Biomedical Engineering Technology *(includes compressed fast track)*

Electronics Engineering Technician

Electronics Engineering Technology *(includes compressed fast track)*

Electro-Mechanical Engineering Technology

DURHAM COLLEGE
SUCCESS MATTERS

School of Science and Engineering Technology

Program Guide 2011

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.

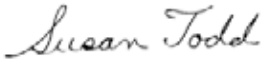
Printed: August 2011

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!



Susan Todd, Dean

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

SCHOOL OF SCIENCE AND ENGINEERING TECHNOLOGY
OSHAWA CAMPUS - FALL 2011

August 17, 2011

Administration/ Support Staff Name	Office #	Phone Ext.	Voice Mail	E-mail Addresses	Position
Todd, Susan (A)	H140B	2319	2319	susan.todd@durhamcollege.ca	Dean
Calhoun, Maureen (A)	H140C	2168	2168	maureen.calhoun@durhamcollege.ca	Associate 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, & Industrial Controls I, Electricity I
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,& Electricity I
Myers, Jeff (S)	H166D	2385	2385	jeff.myers@durhamcollege.ca	Mechanical Technologist, & Measurement I
Oberg, Stacey (S)	A210	2210	22101	stacey.oberg@durhamcollege.ca	Science Lab Technologist
Smith, Mary (S)	H140	3060	3060	mary.smith@durhamcollege.ca	Administrative Support
FACULTY:					**Subjects – Fall 2011**
Agnew, Allan	1100 Simcoe	2421	2421	allan.agnew@durhamcollege.ca	Math for Technology I, Calculus
Antle, Eugene	I211	2468	2468	eugene.antle@durhamcollege.ca	Digital Circuits II, Statistical Quality Control I, Statistical Methods in Control
Benninger, Laura (CF)	UA 4027 H140H	3631 6556	3633 6556	laura.benninger@durhamcollege.ca	Field Placement, Chemistry
Bertrand, Louis	C208	2785	2785	louis.bertrand@durhamcollege.ca	Electronic Circuits II, Computers & Networking, Microprocessors I, Field Placement
Bongondo, Bowy (CF)	D208 Desk 1	TBA	TBA	bowy.bongondo@durhamcollege.ca	Spectroscopy I, Chromatography I, Physical Chemistry, Industrial Chemical Processes
Bracken, Wendy (CF)	D208 Desk 3	TBA	TBA	wendy.bracken@durhamcollege.ca	Mathematics I
Braithwaite, Rob (CF)	D208 Desk 5	TBA	TBA	rob.braithwaite@durhamcollege.ca	Tool Design
Brooks, Brent	H230A	2416	2416	brent.brooks@durhamcollege.ca	Automation Systems, Integrated Automation II, Electricity I, Field Placement
Daniel, Chris Parental Leave Oct10/2011	C208	3653	3653	chris.daniel@durhamcollege.ca	CAD III, Mechanics of Materials, Field Placement
Dimartino Sebastian (CF)	D208 Desk 2	TBA	TBA	sebastian.dimartino@durhamcollege.ca	Computer Applications I, Computer Organization
Dragomatz, Don	A308	2298	2298	don.dragomatz@durhamcollege.ca	Engineering Drawings, Engineering Graphics I, Measurement I
Dragomatz, Terry	A310	2446	2446	terry.dragomatz@durhamcollege.ca	CAD I, CAM II
Dufour, Scott	A307	2415	TBA	scott.dufour@durhamcollege.ca	Spectroscopy I, Chromatography I, Analytical Instrumentation
Eustace, Richard	22-13 Whitby	4198		richard.eustace@durhamcollege.ca	Manufacturing Sciences
Forest, Ron (CF)	H138	2649	TBA	ron.forrest@durhamcollege.ca	Industrial Controls I
Fuentes, Lauren	A243	2276	TBA	lauren.fuentes@durhamcollege.ca	Electronic Circuits II, Electricity I, Field Placement
Grenier, Denis	H216	2248	2248	denis.grenier@durhamcollege.ca	Introduction to CAD
Harrison, Sherri-Ann (CF)	D208 Desk 6	TBA	TBA	harrison.sherri@durhamcollege.ca	Analytical Techniques
Henderson, Bruce (CF)	A212 (desk 2)	2866	28662	bruce.henderson@durhamcollege.ca	Chemistry for Technicians, Analytical Chemistry I
James, Beau	H230C	2066	2066	beau.james@durhamcollege.ca	Integrated Automation II, Electricity I, Automation Fundamentals
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 I
Johnston, Denise (CF)	C108	2614	12614	denise.johnston@durhamcollege.ca	Communications for Success
Kelly, Kevin	A309	3738	37382	kevin.kelly@durhamcollege.ca	Chromatography I, Spectroscopy I, Pharmacology
Kovacic, Frank (CF)	D208 Desk 3	TBA	TBA	frank.kovacic@durhamcollege.ca	Mathematics for Technology I
Kudla, Sandra	H122	2062	2062	sandra.kudla@durhamcollege.ca	Anatomy and Physiology, Dialysis I, Biomedical Terms & Devices II, Intro to Biomedical Eng Tech
Lagerwey Michelle (CF)	A308	2298	TBA	michelle.lagerwey@durhamcollege.ca	Engineering Graphics I, Measurement I
MacKay, Sarah (CF)	D208 Desk 6	TBA	TBA	sarah.mackay@durhamcollege.ca	Biology, Analytical Techniques
McDowell, Doug (CF)	D208 Desk 5	TBA	TBA	doug.mcdowell@durhamcollege.ca	Manufacturing Processes, Metallurgy for Non-destructive

Administration/ Support Staff Name	Office #	Phone Ext.	Voice Mail	E-mail Addresses	Position
Mehrnia, Iraj	A120C	2467	24671	iraj.mehrnia@durhamcollege.ca	Food & Drug Laws & Regulations, Field Placement, Processing Operations
Motum, Ron (CF)	A235	2381	TBA	ron.motum@durhamcollege.ca	Chemistry for Technicians
Myers, Joyce, (Coord.)	H140-G	TBA	TBA	joyce.myers@durhamcollege.ca	Introductory Microbiology, Microbial Applic. II
Patel, Meera (CF)	D208 Desk 4	TBA	TBA	meera.patel@durhamcollege.ca	Chemistry I, Mathematics for Technology I, Physical Science
Patel, Pravin (Coord.)	H140D	2221	2221	pravin.patel@durhamcollege.ca	Computer Apps & Simulation, Field Placement
Rigby, Terry (CF)	A212 (desk 2)	2866	28661	rigby.terry@durhamcollege.ca	Chemistry I
Robinson, Jacob (CF)	A212 (desk 1)	2866	28665	jacob.robinson@durhamcollege.ca	Analytical Chemistry I
Schuett, Dave	C208	3655	3655	dave.schuett@durhamcollege.ca	Digital Circuits II, Physical Science, Computers & Networking
Sigus Clair (CF)	A107	2063	TBA	clair.sigus@durhamcollege.ca	Metallurgy for Non-Destructive, Radiation Safety
Simmonds Fleurette (CF), (Cross Divisional)	C108	2344	TBA	fleurette.simmonds@durhamcollege.ca	Career Mapping, Communication for Success, Tech. Comm. for WQ Technician
Smith, Russell (CF)	C108	2637	TBA	russell.smith@durhamcollege.ca	Organizational Behaviour
Smyth, Roy	22-35 Whitby	4189	TBA	roy.smyth@durhamcollege.ca	Manufacturing Sciences
Stender, Corrie	A243	2276	22762	corrie.stender@durhamcollege.ca	Biology, Environmental Science, Water and Waste & Water Eng., Field Placement
Stevenson, Ross	A121	3013	3013	ross.stevenson@durhamcollege.ca	Environmental Protection & Global Wellness, Environmental Enforcement, Industrial Waste
Suppelsa, Douglas (CF)	A310	2446	TBA	douglas.suppelsa@durhamcollege.ca	Waste Water Collection & Treatment
Subbarao, Gorantla (Rao)	A242	2275	2751	rao.subbarao@durhamcollege.ca	Digital Circuits II, Signals and Systems
Sweetman, Teresa	A235	2381	23811	teresa.sweetman@durhamcollege.ca	Introductory Microbiology, Water Microbiology II
Taylor, Gregg	A307	2415	2415	gregg.taylor@durhamcollege.ca	Chromatography I, Spectroscopy I, Organic Chemistry II
Taylor, Janet (CF)	A212 (desk 2)	2866	28663	janet.taylor@durhamcollege.ca	Chemistry I, Organic Chemistry II
Thompson, Craig (CF)	A212 (desk 2)	2866	28664	craig.thompson@durhamcollege.ca	Chemistry I
Tidman, Rick	H122	2065	2065	richard.tidman@durhamcollege.ca	Biomedical Tech Management, Biomedical Instrumentation I, Medical Imaging Systems I, Safety Standard/Risk Management I
Trelinski, Mike (CF)	A107	2063	TBA	mike.trelinski@durhamcollege.ca	Non-Destructive Testing UT I
Trieselmann, Bruce	A309	2202	22021	bruce.trieselmann@durhamcollege.ca	Biochemistry I, Protein Techniques
Trieselmann, Nadia (CF)	A309	2202	22022	nadia.trieselmann@durhamcollege.ca	Bio-Chemistry I, Cell Biology
Van Schyndel, Tony	H216	2411	2411	tony.vanschyndel@durhamcollege.ca	Digital Circuits II, Mathematics for Technology I, Telecommunications I
White, John	A242	2275	22752	john.white@durhamcollege.ca	Chemistry I, Community & Environment
White, Sarah (CF)	A117	3737	37372	sarah.white@durhamcollege.ca	Health & Safety, Analytical Techniques
Wilson, Katherine	C208	2617	2617	katherine.wilson@durhamcollege.ca	Chemistry I, Topics in Environ. Science, Environmental Sampling
Wraight, Paul	A117	3737	37371	paul.wraight@durhamcollege.ca	Mathematics for Water/Food Tec, Mathematics I and III for Technician
Yacknowiec, Dennis (CF)	Whitby 1103	4068	40681	dennis.yacknowiec@durhamcollege.ca	Water Hydraulics
Zaidman, Katy (Coord.)	H140F	3151	3151	katy.zaidman@durhamcollege.ca	Engineering Materials, Mechanics of Materials, Field Placement
Zirnhelt, John (CF)	A107	2063	20631	john.zirnhelt@durhamcollege.ca	Intro. Non-Destructive Testing, Fundamentals of Welding Inspection

A = Administration**; S =** Support Staff**; FACULTY =** Professors**, Coord. =** Program Coordinator**, 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
H166A (emergency phone ext. 3948)

No Phones Currently: A108, A123, A124

School of Interdisciplinary Studies & Employment Services (Cross Divisional): Denise Johnston, Marla Kordas-Fraser, Valerie Lapp, Lara Loze, Karen Martin, McGuckin, Dawn, Russell Smith, Fleurette Simmonds, Lynette Thompson

WHITBY CAMPUS: Dennis Yacknowiec

Mission: The student experience comes first at Durham College

Vision

Durham College is the premier college in Canada for career-focused students who will succeed in a challenging, supporting and inclusive learning environment.

Our programs are continually shaped by market needs and delivered by exceptional teachers with real-world experience.

Our vibrant campus community enriches the student life experience.

All of this combines to ensure our graduates have the market-ready skills to obtain great careers and make a difference in the world.

