Area of Interest: Skilled Trades

Powerline Technician (Co-op and Non Co-op Version)

Ontario College Diploma  
2 Years  
Ottawa Campus

Academic Year: 2020/2021  
Program Code: 1511X01FWO

Our Program

Become a Powerline Technician in Ontario.

This two-year Powerline Technician Ontario College Diploma program prepares you with the skills you need to succeed as a powerline technician in Ontario. Begin by learning electrical basics and move on to design, planning, construction and maintenance of distribution lines.

You will learn:

• how to use AutoCAD to design structures in 2D and 3D
• about electrical machinery and metering
• how to develop essential safety skills and knowledge
• about practice rigging
• how to design overhead and underground power installations

Starting in the second term, you begin spending one day per week at the Hydro Ottawa partner site located on Bank Street in Ottawa. There you learn climbing, rigging and other hands-on skills you can apply throughout your career.

To ensure the safety of all students, you must complete a Working at Heights training session before you begin training at Hydro Ottawa.

Students also have the option to gain real-world experience through a paid co-operative education (co-op) work term (see Additional Information for more details). Please note that places in the co-op version of the program are subject to availability.

Graduates of this program may be able to work as a powerline technician with electric power generation, and transmission and distribution companies, or pursue a career with electrical contractors and public utility commissions.

SUCCESS FACTORS

This program is well-suited for students who:

• Prefer a hands-on, physical approach to learning.
• Enjoy analyzing and solving problems.
• Work well in a team environment.
• Enjoy the challenge of working outdoors and in all weather conditions.
• Are at ease climbing to and working at heights for power distribution.
• Can work in confined spaces.
• Have a strong aptitude for mechanical reasoning.
Employment

Graduates may find employment as powerline technicians with electric power generation, transmission and distribution companies, electrical contractors and public utility commissions. A strong foundation in technological principles helps graduates to remain current with the changes in technology and grow into supervisory positions.

For the past few years, Hydro Ottawa has hired exclusively from the Algonquin Powerline Technician program to fill their positions for Powerline Maintainer Apprentices and Cable Jointer Apprentices.

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.
- Analyze and solve routine technical problems related to electrical technology and power distribution by applying the principles of mathematics and science.
- Calibrate, use and maintain instrumentation and test equipment.
- Identify problems with overhead and underground powerline equipment and systems by following established procedures and using a variety of troubleshooting techniques.
- Design and draw powerlines and underground distribution systems by following established procedures.
- Practice appropriate safety procedures for self and others and utilize personal protection equipment, including rigging and construction practices.
- Prepare and maintain records and documentation systems and participate in the planning of work and projects.
- Perform tasks related to powerline applications in accordance with relevant law, policies, procedures, standards, regulations, and ethical principles.
- Select and apply electrical cabling requirements and verify system grounding for a variety of powerline applications.
- Install, maintain and remove power poles, transformers, structures and other utility equipment.
- Install and troubleshoot static and rotating electrical machines and associated control systems under the supervision of a qualified person.
- Identify and apply discipline-specific practices that contribute to the local and global community through social responsibility, economic commitment and environmental stewardship.

Program of Study

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<td>Computer Applications - Electrical</td>
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<tr>
<td>ELE8909</td>
<td>Electrical Principles I</td>
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<td>ELE8913</td>
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<tr>
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<td>ELE8023</td>
<td>Alternating Current Circuits</td>
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<tr>
<td>ELE8024</td>
<td>Rigging Theory and Practice</td>
<td>42.0</td>
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ELE8026  Line Work 1  98.0
ELE8027  Electrical Machinery for Powerline Technicians  56.0
PHY8201  Environmental Impact of Technology  42.0

Co-op: 01 Courses Hours
WKTI1100  Powerline Work Term 1 (optional)

Level: 03 Courses Hours
ELE8031  Powerline Design  42.0
ELE8032  Line Work 2  56.0
ELE8033  Revenue Metering  56.0
ELE8034  Underground Systems  42.0
ELE8945  Distributed Power Systems  42.0

