRICAL CONTROLS DESIGN CAD 3000 Students learn the drawing requirements for electrical and electronic controls for automated machines and systems. The course builds on the automation controls and AutoCAD skills learned in INDUSTRIAL CONTROLS II (CONT 3131) and previous CAD courses. Topics include typical drawing packages for industrial automation systems and the creation of electrical control layouts, motor power schematics, control power schematics, input schematics, output schematics, control station layouts, control panel layouts, and bills of material to produce electrical and electronic AutoCAD drawings for automated PLC-based control systems. Students also learn to select the control system parts from automation and industrial control catalogues.

CAD FOR ELECTRONICS I CAD 1133 This course builds upon the generic computer-aided drafting and design skills learned by the students in their introduction to AutoCAD course in the first semester. It is a one-semester course designed to educate students in the basics of electronics/electronic symbols and schematics, printed circuit boards, and electronic project fabrication. AutoCAD computer-aided drafting (CAD) software will be used to create the drawings for electrical and electronic schematics, basic mechanical parts and assemblies, printed circuit boards, and electronic component assemblies. To successfully complete this course each student must create all of the necessary drawings using AutoCAD to design and fabricate a power supply that outputs 28 Vac, 14 Vac, +5 Vdc, and adjustable +/- 0 to 15 Vdc. The student must also assemble and test the power supply.

CAD FOR ELECTRONICS II CAD 2135 The ZUKEN design package CADSTAR will be studied. Within this package are 2 major software programs and each program will be studied independently. The first program to be studied will be Schematic Capture. PCB Design, the other program, will be studied next. The combination of these two programs, will show the complete process of obtaining a working printed circuit board (PCB) from initial circuit concept, to circuit diagram, to PCB design, to negative & photo resist, and finally to etching a copper clad board. Within the Schematic Capture program, the initial circuit concept or "rough sketch" will be used to produce both a high quality schematic diagram and also, the outputs files required to transfer the circuit details to a PCB design program. Using the personal computer as a workstation, the student will create symbols, maintain a library, draw schematic diagrams, plot a diagram, and convert a diagram for transfer to other systems such as either logic simulators or a PCB designer. Within the PCB Design program, the PCB transfer files that were created in Schematic Capture will be used to create a PCB. Using the personal computer as a workstation, the student will draw a board outline, place components, route connections, and plot artwork. The artwork will then be used to produce a PCB in the College's PCB lab facility. It is structured as one three hour class per week. In addition to the lab exercises, students will practice the lecture material by commencing a project of their own choosing. This project will eventually conclude at the end of this course, when a circuit board is produced.

CAD I CAD 3132 This is the first in a series of courses on the Unigraphics CAD system. Students learn about the system in depth, inserting and manipulating two-dimensional entities, creating three-dimensional models and using optimum layering schemes.

CAD II CAD 4132 Students create increasingly complex, three-dimensional models and produce two-dimensional drawings from these models with relevant dimensions, tolerances and annotations. Students also receive an introduction to assembly modeling.

CAD III CAD 5132 This course deals with advanced topics in computer aided design (CAD) using Unigraphics and allows students to follow the design cycle through which all engineered products pass. Building on the fundamentals covered in previous courses, students will have the opportunity to create a variety of mechanical components and assemblies and develop their ability to generate detail and assembly drawings, work with standard material sizes, model parametrically, apply geometrical dimensioning and tolerancing (GD & T), create bills of materials (BOMs) and use both mass analysis and finite element analysis tools to analyze their creations. These topics will be covered by completing both a reverse-engineering project as well as a design project where, beginning with specifications, a product will be designed, analyzed, manufactured, measured, tested and a comprehensive report written to document the process.

CALCULUS MATH 3132 Students apply the principles of calculus to technical problems and everyday events. Topics include differential calculus (such as rates of change, maxima, minima and points of inflection) and integral calculus (including area, arc length, volume and applications). Competent use of a high-end graphic calculator (Texas Instruments' TI-89 graphing calculator is our present choice) is required in this course

CAM I CAM 4132 This course is an introduction to computer-aided manufacturing (CAM). Students learn to use a computer to control a machine tool, and the fundamental programming techniques for computer numerical control (CNC) machines. Students also learn about computer-assisted programming using the APT language, and programming techniques using CAM software from Unigraphics.

CAM II CAM 5132 This course is a continuation of CAM I (CAM 4132). Students use computer-assisted manufacturing (CAM) software to program objects of increasing difficulty. Students also receive practical lab experience machining the programs they create.

CAM III CAM 6132 This is the final computer-aided manufacturing (CAM) course. Students examine advanced topics such as high-speed machining, multiple set up machining, lathe programming, tool libraries and rapid prototyping. Individual and group study, as well as project based learning techniques are used.

CAREER MAPPING COMM 2132 Designed to give the Student a fundamental, entry-level introduction to some of the many varied processes utilized in a conventional machine/fabrication shop. Student will also apply some of this theoretical information while performing safe, effective operation of hand and machine tools by practical demonstration within a "shop" environment. Safety will be an integral, on-going topic.

CELL BIOLOGY BIOT 5131 This course will continue students' exploration of cell biology and provide greater details of immunology, cell growth, receptors and signalling. The laboratory component will support the theory taught in lectures. In addition, the laboratory will also introduce students to the fundamental techniques of culturing eukaryotic cells. Students will also learn to use a haemocytometer**,** to subdivide cells**,** and to prepare and thaw frozen cell stocks.

CHEMISTRY FOR TECHNICIANS CHEM 1100 This one-semester chemistry course includes both lecture (three hours) and laboratory (three hours) sessions. The lecture sessions deal with the practical aspects of chemical principles, and the laboratory sessions relate to the practical applications of chemistry and the development of the necessary hands-on basic techniques and skills necessary for water analysis. Topics include matter, atomic structure, chemical bonding, nomenclature, chemical formulae, the mole, simple chemical reactions and solution chemistry. An emphasis is placed on developing problem solving skills.

CHEMISTRY I CHEM 1131 This one semester introductory chemistry course includes weekly three hour lectures and three hour laboratory sessions. The lectures deal with the theoretical aspects of chemical principles, whereas the laboratory relates to the practical applications of chemistry and the development of the necessary 'hands on' basic techniques and skills. Topics discussed in the lectures include matter, atomic structure, chemical bonding, nomenclature, chemical formulae, the mole, stoichiometry and chemical reactions. An emphasis is placed on developing problem solving skills, which relies, to an extent, on an appropriate mathematical background. The laboratory sessions include a topic on lab safety and safe procedures and practices are continually stressed throughout the semester. The experiments involve sample preparation, use of the analytical balance, solution preparation and standardization, analysis of samples by various procedures, the use of glassware and the use of simple instrumentation (Spec.20, pH meters).

CHEMISTRY II CHEM 2131 This course is a continuation of Chemistry I (CHEM 1131), and consists of two hours of lecture and a three hour lab session per week. The lectures deal with the theoretical aspects of chemical principles; whereas the lab relates to the practical applications of the science of chemistry and the development of the necessary basic skills required. Labs are designed around analysis of samples, with emphasis placed on accuracy. Topics discussed in the lectures include: periodic properties of elements, chemical bonding, intermolecular forces, properties of solutions, equibria and acid base chemistry. Emphasis is placed on problem solving skills development, especially with respect to solution chemistry. The laboratory sessions include a topic on lab safety and experiments involving sample preparation, use of the analytical balance, solution preparation and standardization, analysis of samples by various procedures (volumetric, gravimetric, etc.), the use of glassware, the use of simple instrumentation (spec 20, pH meters, etc.)

CHROMATOGRAPHY I INST 5132 In this course, the basic principles of chromatographic instruments and methods are presented. The types of chromatographic separations and the associated terminology are examined. The applications of thin layer chromatography are addressed, along with the basic applications and types of column chromatography. The information present in a typical chromatogram is described and some fundamental calculations performed. After looking at basic concepts, a brief overview of two of the more commonly used instruments, HPLC and GC, is presented. The basic components of both are described. The use of chromatography as both a qualitative and quantitative instrument is addressed. Chromatographic methods and method validation are described. This course serves as a prerequisite to Chromatography II, in which more detail is presented regarding the instrumentation and applications of chromatographic methods. The laboratory component of this course allows students to receive practical hands-on training on the HPLC, IC and GC and to apply the theory presented in lecture.