Values

Our values drive our organizational culture and our behaviour in delivering our vision and mission. They are:

Integrity and Transparency…

we will behave and communicate sincerely and honestly

Respect…

we will treat everyone with dignity and offer superior service

Equality and Diversity…

we will champion all learners and celebrate diversity

Innovation…

we will be leaders in market-responsive learning experiences and solutions

Personal and team accountability…

we will do what we say we will do

[redacted]

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 2011 – 2012

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

FALL 2011 SEMESTER

July 4, 2011	Fees due date for first year students
July 12, 2011	Web registration - for 2nd year students who have paid for fall semester - begins.
July 13, 2011	Web registration - for 3rd year students who have paid for fall semester - begins.
July 19, 2011	Web registration - for 1st year students who have paid for fall semester - begins.
July 20, 2011	Fees due date for returning students.
August 1, 2011	Civic holiday (no classes).
August 29, 2011	Registration for part-time Oshawa campus students begins and window opens for timetable changes.
August 29, 2011	Apprenticeship Classes begin.
September 5, 2011	Labour Day (no classes).
September 6, 2011	Orientation for first-year students.
September 7, 2011	Classes begin for most programs.
September 13, 2011	Last day for late program registration.
	Last day for fall semester course or program changes.
September 20, 2011	Last day for full-time students to withdraw with a refund of fees paid, less a $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, 2011	Student Health Insurance Plan “Opt-out” deadline.
October 3, 2011	Due date for 2nd instalment of fall fees.
October 4, 2011	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 10, 2011	Thanksgiving (no classes).
October 20, 2011	Fall Convocation (5:00 p.m.)
October 26, 2011	Deadline for submission of adjusted marks to clear INC grades from summer 2011. INC grades after this date will revert to a fail.
November 16, 2011	Winter 2012 semester fees due date.
November 17, 2011	Scholarship Ceremony
November 14, 2011	Last day to withdraw from a fall semester subject. After this date, all subjects will be graded and recorded on the student’s transcript.[1, 2]
December 9, 2011	Last day of classes for most programs.
December 12 to 16, 2011	Fall semester final examinations/evaluation(s) for postsecondary students. Students are reminded not to schedule vacation or employment hours during

	these times. January 4 and 5, 2012 scheduled as tentative snow dates for the Oshawa campus.
December 22, 2011	Grades are available to view electronically as of 4 p.m. Note: official distribution date for the purpose of academic appeals is January 4, 2012.
December 22, 2011	Full-time students may process timetable changes for the winter semester through MyCampus as of 4 p.m. (Oshawa only)
December 24, 2011 – January 1, 2012 inclusive	Campus closed for the holiday season.

WINTER 2012 SEMESTER – JANUARY START

November 21, 2011	Web registration for fall start 1st year students for winter 2012 semester courses begins.
November 28, 2011	Web registration for 2nd and 3rd year students for winter 2012 semester courses begins.
December 5, 2011	Web registration for January start students begins.
December 7, 2011	Winter 2012 semester fees due date.
January 2, 2012	Registration for Oshawa campus part-time students begins.
January 2, 2012	Apprenticeship Classes begin
January 4, 2012	Classes begin for most programs.
	Official grade distribution date for the purpose of Academic Appeals.
January 10, 2012	Last day for late program registration.
	Last day for winter semester course or program changes.
January 10, 12 and 14, 2012	Dates for missed exams from Fall Semester 2011
January 17, 2012	Last day for full-time students, who started their program in September 2011, 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 2012 to withdraw with a refund of fees paid less a $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, 2012	January start students only: Student Health Insurance Plan "Opt-out" deadline.
January 30 to Feb 3, 2012	Winter Break week for Electrical Block Intermediate & Advanced apprenticeship students only.
January 31, 2012	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 8, 2012	Due date for 2nd instalment of winter fees.
February 17, 2012	T2202As available online via MyCampus as of 4 p.m.
February 20, 2012	Family Day (no classes).
February 20 to 24	Winter Break week; no classes with the exception of Apprenticeship and February-start students.

February 27 to March 2	Winter Break week for Apprenticeship students with the exception of Electrical Block Intermediate and Advanced students.
March 7, 2012	Deadline for submission of adjusted marks to clear INC grades from fall 2011. INC grades after this date will revert to a fail.
March 12 to 16, 2012	Winter Break week for most OYAP apprentices (except OYAP hairstylists; please see your school office).
March 19, 2012	Last day to withdraw from a **January-start** subject. After this date, all subjects will be graded and recorded on the student's transcript.[1, 2]
April 6 2012	Good Friday (no classes).
April 10, 2012	Last day to apply to graduate – courses ending April 2012.
April 13, 2012	Last day of classes for most January-start programs.
April 16 to 20	winter semester **(January start)** final examinations/ evaluation(s); students are reminded not to schedule vacation or employment hours during these times.
April 27, 2012	Grades are available to view electronically as of 4 p.m. Official distribution date for the purpose of academic appeals.
May 8, 10, and 12, 2012	Dates for Missed Exams from Winter Semester 2012.
June 21 & 22, 2012	**Convocation (Time and location TBA)**

WINTER 2012 SEMESTER – FEBRUARY START

December 7, 2011	Winter 2012 – February-start - semester fees due date.
	Web registration for February-start students begins.
January 30, 2012	February-start classes begin. (Oshawa campus)
TBA	Registration for Oshawa campus part-time students begins.
February 3, 2012	Last day for February-start late program registration.
	Last day for February-start course or program changes.
February 10, 2012	Last day for full-time students, who started their programs in February 2012 to withdraw with a refund of fees paid less a $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 20, 2012	Family Day (no classes).
February 29, 2012	February-start students only: Student Health Insurance Plan "Opt-out" deadline.
February 24, 2012	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 7, 2012	Due date for 2nd instalment of winter fees – February-start students only.
	Deadline for submission of adjusted marks to clear INC grades from fall 2011. INC grades after this date will revert to a fail.
April 6, 2012	Good Friday (no classes)
April 9, 2012	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]
May 4, 2012	Last day of classes for most February start programs.

May 10, 2012	Grades are available to view electronically as of 4 p.m. Official distribution date for the purpose of academic appeals.
June 21 & 22, 2012	**Convocation (Times to be confirmed)**

SPRING 2012 SEMESTER

March 7, 2012	Spring 2012 semester fees due date.
April 10, 2012	Web registration for Spring/Summer programs begin.
May 7, 2012	Most Spring classes begin.
TBA	Registration for Oshawa campus part-time students begins.
May 11, 2012	Last day for late program registration.
	Last day for most spring semester course or program changes.
May 18, 2012	Last day for full-time students, who started their programs in spring semester to withdraw with a refund of fees paid less a $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 21, 2012	Victoria Day (no classes).
May 31, 2012	Student Health Insurance Plan "Opt-out" deadline.
June 8, 2012	Last day to withdraw from most spring semester subjects. After this date, all subjects will be graded and recorded on the student's transcript.[1, 2]
June 22, 2012	Last day of classes for most Spring-start programs.
June 29, 2012	Deadline for submission of adjusted marks to clear INC grades from January start winter 2011 semester. INC grades after this date will revert to a fail.
June 28, 2012	spring semester grades are available to view electronically as of 4 p.m. Official distribution date for the purpose of academic appeals.

SUMMER 2012 SEMESTER

April 10, 2012	Web registration for Spring/Summer programs begins.
May 2, 2012	Summer 2012 semester fees due date.
July 2, 2012	Canada Day (no classes).
July 3, 2012	Summer classes begin.
July 9, 2012	Last day for late program registration.
	Last day for most summer semester course or program changes.
July 16, 2012	Last day for full-time students, who started their programs in Summer semester to withdraw with a refund of fees paid less a $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 3, 2012	Last day to withdraw from most summer semester subjects. After this date, all subjects will be graded and recorded on the student's transcript.[1, 2]

August 6, 2012	Civic Holiday (no classes).
August 17, 2012	Last day of classes for most Summer start programs.
August 23, 2012	Grades are available to view electronically as of 4 p.m. Official distribution date for the purpose of academic appeals.
October, 2012	**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

Biomedical Engineering Technology
3 Year Diploma

Program Description

The Biomedical Engineering Technology program prepares the student to meet the growing demands in the health care industry for the installation, testing, calibration, preventative maintenance, sales and management of sophisticated electronic and computer controlled medical equipment and systems.

The program is three years in duration, covering theory with hands-on practical, project-based learning of electronic circuits and systems, biomedical devices and systems, biology, chemistry and physics, anatomy and physiology, diagnostic imaging, dialysis, systems, biomedical instrumentation, safety standards, risk management, and report writing.

Graduates will have opportunities in instructing, assisting and consulting physicians, nurses and other medical staff with a variety of medical and electronic equipment, which must be kept in proper working order at all times so that the proper and safe delivery of patient care is not compromised. They will also have the technical and management skills to work for medical equipment manufacturers, sales and service organizations, medical laboratories, and regulatory institutions.

Advanced Standing

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

For further studies, please see Durham College Transfer Guide on the website.
http://www.durhamcollege.ca/info-for/current-students/program-guides/

Employment Opportunities

- biomedical technology
- diagnostic imaging
- dialysis technology
- lab equipment service
- technical sales and support
- certification and regulation

*Ministry of Training, Colleges and Universities program outcomes not available.

Electronics Engineering Technician
2 Year Diploma

Program Description

Electronics is forefront in the exciting world of high technology. No branch of science engineering technology has contributed more to the development of the modern world than electronics. Electronics technicians maintain, operate, test, install and service electronic equipment in the fields of communications, computing, industrial automation, test and measurement, power generation and distribution, health care, and consumer products.

The Electronics Engineering Technician program is two years in duration, covering theory with hands-on practical, project-based learning of analog and digital electronic circuits and systems. Electronics Technicians operate, test, install and service electronic systems in the fields of communications, computing, industrial automation, test and measurement, power generation and distribution, health care, and consumer products.

For further studies, please see Durham College Transfer Guide on the website.
http://www.durhamcollege.ca/info-for/current-students/program-guides/

Employment Opportunities

- Telecommunications equipment services
- Office equipment service technician
- Computer technician
- PLC programming
- Network technician
- Field technician
- Technical sales

Synopsis of the Vocational Learning Outcomes
Electronics Engineering Technician (Ontario College Diploma)

The graduate has reliably demonstrated the ability to

1. analyze*, interpret, modify and prepare electrical and electronics drawings, layouts and reports, with guidance as required.

2. analyze* and solve routine technical problems related to electronics engineering by applying fundamental concepts of mathematics and science.

3. apply appropriate troubleshooting* techniques to electronic circuits or systems and perform test procedures.

4. assemble, modify, test and troubleshoot* electronic circuits, equipment and systems in accordance with job requirements*, functional specifications* and relevant standards, with guidance as required.

5. maintain and repair electronic equipment and systems in accordance with relevant operational guidelines.

6. provide justification for the purchase of electronic equipment, components and systems in accordance with code, standards and job requirements*, and functional specifications*.

7. analyze* and troubleshoot* logic and digital circuits, as well as embedded microprocessor*-based and microcontroller*-based systems, including assembly and high-level language programs.

8. analyze* and troubleshoot* circuits consisting of passive components by applying appropriate measurement techniques.

9. analyze* and troubleshoot* circuits consisting of low power, high power, active and electromechanical components, and analog integrated circuits.

10. analyze* and troubleshoot* control systems.

11. troubleshoot*, maintain and repair analog and digital communication systems.

12. apply relevant shop practices* in compliance with safety policies and current regulations for electronics engineering workplaces.

