

ELECTRICAL ENGINEERING TECHNICIAN

Program Outline

Major:	EETN
Length:	2 Years
Delivery:	4 Semesters, plus 2 work terms
Credential:	Ontario College Diploma, Co-op
Effective:	2013-2014
Location:	Barrie
Start:	Fall (Barrie), Winter (Barrie)

Description

The Electrical Engineering Technician program curriculum incorporates theory applications and practical experience from the generation, distribution, and utilities industries. Concepts from the sciences and humanities are emphasized to ensure that the graduate is provided with current technical knowledge, skills, and practice.

Career Opportunities

There has never been a better time to enter the field of electrical technologies. For Ontario's industries to survive in today's global market economy, they must be able to draw on a pool of technically competent technicians in a broad range of employment settings including those relating to automation, power generation, distribution, utilization and maintenance, industrial telecommunications and control systems. Our program can assist you in meeting these challenges.

Program Learning Outcomes

The graduate has reliably demonstrated the ability to:

- communicate information effectively and accurately by analyzing, translating, and producing electrical drawings and other related documents and graphics;
- apply the principles of mathematics and science to analyze and solve routine technical problems related to electrical power technology as found in automation, power generation, distribution, and utilities industries;

- use, calibrate, and maintain instrumentation and test equipment relating to the power utility industry;
- follow established procedures to verify acceptable function of, and use a variety of troubleshooting techniques to identify problems with, electrical circuits, equipment, and systems normally found in automation, power generation, distribution, and utilities industries;
- assemble and commission electrical circuits and equipment that fulfill the job requirements and specifications relating to automation, power generation and distribution industries;
- commission, operate and troubleshoot rotating electrical machines;
- select and apply electrical cabling requirements and verify system grounding in the electrical power industry for a variety of applications;
- contribute to the design of electrical circuits, equipment, components, and systems in automation, power generation, transmission, distribution, and utilities industries;
- analyze and troubleshoot electrical circuits and electronic circuits in the power industry;
- analyze and troubleshoot a variety of control systems relating to automation, power generation, distribution, and utilities industries;
- use computers to support the electrical environment;
- assist in conducting quality control and quality assurance procedures in the distribution network in the power industry;
- prepare and maintain records and documentation systems;
- apply principles of networking, microprocessor systems, instrumentation, telecommunications, and other related technologies to reach completion of electrical engineering tasks in automation, power generation, distribution, and utilities industries;
- apply knowledge of appropriate safety procedures and standard shop practices to electrical engineering workplaces related to the power industry;
- apply engineering principles relating to automation, electrical power generation, transmission, distribution, and control;
- analyze grid systems using per unit analysis and scalar and vector modeling encompassing paralleling effects of power generators and transformers;
- perform tasks in accordance with relevant law, policies, procedures, standards, regulations, environmental and ethical principles.

Practical Experience:

Co-operative Education is a mandatory component of all Co-op programs at Georgian College; it has been designed as a process by which students integrate their academic education with work experience related to their program of study. This integration affects much more than simply earning a salary, including the adjustment to the work environment and the development of professionalism. It also reinforces skills and theory learned during academic semesters, develops professional contacts, job knowledge and

career path, improves human relations and communication skills and promotes personal maturity and financial independence.

Students are requested to register, attend and participate in their scheduled co-operative education classes. These classes are scheduled for all first year students and are expected to be completed in order to proceed successfully to their first co-op work experience. To ensure students are eligible to proceed onto any co-op work experience students should refer to Promotional Status and Eligibility for Co-op as outlined in the College Calendar. Co-op policies and procedures can be located on our website:
www.georgianc.on.ca/careers/for-students/

Georgian College follows the Co-operative Education guidelines set out by the Canadian Association for Co-operative Education (CAFCE) and Education at Work Ontario (EWO) by supporting the learning outcomes designed for the program specific graduate profile and curriculum as set out by the Ministry of Training, Colleges and Universities.