CHROMATOGRAPHY II INST 6132 This course continues and expands upon the concepts presented in Chromatography I. A more detailed examination of the instrumentation and components used in HPLC, GC and IC is presented. Sample preparation is examined along with the methods and applications of each instrument. Troubleshooting strategies are presented and discussed for both HPLC and GC systems and chromatograms. Other chromatographic systems (GC-MS, HPLC-MS, CE, SFC) will also be addressed. Validation of chromatographic instruments is presented. The laboratory component of this course allows the students to receive practical hands-on training on the HPLC, IC and GC and to apply the theory presented in lecture.

CIRCUIT ANALYSIS CIRC 3131 This is a natural progression of the Electricity II course from semester 2. In general, this course reinforces the basic concepts of Ohm's law, KCL and KVL for electric circuits, and introduces the methods used to analyze circuits. Analysis tools such as: network theorems, voltage and current dividers, nodal and loop analysis, and practical voltage and current sources and their interchange ability are emphasized. This course demonstrates that the analysis techniques developed for DC circuits also apply to AC circuits. The types of AC circuits covered include RLC series and parallel impedance's, and resonant circuits. The course is configured as two hours of lecture and a two hour lab per week to involve the

student in both the theoretical and practical applications of this field. This course uses the circuit simulation software Multisim.

COMMUNICATIONS FOR SUCCESS COMM 2103 This course helps students to discover and perfect the skills that will prepare them for success in college, career, and life. Reading comprehension, writing skills and presentation techniques will be covered. Also, students learn and practice basic computer applications to complete technical documents and present research assignments.

COMMUNICATION FOR THE WORKFORCE COMM 2136 This course is designed to reinforce and expand on the writing skills students require in the technical workplace. Students will learn to select and use appropriate research, language, layout and graphics for technical documents. Emphasis will be placed on: the process of completing any on-the-job writing assignment, the specific formats most often used, and related communication tasks such as oral presentations. To help reach these goals, the course will focus on the elements of clear writing, and the necessary critical thinking that must precede good writing.

COMMUNITY & ENVIRONMENT ENVI 3131 This course examines the diverse needs and activities of Canadian communities and their impact on the environment. Students examine the structure of communities and the socio-economic factors that influence people's mindsets with respect to environmental issues. Thus environmental issues—such as solid waste, air quality, water quality, and energy use—are studied with reference to attitudes and lifestyle expectations.

COMPUTER APPLICATIONS & SIMULATION COMP 1107 In this course students will learn to design and test electronic circuits using MultiSim and LabVIEW. They will also learn to use the Microsoft Excel spreadsheet for technical applications, and integrate other office products into an informal lab report.

COMPUTER APPLICATIONS COMP 1101 This a practical lab subject that is intended to give science and engineering technology students the spreadsheet and documentation skills that they will need in their college and professional careers. The students will gain experience using WINDOWS 7 and MICROSOFT WORD/EXCEL/POWERPOINT. This subject consists of one two hour lab per week which is accompanied by extensive home assignments. It is the students' responsibility to ask for help for any parts of the assignments that they don't understand.

COMPUTERS AND NETWORKING COMP 4131 This course covers microcomputer hardware, software, operating systems, configuration, troubleshooting, as well as transmission, interface, integrity and security of computer data. Also covered will be architecture and protocols, transport networks and data management.

CO-OP PLACEMENT COOP 1100 & COOP 2100 The co-operative semester is a four-month assignment from May to August at a non-destructive testing (NDT) facility. Students experience first-hand NDT techniques and provide assistance to certified NDT practitioners. As well, students develop practical skills to complement the theory covered in the academic courses delivered.

CUSTOMER CARE & SERVICE BMCS 6131 Students examine patient care with respect to the complex patient population. Using medical technology, students also learn about the ability to monitor, diagnose and restore valuable patient records.

DIALYSIS I BMDL 5131 Students become familiar with the concepts of dialysis technology, theory and practice. The physiology of renal failure and body function are covered, as well as the operation of dialysis machines, artificial kidney use, water treatment, and facility design.

DIALYSIS II BMDL (NEW) This course is a continuation of BMDL5131, dealing with the operation, maintenance and troubleshooting of dialysis machines, artificial kidney use, water treatment, and facility design

DIGITAL CIRCUITS I CIRD 1131 This course helps students learn the principles and applications of digital electronics. Students receive theoretical and practical training while gaining the foundation for more advanced study. Topics include basic logic gates, inverting logic gates, arithmetic circuits, Boolean algebra, and reduction techniques. Students have ample opportunity to put their training into practise, working on arithmetic circuits in digital computing and control, and the use of CPLDs to solve logic designs.

DIGITAL CIRCUITS II CIRD 2131 This course is a continuation of DIGITAL CIRCUITS I (CIRD 1131). Students gain a greater understanding of the principles and applications of digital electronics through theory and practical applications. Topics include arithmetic operations and circuits, multiple Xers and demulti plexers, latches and flip flops, sequential logic and counters. Practical applications in computing and control are emphasized. Students use the 74LS TTL and 74HC CMOS series in lab sessions, advanced CPLD designs and applications.

DIGITAL CIRCUITS III CIRD 3131 This course is a continuation of DIGITAL CIRCUITS II (CIRD 2131). Students further their understanding of the principles and applications of digital electronics. In addition, students examine more advanced concepts such as shift registers, parallel to serial, serial to parallel, ring counters, multi-vibrators and interfacing to the analogue world using A/D and D/A circuits. Using the TTL and CMOS logic families, students gain plenty of practical computing and control experience, implementing complex logic functions with CPLDs.

DYNAMICS OF MACHINES MACH 3132 Students examine the dynamic nature of machine elements and mechanisms, including gearing, belt drives, linkages and balancing. Other topics include gearing parameters, speed ratios, power characteristics, common linkage mechanism analysis, and the dynamic balancing of rotary systems using graphical techniques.

ELECTRICAL CONTROLS FOR BIOMEDICAL TECHNOLOGY BMEC 5100 This course educates students about the theory of operation and the practical implementation of the industrial controls systems used in medical applications and health care facilities. Industrial electrical symbols, ladder diagrams, relays, motor starters, human interface devices, industrial sensors and motor control circuits are covered in detail. The laboratory component of this course provides practical experience and the numerous control devices used in the health care industry.

ELECTRICITY I ELEC 1131 This course gives students a background in basic electric circuit theory. Topics include a review of basic mathematical skills, the SI system of units, the behaviour of elementary particles, insulating and conducting materials, resistance, magnetism, inductance, and capacitance**.** In labs, students practise their electrical measurement and analytical skills, and verify principles covered in lectures. Students learn the basic laws of electricity and magnetism and solve problems involving various passive components and circuit resistances in direct current circuits.

ELECTRICITY II ELEC 2131 Topics include a review of electrical units, resistance, energy, power, series/parallel resistances, magnetism, electromagnetism, inductance and capacitance. Students continue to build their knowledge of resistance, capacitance and inductance by considering the influence of alternating current (AC). Lab sessions reinforce students' skills in electrical measurement and the analysis of observed data. Students examine the basic laws of electricity and magnetism, solve problems using various passive components and circuit impedances in DC and AC circuits, and learn to use lab facilities and basic measuring equipment.

ELECTRONIC CIRCUITS I CIRE 1131 This foundation level course starts with an in-depth analysis of the diode, its various circuit applications such as rectification, filtering, voltage regulation, voltage multiplication, limiters, clampers, zener diodes, and light emitting diodes. It then precedes with the basics of transistors, transistor biasing and transistor amplifier configurations. IC voltage regulators will also be covered.

ELECTRONIC CIRCUITS II CIRE 2131 This course is a continuation of Electronic Circuits I. Class A, B, AB, and C power amplifiers are investigated to reveal their power efficiencies. The Field Effect Transistors (FET) are introduced. New parameters such as transconductance and drain and transfer curves are applied to the FET circuits. Different FET bias circuits such as self bias and voltage divider bias circuits are studied. The different amplifier configurations of common source, common drain, and common gate are introduced. Amplifier performance for gain, phase, and impedance are predicted. Several types of MOSFET transistor devices and their biasing circuits are examined. Switching devices such as SCR, SUS, DIAC, TRIAC and UJT are covered. Their input and output and control signal waveforms are studied. Opto-electronic devices including photo cell, photo resistor, photo diode, photo transistor and optocouplers are introduced. Theoretical knowledge is integrated with lab exercises. Circuits are assembled and tested to observe whether they comply with theoretical expectations.