13. assist in implementing and conducting quality control* and quality assurance* programs and procedures.

Electronics Engineering Technology
3 Year Diploma

Program Description

Electronics is forefront in the exciting world of high technology. No branch of science engineering technology has contributed more to the development of the modern world than electronics. Electronic technologists design, operate, test, install and service electronic systems in the fields of communications, computing, industrial automation, test and measurement, power generation and distribution, health care and consumer products.

The Electronics Engineering Technology program is three years in duration, covering theory with hands-on practical, project based learning of analog and digital electronic circuits and systems, microprocessor based controls, robotics and PLC based controls, telecommunication systems and instrumentation and control.

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

For further studies, please see Durham College Transfer Guide on the website.
http://www.durhamcollege.ca/info-for/current-students/program-guides/

Employment Opportunities

- Robotics technologist
- Nuclear operator
- Instrumentation technologist
- Controls technologist
- Telecommunications technologist
- Computer technologist
- PLC programmer and controls specialist
- Networking technologist
- Technical sales
- Plant maintenance
- Technical consultant
- Field technologist

Synopsis of the Vocational Learning Outcomes

Electronics Engineering Technology (Ontario College Advanced Diploma)

The graduate has reliably demonstrated the ability to

1. analyze*, interpret, modify, design* and produce electrical and electronics drawings, layouts and reports.

2. analyze* and solve technical problems related to electronics engineering by applying principles of advanced mathematics and science.

3. apply appropriate troubleshooting* techniques to electronic circuits or systems and generate and perform test procedures.

4. design*, build, test and troubleshoot* electronic circuits, equipment, systems and subsystems in accordance with job requirements*, functional specifications* and relevant standards.

5. modify, maintain, repair and recommend electronic equipment and systems in accordance with relevant operational guidelines.

6. determine, select, recommend and justify the purchase of electronic equipment, components and systems in accordance with code, standards and job requirements* and functional specifications*.

7. design*, modify, analyze* and troubleshoot* logic and digital circuits, and embedded microprocessor*-based and microcontroller*-based systems, including assembly and high-level language programs.

8. design*, analyze* and troubleshoot* circuits consisting of passive components by applying appropriate measurement techniques.

9. design*, analyze* and troubleshoot* circuits consisting of low power, high power, active and electromechanical components, and analog integrated circuits.

10. design*, analyze* and troubleshoot* control systems.

11. design*, analyze*, troubleshoot* and repair analog and digital communication systems.

12. apply relevant shop practices* in compliance with safety policies and current regulations for electronics engineering workplaces.

Electro-Mechanical Engineering Technology
3 Year Program

Program Description

This program prepares students for careers in multiple areas of technology, spanning the electrical and mechanical engineering technology boundaries. The program's primary focus is industrial automation and the associated control systems, mechanical power transmission, programming, design, integration and documentation.

Graduates of this program are employed in a wide range of careers. Some graduates design industrial control systems for a variety of machines and systems, whereas others install, service, document and troubleshoot a wide assortment of automated machines and systems. Some graduates find themselves performing plant maintenance, technical sales or support specialist services.

Electro-Mechanical Engineering Technology students are the primary users of the Integrated Manufacturing Centre (IMC). The IMC is a fully functional, industrial grade automated manufacturing facility that is completely integrated. Major equipment components within IMC are industrial robots, PLCs, HMIs, industrial networks, automatic ID and material handling systems.

IMC is a modern world class training facility that is unique to post-secondary training in Canada. IMC gives our graduates a definite edge in the industrial automation field.

Todays companies require technical experts who are trained in more than one discipline of engineering technology. Rapid changes in the manufacturing sector have increased the demand for improved efficiency and productivity. Electro-Mechanical graduates are an asset to any company that utilizes automated manufacturing and/or industrial control systems. Mandatory field placement consists of a minimum of 100 hours of hands-on experience, in industry, relevant to the program of studies.

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

For further studies, please see Durham College Transfer Guide on the website.
http://www.durhamcollege.ca/info-for/current-students/program-guides/

Employment Opportunities

- Automation specialist
- Control systems design
- CAD design/drafting
- Maintenance supervisor
- Robotic technologist
- Technical sales
- Plant maintenance
- Electrical service industry
- PLC programmer
- Pneumatic/hydraulic specialist
- Application engineering
- Instrumentation technologist
- Consulting services
- Machinery design and control

Synopsis of the Vocational Learning Outcomes
Electromechanical Engineering Technology Programs

The graduate has reliably demonstrated the ability to

1. fabricate mechanical components and assemblies, and assemble electrical components and electronic assemblies by applying workshop skills and knowledge of basic shop practices in accordance with applicable codes and safety practices.

2. analyse, interpret, and produce electrical, electronic, and mechanical drawings and other related documents and graphics necessary for electromechanical design.

3. select and use a variety of troubleshooting techniques and test equipment to assess electromechanical circuits, equipment, processes, systems, and subsystems.

4. modify, maintain, and repair electrical, electronic, and mechanical components, equipment, and systems to ensure that they function according to specifications.

5. apply the principles of engineering, mathematics, and science to analyse and solve design and other complex technical problems and to complete work related to electromechanical engineering.

6. design and analyse mechanical components, processes, and systems through the application of engineering principles and practices.

7. apply principles of mechanics and fluid mechanics to the design and analysis of electromechanical systems.

8. design, analyse, build, and troubleshoot logic and digital circuits, passive AC and DC circuits, and active circuits.

9. design, select, apply, integrate, and troubleshoot a variety of industrial motor controls and data acquisition devices and systems.

10. design, analyse, and troubleshoot microprocessor-based systems.

11. install and troubleshoot computer hardware and high-level programming to support the electromechanical engineering environment.

12. analyse, program, install, integrate, and troubleshoot automated systems including robotic systems.

13. establish and maintain inventory, records, and documentation systems.

14. assist in project management by applying business principles to the electromechanical engineering environment.

15. select for purchase electromechanical equipment, components, and systems that fulfill the job requirements and functional specifications.

16. specify, coordinate, and conduct quality-control and quality-assurance programs and procedures.

17. perform all work in accordance with relevant law, policies, codes, regulations, safety procedures, and standard shop practices.

18. develop personal and professional strategies and plans to improve job performance and work relationships with clients, coworkers, and supervisors.

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

Durham College
Academic Policies & Procedures

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

Science and Engineering Administrative policies

Communication/MyCampus

Regular communication between college staff and students is very important to ensure that students stay informed about special events, changes in programming and various deadlines. The School of Science and Engineering Technology office will use MyCampus email to alert you to important details about your program. You are requested to visit MyCampus often to view campus-wide announcements and to check your MyCampus email account.
Professors will confirm their preferred method of communication. Emails sent to professors and/or staff must be professional in appearance and content. Inappropriate emails will be retained and a copy forwarded to the dean or associate dean for appropriate action.

Timetables and timetable changes

Timetables are available online through our intranet – "MyCampus". You can view and/or print your timetable from any computer with internet access. If you require assistance, please contact the Help Desk: (905) 721-3333. MyCampus provides students with the ability to modify timetables at specified times as listed in the Academic Calendar (posted on MyCampus). **Please note: students have the responsibility to ensure that all of their required courses are on their schedules**. Assistance is available via your Student Liaison. Should you find a discrepancy on your timetable, **seek assistance immediately.**

Disclaimer

Because of our commitment to continuous improvement of our curriculum, there may be some changes in courses offered. If this occurs, we will notify those affected.

Course/program changes

Adding and/or deleting courses or changing a program must be done within the first week of course or program commencement.

Application for a course credit

Applications must be submitted to the Registrar's Office no later than two weeks from the course commencement.

Emergency Calls

The School of Science and Engineering Technology staff will accept messages for students in the event of a family emergency. Please make sure that anyone in your life who needs to locate you during class time for reasons other than an emergency has a copy of your timetable (e.g. classmates, family, day care provider, employer). The staff is unable to release your schedule information to anyone due to the Freedom of Information Act.

Freedom of Information

Freedom of Information/Protection of Privacy - Pursuant to the Freedom of Information & Protection of Privacy Act, the School of Science and Engineering Technology office may not release any personal information regarding a student. This includes academic standing, personal data, timetable information etc. without a signed Release of Information form initiated by the student.

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). Class attendance and participation will enhance your opportunities for success. Please refer to the course outline for specific expectations for each course.

Assignments
Students should keep back-up copies of all assignments in case the original is lost. Electronic submission of assignments is at the option of the professor. Assignments submitted electronically must be in the software format as stated specifically by your professor. Attachments that will not open are the responsibility of the student and subject to the late penalty.

Handing in/Returning of Reports/Assignments
Deadlines will be clearly specified in each course outline and all submissions must meet specified guidelines as detailed by the section professor. 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.

Academic Dishonesty
Efforts will be made to deny opportunities for dishonesty. 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.

Examinations
In this section, a final examination is defined as an invigilated comprehensive evaluation given just after regularly scheduled classes. (Week 15) Final examinations will be held for courses as specified in the course outline. A final examination will be comprehensive, and examination questions should reflect the approximate time weighting specified in the course outline.

Prerequisite courses
Course prerequisites exist to promote student success. Exceptions to the established prerequisite course structure are not permitted. Students who do not have all credits completed from previous semesters may not be eligible for a full-time course load due to required prerequisites. Students with “non-standard” scheduling needs are urged to review their academic plan with the Student Liaison each semester.

Repeating courses
Durham College’s grading and promotion policy states that courses may be repeated only once without approval from the Dean or designate. The School of Science and Engineering Technology approves repeating of courses for all Science and Engineering students who are repeating a course a second time or more. Students are encouraged to meet regularly with the Student Liaison if they are struggling with academic success.

Withdrawing from a course
All withdrawals must be done within the first two weeks of the start of any module with no record notes on the student’s transcript. Students withdrawing from a course during week three, four or five of the start of the module will have the course recorded as a ‘W’ (withdrawn) on their transcript. Students may not withdraw from a course during the last two weeks of the module in which they are enrolled. After this date, all courses will be graded and recorded on the student’s transcript. Please refer to the “Important Dates” section for a listing of withdrawal deadlines.

Graduation Requirements
Students must have a minimum GPA of 2.0 to be eligible for graduation. In addition, a student must have successfully completed all required courses. A student who has a GPA of less than 2.0 should contact the School of Science and Engineering Technology office to arrange for academic counselling. Please refer to the academic policies posted on the Durham College website, www.durhamcollege.ca/policies, for more information. At least 25% of the completed program courses and/or weighted credit hours must be completed at Durham College to be eligible for a Durham College diploma. Students must complete an application for graduation on MyCampus or via paper form in Registration.

Application for graduation

Applications for graduation for those wishing to graduate at the June Convocation are available online via MyCampus in January and due by a specified deadline (usually mid-February). A diploma will not be prepared until the application is received. Applications for graduation for the October Convocation are usually due by mid-September. Check MyCampus for deadline dates and updates.

Computer Labs

Computer labs are reserved for coursework. Games are not permitted. Adult material must not be displayed at any time. Please refer to the Information Technology Acceptable Use policy posted on the Durham College website www.durhamcollege.ca/policies. Note: afterhours access to labs is unique by course and must be approved by the professor. Students must sign in and out with Security.

Laptop & Desktop Computers: (Instant Messaging, (MSN, etc.) Chat, Gaming, Cell phones)

Research studies and feedback have shown that these activities can cause a distraction to other students. They are not acceptable classroom behaviours. Students involved in chatting or gaming during a teaching session will be asked to leave the classroom.