The Program Progression:

Fall Intake - Barrie

Sem 1	Sem 2	Work Term 1	Sem 3	Work Term 2	Sem 4
Fall 2013	Winter 2014	Summer 2014	Fall 2014	Winter 2015	Summer 2015

Winter Intake - Barrie

Sem 1	Sem 2	Work Term 1	Sem 3	Work Term 2	Sem 4
Winter 2014	Summer 2014	Fall 2014	Winter 2015	Summer 2015	Fall 2015

Admission Requirements:

You must meet ONE of the following requirements to be eligible for admission to these programs:

Secondary school applicants:

- OSS Curriculum: OSSD or equivalent with Grade 12 English (C) or (U) (ENG 4C, ENG 4U); plus any Grade 12 College Mathematics (MAP 4C or MCT 4C), or any Grade 12 University Mathematics. Also recommended: any Grade 11 (C) or (U/C) and/or any Grade 12 (C) or (U/C) Physics)

Non-Secondary school applicants (19 years or older):

- Any credit Communication course and most credit mathematics courses taken at Georgian College
- College preparatory programs including those taken at Georgian College: Technology Foundation and Technology Fundamentals*
- Equivalent courses in English and mathematics taken through secondary school or Independent Learning Centres (at the general, advanced, college or university level)
- Academic and Career Entrance Certificate (ACE) program with communications and business, apprentice or technical mathematics*
- Mature student testing in English and mathematics that meets the minimum standards for admission (available through most testing services)*
- Ontario High School Equivalency Certificate (GED)
- English, Literature or Communication credit courses and most mathematics credit courses from accredited colleges/universities

Home school applicants:

- Applicants can write the mature student testing in English and mathematics that meets the minimum standards for admission (available through testing services)*

* available from Georgian College. For a complete listing please contact the Office of the Registrar.

Non-secondary school applicants who are 19 years of age or over by the first day of classes, and who lack the academic entrance qualifications, may be considered for entrance to an appropriate post-secondary diploma or certificate program as mature applicants. Mature applicants must meet all program specific prerequisites including all selection criteria; equivalencies are stated above. Applicants who are unsure whether they meet admission requirements should contact the Office of the Registrar. In addition, those applying as mature students and having no documentation of Grade 12 education must supply, if required, proof of age, such as a copy of an official birth certificate or driver's licence. Refer to Section 2.5 and 2.6 of the Academic Calendar for further details.

Credit transfer and course exemptions:

Applicants who have taken courses from a recognized and accredited post-secondary institution and/or have relevant life/learning experience may be eligible for credit transfer/course exemptions. Courses/experience must match at least 80% of the learning outcomes of a Georgian College course with a minimum grade of 60% or C achieved in previous coursework; some program exceptions apply (see program outline). For further information please visit the Credit Transfer Centre website: georgiancollege.ca/admissions/credit-transfer/

Graduation Requirements:

- 19 Mandatory Courses
- 2 Communications Courses
- 3 General Education Courses
- 2 Co-op Work Terms

Graduation Eligibility:

To graduate from this program, the passing weighted average for promotion through each semester, from year to year and to graduate is 60%. Additionally, a student must attain a minimum of 50% or a letter grade of P (Pass) or S (Satisfactory) in each course in each semester.

Mandatory Courses

DRFT1003 Introduction to Technical Drafting
ELEC1000 CAD Electrical Circuits
ELEC1001 AC Circuit Fundamentals
ELEC1002 Electrical System and Control 1
ELEC2005 Electrical Machines
ELEC2006 Power Transmission and Distribution
ELEC2007 CAD Electrical Layouts
ELEC2008 Programmable Logic Controller 1
ELEC2010 Progressive Electrical Maintenance
ELEC2011 Power Transmission and Distribution 2
ELEC2014 Hydro Codes and Standards
ELEC2018 Electronic Devices
ELEN1000 DC Circuit Fundamentals
ENVR1003 Environmental Health and Safety
GEOG2000 Geographic Information Systems
MATH1006 Mathematics for Technology
MGMT2002 Project Management
PHYS1001 Physical Sciences
ROBT2000 Robotics

Communications Courses

To be selected at time of registration from the College list, as determined by testing.