ELECTRONIC CIRCUITS III CIRE 3131 This course covers the operational amplifiers (op amps) in detail. The op amp analog operations such as addition, subtraction, integration and differentiation, constant current source, voltage reference, current-to-voltage conversion, phase shifting, window detection and filtering are covered. The course is complemented with lab experiments to verify the principles dealt in the theory class.

EMBEDDED SYSTEMS EMBS 6100 This course enables students to apply the fundamentals of microcontroller programming learned in the Microprocessors I (MPRO 1131) course to embedded system techniques. Lecture topics cover programming the Motorola HCS12 on-chip peripherals, digital analog interfacing techniques and advanced software techniques in assembler and C. Students work in labs using an HCS12 microcontroller single-board computer, programmed using a cross-assembler and the GNU C cross-compiler. The labs include some work with interface electronics. A group project helps students learn about programming and software project management.

ENGINEERING DESIGN ELEMENTS DRFT 3131 This course introduces students to the elements of mechanical design. Topics include mechanical engineering components (e.g. fasteners, bearings, and springs) and basic machine elements (e.g. gears, belts and pulleys, chains and sprockets). Students exercise their knowledge and ability via design assignments in assembly and machine design.

ENGINEERING DESIGN PROJECT CAD 6132 This course exposes students to the entire design process by providing them with an opportunity to design and manufacture their own, unique and functional, pneumatic piston engine. In doing so, they will need to understand and incorporate the specifications, manufacturing limitations and time constraints imposed on them while simultaneously designing, calculating, modeling, detailing, sourcing, manufacturing, assembling, testing, analysing, documenting and presenting their final design. In doing so, students will work in the multiple roles of lead design engineer, draftsman, material acquisitoner, assembly technician, test engineer, cost estimator and project engineer in order to give them a wholistic view of the design process. Students will manufacture their own engine parts using a variety of conventional machines (lathes, mills, etc..) as well as have the opportunity to use a rapid prototyping machine to quickly itterate the design of a select number of their components. In addition, since the functionality of their engine is greatly dependant upon the quality of the parts they create, their detail drawings must be generated with a firm understanding of design standards, materials, fits, surface finishes, GD&T and drafting techniques in order to be successful.

ENGINEERING DRAWINGS DRFT 1107 This lecture-based course introduces students to the foundations of engineering drawings. Topics include orthographic projection, auxiliary views, section views, freehand sketching, working drawings, dimensions and tolerances, specifications, notes and revisions.

ENGINEERING GRAPHICS I DRFT 1131 This lab-based course focuses on the creation of engineering drawings using AutoCAD. Topics include 2D AutoCAD drawing and editing techniques, construction of orthographic views, layers and appearance, AutoCAD layouts, basic dimensioning and drawing annotation.

ENGINEERING GRAPHICS II DRFT 2131 This course focuses on the creation of working drawings as well as introductory drawing office and engineering procedures. Topics include conventional dimensioning, detail drawings, assembly drawings, limits and fits, drawing office procedure, datums and positioning, engineering changes, and geometric dimensioning and tolerancing.

ENVIRONMENTAL CHEMISTRY CHEM 3132 This lab and lecture-based course focuses on the chemical aspects of environmental problems that have been created by humans. Chemical and physical properties of various organic and inorganic compounds (i.e. VOCs, PAHs, PCBs, mercury, arsenic, lead etc.) are reviewed in order to obtain a thorough understanding of how each of these compounds interacts within various media (i.e. soil, water and air) and measures that can be used to remediate their impacts.

ENVIRONMENTAL ENFORCEMENT REGS 2131 Students study, in detail, environmental enforcement in Ontario. Abatement procedures, abatement tools and management strategies, including ISO 14000, are examined. Spill cleanup regulations and legal defences against enforcement actions are studied from an industrial perspective. Also, common law and its expanding role in environmental protection and actions are studied. Trends in environmental policy are examined so that students can be more aware of probable developments in future environmental enforcement activities.

ENVIRONMENTAL ENGINEERING ENGR 1131 This lab will and lecture-based course expands students' knowledge of the processes, practices and equipment for dealing with environmental engineering problems. Students also learn about the challenges of water sewage treatment, hydrology**,** storm water management and noise pollution.

ENVIRONMENTAL PROTECTION AND GLOBAL WELLNESS GNED 1501 Students will learn more about the prominent environmental issues of our time. This course will focus on timely issues in the environmental field that present varying degrees of risk to the heath of humans, ecosystems and our planet. It will be a look beyond the media headlines at the policies, politics and basic science of our most interesting environmental challenges. Topics will include climate change, arctic ecosystems, water conservation and water quality, endocrine disrupting substances (gender benders), renewable energy, resource depletion, the dilemma of pesticide use and natural toxins. The course will begin with a brief look at the responsibilities of the Federal, Provincial and municipal governments as they relate to environmental matters. Each issue will then be considered in the Canadian and global context.

ENVIRONMENTAL REGULATIONS REGS 1131 This course provides a thorough review of environmental protection legislation and regulations at the federal, provincial and municipal levels. It also covers public attitudes and a brief history of key environmental issues and incidents that helped shape current environmental legislation. The Canadian Environmental Protection Act, the Canadian Environmental Assessment Act, the Fisheries Act, the Ontario Environmental Assessment Act, the Nutrient Management Act, the Ontario Water Resources Act, the Environmental Bill of Rights, the Safe Drinking Water Act, the Green Energy Act and the Water Opportunities Act, among others, are introduced along with some of the key regulations. The important regulations are examined in greater depth in subsequent courses.

ENVIRONMENTAL SAMPLING QUAL 1132 This combined lecture and lab course provides instruction about environmental sampling, analyses, and associated quality assurance and quality control practices. Students practice sampling techniques in a range of field situations and develop an understanding of sample program design, sample management and QA/QC practices.

ENVIRONMENTAL SCIENCE ENVI 2131 This course examines the effect of human intervention on biomes and ecosystems by investigating the major categories of pollution, as well as the major trends in resource consumption and use. This helps students better understand how human action alters the environment and why this action may significantly affect an ecosystem and its sustainability. Lab exercises focus on terrestrial and aquatics ecosystems, as well as projects involving the human aspects of air and water pollution and their effects on communities.

ENVIRONMENTAL TOXICOLOGY TOXI 1131 This course introduces students to the principles of environmental toxicology. Topics include an overview of the effects of toxic compounds on the human body, as well as living organisms in aquatic and terrestrial ecosystems. Epidemiological studies and environmental risk assessments as they relate to environmental toxicology will also be examined.

FIELD PLACEMENT & REPORT FWBM 6131 Students prepare a detailed report and present it to their peers, both orally and in writing.

FIELD PLACEMENT PLAC 1100 Placement in a student's chosen field is considered an important part of a technologist's education, providing them with practical experience prior to graduation. Each placement is different as there are a variety of organizations participating. Satisfactory completion is mandatory in order to graduate from Durham College.

FLUID MECHANICS FLUD 4131 This course deals with the fundamentals of fluid properties, fluid pressure, hydrostatic forces on surfaces, buoyancy, fluid flow, flow measurement and energy losses—both major and minor—associated with the fluid flow in piping systems.

FLUID POWER I FLUD 1131 The use of fluid under pressure to transmit power and control motion, is studied in this course. The principles of fluid power are presented to students in order to relate the laws of physics to practical control systems. An explanation of the operation of various fluid power components (pumps, valves, actuators and system accessories applications) is used. The fundamental concepts and basic skills necessary to develop a logical approach to the solution of fluid power control system problems will also be presented.

FLUID POWER II FLUD 2132 The increased use of automated manufacturing machines in industry has produced a need for sophisticated control systems. The application of logic control functions are used to develop a systematic approach to the solution of fluid-power-controlled system problems. In this course the solution of fluid power control systems will be presented using pneumatic, relay and PLC ladder logic.