Safety in Science 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.

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.

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.

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 80 hours of on the job placement in their chosen field and five (5) hours of required workshops. Proper documentation must be provided to Maureen Green in the Technology Office (H140) before May 11th in the graduating year.

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.

Grade Point Average 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 80 hours on the job and 5 hours required workshops) to be eligible to graduate. Please refer to your Student Handbook or your Student Liaison for more information on GPA.

Grade appeals

Students who do not agree with their marks have 15 days from receipt of that mark to launch a grade appeal. The first step in the appeal is to speak to the professor who issued the grade. For more details on the grade appeal process please consult the procedures regarding grade appeals posted on MyCampus.

LAB POLICIES AND EXPECTATIONS (Science programs only)

1. Laboratory attendance is compulsory; there will be no makeup laboratories.

2. Students must attend in their scheduled lab section unless otherwise approved by the instructor.

3. Students must arrive to all laboratories on time in order to hear the pre-lab instruction. Students arriving **later than 20 minutes past the hour may not be admitted** and will receive a mark of zero for that lab.

4. If a student misses a laboratory, documentation must be provided. If documentation cannot be provided the student will receive a mark of zero.

5. Students may be excused from completion of a lab, with proper documentation, for a maximum of **2 lab periods.** Beyond this they will receive a mark of zero regardless of whether documentation is provided or not. (This may reflect a 20% maximum based on various laboratory schedules and will be clarified by the professor as appropriate)

6. Students must have their lab workbook data signed off by the professor where appropriate, **before leaving** the laboratory.

7. Students must be present and actually complete the laboratory in order for a report to be accepted.

8. Students must work cooperatively, respectfully and safely. Students who do not follow the college code of conduct or lab safety rules and regulations may be asked to leave the laboratory.

LAB SAFETY REGULATIONS (Science programs only)

Before starting work in the labs, all students must complete the safety training as provided on line through WebCT. This includes a safety video and quiz where students are required to achieve a grade of 80% (multiple attempts are permitted). Any special health conditions or safety concerns may be noted here. Completion of this training confirms the student understands and agrees to the safety regulations put forth. **Students not completing this requirement will be denied access to the labs and will receive a mark of zero for the missed lab periods.**

1. Supervision is required in all labs for first, second and third year students. Exceptions to this may be permitted in certain labs with professor approval.

2. Eating, drinking and horseplay in the lab are not permitted. Eating and drinking may be permitted in A120 as appropriate.

3. PPE: Lab coats, safety glasses required in A209, A213, A240 and UB4050
   Lab coats required in A206
   Lab coats, safety glasses in I210 unless otherwise specified by professor.

   Students must wear closed toe shoes and long pants while working in any lab

4. Read the safety warning on reagent containers. Become familiar with the Material Safety Data Sheets. Use the fume hood for all chemicals/reactions producing offensive odours/or toxic fumes.
5. **Report all spills, accidents or injuries to the professor immediately.**

If chemical enters the eye, immediately use eye wash and flush for a minimum of 5 minutes.
If chemical is spilled on skin, immediately wash with plenty of water.
Lab instructor must complete an incident report form and investigate for any potential corrective action. (available on line)

6. **Use proper lab techniques at all times:**
   Waft fumes to nose rather than smelling directly.
   Carry all strong acids and bases in an approved rubber container.
   Pour acid slowly into water. NEVER WATER INTO CONCENTRATED ACID.
   Point test tube away from yourself and others when carrying out reaction.
   When inserting anything glass into a rubber stopper, lubricate with water or glycerol; wrap hand in towel; apply gentle pressure with twisting motion, never force.
   Discard cracked or chipped glassware in “broken glassware” box located in each lab.
   Flammable liquids should never be used with open flame in lab.
   Extremely corrosive materials should be handled only while wearing gloves.
   Label each container of material as you remove it from a reagent bottle according to WHMIS.
   Do not put extra removed material back into reagent bottles.
   Do not use Parafilm as a lid for volumetric flasks or other glassware unless directed to do so by the professor.

7. **Pour or scoop out only quantities of reagents or chemicals as required by the experiment.** Weigh quantities directly from containers and do not transfer excessive amounts to large weigh boats. Return lids to all containers immediately after use.

8. **Clean up spills immediately using appropriate method**
   For acids use sodium bicarbonate or the acid spill kit
   For bases use water or the base spill kit
   For organics use absorbent or the organic spill kit.
   (Spill kits are in the balance room – A211)

9. Clean up balance immediately after use. Brushes are at each balance for this purpose.

10. Disposal of chemicals: When in doubt consult professor. Never mix chemicals unless specifically instructed to do so.

    Organic Compounds: In general, all liquid is to be placed in "Halogenated" or Non-halogenated" waste cans as appropriate. Non-toxic organic solids may, on advice of the professor, be placed in garbage.

    Inorganic Compounds: Follow specific instructions. In general, if water soluble, dissolve in water and flush down drain with lots of water. Insoluble materials may be placed in garbage.

    Acids and Bases: Neutralize strong acids and bases prior to disposal. Pour slowly into sink **in the fume hood**, while water is running. Keep water running for a few minutes after. Never dispose of acids and bases together.

11. Any sample that needs to be stored must be clearly labelled, dated and stored in an appropriate container and designated laboratory cabinet. Samples stored in laboratory glassware such as volumetrics, will be disposed of.

12. At end of lab period your work station should be left clean with all glassware cleaned and returned to the appropriate location. **NO BEAKERS ARE TO BE LEFT IN THE FUME HOODS.** Wash your hands before leaving the lab.

13. Special rules will apply to A206 for Microbiology and will be detailed by professor as needed. No material or equipment is to be removed from A206 without professor's permission.

14. Students are not to remove any chemicals, solvents, equipment or supplies from the laboratory without permission. If a student does, he/she may be asked to withdraw from the program.

15. Familiarize yourself with the location of fire extinguishers, fire blankets, emergency showers, eyewash, emergency gas shut off and evacuation routes.

Lab safety for the Electrical and Mechanical programs will be discussed in class.

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

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.

According to Durham College Academic Policy ACAD-103 and as a requirement for graduation, every Durham College student in a two or a three-year diploma program must have successfully completed a minimum of three General Education courses from at least **two different** General Education themes as follows:

GNED 1100 – Personal Understanding
GNED 1200 – Arts and Society
GNED 1300 – Civic Life
GNED 1400 – Social and Cultural Understanding
GNED 1500 – Science and Technology

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 document (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

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. It is **strongly recommended** that students do not carry any outstanding courses in third year to ensure that they meet field placement pre-requisite requirements and graduation deadlines.

Evaluation criteria and weighting

- In order to be eligible to graduate, the student must successfully complete a minimum of 80 hours on the job placement in his/her chosen field and 5 hours of required workshops on or before May 11, 2011
- The student must have the employer complete and sign the "student evaluation form" and submit the form to the Student Liaison in the Technology Office (H140A) on or before May 11, 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 11, 2011. This tracking form (Task Log) is attached to the employer evaluation form in your placement package and must be **signed** by the employer.

Terms and conditions of placement

Students must have a minimum 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 80 hours of program related, practical work experience in his/her chosen field and 5 hours of required workshops.

The placement options are:

1) One day a week during the fall and/or winter semester for a minimum of 80 hours.
2) A summer position after second year 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.
5) Working during a block period of time such as the Xmas break, Reading week or in May once all course work is complete.

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.

Should the field placement assignment not meet the needs of the student, the student, in conjunction with the placement coordinator will attempt to find another placement company. The student should notify the field placement coordinator within two weeks of the assignment if alternate arrangements need to be made.

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 and select electives and options if applicable;
- transfer to another program;
- access other college services to support student success.

While drop-ins may be possible (and always welcome) 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, by phone or email. 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

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 in accordance with the Ontario Human Rights Code and the Accessibility for Ontarians with Disabilities Act by ensuring that students with disabilities have equal access to 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 SW116. The documentation should outline the current impact of the disability. 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 SW 116).

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 submits the Test Center Form less than 5 business days in advance of the test date.**

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 the CSD website each term

It is the student's responsibility to check their My Campus email address 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.

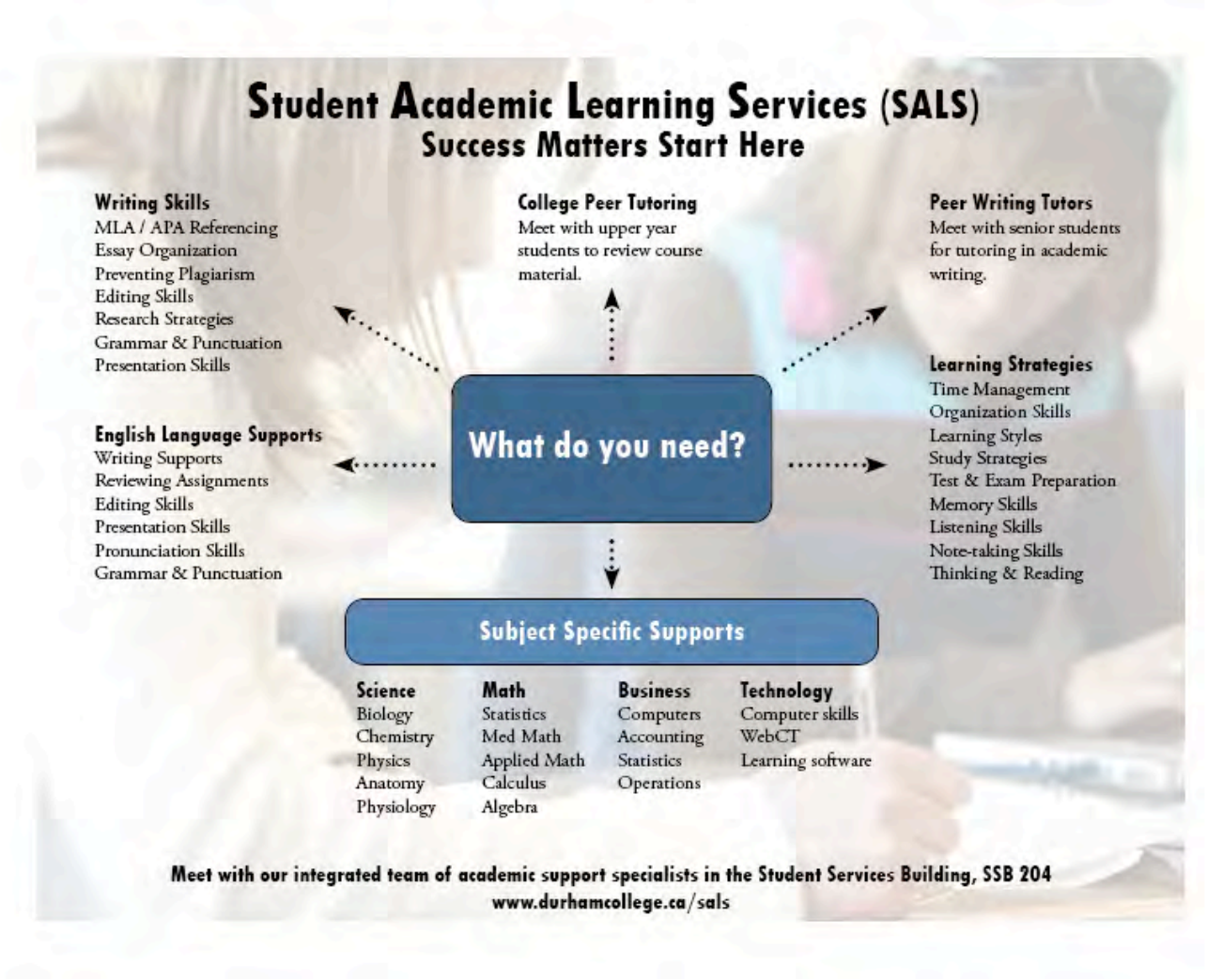
To Find Out More About CSD Services…
For further information please call 905-721-3123, drop by at SW116 to set up an appointment or visit our website at www.durhamcollege.ca/csd.