Choose one from equivalencies: Courses Hours
GED1511  General Education Elective  42.0

Level: 04 Courses Hours
ELE8042  Introduction to Protection and Control  56.0
ELE8043  Line Work 3  70.0
ELE8044  Street Lighting and Communications Systems  56.0
ELE8944L  Utility Electrical Systems with AutoCAD  56.0
ELE8949  Project Management for Electrical Engineering Technicians  14.0
ENL8720  Technical Communication for Technicians  42.0

Fees for the 2020/2021 Academic Year

Tuition and related ancillary fees for this program can be viewed by using the Tuition and Fees Estimator tool at https://www.algonquincollege.com/fee-estimator.

Further information on fees can be found by visiting the Registrar’s Office website at https://www.algonquincollege.com/ro.

Fees are subject to change.

Additional program related expenses include:
Expenses total approximately $1,200 in the first year and $650 in the second year. Most supplies can be purchased at the campus store. See https://www.algonquincollege.com/coursematerials/ for more information about books. All students are required to have CSA-approved safety footwear and protective eyewear.

There will be an Ancillary fee in level 01 of $70 for Pearson’s math lab. There will be an Ancillary fee in level 02 of $2,520 for handtools, line kit, pliers, wrench, ruler, knife, screwdriver, hammer and working at heights training. Students are responsible for parking and locker fees, if applicable.

Admission Requirements for the 2021/2022 Academic Year

College Eligibility

- Ontario Secondary School Diploma (OSSD) or equivalent. Applicants with an OSSD showing senior English and/or Mathematics courses at the Basic Level, or with Workplace or Open courses, will be tested to determine their eligibility for admission; OR
- Academic and Career Entrance (ACE) certificate; OR
- General Educational Development (GED) certificate; OR
- Mature Student status (19 years of age or older and without a high school diploma at the start of the program). Eligibility may be determined by academic achievement testing for which a fee of $50 (subject to change) will be charged.

Program Eligibility
Powerline Technician (Co-op and Non Co-op Version)

- English Grade 12 (ENG4C or equivalent).
- Mathematics Grade 12 (MAP4C or equivalent).
- Applicants are required to complete a Mechanical Comprehension assessment administered by the Test Centre and pay the exam fee.
- Applicants with international transcripts must provide proof of the subject specific requirements noted above and may be required to provide proof of language proficiency. Domestic applicants with international transcripts must be evaluated through the International Credential Assessment Service of Canada (ICAS) or World Education Services (WES).
- IELTS-International English Language Testing Service (Academic) Overall band of 6.0 with a minimum of 5.5 in each band; OR TOEFL-Internet-based (iBT)-overall 80, with a minimum of 20 in each component: Reading 20; Listening 20; Speaking 20; Writing 20.

Should the number of qualified applicants exceed the number of available places, applicants will be selected on the basis of their proficiency in English, mathematics and mechanical comprehension.

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College Eligibility

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Application Information

POWERLINE TECHNICIAN (CO-OP AND NON CO-OP VERSION)
Program Code 1511X01FWO

Applications to full-time day programs must be submitted with official transcripts showing completion of the academic admission requirements through:

ontariocolleges.ca
60 Corporate Court
Guelph, Ontario N1G 5J3
1-888-892-2228

Students currently enrolled in an Ontario secondary school should notify their Guidance Office prior to their online application at http://www.ontariocolleges.ca/.
Applications for Fall Term and Winter Term admission received by February 1 will be given equal consideration. Applications received after February 1 will be processed on a first-come, first-served basis as long as places are available.

International applicants please visit this link for application process information: https://algonquincollege.force.com/myACint/.

For further information on the admissions process, contact:

Registrar`s Office
Algonquin College
1385 Woodroffe Ave
Ottawa, ON K2G 1V8
Telephone: 613-727-0002
Toll-free: 1-800-565-4723
TTY: 613-727-7766
Fax: 613-727-7632
Email: mailto:AskUs@algonquincollege.com

Additional Information

Programs at Algonquin College are Bring Your Own Device (BYOD). To see the BYOD requirements for your program, please visit: https://www7.algonquincollege.com/byod/.