FOOD & PHARMACEUTICAL SCIENCE NUTR 2132 This is a one semester course designed to introduce the student to the basics of foods and pharmaceuticals. The Canadian pharmaceutical industry is discussed. The regulations regarding pharmaceuticals are introduced. The basics of quality control of tablets are introduced. The forms pharmaceuticals come in and the labelling of pharmaceuticals is introduced. Nutraceuticals, probiotics, prebiotics and functional foods are introduced. Foods are looked at from the standpoint of the major components, such as fat, protein, carbohydrates, and water and their significance in the manufacture of foods and their role in nutrition for the body. Minor components, such as vitamins, minerals, toxins, food additives, microbes and their significance to health are discussed. Control of nutrient addition and other quality control aspects of food processing are introduced.

FOOD PROCESSING, STORAGE AND PACKAGING FOOD 2103 This is a one semester course which discusses the principles of food processes. The topics are covered from a descriptive point of view with an emphasis on Critical Control points and Food Safety in Food Processes. Topics described include deteriorative factors of foods, unit operations, various industry sectors, packaging and warehousing operations.

FOOD SAFETY-HACPP SAFE 1103 This course provides an overview of Food Safety. The types of potential hazards and the Principles of HACCP (Hazard Analysis Critical Control Point) will be introduced. Students will gain a general understanding of Food Safety and Safe Food handling Techniques. Students will be exposed to a Self Inspection Audit and Common Food Allergens.

FUNDAMENTALS OF WELDING INSPECTION WELD 3100 This course provides the student with the fundamentals of welding, weld quality and weld inspection. The student will learn about visual inspection methods, welding metallurgy, electrodes, symbols and power supplies. Weld faults, their causes and the application of appropriate inspection methods will be discussed. Inspection record keeping, qualification of welders and weld procedures, and the preparation of weld maps will be covered. Course content will meet or exceed the body of knowledge defined in CSA Standard W178.2 for Level 2 Welding Inspectors.

GOOD MANUFACTURING PRACTICES GOOD 1131 This is a three hour lecture course intended to introduce the student to Food and Pharmaceutical legislation. This course reviews current legislation – federal, provincial, and municipal – that regulates the food and pharmaceutical industries in Ontario and the agencies in Ontario and the agencies that enforce the legislation. The Food and Drugs Act, the pharmaceutical and food good manufacturing practices (GMPS) are discussed. WHMIS, HACCP, ISO 9000 and similar quality programs are discussed.

GOOD MANUFACTURING PRACTICES FOR THE FOOD PROCESSING WORKER MANF 2103 This is a course designed to provide the student with training in the areas of Personnel Practices, Shipping, Receiving, Handling and Storage Practices, proper Sanitation, Equipment Maintenance, Pest Control, Recalls and Water Safety. The course is designed to explain CFIA's Food Safety Enhancement Program Manual in detail using OMAFRA's Advantage Good Manufacturing Practices Program.

HEALTH & SAFETY HLTH 1133 This two-hour lecture course provides specific health and safety training in areas that are directly pertinent to water and wastewater facility and field operations in water distribution and collection systems. The course covers basic health and safety legislation and focuses on roles, responsibilities, personal protection and worker rights that are immediately applicable to an industrial workplace. Specific instruction is conducted in key areas that are most relevant to the water and wastewater industry, such as confined spaces. Students complete a course in first aid and CPR prior to going out on placement.

INDUSTRIAL CHEMICAL PROCESSES INDC 6100 Students examine various industrial processes and review the fundamental principles of unit operations in physical and chemical change. The focus is on material and energy balance in terms of chemical conversion as well as new process technologies.

INDUSTRIAL CHEMISTRY INDC 4100 This course focuses on the chemistry of industrial applications. Related topics focus primarily on chemical kinetics (rates of reaction), electrochemistry and inorganic chemistry.

INDUSTRIAL CONTROLS I CONT 3123 This course is designed to educate the student in the theory of operation and practical implementation of industrial control systems and micro PLC systems. Industrial electrical symbols, ladder diagrams, relays, motor starters, human interface devices, industrial sensors, micro PLC's and motor control circuits will be covered in detail. The laboratory component of this course provides

practical experience with numerous control devices that can be directly related to industrial control systems found in industry. This course is a prerequisite for INDUSTRIAL CONTROLS II (CONT 3131).

INDUSTRIAL CONTROLS II CONT 3131 The course covers the theory of operation and practical implementation of three-phase power, industrial control systems and electric motors, as well as AC electronic drives and controls. A number of power electronic circuits are covered in this area, such as three-phase power rectification and pulse width modulated inverters. The student will also program and integrate a commercially available AC adjustable frequency drive controller. The student is required to integrate a PLC, operator controls, sensors, motors, electronic drives, and other electrical components to create a small scale automated system that includes a communications data link for data transfers. The theory portion of this course is reinforced through practical laboratory experiments.

INDUSTRIAL WASTE WAST 3131 Students study the key aspects of industrial waste management and pollution prevention programs. Topics include the definition of industrial waste; the sources and types and classification of industrial waste (Reg 347); the regulatory requirements for industrial and hazardous treatment and handling; waste minimization practices and a comprehensive coverage of the primary waste treatment and emission control technologies. Applicable regulations relating to waste management are studied along with the introduction of the Waste Diversion Act.

INSTRUMENTAL ANALYSIS INST 1104 This course introduces students to process instrumentation and controls used in the water and wastewater field. Students will gain an understanding of the functionality of instruments used to measure, control and monitor plant process variables such as flow, level, pressure, as well as analytical instruments used to measure plant conditions such as turbidity, chlorine residual and pH.

INSTRUMENTATION AND CONTROL DATA 3131 This course covers the theory and application of transducers, sensors, signal conditioning, open and closed loop systems, process control and instrumentation. National Instruments LabView is used for simulation, data acquisition, presentation, analysis and control.

INSTRUMENTATION AND CONTROL I CONT 5131 This course covers the principles of sensors and transducers used in process control. As well, it will cover temperature, pressure, level and flow measurements, data acquisition and control.

INSTRUMENTATION AND CONTROL II CONT 6131 This course is a continuation of CONT5131. It will cover control loops and their elements, automatic control, safety systems, and Instrumentation & Control Applications.

INTEGRATED AUTOMATION I CONT 3141 This one-semester course is designed to further educate students in numerous aspects of industrial automation. The course builds upon the electric motors, industrial controls, DC/AC drives and micro PLCs studied in INDUSTRIAL CONTROLS I (CONT 3123) and INDUSTRIAL CONTROLS II (CONT 3131). The course begins with an introduction to the hardware, programming, and networking architecture of the Allen Bradley SLC 500 system. It continues with the hardware, programming and interfacing of interactive operator touch screens. It then proceeds with an introduction to the hardware, programming and interfacing of industrial robots. The course concludes with students programming and interfacing a SLC 5/04, PanelView touch screen, and industrial robot to create a functional, interactive work-cell. Theory classes will be re-enforced with practical laboratory experiments in each of the three major subject areas. This course is a prerequisite for INTEGRATED AUTOMATION II (CONT 4101), which continues with advanced PLC programming, robotics and work-cell integration.

INTEGRATED AUTOMATION II CONT 4101 This is a single-semester course that educates students about the integration of industrial automation, robotics, PLCs and operator terminals. It is a continuation of

INTEGRATED AUTOMATION I (CONT 3141). It focuses on the more advanced integration and programming aspects of industrial robots, PLCs and operator terminals. It also introduces students to analogue I/O and data highway, plus messaging. Students utilize multiple programming packages for PLCs, panelviews and robotics. Throughout the course students study robotics/PLC hardware, robotics/PLC installation and configuration parameters, more advanced PLC programming and system integration aspects of industrial automation. The theory section of this course is re-enforced through practical design and integration-based laboratory experiments in the fully functional automation laboratory.

INTRODUCTION TO THE FOOD INDUSTRY FOOD 1101 This course introduces the student to food safety hazards, causes and prevention and applies this knowledge to the processing facility and employee. On completion, the student will be aware of the history, safety concerns, and trends in each sector of processing in Ontario with respect to food safety, food security and sanitation.