Student Academic Learning Services (SALS)

Success Matters Start Here! The staff and faculty at the Student Academic Learning Services Centre can help you achieve your educational goals.

You can use the centre to:

- **Get peer tutoring help**
- **Learn how to study smarter, not harder**
- **Learn to manage your time and prepare for tests**
- **Improve your reading skills and take better notes**
- **Use 28 lab computers with learning software**
- **Increase your English proficiency**
- **Improve your writing skills**
- **Have a quiet space to do your work**
- **Access group study space**
- **Improve your marks from a 'B' to an 'A'**



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 is easy to find. Both wired and wireless computer access is available along with 10 small group study rooms and the *Den* in the basement for group work. 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 now have a small branch library at their location. They may also use the North Oshawa campus 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
	http://www.durhamcollege.ca/EN/library/library.php

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, Bursaries and Awards

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.

Bursaries: 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.

Durham College supports access o 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.

Durham College Access Bursary Program: This bursary is available to Ontario students offered admission to a full time, **first year** program at Durham College.

Durham College Upper Year Student Bursary Program: Students must complete the Student Financial Profile application for consideration for bursary funding.

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

Eligibility: Students who are currently enrolled full-time 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.

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.

Unless otherwise noted, all students must complete the online Student Financial Profile application for consideration for bursary and award 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.

For further information on scholarships, bursaries and awards, please contact studentawards@durhamcollege.ca.

NOTE: 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.

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
Carpenters Union Local 397 Award	$800
Durham College Access Bursary	Various amounts
Durham College Alumni Association Award	$1200
Durham College Alumni Association Award – *In Course (Application Required)*	$1000
Durham College Bursary	Various amounts
Durham College Endowed Award – *In Course*	$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
Fairfax Financial Holdings Ltd. Scholarship	$3500
Garfield Weston Award	$2500 + up
Greenbriar Foundation Award	$1000
Harold "Pat" Dooley Bursary	$1300
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
Lois Sleightholm 21st Century Award	$1000
Marjorie Elizabeth Willoughby Award	$3000
Ontario Aboriginal Bursary	Up to $3000
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
Purdue Pharma Award	$800
Retired Teachers of Ontario District 28 Award	$500
Ross Mackie Award	$2000
UA Local 463 Award	$400
The Central East Community Care Assess Centre Award	$500& $750
Wordham Family Award	$3,000
Your Student Association Award	$400

School of Skilled Trades, Apprenticeship & Renewable 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 & Mgt.	$600

Bruce MacMillan Memorial Award	Robotics or related field in technology	$800
Canadian Healthcare Engineers Society, Ontario Chapter Award	Biomedical Engineering Technology	$1200
Canadian Institute of Food Science & Technology-Toronto Section Award	Pharmaceutical and Food Science Technology	$1000
CINDE – Student Scholarship	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	Trades program with an insulation component	$1000
Mike Kavanaugh Award	Mechanical Technician Program – Tool and Die/CNC	$800
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
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
Xerox Canada Award	School of Technology program	$600

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
Greater Oshawa Chamber of Commerce Award	School of Business program	$800
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	$800
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 Continuing Education

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 Communication, Language & General Studies

Special Olympics 2008 Spring Games Award	Community Integration through Cooperative Education	$1000

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
Tyncel Hasan Award	Graphic Design	$400

School of Health & Community Services

Daryl and Cindy Austin Award	Any Health & Community Services program	$750
Durham Filipino-Canadian Society and Dr. Gregorio Bayang Award	Dental Assisting/Dental Hygiene	$800
Dwayne Moses Memorial Award	Human Services Worker	$800
George & Gennie Chaput Award for Excellence in Patient Care	Practical Nursing	$1000
Joyce Marshall Bursary -	Early Childhood Education	$500
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
Bert Dejeet Justice Bursary	2nd or 3rd year of Paralegal (2 year diploma); Law and Security Administration; Legal Administration/Law Clerk or Police Foundations	4 awards of $200 – $250 each
Midge Day Memorial Award – *In Course*	Legal Administration	$500
Patricia O'Connor Premier's Award	Paramedic	$1000

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
Stikeman Elliott Award	Legal Administration	$500

School of Science & Engineering Technology

Durham Land Stewardship Council	Environmental Technology	$500
TD Bank Group Award	Environmental Technology	$1,600

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/info-for/current-students/program-guides/**

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 2011/2012 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **21-Jul-11** **-WEEKLY BREAKDOWN-**

BIOMEDICAL ENGINEERING TECHNOLOGY

	COURSE NAME	MOD	CODE	PREREQUISITES	COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 1									
	ANATOMY AND PHYSIOLOGY		BIOL 1507			3	0		
	INTRODUCTION TO BIOMEDICAL ENG. TECH.		BMET 1100			3	0		
	COMMUNICATIONS FOR SUCCESS		COMM 2103			2	1		
	COMPUTER APPLICATIONS AND SIMULATION		COMP 1107			0	3		
	ELECTRICITY I		ELEC 1131			3	2		
	MATHEMATICS FOR TECHNOLOGY I		MATH 1131			4	0		
						15	**6**		
SEMESTER 2									
	BIOMEDICAL TERMS AND DEVICES I		BMDV 4131	BIOL 1507		2	2		
	DIGITAL CIRCUITS I		CIRD 1131	ELEC 1131		2	2		
	ELECTRONIC CIRCUITS I		CIRE 1131	ELEC 1131		3	2		
	ELECTRICITY II		ELEC 2131	ELEC 1131		3	2		
	MATHEMATICS FOR TECHNOLOGY II		MATH 2131	MATH 1131		4	0		
						14	**8**		
SEMESTER 3									
	BIOMEDICAL TERMS AND DEVICES II		BMDV 5131	BMDV 4131		2	2		
	INTRODUCTION TO CAD		CAD 2136			0	3		
	DIGITAL CIRCUITS II		CIRD 2131	CIRD 1131		2	2		
	ELECTRONIC CIRCUITS II		CIRE 2131	CIRE 1131		3	2		
G	ENVIRONMENTAL PROTECTION AND GLOBAL		GNED 1501			3	0		
	PHYSICAL SCIENCE		PHYS 1131			3	0		
						13	**9**		

BIOMEDICAL ENGINEERING TECHNOLOGY

	COURSE NAME	MOD	CODE	PREREQUISITES			COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 4											
	BIOMEDICAL TERMS & DEVICES III		BMDV 6131	BMDV 5131				2	2		
	ELECTRICAL CONTROLS FOR BIOMEDICAL		BMEC 5100	ELEC 2131				2	2		
	DIGITAL CIRCUITS III		CIRD 3131	CIRD 2131				2	2		
	ELECTRONIC CIRCUITS III		CIRE 3131	CIRE 2131				2	2		
	CAREER MAPPING		COMM 2132	COMM 2103				2	1		
	COMPUTERS AND NETWORKING		COMP 4131					2	1		
								12	**10**		
SEMESTER 5											
	DIALYSIS I		BMDL 5131	BIOL 1507	BMDV 4131			1	2		
	BIOMEDICAL TECHNOLOGY MANAGEMENT		BMGM 5131	BMDV 5131				2	0		
	BIOMEDICAL INSTRUMENTATION I		BMIN 5131	CIRD 2131	CIRE 3131			2	3		
	MEDICAL IMAGING SYSTEMS I		BMIS 5131	CIRE 3131				2	2		
	SAFETY STANDARDS/RISK MGMT. I		BMSS 6131	BMDV 5131				2	0		
G	GENERAL EDUCATION ELECTIVE		GNED 0000					3	0	0	
								12	**7**	**0**	
SEMESTER 6											
	CUSTOMER CARE & SERVICE		BMCS 6131	BMDV 5131				2	0		
	DIALYSIS II		BMDL 6131	BMDL 5131				1	2		
	BIOMEDICAL INSTRUMENTATION II		BMIN 6131	BMIN 5131				2	2		
	MEDICAL IMAGING SYSTEMS II		BMIS 6131	BMIS 5131				2	2		
	SAFETY STANDARDS/RISK MGMT II		BMSS 7131	BMSS 6131				2	0		
	FIELD PLACEMENT & REPORT		FWBM 6131	BMIN 5131	BMSS 6131	BMDV 6131	BMCS 6131	0	0		200
G	LAW & ETHICS		GNED 1402					3	0		
								12	**6**		**200**

PROGRAM OF STUDY 2011/2012 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **21-Jul-11** **-WEEKLY BREAKDOWN-**

BIOMEDICAL 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.

PROGRAM OF STUDY 2011/2012 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **21-Jul-11** **-WEEKLY BREAKDOWN-**

BIOMEDICAL ENGINEERING TECHNOLOGY - FAST TRACK

COURSE NAME	MOD	CODE	PREREQUISITES			COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 1										
ANATOMY & PHYSIOLOGY		BIOL 1507					3	0	0	
DIALYSIS		BMDL 5131					2	2	0	
BIOMEDICAL TERMS AND DEVICES II		BMDV 5131					2	2	0	
INTRODUCTION TO BIOMEDICAL ENGINEERING TECHNOLOGY		BMET 1100					3	0	0	
BIOMEDICAL TECHNOLOGY MANAGEMENT		BMGM 5131					2	0	0	
BIOMEDICAL INSTRUMENTATION I		BMIN 5131					2	3	0	
MEDICAL IMAGING SYSTEMS I		BMIS 5131					2	2	0	
SAFETY STANDARDS/RISK MGMT. I		BMSS 6131					2	0	0	
							18	**9**	**0**	
SEMESTER 2										
CUSTOMER CARE & SERVICES		BMCS 6131					2	0	0	
BIOMEDICAL TERMS AND DEVICES III		BMDV 6131					2	2	0	
BIOMEDICAL INSTRUMENTATION II		BMIN 6131					2	2	0	
MEDICAL IMAGING SYSTEMS II		BMIS 6131					2	2	0	
SAFETY STANDARDS/RISK MGMT II		BMSS 7131					2	0	0	
DATA COMMUNICATIONS		DCOM 6131					1	2	0	
FIELD PLACEMENT & REPORT		FWBM 6131	BMIN 5131	BMSS 6131	BMDV 6131	BMCS 6131	0	2	0	
							11	**10**	**0**	

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.