General Education Courses

To be selected from College list

Co-op Work Terms

COOP1022 Electrical Work Term 1

COOP2017 Electrical Work Term 2

Course Descriptions:

COOP1022 Electrical Work Term 1 640.0 Hours

Co-operative Education is a mandatory component of all Co-op programs at Georgian College. It has been designed as a process by which students integrate their academic education with electrical oriented work experience related to their program of study. This integration affects much more than simply earning a salary, including the adjustment to the work environment and the development of professionalism. It also reinforces skills and theory learned during academic semesters, develops professional contacts, job knowledge and career path, improves human relations and communication skills and promotes personal maturity and financial independence.

COOP2017 Electrical Work Term 2 560.0 Hours

Building on previous Co-op experience, students will continue to gain valuable experience and develop knowledge and skills through the second 4 month co-op terms that are relevant to the Electrical sector. Students will gain experience with a variety of electrical functions in various workplaces. Upon completion of the Co-op work term students will be required to attend a debriefing session to review the requirements for completion of the Co-op work term.

P- COOP1022 Electrical Work Term 1

DRFT1003 Introduction to Technical Drafting 42.0 Hours

This course will introduce the student to reading and understanding engineering drawings and the use of the computer as a drafting tool. Emphasis will be on creating accurate, clear drawings. Standards and conventions will be presented and their applications will be shown using CAD.

ELEC1000 CAD Electrical Circuits 42.0 Hours

This course stresses the development of a reasonable skill in preparing and interpreting basic electrical engineering drawings. The student will produce neat and accurate drawings of single line, schematic, connection and inter-connection diagrams. Emphasis will be on industrial power and control applications. Computer Aided Drafting methods will be used to prepare the drawings.

P- DRFT1003 Introduction to Technical Drafting

ELEC1001 AC Circuit Fundamentals 56.0 Hours

A study of single and three phase power systems with various resistive and reactive loads; the relationship between real, apparent and reactive power - including the use of power, phasor and impedance diagrams; methods of measuring power; calculations power factor.

ELEC1002 Electrical System and Control 1 56.0 Hours

The principles of motor control and protection in both AC and DC circuits are developed for forward, reverse and speed regulating applications using electromechanical devices. Control of special motors such as synchronous and wound rotor are analyzed. Standard motor control circuit diagrams and symbols receive detailed attention.

ELEC2005 Electrical Machines 56.0 Hours

This course examines the basic theory, characteristics, construction operation and application of rotating electrical machines. It includes the study of direct current motors, direct current generators, alternators, synchronous motors, polyphase induction motors and single phase motors.

ELEC2006 Power Transmission and Distribution 42.0 Hours

This course is an introduction to power systems. The basic engineering principles of how electrical power is generated, transmitted, distributed and controlled are developed through examination of transformer design, power transmission equipment, and the electrical code.

ELEC2007 CAD Electrical Layouts 42.0 Hours

This course stresses continued development in the skills of preparing and interpreting electrical drawings with emphasis placed on electrical layout and installation drawings such as electrical panel and equipment layouts, cable schedules and conduit installation drawings. Drawings will be prepared on CAD. Specific customization of CAD as it relates to electrical drawings will also be covered.

P- ELEC1000 CAD Electrical Circuits

ELEC2008 Programmable Logic Controller 1 42.0 Hours

This course develops the functional design, hardware configuration, programming and application of Programmable Logic Controllers (PLC). The design and programming of control circuits using examples from industrial applications will be emphasized. The application of PLC's in process automation will be examined. An overview of functional hardware design will be included. The equipment used will be small and medium sized PLC's with both digital and analog capabilities.