INTRODUCTION TO AUTOMATION FOR THE FOOD INDUSTRY FOOD 2104 Introduction to Automation for the Food Industry is designed to educate students in the terminology, physical identification and operation of typical industrial control devices used to operate and monitor automated equipment. This course begins by introducing students to operator control panel components such as switches, indicators and machine control and motion devices. The course progresses to discuss more advanced technologies, illustrating examples of Programmable Logic Controller (PLC) systems, touch screen Human Machine Interface (HMI) control and the interaction of a basic automated system from an onscreen, SCADA (Supervisory Control and Data Acquisition) interface. This course is prepared from the perspective of an automated equipment operator and is not intended to be an automation controls design course. Course format consists of a 3 hour lecture and a 3 hour laboratory per week.

INTRODUCTION TO BIOMEDICAL ENGINEERING TECHNOLOGY BMET 1100 This course introduces the student to the principles and concepts of biomedical engineering. Students gain an understanding of the breadth and depth of the discipline and their rate in the contemporary healthcare environment. Topics are introduced here that are explored in greater depth in subsequent courses.

INTRODUCTION TO CAD CAD 2136 This course covers the basic commands used in AutoCAD to draw, edit, and plot a simple two-dimensional drawing. It includes layering schemes and techniques; saving and recalling a drawing file; dimensioning; crosshatching; linetypes; prototype drawings; management of blocks; wblocks; and titleblocks.

INTRODUCTION TO FOOD MICROBIOLOGY MICR 1103 This is a basic course describing essential skills required to handle food and equipment in a safe manner that prevents food contamination and food borne illness. Topics covered include: Sources, Causes, and Prevention of Food borne Illness, Safe Food Handling Techniques and the role of the food process operator in minimizing the risk of food borne illness to the general public.

INTRODUCTION TO NON-DESTRUCTIVE TESTING NDTE 1100 This course introduces students to the fundamental concepts of non-destructive testing (NDT) and various manufacturing activities. Students become familiar with basic methods of NDT. Topics include NDT centre fundamentals, as well as foundations of quality control concepts, codes, standards and documenting the process.

INTRODUCTION TO WATER AND WASTEWATER WATR 1133 This course consists of three hours of lecture and two hours of lab time per week to give students an introductory understanding of water and wastewater treatment and its associated distribution and collection systems. Public health; characteristics of water and wastewater (physical, chemical, microbiological and radiological, etc.); basic principles (hydraulics, chemical reactions, electricity, etc.); treatment processes; disinfection; equipment basics; collection and

distribution systems; sample collection; and water and wastewater analysis are all covered. Students attempt the Ontario Ministry of the Environment's entry level drinking water course test. Students may also attempt to write the Ontario Ministry of Environment's operator-in-training (OIT) examinations.

INTRODUCTORY MICROBIOLOGY MICR 1131 This course introduces applied aspects of microbiology. It includes a practical and theoretical introduction to microbial cell morphology and the structure and function of prokaryotes and eukaryotes. The diversity of the microbial world is examined by comparing bacterial, fungal, protozoan and viral organisms. The growth, reproduction and enumeration of micro-organisms are studied as well as the effects of physical and chemical agents on microbial growth. The laboratory component provides hands-on experience in the isolation, cultivation and enumeration of micro-organisms as well as in the preparation of microbiological media and cultures.

LAW AND ETHICS GNED 1402 This course will introduce students to the fundamental legal principles applicable to businesses in Canada. Students will gain an understanding of the Canadian Legal System, Dispute Resolution, Contract Law, Business Torts, Property Law, Employment Law, Intellectual Property Law, as well as the key distinctions between Civil and Criminal Law. Students will apply legal theory in a practical manner through case scenarios and case analyses.

MANUFACTURING PROCESSES MANF 3131 Students learn about the production of finished parts in metal and non-metal substances, and how planning a manufactured product can affect the decision to use or not to use a particular process. Topics include casting and forming, non-metallic materials, non-traditional machining processes, manufacturing systems and automation, production systems, and jigs and fixtures.

MANUFACTURING SCIENCES MANF 1131 Designed to give the Student a fundamental, entry-level introduction to some of the many varied processes utilized in a conventional machine/fabrication shop. Student will also apply some of this theoretical information while performing safe, effective operation of hand and machine tools by practical demonstration within a "shop" environment. Safety will be an integral, on-going topic.

MATERIALS MATL 1000 This course is designed to give students an understanding of the nature and properties of materials. Structures, defects, diffusion and mechanical properties of metals, ceramics and polymers will be studied.

MATHEMATICS II FOR WQ TECHNICIANS MATH 2125 This course continues the work that was begun in MATH 1109 with a focus on specific calculations and formulas required in the water quality industry. These will include Applied Volume Calculations, Flow and Velocity Calculations, Loading Rate Calculations, and Detention and Retention Time Calculations. The actual mathematical procedures, using realistic numbers, applied problems and calculator procedures are stressed.

MATHEMATICS FOR TECHNOLOGY I MATH 1131 The purpose of this course is to refresh and upgrade existing mathematical skills such as algebra, geometry, trigonometry, and more. Emphasis is placed on developing problem solving techniques by applying these math topics to related engineering problems. Portions of this course will be spent supporting the first year Physics course PHYS 1131. This is configured as four one hour classes per week.

MATHEMATICS FOR TECHNOLOGY II MATH 2131 This is the second of the two first year mathematics courses. Students develop problem solving skills by applying topics of study to related practical problems. Topics of study include: quadratic equations; systems of linear equations in two and three unknowns; trigonometric functions; exponents and radicals; direct and indirect variation; complex numbers; sequences; exponents and logarithms; and analytical geometry. It is configures as four one hour classes per week.

MATHEMATICS FOR WATER/FOOD TECHNICIANS MATH 1109 This three-hour lecture course reviews basic mathematical operations within the SI system of units. It also covers algebra, fractions, decimals, percentages, ratios, proportions, graphing and problem solving. This course covers the components skills required for MATH 2125.

MATHEMATICS FOR WATER/FOOD TECHNICIANS MATH 1109 This three-hour lecture course is essential to the Water Quality Technician program. The course reviews basic mathematical operations within the SI system of units, the imperial system of units and the conversions between the two. Students learn to solve problems in a logical and organized manner.

MATHEMATICS I FOR TECHNICIAN MATH 1124 This elementary mathematics course helps students develop analytical skills and prepare for further studies in mathematics. Topics include the use of calculators, operations with units, basic number operations, basic algebraic operations, solving word problems, functions, graphs and the fundamentals of trigonometry and vectors.

MATHEMATICS I MATH 1132 Students refresh and develop their skills in fundamental mathematics including algebra graphing, unit conversions, geometry and dimensional analysis topics required in other courses and for their chosen careers. As well, students practise and strengthen their reasoning abilities by restating problems so they can be solved mathematically.

MATHEMATICS II FOR TECHNICIAN MATH 2124 This course is a continuation of MATHEMATICS I FOR TECHNICIAN (MATH 1124). Topics include plane geometry, solid geometry, factoring, algebraic fractions, fractional equations and systems of linear equations.

MATHEMATICS II MATH 2132 This course is a continuation of Mathematics 1 (MATH 1132). Students develop their mathematical skills through topics such as exponential and logarithmic functions, radicals and exponents and systems of equations. Actual mathematical procedures using realistic numbers and calculator procedures are stressed.

MATHEMATICS III FOR TECHNICIAN MATH 3124 The course is designed to refresh and reinforce students' skills in the fundamental mathematics required in their other subject areas. Parallel to this primary purpose is the exercising and strengthening of students' abilities to reason and resolve verbal problems into forms that can be solved by mathematical means. Texas Instruments' TI-89 graphing calculator is required for this course.

MEASUREMENT I MEAS 4132/MEAS 4134 In this dimensional metrology course, students examine the theory and applications of various measuring devices and their application to industrial quality assurance. Topics include standards, calibration and traceability, tolerancing systems, the principles of measurement, amplifying devices, sources of error, and manual and CNC co-ordinate measuring machines.

MEASUREMENT II MEAS 5132 Students enhance their knowledge of the theory and applications of various measuring devices and how they are applied to industrial quality assurance. Topics include the kinematic design of instruments, comparator systems, surface and roundness assessment, metrology optics, co-ordinate measuring machines, and in-process gauging.

MECHANICS OF MATERIALS MTRL 2132 This course teaches students how to determine where (and if) a mechanical component will break as well as how much it will deflect under an applied load. In order to do this, previous knowledge of applied mechanics is coupled with the fundamental mechanical design concepts of stress and strain. Class examples will cover members under tensile and compressive forces, twisting of solid and hollow shafts, bending and deflection of beams, thermal stresses and thin walled pressure vessels. The

application of appropriate safety factors and stress concentrations is also covered and students will have an opportunity to apply their knowledge by competing in a small classroom design competition.