PROGRAM OF STUDY 2011/2012 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **21-Jul-11** **-WEEKLY BREAKDOWN-**

ELECTRO-MECHANICAL ENGINEERING TECHNOLOGY-MECHTRONICS

COURSE NAME	MOD	CODE	PREREQUISITES	COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 1								
INTRODUCTION TO CAD		CAD 2136			0	3		
COMMUNICATIONS FOR SUCCESS		COMM 2103			2	1		
COMPUTER APPLICATIONS & SIMULATION		COMP 1107			0	3		
ELECTRICITY I		ELEC 1131			3	2		
MATHEMATICS FOR TECHNOLOGY I		MATH 1131			4	0		
PHYSICAL SCIENCE		PHYS 1131			3	0		
					12	**9**		
SEMESTER 2								
CAD FOR ELECTRONICS I		CAD 1133	CAD 2136		0	2	1	
DIGITAL CIRCUITS I		CIRD 1131	ELEC 1131		2	2		
ELECTRONIC CIRCUITS I		CIRE 1131	ELEC 1131		3	2		
ELECTRICITY II		ELEC 2131	ELEC 1131		3	2		
FLUID POWER I		FLUD 1131			2	1		
MATHEMATICS FOR TECHNOLOGY II		MATH 2131	MATH 1131		4	0		
					14	**9**	**1**	
SEMESTER 3								
DIGITAL CIRCUITS II		CIRD 2131	CIRD 1131		2	2		
ELECTRONIC CIRCUITS II		CIRE 2131	CIRE 1131		3	2		
INDUSTRIAL CONTROLS I		CONT 3123	ELEC 2131		2	2		
FLUID POWER II		FLUD 2132	FLUD 1131		2	1		
MANUFACTURING SCIENCES		MANF 1131			2	2		
CALCULUS		MATH 3132	MATH 2131		4	0		
					15	**9**		

PROGRAM OF STUDY 2011/2012 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **21-Jul-11** **-WEEKLY BREAKDOWN-**

ELECTRO-MECHANICAL ENGINEERING TECHNOLOGY-MECHTRONICS

	COURSE NAME	MOD	CODE	PREREQUISITES		COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 4										
	ELECTRONICS CIRCUITS III		CIRE 3131	CIRE 2131			2	2		
	CAREER MAPPING		COMM 2132	COMM 2103			2	1		
	INDUSTRIAL CONTROLS II		CONT 3131	CONT 3123			2	2		
	INTEGRATED AUTOMATION I		CONT 3141	CONT 3123		CONT 3131	2	2		
	C PROGRAMMING FOR TECHNOLOGY		CPRG 2101	MATH 2131			1	2		
	APPLIED MECHANICES		MECH 2103	MATH 1131	PHYS 1131		3	0	0	
							12	**9**	**0**	
SEMESTER 5										
	AUTOMATION SYSTEMS		AUTO 1100	CONT 3141		CONT 4101	2	2		
	INTEGRATED AUTOMATION II		CONT 4101	CONT 3141	CONT 3131		2	2		
	INSTRUMENTATION & CONTROL I		CONT 5131	CONT 3141			2	2		
G	GENERAL EDUCATION ELECTIVE		GNED 0000				3	0	0	
G	ENVIRONMENTAL PROTECTION AND GLOBAL		GNED 1501				3	0	0	
	MANUFACTURING PROCESSES		MANF 3131	MANF 1131			3	0	0	
	FIELD PLACEMENT		PLAC 1100	GPA 2.0			0	0		
							15	**6**	**0**	
SEMESTER 6										
	AUTOMATION PROJECT		AUTO 2100	CONT 4101	AUTO 1100		1	2		
	CAD FOR ELECTRICAL CONTROLS DESIGN		CAD 3000	CAD 1133	CONT 3141		0	2		
	INSTRUMENTATION & CONTROL II		CONT 6131	CONT 5131			2	2	1	
G	LAW & ETHICS		GNED 1402				3	0		
	DYNAMICS OF MACHINES		MACH 3132				3	0		
	FIELD PLACEMENT		PLAC 1100	GPA 2.0			0	0		
	SCADA		SCAD 6100	CONT 4101	AUTO 1100	AUTO 2100	1	3		
	STATISTICAL METHODS IN QUALITY CONTROL		STAT 3136	MATH 2131			2	1		
							12	**10**	**1**	

PROGRAM OF STUDY 2011/2012 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **21-Jul-11** **-WEEKLY BREAKDOWN-**

ELECTRO-MECHANICAL ENGINEERING TECHNOLOGY-MECHTRONICS

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 are required to do a math assessment and may be required to do academic upgrading

PROGRAM OF STUDY 2011/2012 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **21-Jul-11** **-WEEKLY BREAKDOWN-**

ELECTRONICS ENGINEERING TECHNICIAN

	COURSE NAME	MOD	CODE	PREREQUISITES	COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 1									
	INTRODUCTION TO CAD		CAD 2136			0	3		
	COMMUNICATIONS FOR SUCCESS		COMM 2103			2	1		
	COMPUTER APPLICATIONS AND SIMULATION		COMP 1107			0	3		
	ELECTRICITY I		ELEC 1131			3	2		
G	GENERAL EDUCATION ELECTIVE		GNED 0000			3	0		
	MATHEMATICS FOR TECHNOLOGY I		MATH 1131			4	0		
	PHYSICAL SCIENCE		PHYS 1131			3	0		
						15	**9**		
SEMESTER 2									
	CAD FOR ELECTRONICS I		CAD 1133	CAD 2136		0	2	1	
	DIGITAL CIRCUITS I		CIRD 1131	ELEC 1131		2	2		
	ELECTRONIC CIRCUITS I		CIRE 1131	ELEC 1131		3	2		
	CAREER MAPPING		COMM 2132	COMM 2103		2	1		
	ELECTRICITY II		ELEC 2131	ELEC 1131		3	2		
	MATHEMATICS FOR TECHNOLOGY II		MATH 2131	MATH 1131		4	0		
						14	**9**	**1**	
SEMESTER 3									
	DIGITAL CIRCUITS II		CIRD 2131	CIRD 1131		2	2		
	ELECTRONIC CIRCUITS II		CIRE 2131	CIRE 1131		3	2		
	COMPUTERS AND NETWORKING		COMP 4131			1	2		
	INDUSTRIAL CONTROLS I		CONT 3123	ELEC 2131	CIRD 1131	2	2		
G	ENVIRONMENTAL PROTECTION AND GLOBAL		GNED 1501			3	0		
	TELECOMMUNICATIONS I		SYSC 4131	CIRE 1131		4	0		
						15	**8**		

PROGRAM OF STUDY 2011/2012 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **21-Jul-11** **-WEEKLY BREAKDOWN-**

ELECTRONICS ENGINEERING TECHNICIAN

	COURSE NAME	MOD	CODE	PREREQUISITES	COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 4									
	DIGITAL CIRCUITS III		CIRD 3131	CIRD 2131		2	2		
	ELECTRONIC CIRCUITS III		CIRE 3131	CIRE 2131		2	2		
	INDUSTRIAL CONTROLS II		CONT 3131	CONT 3123		2	2		
	INTEGRATED AUTOMATION I		CONT 3141	CONT 3123		2	2	0	
	C PROGRAMMING FOR TECHNOLOGY		CPRG 2101	MATH 2131		1	2		
G	LAW & ETHICS		GNED 1402			3	0		
						12	**10**	**0**	

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.

ELECTRONICS ENGINEERING TECHNOLOGY

	COURSE NAME	MOD	CODE	PREREQUISITES	COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 1									
	INTRODUCTION TO CAD		CAD 2136			0	3		
	COMMUNICATIONS FOR SUCCESS		COMM 2103			2	1		
	COMPUTER APPLICATIONS AND SIMULATION		COMP 1107			0	3		
	ELECTRICITY I		ELEC 1131			3	2		
G	GENERAL EDUCATION ELECTIVE		GNED 0000			3	0		
	MATHEMATICS FOR TECHNOLOGY I		MATH 1131			4	0		
	PHYSICAL SCIENCE		PHYS 1131			3	0		
						15	**9**		
SEMESTER 2									
	CAD FOR ELECTRONICS I		CAD 1133	CAD 2136		0	2	1	
	DIGITAL CIRCUITS I		CIRD 1131	ELEC 1131		2	2		
	ELECTRONIC CIRCUITS I		CIRE 1131	ELEC 1131		3	2		
	CAREER MAPPING		COMM 2132	COMM 2103		2	1		
	ELECTRICITY II		ELEC 2131	ELEC 1131		3	2		
	MATHEMATICS FOR TECHNOLOGY II		MATH 2131	MATH 1131		4	0		
						14	**9**	**1**	
SEMESTER 3									
	DIGITAL CIRCUITS II		CIRD 2131	CIRD 1131		2	2		
	ELECTRONIC CIRCUITS II		CIRE 2131	CIRE 1131		3	2		
	COMPUTERS AND NETWORKING		COMP 4131			1	2		
	INDUSTRIAL CONTROLS I		CONT 3123	ELEC 2131	CIRD 1131	2	2		
G	ENVIRONMENTAL PROTECTION AND GLOBAL		GNED 1501			3	0		
	TELECOMMUNICATIONS I		SYSC 4131	CIRE 1131		4	0		
						15	**8**		

PROGRAM OF STUDY 2011/2012 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **21-Jul-11** **-WEEKLY BREAKDOWN-**

ELECTRONICS ENGINEERING TECHNOLOGY

	COURSE NAME	MOD	CODE	PREREQUISITES			COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 4											
	DIGITAL CIRCUITS III		CIRD 3131	CIRD 2131				2	2		
	ELECTRONIC CIRCUITS III		CIRE 3131	CIRE 2131				2	2		
	INDUSTRIAL CONTROLS II		CONT 3131	CONT 3123				2	2		
	INTRGRATED AUTOMATION I		CONT 3141	CONT 3123			CONT 3131	2	2	0	
	C PROGRAMMING FOR TECHNOLOGY		CPRG 2101	MATH 2131				1	2		
G	LAW & ETHICS		GNED 1402					3	0		
								12	**10**	**0**	
SEMESTER 5											
	CAD FOR ELECTRONICS II		CAD 2135	CAD 1133				0	3		
	CIRCUIT ANALYSIS		CIRC 3131	ELEC 2131				2	2		
	INSTRUMENTATION & CONTROL I		CONT 5131	CONT 3141				2	2		
	SIGNALS AND SYSTEMS		DGSP 5101	CIRD 3131	CPRG 2101	MATH 2131		2	2		
	CALCULUS		MATH 3132	MATH 2131				4	0		
	MICROPROCESSORS I		MPRO 1131	CIRD 3131	CPRG 2101			2	2		
	FIELD PLACEMENT		PLAC 1100	GPA 2.0				0	0		
								12	**11**		
SEMESTER 6											
	INSTRUMENTATION & CONTROL II		CONT 6131	CONT 5131				2	2		
	EMBEDDED SYSTEMS		EMBS 6100	MPRO 1131				2	2		
	FIELD PLACEMENT		PLAC 1100	GPA 2.0				0	0		80
	STATISTICAL METHODS IN QUALITY CONTROL		STAT 3136	MATH 2131				2	1		
	TELECOMMUNICATONS II		SYSC 5131	SYSC 4131				2	2		
	TECHNICAL PROJECT		TECH 6100	DGSP 5101	MPRO 1131			0	2	2	
								8	**9**	**2**	**80**

PROGRAM OF STUDY 2011/2012 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **21-Jul-11** **-WEEKLY BREAKDOWN-**

ELECTRONICS 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.