ELEC2010 Progressive Electrical Maintenance 42.0 Hours

To be able to manage the maintenance function - to identify safe working habits - interpret all necessary information from various manuals electrical plans - Set up maintenance schemes, lubrication - training - tooling - testing. Repairing. Costing - on various types of plant equipment.

ELEC2011 Power Transmission and Distribution 2 42.0 Hours

This is an advanced Power Distribution course that performs per unit calculations for grid system analysis. Scalar and vector modeling are used to describe the paralleling

effects of generator and transformers. Power factor correction and energy management techniques are studied within the course. In the lab component, students gain the practical experience needed to work in an industrial environment and/or power utilities (generation, transmission, distribution).

ELEC2014 Hydro Codes and Standards 56.0 Hours

This course is designed to introduce the student to the structure and content of the Ontario Electrical Code. Students use design practice and principles applied to distribution and transmission standards as used by utilities in Ontario. Job analysis and design, planning, equipment selection, and government and legal challenges are covered as applied to new upgraded electrical infrastructure.

ELEC2018 Electronic Devices 56.0 Hours

This course explores the theory and principles of electronic devices and digital circuits. Special attention is devoted to topics related to logic gates, flip-flops, encoders, decoders, advanced digital systems, A/D and D/A conversion, power switching and control. Laboratory experiments reinforce lecture theory and provide the student with experience in the use of test instruments and procedures.

ELEN1000 DC Circuit Fundamentals 56.0 Hours

This course introduces the student to the fundamental concepts of direct current electricity using power related applications where possible. Topics include: series and parallel DC circuits, magnetism, inductance, capacitance, DC metering applications and an introduction to network analysis.

ENVR1003 Environmental Health and Safety 42.0 Hours

This course provides an overview of the requirements of current legislation and standards pertaining to environmental health and safety in the workplace. Health and safety management systems, hazardous materials management, WHMIS, biological, physical and chemical hazards, environmental monitoring devices, confined space entry, personal protective equipment, and emergency response will be examined.

GEOG2000 Geographic Information Systems 42.0 Hours

This course will provide an introduction to the topic of Geographic Information Systems (GIS). It will familiarize the student with the basics of the technology and provide an appreciation for the use of GIS in both business and government. Projects will familiarize the student with the use of digital maps, various forms of data input, analysis and the presentation of finished products.

MATH1006 Mathematics for Technology 42.0 Hours

This course provides a foundation in mathematics for students in engineering technology or engineering related programs. Mathematical techniques are applied to a range of technical and financial problems.

MGMT2002 Project Management 42.0 Hours

This course introduces the fundamental principles necessary for successful management of projects. Project planning, management and control techniques will be discussed and the application of computers in project management will be studied.

PHYS1001 Physical Sciences 42.0 Hours

This is a course designed to introduce students to the basic concepts of Physics. It deals with topics which include basic mechanics, simple harmonic motion natural frequencies and sound; heat, thermal expansion, temperature and heat transfer; electromagnetic waves, light optics electricity and magnetism. These concepts are developed by considering practical related examples. Laboratory experiments may be used to illustrate and investigate the principles involved.

ROBT2000 Robotics 42.0 Hours

This is an introductory course in industrial robots. There are two main classes of industrial robots - continuous path robots and pick- and-place robots. Students in this course will learn to operate, program, and service modern continuous path industrial robots. They will also learn to design, construct, and program pneumatic pick-and-place robots using current industrial standards and materials. Proper robot safety procedures will be emphasized throughout the course.

Course Description Legend

P = Prerequisite; C = Concurrent prerequisite; CO= Corequisite

Information contained in College documents respecting programs is correct at the time of publication. Academic content of programs and courses is revised on an ongoing basis to ensure relevance to changing educational objectives and employment market needs. The college reserves the right to add or delete programs, options, courses, timetables or campus locations subject to sufficient enrolment, and the availability of courses.