MEDICAL IMAGING SYSTEMS 1 BMIS 5131 This course is designed to educate students in the theory of operation common in medical imaging devices. Students gain an overview of the components, systems, and serviceable components of the various devices. The laboratory component of this course provides practical experience in our x-ray fluoroscopy lab.

MEDICAL IMAGING SYSTEMS I1 BMIS 6131 This course is a continuation of MEDICAL IMAGING SYSTEMS I (BMIS 5131). Students gain an overview of imaging systems, as well as various imaging modalities including X-ray, ultrasound, nuclear medicine and MRI, PACS and RIS. Topics include the serviceable components of the various devices.

METALLURGY FOR NON-DESTRUCTIVE METL 1132 This course provides the students information on fundamental concepts of metallurgy. The knowledge of these concepts is invaluable for Non-Destructive Testing specialists who plan to deal with metals as a future vocation. The course explores the behaviour of metals subjected to manufacturing processes. It explains how desired material properties are attained.

METALLURGY I METL 1131 This course establishes the basis for understanding the behaviour and characteristics of metals and alloys. Topics include the atomic structure of metals; slip plastic deformation and recrystallization; principles of mechanical and non-destructive testing; thermal equilibrium diagrams; and the iron-carbon system.

METALLURGY II METL 2131 Students apply their knowledge of metal structure and equilibrium diagrams to the discussion of heat-treatment principles. Topics include iron and steel production, properties and classification. Various aspects of non-ferrous metals and alloys, as well as physical and mechanical properties and their applications, are examined.

MICROBIAL APPLICATIONS I—FOOD AND WATER MICR 2131 The course examines the relationship between micro-organisms and food in negative and positive contexts. The relationship between microbes, foods, water and their human hosts in relation to food-borne and water-borne disease and food safety is also studied. Using rapid and conventional accredited laboratory methods, students develop microbiological techniques to determine microbial populations and isolate specific pathogenic micro-organisms found in food products. As well, they learn about the microbial analysis of drinking water and wastewater for pathogenic organisms.

MICROBIAL APPLICATIONS II—DIAGNOSTIC & RAPID METHODS MICR 2133 Students examine the different methods and approaches to characterize, classify and identify bacteria. This course emphasizes the physiological, morphological and biochemical characteristics used to identify bacteria found in the food, biotechnological and pharmaceutical industries. As well, students examine rapid testing and automated systems to determine whether micro-organisms are present in a sample and identify the unknown organisms to the species level. Students develop sufficient knowledge of staining methods, isolation techniques, microbial nutrition, biochemical activities and the characteristics of micro-organisms to independently identify unknown cultures.

MICROPROCESSORS I MPRO 1131 This course introduces students to microcontroller systems using the Motorola 16-bit HCS12 as representative of microcontrollers currently available. The course begins with an overview of computer architecture and the fundamentals of computer programming. Students will have the opportunity to program the microcontroller in assembly language, as well as the C programming language. Lab

exercises will use both a software simulator and a single-board microcontroller development system. Programs will be cross-assembled or cross-compiled from the IBM PC to the target system, and will interface with the built-in hardware devices on the development board.

NON-DESTRUCTIVE TESTING—EDDY CURRENT NDTE 4101 Using the eddy current inspection method, students learn to identify common discontinuities and generate an interactive exchange of views and ideas related to this test method. As well, students acquire a working knowledge of the eddy current inspection process, and relate theoretical concepts of this test method to practical applications.

NON-DESTRUCTIVE TESTING—LIQUID PENETRANT NDTE 1102 Students learn about the fundamental concepts of liquid penetrant inspection (LPI). Using LPI, students learn to identify common discontinuities; study the LPI inspection process; and relate theoretical concepts of LPI test methods to practical applications.

NON-DESTRUCTIVE TESTING—MAGNETIC PARTICLE NDTE 2101 Students learn about the fundamental concepts of magnetic particle inspection (MPI). As well, students use MPI to identify common discontinuities; acquire a working knowledge of the MPI inspection process; and relate theoretical concepts of MPI test methods to practical applications.

NON-DESTRUCTIVE TESTING—RADIOGRAPHY NDTE 5101 In this course students examine the fundamental concepts of Radiographic Testing (RT). Students learn to identify common discontinuities detectable by RT inspection methods, acquire a working knowledge of RT inspection processes, and relate theoretical concepts of RT test methods to practical industry applications.

NON-DESTRUCTIVE TESTING—ULTRASONIC I NDTE 3101 In this course students examine the fundamental concepts of Ultrasonic Testing (UT). Students learn to identify common discontinuities detectable by UT inspection methods, and acquire a working knowledge of UT inspection processes. As well, students relate theoretical concepts of UT test methods to practical industry applications.

NON-DESTRUCTIVE TESTING—ULTRASONIC II NDTE 3102 This course gives students foundations of Ultrasonic Inspection theory including Pulse-Echo, Through Transmission and Immersion methods. The course covers industrial applications, operating procedures, relevant specifications, codes, written instructions and interpretation of indications.

NUCLEAR PHYSICS NUCL 5100 The course begins with a study of the structure of the nucleus. Students examine alpha, beta and gamma radiation, as well as study radioactive decay. Other topics include power production, fission, fusion, industrial uses, nuclear medicine, radiation hazards, detectors and radiation measurement.

ORGANIC CHEMISTRY I ORGN 1131 This is a one semester course designed to introduce the student to the basic concepts of organic chemistry. This course is designed to familiarize the student with organic chemical structures, functional groups, nomenclature and basic physical properties and reactions of organic compounds.

ORGANIC CHEMISTRY II ORGN 2131 This course is a continuation of Organic Chemistry 1 (ORGN 1131) and will assume a basic background in Organic Chemistry. The skills developed in ORGN 1131 (nomenclature and reactions) will be reviewed and explored in greater depth. Reaction mechanisms will be used to classify organic reactions as well as serve to predict the products of reactions. These principles will be used to explain the important reactions of each functional group. An emphasis will be placed on organic chemical problem-solving skills in both synthetic and qualitative organic analysis. The use of spectroscopic

techniques to identify organic compounds will be addressed. The laboratory portion of this course emphasizes the techniques of Organic Chemistry (distillation, reflux, extraction, re-crystallization, chromatography, etc.), adding to and reinforcing the lab skills developed in first year.

ORGANIZATIONAL BEHAVIOUR GNED 1410 This course studies the process the consumer goes through in making purchase decisions. Strategies that enable marketers and the media to affect this process and the mechanisms they use to do so are analyzed and discussed. The course will assist students in becoming more effective marketers and sales professionals by helping them understand the processes and influences that drive the purchase behaviour in consumers.

PHARMACEUTICAL MICROBIOLOGY MICR 2134 This course examines the relationship between micro-organisms, their human hosts and pharmaceutical products, cosmetics and medical devices. In lectures and labs, students further develop microbiological techniques to determine microbial populations and isolate specific spoilage micro-organisms. This is achieved by using conventional accredited laboratory methods including USP sterility, preservative challenge, and microbial limits testing methodology. Other topics include chemotherapeutic agents, mode of action, resistance and susceptibility. As well, students examine the methods of detecting antibiotic sensitivity and potency.

PHARMACEUTICS PHRM 3131 This course describes the development, approval process, formulation, manufacture and testing of pharmaceutical products. Solid dosage forms (tablets, capsules, powders), liquid dosage forms (solutions, syrups, suspensions, emulsions) and other dosage forms (ointments, creams, transdermal patches, aerosols) are addressed. The pharmaceutical industry is addressed from a Canadian and North American perspective. The role of government agencies (USP/NF, FDA, CDER, TPD) is discussed. cGMPs and GLPs are described as they relate to this industry. The Laboratory portion of the course addresses the testing of raw materials and finished products. Both chemical (impurity testing, assays – HPLC, UV/VIS, and identification tests) and physical testing (friability, disintegration, dissolution, viscosity, hardness, etc.) are performed according to USP/NF monographs. The importance of documentation in the laboratory is stressed.

