

# ELECTRICAL TECHNIQUES

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## Program Outline

<b>Major:</b>	ELTQ
<b>Length:</b>	1 Year
<b>Delivery:</b>	2 Semesters
<b>Credential:</b>	Ontario College Certificate
<b>Effective:</b>	2014-2015
<b>Location:</b>	Midland, Owen Sound
<b>Start:</b>	Fall (Midland, Owen Sound), Winter (Midland)

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### Description

This program provides students with the theoretical and practical training to perform most basic electrical techniques. At the completion of the program, students are ready to apply for work as an Electrician's helper or apprentice, or they may choose to continue their education and apply for an Electrical Engineering Technician or Technologist post-secondary program. Students will be exposed to topics including health and safety, reading of drawings, applied math, communications, electrical theory, electronic theory, installation practices, CAD and basic control system principles.

### Career Opportunities

Graduates pursuing an apprenticeship may find a range of occupations in the electrical field including construction, maintenance, service and industrial. Graduates choosing to continue their education will find additional opportunities in power generation and transmission, alternate energy, green technologies and automation sectors.

### Program Learning Outcomes

The graduate has reliably demonstrated the ability to:

- identify, select, and use various electrical products, supplies, and materials commonly found in residential and commercial settings;
- use required work site tools in a proper and safe manner;
- use basic electrical test equipment in a proper and safe manner

- read and interpret wiring and schematic diagrams and drawings;
- describe the health and safety requirements of the electrical field including, and not limited to: WHIMIS, Fall Arrest, Basic First Aid/CPR, etc.;
- use basic electrical measuring instruments to test, troubleshoot and diagnose electrical problems;
- identify, select and organize the necessary tools and equipment in preparation for common electrical installations;
- perform most aspects of residential wiring installations with guidance of the site electrician;
- read and interpret the Ontario and Canadian Electrical Codes as they apply to residential installations;
- use the correct techniques for various electrical installations;
- discuss the advantages and disadvantages of traditional and renewable energy sources, current resources, technologies, and their limitations and a realistic appreciation of what energy sources and technologies will be in the future.

### **The Program Progression:**

Fall Intake - Midland, Owen Sound

Sem 1		Sem 2
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Fall		Winter
2014		2015

Winter Intake - Midland

Sem 1		Sem 2
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Winter		Summer
2015		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) (ENG4C, ENG4U)

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

- Any credit Communication course taken at Georgian College

- Most college preparatory programs including those taken at Georgian College: Technology Foundation, Technology Fundamentals and General Arts and Science\*
- Equivalent courses in English 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
- Mature student testing in English that meets the minimum standards for admission (available through most testing services)\*
- Ontario High School Equivalency Certificate (GED)
- English, Literature or Communication credit courses from accredited colleges/universities

Home school applicants:

- Applicants can write the mature student testing in English 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/](http://georgiancollege.ca/admissions/credit-transfer/)

## **Graduation Requirements:**

### **10 Mandatory Courses**

- 1 Communications Course
- 1 General Education Course

**Graduation Eligibility:**

To graduate from this program, the passing weighted average for promotion through each semester, 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 unless otherwise stated on the course outline.

**Mandatory Courses**

DRFT1003 Introduction to Technical Drafting  
ELEC1001 AC Circuit Fundamentals  
ELEC1002 Electrical System and Control 1  
ELEC1003 Electrical Installations  
ELEC1004 Electronics 1  
ELEC1005 Electronics 2  
ELEC1006 Prints and Electrical Code  
ELEN1000 DC Circuit Fundamentals  
ENVR1003 Environmental Health and Safety  
MATH1018 Introduction to Technical Mathematics

**Communications Course**

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

**General Education Course**

To be selected from College list

**Course Descriptions:**

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.

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.

#### ELEC1003 Electrical Installations 42.0 Hours

In this course students perform installation methods for various electrical wiring methods and safely perform their tasks according to Code rules. Topics covered in this course include raceways and wireways, cabling methods, service entrance installations, low voltage and extra-low voltage circuits.

#### ELEC1004 Electronics 1 42.0 Hours

In this course students interpret the symbols, basic operation and correct circuit configurations for logic gates, resistors, N and P type semiconductors, diodes and transistors. Topics covered in this course include testing of components, soldering and de-soldering procedures, troubleshooting and common applications for digital and semiconductor components.

#### ELEC1005 Electronics 2 42.0 Hours

In this course students use meters and test equipment to check electronic components, test circuits, verify power supply outputs and interpret waveforms. Topics covered in this course include testing and isolation procedures, rectification, capacitor operation, thyristors and phase shifting.

#### ELEC1006 Prints and Electrical Code 42.0 Hours

In this course students are required to interpret and obtain information from architectural, structural and electrical drawings. Students determine which electrical code and building code rules apply to various installations. Topics covered in this course include deciphering of alpha numeric lines, reading of measurement scales, common building materials and building methods, reading of specifications, equipment selection, ordering and scheduling.

#### 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.

**MATH1018 Introduction to Technical Mathematics 42.0 Hours**

This course provides a foundation in mathematics in engineering technology and related programs. Students will develop skill in mathematical thinking and problem solving, and appropriately apply technology in the solution of engineering related problems using algebra, geometry, right angle trigonometry, trigonometric functions of any angle, systems of linear equations, and exponential and logarithmic functions. Additional time to strengthen and reinforce mathematical competencies will be made available to those students who require it.

**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.*