PROGRAM OF STUDY 2011/2012 **SCHOOL OF SCIENCE & ENGINEERING TECHNOLOGY** **21-Jul-11** **-WEEKLY BREAKDOWN-**

ELECTRONICS ENGINEERING TECHNOLOGY - FAST TRACK

COURSE NAME	MOD	CODE	PREREQUISITES	COREQUISITES	LECT. HRS	LAB HRS	ALT. DEL. HRS	FIELD PLMT. HRS
SEMESTER 1								
COMPUTER ORGANIZATION		COMP 4101			2	2		
INDUSTRIAL CONTROLS I		CONT 3123			2	2		
SIGNAL AND SYSTEMS		DGSP 5101			2	2		
MICROPROCESSORS I		MPRO 1131			2	2		
FIELD PLACEMENT		PLAC 1100			0	0		
TELECOMMUNICATIONS I		SYSC 4131			4	0		
					12	**8**		
SEMESTER 2								
INDUSTRIAL CONTROLS II		CONT 3131	CONT 3123		2	2		
INTEGRATED AUTOMATION I		CONT 3141		CONT 3131	2	2		
INSTRUMENTATION AND CONTROL		DATA 3131			2	2		
DATA COMMUNICATIONS		DCOM 6131			1	2		
EMBEDDED SYSTEMS		EMBS 6100	MPRO 1131		2	2		
FIELD PLACEMENT		PLAC 1100			0	0		
TELECOMMUNICATIONS II		SYSC 5131	SYSC 4131		2	2		
TECHNICAL REPORT		TECH 6100			0	2		
					11	**14**		

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.

ANALYTICAL CHEMISTRY I CHEM 3131
The course serves as an introduction to analytical methods and their applications. Sample pr
method selection, techniques, calculations and data handling are addressed as they apply to
types of chemical analysis. This course introduces the chemical principles behind gravimetric
volumetric methods of analysis. Problem-solving is strongly emphasized. The laboratory por
course emphasizes good laboratory technique and practices. Accuracy and precision of analy
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 (aci
redox, complexation). More advanced concepts and theory are examined as they deal with e
analysis. This course also serves as an introduction to instrumental analysis, addressing both
electrochemical and spectroscopic methods from an analytical perspective. Problem solving i
emphasized. The laboratory portion of this course emphasizes good laboratory technique an
Accuracy and precision of analytical results as well as documentation and presentation of lab
results are evaluated.

ANALYTICAL INSTRUMENTATION LAB INST 2135
This is a one-semester laboratory course (Two hours/week). Students will apply the theoreti
knowledge gained from INST 2134 and run experimental analysis on various spectrographic a
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' knowled
methods of instrumental analysis. Students are introduced to basic spectrographic and chrom
instrumental concepts and applications, including interpretation of analytical results. This the
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
required for satisfactory performance in any laboratory-related work. Techniques taught incl
use of the analytical balance, proper pipetting techniques, use of the buret, transferring solut
the pH meter and the spectrophotometer. The course consists of 1 lecture hour and 2 lab ho

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.
unifying themes, the interrelationships of body organ systems, homeostasis, and the complin
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 dra
is a technical skill required in their field. Students will prepare applicable drawings. The applic
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.
and labs, students learn about aquatic, terrestrial and atmospheric ecosystems at the microb
Through practical applications, they learn to apply this information to water and wastewater t
and testing. Other topics include biogeochemical cycles and energy flow within ecosystems,
bioremediation, and biotechnology and its uses in the assessment and cleanup of environmer
Lab exercises reinforce the theoretical principles and introduce students to environmental lab
methods that comply with current standards and practices.

APPLIED MECHANICS FOR TECHNICIAN MECH 2104
In this course, the student will study forces and their effects on machines and in different engineering structures. Concepts such as vectors, equilibrium, stress and stain are studied and used in helping to understand what is happening inside and outside of a machine part or a structure. Typically, once the forces acting in a member are determined, the physical characteristics represented by centroids and moments of inertia can be established. An example might be a truss member found to be in a state of tension can be considered a cable whereas in compression it would be considered a beam with determined minimum physical properties. Emphasis throughout the course is placed on developing a systematic approach to solving problems, based on fundamentals principles. This will include the use of basic algebra, calculator skills, and sketching of properly completed free body diagrams.

APPLIED MECHANICSMECH 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
Automation Fundamentals is designed to educate students in the theory of operation and basic implementation of Programmable Logic Controllers (PLC) and HMIs (Human Machine Interface), as they relate to industrial control systems. 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 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 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.

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 and 10 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, 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. Skillful 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 (BIOT 6131) is a one-semester course with one scheduled hour of lecture and three schedules 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 and to put them into the context of the business world. 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 micro-organism using chromatographic and affinity techniques. In the other project the teams will carry put a series of small-scale fermentations. In both projects students will run assays to test the success and quality of their processes and products.
Students will also develop a fundamental understanding of marketing, microeconomics, managerial accounting, corporate financing, and business strategy with respect to their chosen industry, and apply this knowledge to the analysis of a business case.

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.

C PROGRAMMING FOR TECHNOLOGY CPRG 2101
This course introduces the student to the foundations of computer programming using the C programming language. It is designed as an introductory course and assumes little or no prior programming experience. Examples and applications are drawn from the field of electronics and engineering and relate to prior technology courses in the program of studies. Topics include: overview of programming fundamentals, variables and operators, iteration and selection, structures and enumerated data types, functions, arrays, pointers, file I/O and hardware control. Students will also get the opportunity to use C for electronics control applications using a hardware interface kit connected to the lab PC.

CAD FOR ELECTRICAL CONTROLS DESIGN CAD 3000
A one-semester course designed to expose the electro-mechanical engineering technology student to the drawing requirements of an electrical control system for an automated machine/system. The course builds upon the automation controls and AutoCAD skills acquired in Integrated Automation I (CONT 3141) and CAD for Electronics (CAD 1133). The course begins with an introduction to typical drawing packages for industrial automation systems. Throughout the course the student will be required to produce the necessary electrical/electronic and layout AutoCAD drawings for a PLC based automated control system. The students will learn how to create electrical controls layouts. Motor power schematics, control power schematics, input schematics, output schematics, control station layouts, control panel layouts and bills of material. The student will also be required to select the necessary parts for the controls system from automation & industrial control catalogues.

CAD FOR ELECTRONICS I CAD 1133
This course builds upon the generic computer aided drafting and design skills learned by the student in their introduction to AutoCAD course in the first semester. It is a one semester course designed to educate the student in the basics of electronics symbols and schematics, circuit simulation with Multisim, printed circuit board design and layout with Eagle software and actual printed circuit board (PCB) productions and electronic project fabrication. To successfully complete this course each student will create all of the necessary electronic and mechanical drawings for a 5v fixed and dual-tracking 0- 15v

variable DC power supply. As well, the student will fabricate the printed circuit board from their drawing, punch the holes in the power supply case and assemble all the components to produce a functional 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 design 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 NX 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 as well as develop their ability to generate detail and assembly drawings, work with standard material sizes, model parametrically, apply geometrical dimensioning & tolerancing (GD&T), create bills of materials (BOM's) and use mass and finite element analysis tools to analyze their creations. These topics will be covered by completing a variety of assignments, a reverse-engineering project and both individual and team design projects where students will design, analyse, manufacture and test their designs either in a lab or in head-to-head competion against each other.

CALCULUS MATH 3132
Students apply the principles of calculus to technical problem solving. Topics in differential calculus include; limits, rates of change, maxima, minima, points of inflection, related rates and optimization. Topics in integral calculus include; motion, area and volume. Basic rules for differentiation and integration are taught.

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
This course is designed to help students succeed in their job search for technical careers and reinforce and expand upon the writing skills students require in the technical workplace. Students will study the job market and prepare for interviews, prepare cover letters, a resume, and develop a career action plan. In addition they will learn to select and use appropriate research, language, layout and graphics for technical documents. Emphasis will be on the preparation of documents that are clear, accurate and precise by using correct spelling, punctuation, sentence structure and grammar.

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 IINST 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 simplify complex circuits and/or analyze various electric properties of circuits (e.g. voltage, current, resistance, power). Analysis tools such as: Thevenin's and Norton's theorem, voltage and current dividers, mesh, nodal and loop analysis, and practical voltage and current sources and their inter-changeability are emphasized. The course will demonstrate that the analysis techniques developed for DC circuits will also apply to AC circuits. The types of AC circuits covered include: RLC series and parallel impedances and resonant circuits. The course is configured as 2 hours of lecture and a 2-hour lab, per week, so as to involve the student in both the theoretical and practical applications of this field. This course will use several software applications such as Excel. Multisim and LabVIEW.

COMMUNICATION FOR CEREER SUCCESS FOR WATER QUALITY TECHNICIAN COMM1133
This course focuses on developing those characteristics which contribute to professionalism in a technical environment: the importance of being an effective communicator, the importance of being an active participant as well as an understanding of and a flexible attitude toward the beliefs and opinions of others. Activities will incorporate in-class discussions/applications, research tasks, employment portfolio preparation, information interviews, job-interview strategies, peer assessments, and reflections.

COMMUNICATION FOR THE WORKPLACE 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.

COMMUNICATIONS I COMM 1325
This course concentrates on the fundamentals of correct grammar, vocabulary usage, punctuation, and spelling. These principles will be applied in the major units of study: sentence structure and paragraph writing. The course will include in-class writing assignments, computer-based writing assignments, and computer writing lab components.

COMMUNICATIONS II COMM 2316
This course introduces students to applied communication with emphasis on the development of reading, writing, and thinking skills. The primary focus on the course will be on effective essay writing and on the use of correct spelling, grammar, and punctuation.

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.

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, you will learn to design and test analog electronic circuits using the Multisim simulation software. You will use the LabVIEW software to interface inputs, outputs and control a process. You will also learn to use Microsoft Excel spreadsheet for technical applications, such as tables, calculations, graphing, and charts. You will learn how to integrate Multisim, Ms Excel, and Ms Word documents into a formal technical 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
The computers and networking course provides electronics and biomedical engineering technology students with the fundamental skills to install and maintain small computer networks. The course starts with the pc and uses hands-on labs to master installation, upgrading, maintenance and basic troubleshooting of workstations. The course then continues with networking the workstations, design of small local area networks, installations and maintenance of a small network. The student will also look at wireless technology and storage area network with specific application in industry.

COMPUTERS I COMP 1326
Basic computer programs such as MS Word and MS Excel are introduced.

CO-OP PLACEMENT COOP 1100
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.

CO-OP PLACEMENT 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.

DATA COMMUNICATIONS DATA 6131
Networking and Data Communications makes the connections from device to device and ultimately between people. We live in a world that is demanding twenty-four hour connections. Current market analysis indicates networking and more specifically internetworking is in very large demand. From corporations to the factory floor, small offices and hospitals, and even into "smart" homes there is a growing need to interconnect computerized equipment. This course will prepare our Electronics and Biomedical Engineering Technology students to meet the challenges relating to computer networks that most of them will face.

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.

DNA TECHNIQUES BIOT 3131
DNA Techniques (BIOT 3131) 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 quantifications by UV spectroscopy, restriction digest, DNA ligation, preparation of competent cells and bacterial transformation, DNA fingerprinting (using PCR), Southern blotting, plasmid mapping, and agarose gel electrophoresis and annotation. Students will also learn and practice protein quantification using the Bradford method. The students will be taught to use bioinformatics tools and resources that can assist them with their work and the interpretation of their results, including NCBI databases and on-line modelling of restriction digests.

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 FUNDAMENTALS ELEC 1133
Electrical Control Fundamentals is designed to educate students at an introductory level, the theory of electricity fundamentals primarily applied to an industrial environment. 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, VFDs and associated control devices are studied along with schematics 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 Automation Fundamentals, OPER 3133.

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
A one-semester course designed to educate the students in DC Electric circuit fundamentals. This course is the foundation and prerequisite for multiple electrical and electronics courses, in your program of studies. The course begins with the coverage of SI units, scientific notation, atom structure and electrical quantities. It proceeds with Ohm's law, electrical power, series, parallel and series-parallel circuits, which is the backbone of electric circuit theory. The course concludes with an introduction to Magnetism/Electromagnetism, alternating current/voltage and the mathematical analysis of sinusoidal waveforms. Throughout this course the student is required to complete weekly lab experiments and an associated lab report.