PHARMACOLOGY PHRM 4131 This course describes the actions of pharmaceutical products on biological systems and the body. Factors influencing the intensity of drug responses (administration, pharmacokinetics—absorption, distribution, metabolism and excretion) will be addressed. Receptor-mediated drug action will be examined as it applies to a whole variety of drug classifications. An overview of the formulation of pharmaceutical products and their relationship to pharmacological activity will be examined, with emphasis on the BCS classification system and how this relates to the pharmacological activity of finished dosage forms. Major categories of drugs (CNS, cardiovascular, antihistamines, NSAIDS, etc.) will be discussed along with their actions, adverse effects, etc. A brief look at alternative drugs will also be included.

PHYSICAL CHEMISTRY PHYC 3100 This is an introductory physical chemistry course studying the underlying principles that govern the properties and behaviour of chemical systems. Physical chemistry illustrates the establishment and development of underlying physical principles that govern the properties and behaviour of chemical systems. Its concepts are used to explain and interpret observations on the physical and chemical properties of matter in its various states (gas, liquid and solid). Physical chemistry is essential for developing and interpreting the modern techniques used to determine the structure and properties of matter.

PHYSICAL SCIENCE—TECHNICIAN PHYS 1122 This course is designed to introduce the mechanical and electrical engineering technician student to a variety of topics within the physical sciences. This course encourages students to consider common events to recognize that mathematics can be used as a tool to explain and predict technologies based upon observations. At an introductory level, topics in this course promote the discussion and calculation of problems involving kinematics & dynamics, motion, momentum, work and energy, heat and temperature, waves, sound, electricity and modern physics.

PHYSICAL SCIENCE—TECHNOLOGY PHYS 1131 This course introduces students to the concepts of kinematics, dynamics, gravity, work, energy, torque, power, momentum, circular motion, sound, light and heat through an extensive use of formulas to calculate various physical quantities within these topics. As a result, the ability to perform algebraic manipulation is an essential skill to succeed in this course and students must also develop a firm understanding and ability to specify the correct units for all of their calculations. In addition, (based on their specific program of study) students are given the opportunity to either write an essay or work in a group to build and present a design project based on a topic of their choice.

PROCESSING OPERATIONS I PROC 5131 This is a three hour lecture, two hour lab course designed to discuss foods, their quality parameters and the principles of food processing and food safety. Topics are covered from a general point of view with descriptive material provided for representative applications. Subjects covered include: major and minor food components, unit operations, quality factors, deteriorative factors of foods, heat and cold preservation and processing and an introduction to HACCP.

PROCESSING OPERATIONS II PROC 6131 This is a three hour lecture, two hour lab course which covers various aspects of food and some pharmaceutical manufacturing. Topics are covered from a general point of view with descriptive material provided for representative applications. Major topics covered include dehydration and concentration processes, sterilization systems, irradiation, microwave heating, ohmic heating, other newer technologies, food fermentations, packaging materials, food additives, vitamin addition and some specific food commodities.

PRODUCT DEVELOPMENT PROD 3131 This is a three hour lecture and lab course that deals with the basic stages of product development for food products. Over the course of the semester, the students will develop a "new" food product complete with packaging. They will become familiar with government regulations concerning the packaging, labelling and introduction of a new food product. They will also be introduced to MS Project as a planning tool and Genesis SLQ as a labelling aid. The product development of nutraceuticals, functional foods and novel foods, such as genetically modified foods will also be discussed.

PROTEIN AND DNA TECHNIQUES BIOT 3131 Protein and DNA Techniques is a one-semester course with four scheduled hours of laboratory exercises and one scheduled hour of lecture per week. This course is designed to train students to work independently and safely in the biotechnology laboratory by teaching comprehensive research techniques, methods for documentation and data analysis, and good laboratory practices. Students will learn and practice DNA techniques including DNA purification from bacteria and agarose gels, DNA quantification, restriction digests, DNA ligation, preparation of competent cells and bacterial transformation, DNA fingerprinting (using PCR), and agarose gel electrophoresis. Students will also learn and practice protein techniques including protein quantification. The students will be taught to use bioinformatics tools and resources that can assist them with their work and the interpretation of their results.

QUALITY ASSURANCE & CONTROL GNED 1405 This course covers various aspects of, and differences between, quality assurance and quality control. The course focuses on the fact that quality has become a priority issue for most companies and agencies providing goods and services to consumers and clients. Public reaction to independent market research can have a profound effect on companies and their employees. A history of the development of quality concepts and quality standards will be studied along with quality parameters, problem-solving techniques and continuous improvement. Students will gain an enhanced understanding of their role within an organization utilizing quality management standards. Students will be invited to consider how the perception of quality influences their personal thinking and buying habits.

QUALITY ASSURANCE AND QUALITY CONTROL QUAL 2103 This is a course which discusses quality assurance and quality control of the critical elements of the processing and packaging of foods and beverages effecting industries such as; dairy, meats, poultry, fish, grains, fruits and vegetables processing,

confectionary, and baked goods. Basic mathematical concepts will be studied along with quality measurables, and data management.

RADIATION SAFETY RAD 1131 Students are introduced to basic atomic physics, industrial gamma and X-ray equipment, as well as means of radiation measurement. Topics include the foundations of radiation safety and protection, such as personal maximum permissible doses; performing leak tests; storage of radiographic exposure devices; different effects of radiation; transportation of radioactive materials; radiation emergency procedures; and Atomic Energy Control Board (AECB) regulations.

REGULATIONS & ENFORCEMENT REGS 1133 This three hour lecture course provides a review of water quality legislation and key regulations in Ontario. The course emphasizes the provincial and municipal responsibilities relative to water and wastewater. The course concentrates on the following Acts and their prominent applicable regulations: the Safe Drinking Water Act, the Ontario Water Resources Act, the Water Opportunities Act, the Ontario Environmental Protection Act, Environmental Assessment Act and the Environmental Bill of Rights. New Regulations will be added as required.

REGULATIONS FOR THE FOOD INDUSTRY REGS 1103 This course will introduce the student to the various acts, regulations and standards governing the food industry in Ontario at the Federal, Provincial and Municipal levels. Employee rights pertaining to safety in the workplace will also be discussed, with references to the Occupational Health and Safety Act and the Ministry of Labour Laws. Students will have an opportunity to successfully complete WHMIS training and certification. Programs such as Canada's Partners in Protection Program (PIP) and the US's Customs-Trade Partnership Against Terrorism (CTPAT) will be introduced. Food security issues such as bioterrorism, employee sabotage, traceability and product recalls will be discussed.

SAFETY STANDARDS/RISK MANAGEMENT I BMSS 6131 Students learn how equipment failure is addressed, the role of the technologist in medical/legal issues, forms and record keeping, as well as the risks associated with the improper use and alteration of equipment. Topics include the use of safety and standards for medical equipment, their use with patients in and outside of clinical settings and adherence to AAMI, CSA and IEC standards for medical equipment.

SAFETY STANDARDS/RISK MANAGEMENT II BMSS 7131 This course is a continuation of Safety Standards/Risk Management I (BMSS 6131). Students apply their new safety and standards knowledge in actual situations where preventive maintenance, service and/or repair is required. Records of the event are logged according to standards and filed for analysis.

SIGNALS & SYSTEMS DGSP 5101 This course introduces students to the basics of signal processing and communication engineering. It also introduces the fundamentals of digital signals and their manipulation. Students compare analogue and digital processing methods, characteristics of signals and characterization of linear systems, such as analogue and digital filters. Other topics include frequency and time domain analysis, and various applications such as sound and image processing.

SPECTROSCOPY I INST 5131 This course focuses on the use of spectroscopic instruments in both qualitative and quantitative chemical analysis. The emphasis in this course is on the use of spectroscopic instruments (AAS, FES, GFAA, ICP, UV/VIS, fluorometry, IR, NMR, MS, XRF, etc.) in the quantitative analysis of bio-molecules, organic compounds and inorganic chemicals. These instruments will be addresses with regards to instrumentation, methods, sample preparation, applications and calculations. The application of these instruments to common analytical procedures will be stressed. Spectroscopy I consists of both a lecture and laboratory component. In the lab, the students will be given extensive hands-on experience with a variety of spectroscopic instruments (AAS, FES, UV/VIS, fluorometry, IR, NIR).