Students in Level 01 are required to pay for and attend an extracurricular eight-hour session which enables them to meet the Ontario regulation 297/13 Working at Heights Training Standard. This certification is valid for a three-year period and must be successfully obtained prior to beginning courses at the Hydro Ottawa partner site as part of this program.

As per College Directive AA39 Policy 7 students whose academic achievement at Level 01 does not meet the criteria to progress to full-time studies at Level 02 are required to reapply through ontariocolleges.ca for a future academic year.

Beginning in Level 02 of the program students are required to attend training classes one day per week at the Hydro Ottawa partner site. Students are responsible for their own transportation to the site. Students who do not successfully complete the courses delivered at the Hydro Ottawa partner site are unable to progress further in the program.

Participation in a fitness program is highly encouraged for all program students. The Algonquin Fitness Zone has a regimen developed in collaboration with Hydro Ottawa which may be followed at their location or elsewhere. The physical demands of the Line Work training are fairly high but may be readily attained and maintained through this practice.

standard in the field of engineering. Mac platforms are not acceptable because they are not compatible with the hardware and software used in this program.

Students considering a career in the utilities industries should be aware that a security clearance is required by many organizations as a condition of employment.

For more information, contact Ken Jessome, Program Coordinator, at 613-727-4723 ext. 3422 or mailto:jessomk@algonquincollege.com.

CO-OP INFORMATION

Apply directly to the non co-op version of this program through OntarioColleges.ca or our International Application Portal. Qualified students may elect to participate in the co-op version, two terms prior to the first co-op work term. Subject to availability.

Cooperative education (Co-op) allows students to integrate their classroom learning with a real-world experience though paid work terms. Two academic terms prior to the cooperative education work term, students are required to actively participate in and successfully complete the self-directed co-op online readiness activities and in-person workshops.

Students must actively conduct a guided, self-directed job search and are responsible for securing approved program-related paid co-op employment. Students compete for co-op positions alongside students from Algonquin and other Canadian and international colleges and universities. Algonquin College`s Co-op Department provides assistance in developing co-op job opportunities and facilitates the overall process, but does not guarantee that a student will obtain employment in a co-op work term. Co-op students may be required to re-locate to take part in the co-op
employment opportunities available in their industry and must cover all associated expenses; e.g., travel, work permits, visa applications, accommodation and all other incurred expenses.

Co-op work terms are typically 14 weeks in duration and are completed during a term when students are not taking courses.

International students enrolled in a co-op program are required by Immigration, Refugees and Citizenship Canada (IRCC) to have a valid Co-op/Internship Work Permit prior to commencing their work term. Without this document, International students are not legally eligible to engage in work in Canada that is a mandatory part of an academic program.

For more information, please visit https://www.algonquincollege.com/coop.

Course Descriptions

DAT8942 Computer Applications - Electrical

Students are introduced to the College computer network, spreadsheet applications, word processing software and electrical design software, including Multisim electronic workbench and AutoCAD. Focus is on AutoCAD, in particular electrical applications.

Prerequisite(s): none
Corequisite(s): none

ELE8023 Alternating Current Circuits

The behaviour of alternating current (AC) circuits and the operation of capacitors, inductors and resistors in AC circuits are studied. Students apply this theory to transmission lines and reactors used by power utilities. The principles of induction, bonding and grounding are applied to jobsite problems and procedures.

Prerequisite(s): ELE8909
Corequisite(s): none

ELE8024 Rigging Theory and Practice

The application of pulleys, levers, gears and hydraulics is examined with applications to hoisting, rigging and guyng. The relationship between angles, distances and forces is studied with applications to guyng and cable installation. Students experiment in the lab to develop their ability to apply physical principles to work related situations.