ELECTRICITY II ELEC 2131
This course is a continuation of Electricity 1 (ELEC 1131), which focused on DC fundamentals (series, parallel, series-parallel and magnetism).
Electricity II begins with an introduction to the analysis of Capacitors and Inductors in DC and AC circuits. The course proceeds with the study of Transformers, RC and RL circuits. It concludes with the analysis of RLC circuits, resonance and passive filters.
Throughout this course the student is required to complete weekly lab experiments and an associated lab report. Lab experiments are used to measure and verify the electrical principles related to the various subject areas covered by the course.

ELECTRONIC CIRCUITS I CIRE 1131
In this course, you will learn the basic of Electronic circuits and devices. The course begins with the analysis of the P-N junction, which is the foundation of most electronic devices. The course then proceeds with an in-depth analysis of the diode, and its various circuit applications such as rectification, filtering, voltage regulation, voltage multiplication, limiters, clampers and light-emitting diodes. Power supply regulators ICs are also introduced. You will then study the basic of transistor, transistor biasing, and transistor amplifier configurations. Electronic circuits will be designed and tested using Multisim, the electronics simulation software.

ELECTRONIC CIRCUITS II CIRE 2131
Electronic Circuits II is a continuation of Electronic Circuits I and covers different types of electronic devices. We start with a review of Common Collector and Common Emitter amplifiers to lead into Class A. B. AB, and C power amplifiers.
The Field Effect Transistor (FET) will be introduced and new parameters such as transconductance, drain and transfer curves are applied to the FET circuits to analyze the different biasing methods available and from there study the different amplifier configurations such as common source, common drain, and common gate. The amplifier performance for gain, phase, and impedance will be predicted. D-Type and E-Type MOSFET transistors will also be evaluated and their biasing circuits examined.

EM (Electro-Magnetic) waves and the frequency/wavelength spectrum are introduced to understand the operation of opto-electronic devices in the visible light spectrum. Circuits including photo cell, photo resistor, photo diode, photo transistor and opto-couplers will be studied.
Thyristors (fast switching devices) such as SUS, DIAC, SCR, TRIAC, and UJT are covered and their input/output and phase control signal waveforms are assessed.
The course is configured as 3 hours of lecture and a 2-hour lab, per week and will use several software applications such as Excel, Multisim and LabVIEW.

ELECTRONIC CIRCUITS III CIRE 3131
Electronics Circuits III deals with one of the most versatile and widely used electronics devices in linear applications; the operational amplifier or op-amp.
Different op-amps will be studied and given the data sheets of the component, its major characteristics including open-loop gain, slew rate, input voltage range, input impedance, CMRR, input bias current, offset bias current, input offset voltage and output impedance will be determined and compared to those of an ideal op-amp while evaluating their impact on a circuit design.
Negative feedback op-amp circuits will be explained, analyzed and designed and many circuits such as analog adders, subtractors, constant current sources, current-to-voltage converters, voltage-to-current converters, filters, oscillators and waveform generators will be designed and troubleshooted.
The course is complemented by a lab program which will reinforce skills in electrical measurement and analysis of observed data. The lab experiments will also allow the student to verify principles dealt with during the lecture periods.
Several software applications such as Excel, Multisim and LabVIEW will be used in this course.

EMBEDDED SYSTEMS EMBS 6100
This course lets students apply the fundamentals of microcontrollers programming learned in the Microprocessors I course to embedded system techniques. Lecture topics will cover programming the Freescale HCS12 on-chip peripherals, digital-analog interfacing techniques, and advances software techniques in assembler and C. Students will work in labs using a HCS12 microcontroller single board computer, programmed using a cross-assembler and the GNU C cross-compiler. The labs are supplemented by a project that will focus on embedded software development and 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.

ENGINEERING MATERIALS METL 1131This course establishes the basis for understanding the behaviour and characteristics of engineering materials. The course focuses on the materials properties and their relationship to the atomic structures, plastic deformation and recrystallization, principles of mechanical and non-destructive testing and thermal equilibrium diagrams.

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
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 is considered an important part as a technologist's education, and student are required to obtain a minimum of 80 hours on the job placement in their chosen field and 5 hours of required workshops. There is no formal set of topics of instruction for placement but it must provide the student with practical experience in their chosen field. Each placement will be different as there will be a variety of organizations participating.
Students may achieve their placement requirement in various ways by completing one of the following:

i. A summer position after second year related to their field of study.
ii. Working on day a week during the fall and or winter academic school year.
iii. Working during a block period of time such as the Christmas break, Reading week or in May after all courses work is completed.
iv. Completing an internship for 4,8,12 or 16 months.
v. Applying for a prior work experience with proper approval and documentation.

Placement is approached as an actual job, with students attending interviews and being selected for positions by the employer. Students are to perform as technologists in training. A satisfactory completion is mandatory in order to graduate from Durham College.

FLUID MECHANICS FLUD 4131
Fluid mechanics is the technology concerned with the fundamentals of fluid properties, fluid pressure, hydrostatic forces on surfaces, buoyancy, fluid flow, flow measurement, and both major and minor losses associated with fluid flow in piping systems.

FLUID POWER I FLUD 1131
The used of fluid under pressure to transmit power and control motion are studied in this course. The principles of fluid power are presented to relate the laws of physics to practical hydraulic control systems and applications. The operation of various fluid power components (pumps, valves, actuators and system accessories applications) is covered in depth. The fundamental concepts and basic skills necessary to develop a logical approach to the design and troubleshooting of hydraulic controls systems will be emphasized in this course.

FLUID POWER II FLUD 2132
This course delves into the theory and practice of pneumatics: using air in the generation, control and transmission of power, fluid logic control systems, circuits and electrical controls for fluid power systems. The development of ladder logic code for programmable logic controllers and the integration of these controllers within electro-pneumatics system will be explored.

FOOD AND DRUG LAWS AND REGULATIONS 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.

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 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 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.

INSTRUMENTATION AND CONTROL DATA 3131
From the simple digital thermometer used at home to remote patient monitoring and control system found in hospitals, data acquisition systems are finding wide and varied applications in many fields. Included in the topics that will be studied are: Transducers and Sensors, Analogue and Digital Signals, Signal Conditioning, Signal Acquisition & Processing, Instrumentation and Process Control, High Level Language Programming. Opportunities in a laboratory setting will be provided for developing virtual instruments (VI) and hardware interfacing with sensors for "real world" data collection and software design.

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 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 foundation course focuses on topics related to the creation and interpretation of engineering drawings using AutoCAD 2009/2010 as a drawing tool. The content includes most topics related to the creation of a new product from initial sketching to: detailed design definition in 2D and if required 3D; and the creation of engineering drawing(s), detail and assembly, including selection and creation of the necessary views, dimensioning, notes, and title block. Related topics and concepts needed to complete drawings such as tolerancing and fasteners are visited.
The intent in this course is that the student will be able to produce a set of engineering drawings using a CAD system that fully documents a design and can be used by the shop or trades people to implement the design.

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 maintenance of microbial 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
This course is 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 combined lecture laboratory course provides students with a basic knowledge of general properties of materials including how the atoms and molecules are arranged. (SRO, LRO) Understanding these concepts leads to proficiency in materials selection. With the focus on metals, polymers and ceramics students will examine materials imperfections and mechanical properties as well as methods for preventing degradation such as cathodic protection.

MATERIALS AND THE ENVIRONMENT 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.

MATHEMATICS FOR TECHNOLOGY IMATH 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 configure**d** 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**.** Topics covered include algebra, fractions, decimals, percentages, ratios, proportions, graphing and problem solving**.** This course covers the component skills required for MATH 2125.

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. As well, students practise and strengthen their reasoning abilities by restating problems so they can be solved mathematically**.** This course covers the component skills required in Math 2132.

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 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. Using mathematical procedures and applying mathematical concepts to solve problems are stressed.

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. Using mathematical procedures and applying mathematical concepts to solve problems 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.

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 establishes the basis for understanding the behaviour and characteristics of metals and alloys. The course gives the understanding of iron and steel production processes. The course focuses on the atomic structures of metals, slip, plastic deformation and recrystallization, thermal equilibrium diagrams and the iron carbon system. The heat treatment principles are discussed. Physical and mechanical properties of non-ferrous metals and alloys and their applications are considered.

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 and 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, biochemical and serological 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. During weekly laboratory sessions 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 will introduce student to microcontroller systems, using the Free scale Semiconductor 16-bit HCS12 as representative of microcontrollers currently available. The course begins with the fundamentals of CPU operation, and then provides the opportunity to program the microcontroller in assembler language as well as the C programming language. The course also provides an overview of contemporary computer architecture. Lab exercises will use both a software simulators and single-board microcontroller development system. Programs will be cross-assembled or cross-compiled from a MS Windows 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, **their** mode of action, resistance and susceptibility. Emerging pathogens and superbugs resistance to antimicrobial controls and their impact are studied. 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 as well as Quality Assurance and its role in helping to establish/maintain quality standards. 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.

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 tools 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 TECHNIQUES BIOT 4133
Protein Techniques (BIOT 4133) is a one-semester course with four scheduled hours of laboratory exercises and one scheduled hour 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 protein techniques including six exclusion chromatography, ion exchange, chromatography, affinity chromatography, three phase partitioning, SDS-PAGE and gel staining, drying, and annotation, western blotting and hybridization, and the preparation and use of an 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, including NCBI databases.

QUALITY ASSURANCE & CONTROL GNED 1405
This course covers various aspects of, and differences between, quality control and quality assurance. Focusing on the fact that quality has become a priority for many companies and many are certified to some type of quality standard. A brief history of the development of quality concepts is covered. Various quality standards will be studied along with quality measurable, problem solving techniques and continuous improvement. Students will be challenged to explore their own concepts of quality and examine the criteria that they use to select products and services that they purchase.

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.

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 & SYSTEMSDGSP 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 IISTAT 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 a one hour lecture and a three hour lab. It is a combined theory lab course covering the following topics. Centrifugal water pumps, waste water pumps, w2ater valves, pipe threading, soldering, metrology, fittings and fluid conductors, bearing, seals, packing, drilling and taping, coupling alignments with dials and lazor, air preparation, and vibration analysis.

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 PROJECTTECH 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
Thermodynamics is the science of the conversion of heat energy from available sources into other energy forms and mechanical work. Thermodynamics investigates the relationship between heat, work, and system's properties. The basic concepts of thermodynamics and their application to engineering problems are introduced. The course includes a study of terminology, properties of a system, processes, ideal gas laws and an introduction to thermodynamics cycles.

TOOL DESIGN TOOL 5131
This course deals with the application and design of plastic injection moulds and die cast injection moulds as related to industry. Students will complete mould designs using unigraphics software and deciding components needed. Students will also design parts that are being moulded.

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 per week. The course provides a detailed examination of groundwater and surface water movement, availability and usage and the factors that impact and influence them. This course investigates how groundwater and surface water move, the impact of porosity and permeability, rainfall and drought. This course focuses on the importance of the entire watershed, the influence of the hydrological cycle, stream flow, floods, reservoirs and aquifers. This course also focuses on the mechanics that occurs when both installing a well and extracting water from it. Throughout the course, students will be encouraged to relate their learning back to their future roles as operators and to identify how this learning will provide them with a strong foundation for making sounds decisions in the future.

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.