SPECTROSCOPY II INST 6131 This course addresses spectroscopic methods of analysis. In particular, the application of these methods to the identification and structural analyses of organic compounds will be emphasized. Infrared, ultraviolet, visible, nuclear magnetic resonance, and mass spectroscopy will be looked at in terms of basic theory, sampling, data collection, spectral evaluation and interpretation. Correlation tables will be used to predict and identify the structure of a variety of organic compounds using spectra alone and in combination. The laboratory component of this course provides hands-on experience using infrared, ultraviolet/visible, and atomic absorption, emission and fluorometry spectroscopies in addition to a number of other instrumental methods.

STATISTICAL METHODS IN QUALITY CONTROL STAT 3136 This course deals with basic statistics for technical personnel and some of the topics in statistical process control (SPC). Students will learn to describe data graphically and numerically; how probability applies to statistics and quality control; normal binomial and Poisson probability distributions. They will also study linear regression and correlation. Students will then learn how to apply statistics to process control, including how to use and interpret various control charts for variables and attributes.

STATISTICAL QUALITY CONTROL I STAT 3134 This course deals with basic statistics for technical personnel. Students learn to describe data graphically and numerically; how probability applies to statistics and quality control; and how to make inferences and test hypotheses from large and small samples. Students also learn about probability distributions including the normal, binomial and Poisson distributions; linear regression and correlation; and how to estimate a confidence interval. Other topics include multiple regression analysis; analysis of enumerative data using Chi-square analysis; and some principles of good experimental design.

STATISTICAL QUALITY CONTROL II STAT 4133 Students learn about the relationship between statistics and statistical process control (SPC), including how to use and interpret various control charts for variables and attributes. Other topics include statistics for lot-by-lot acceptance sampling by attributes, statistics for sampling for reliability, and other quality improvement techniques such as Pareto and cause-and-effect diagrams.

SUPERVISORY CONTROL & DATA ACQUISITION (SCADA) SCAD 6100 Students learn about industrial supervisory control and data acquisition systems. The course builds upon the industrial control, DC/AC drive and Allen-Bradley PLC knowledge gained in other courses. Topics include the philosophy and programming of the SCADA system using RSView software; the design, programming and interfacing of the virtual SCADA system; the conversion process of existing systems; programming and interfacing a working SCADA application with multiple PLC's; and controlling and supervising various industrial situations. Theory is reinforced in laboratory experiments with a final project.

SYSTEM MAINTENANCE WATR 5133 This course consists of two hours of lecture and two hours of laboratory exercises per week. It is a combined theory/laboratory course dealing with headers and swing joints, pumps, values, fire hydrates, corrosion control, wet wells, motors, controllers, water meters, lift stations and reservoirs.

SYSTEMS MANAGEMENT I SYSM 1131 This course is an introduction to computer system administration. It is intended for those students who use computer systems as their primary CAD or engineering development workstation and who need to perform routine system administration tasks. The course touches on a number of areas that include the command shell, shell programming, AWK programming, adding users, terminals, and printers, data backup, system maintenance and upgrades and networking.

TECHNICAL PROJECT TECH 6100 This is a capstone project course, offered in the final semester of the Electronics Engineering Technology program to demonstrate mastery of the subject matter. The student

plans, designs, builds, presents and documents a technical project. A team-based approach by professors and support staff ensures that the student can consult frequently with appropriate subject matter experts on the various aspects of the project. The student produces a report that is intended to help meet the report writing requirement for certification as a Certified Engineering Technologist under OACETT.

TELECOMMUNICATIONS I SYSC 4131 This course is a one-semester introduction to communications. The intent of this course is to present the general principles of electronic communications at a systems level. The emphasis is on the signal processing functions of various modulation and demodulation operations such as AM and FM. Other topics of instruction include: transmission in general, noise, antennas, super-heterodyne receiver, monochrome & colour television, and landline & cellular telephones. It is configures as four one hour classes per week.

TELECOMMUNICATIONS II SYSC 5131 This course is a continuation of the introductory Telecommunications I. This course is structured for two hours of lecture and two hours of lab, per week. The Lecture content covers two basic areas of electronic telecommunications: 1, that of digital communications, and 2, the use of optical fibres as a transmission medium. In addition to these two main topics, electronic signal structure (harmonic content) will be analysed and signal levels in communication links (in decibels) will be calculated. The lab program will involve projects in the above-mentioned subject areas as well as other related projects.

THERMODYNAMICS THER 1101 Students gain a foundation in thermodynamics and the application of theory to industrial processes. The course focuses on mechanical work and the conversion of heat energy into other energy forms. Topics include the first and second laws of thermodynamics; the properties of liquids and gases; ideal gases; vapour power cycles; gas power cycles; and refrigeration.

TOOL DESIGN TOOL 5131 This course deals with the application and design of various machine components and injection moulds related to the plastics industry. Students complete designs using Unigraphics software and calculations involving mechanical strength and processing capacities.

TOPICS IN ENVIRONMENTAL SCIENCE ENVI 3132 This combined theory and lab course provides instruction on the three stages of environmental site assessments, environmental audits, geographic information systems and assessing air quality. This course provides a solid background and thorough understanding of the regulatory processes involved with environmental site assessments, brownfield redevelopment and record of site conditions associated with property transactions.

TRENDS IN BIOTECHNOLOGY BIOT 1131 This course provides a comprehensive overview of the field of biotechnology. The basic theory and techniques of cell and molecular biology, as they apply to a broad range of biotechnology processes and products in the pharmaceutical, health, environmental and food industries are examined. The course also surveys the continuously evolving legal, ethical, economical, environmental and social issues surrounding biotechnology.

URBAN ENVIRONMENTAL PLANNING PLAN 3131 This course focuses on the finite assimilative and regenerative capacity of ecosystems, as they relate to urban environmental planning. Topics include watershed development, site-specific environmental impact assessment, environmental protection, environmental stability, and planning policy.

WASTEWATER COLLECTION & TREATMENT WATR 4133 This course consists of two hours of lecture and two hours of laboratory exercises per week. The collection and treatment of wastewater is an important component of water use in Ontario. The course examines the major trends in wastewater management at the industrial, urban and agribusiness levels. It offers an in-depth examination of the

wastewater treatment methods currently used in Ontario with an emphasis on operator preparedness for employment in the wastewater treatment sector.

WATER AND WASTEWATER ENGINEERING WATR 2133 This course consists of two hours of lecture and two hours of lab time per week and covers the following topics: groundwater flows; porosity; permeability; water level measurement; cone of depression; yield versus well size; yield versus drawdown; multiple wells; water use and availability; the hydrological cycle; the impact of rainfall; watersheds; stream flows and gauging stations; and methods of flood control, droughts, water reservoirs and aquifers.

WATER HYDRAULICS WATR 3133 This course introduces students to hydraulics. Topics include basic physical principles pertaining to fluid flow and the relationship between force and pressure, schematic diagrams and hydraulic symbols and pumps, actuators and valves.

WATER MICROBIOLOGY I MICR 1135 This course provides the basic microbiological concepts that pertain to the water and wastewater industry. It introduces students to different types of micro-organisms including the bacteria, protozoa, algae and viruses commonly found in water and wastewater. Topics include the morphology, identification, function, reproduction and enumeration of these microbes. Students are also introduced to the environmental conditions in which water and wastewater microbes grow and the methods used to control their growth. Practical laboratory exercises provide students with the methodologies currently used by laboratories to comply with the current standards and practices used in the industry.

WATER MICROBIOLOGY II MICR 2135 This course introduces students to the beneficial and detrimental significance and role of micro-organisms in water and wastewater treatment processes. Students learn how specific aerobic and anaerobic water and wastewater treatment processes affect the micro-organism's environment and ability to survive. They also learn the identity and significance of microbial indicator organisms. The dynamics of established and emerging waterborne pathogens, the diseases they cause and their impact on public health are covered extensively. Practical laboratory exercises provide students with the methodologies currently used by laboratories to comply with current standards and practices used in the industry.

WATER TREATMENT & DISTRIBUTION WATR 6133 This course consists of two hours lecture and two hours lab per week. It is detailed examination of water and its distribution. It details sources of drinking water and their characteristics, what makes water unsafe to drink, how it is treated to make it safe to drink and how this all relates to the work of a drinking water operator. It also covers current methods used for the distribution of safe drinking water in Ontario. Students also examine alternative treatment processes.