Prerequisite(s): none
Corequisite(s): none

ELE8026 Line Work 1

Students demonstrate safe practices by identifying, controlling and eliminating all potential health and safety hazards; selecting, wearing, adjusting, using and maintaining personal protective devices; performing evacuation and rescue procedures; practicing good housekeeping; working within safe physical limits and applying correct body mechanics and applying the principles of induction, grounding and bonding. Using field experiences under the supervision of a qualified person, students select, operate and maintain tools and equipment by inspecting, maintaining and using hand, power tools and explosive actuated tools; inspecting, operating and maintaining vehicles and auxiliary equipment and ensuring setup of mobile equipment. These skills are applied to install, maintain and remove power pole systems by identifying the type, size and location of a pole; framing and erecting a pole; straightening a pole and testing a pole for integrity.

Prerequisite(s): ELE8909 and ELE8913
Corequisite(s): none

ELE8027 Electrical Machinery for Powerline Technicians

Electromagnetism is studied as the basis for understanding the operation of electrical equipment. This extends into transformer operation, sizing, construction and cooling. Students examine and
calculate voltages, current, power and other characteristics of single and three phase systems. An overview of motors is included with a view to their characteristics as load on electrical systems. Students examine generators as power sources and distributed generation systems, as well as the characteristics of overcurrent devices.

Prerequisite(s): ELE8909 and MAT8001
Corerequisite(s):none

ELE8031 Powerline Design

Part III of the Canadian Electrical Code, utility standards and other resources are applied to solve design problems associated with transmission lines including sizing of conductors, insulators, control devices and sag and tension calculating. Students prepare a job plan by identifying the worksite; determining job methods, assignments and process; determining material and equipment and establishing lockout, tagging and hold-off procedures as per the Utility Work Protection Code.

Prerequisite(s): ELE8913
Corerequisite(s):none

ELE8032 Line Work 2

Using field experiences under the supervision of a qualified person, students install and maintain overhead power systems by installing and removing conductors; splicing or repairing conductors; installing spacers, conductor measurement equipment and markers. Installing and removing switches; installing or removing service/secondary conductors; inspecting overhead power systems; upgrading overhead structures; installing anchoring and guying systems are also practiced.

Prerequisite(s): ELE8026
Corerequisite(s):none

ELE8033 Revenue Metering

The installation, testing and maintenance of single and three phase revenue metering is studied and practiced in a lab environment. The emphasis is on smart metering and associated systems. Students study and practice the installation of current transformers (CTs) and potential transformers (PTs). Metering issues related to protection and control are also examined.

Prerequisite(s): ELE8023
Corerequisite(s):none

ELE8034 Underground Systems

Students acquire the skills required to install and maintain underground distribution systems. In the lab, terminating and splicing primary/secondary underground cables is practiced. Students will also learn about cable construction and the role of each cable component, and how these cables work in the underground system. Students will study different types of padmount and submersible transformer installations, switching and troubleshooting. Confined space entry and rescue procedures will be practiced as well as the handling of compressed gases.

Prerequisite(s): none
Corerequisite(s):none

ELE8042 Introduction to Protection and Control

Students examine the types of protection relays and fault protection used in power distribution and transmission. Students study equipment ratings, current transformers, fuses, circuit breakers, time current curves (TCC curves), single line representations of power systems, typical drawing symbols and terminology, zones of protection, selective coordination, substation design and power flow. Protection and control relays for transformers, motors, and feeders are programmed, tested and used in simulation.

Prerequisite(s): ELE8945
Powerline Technician (Co-op and Non-Co-op Version)

Corerequisite(s): none

**ELE8043 Line Work 3**

Under the supervision of a qualified person, students handle energized lines using rubber protective equipment and live line tool methods. Students gain experience in selecting, testing, inspecting, and maintaining rubber protective equipment, live line tools and barriers; tying, clamping and relocating energized conductors; installing and removing openers, insulators and switches on live conductors.

Prerequisite(s): ELE8032
Corerequisite(s): none

**ELE8044 Street Lighting and Communications Systems**

Connecting, testing and troubleshooting street lighting systems and controls is studied and practiced in the lab. Students examine telecommunication systems associated with smart metering and Supervisory Control and Data Acquisition (SCADA) systems.

Prerequisite(s): ELE8033
Corerequisite(s): none

**ELE8909 Electrical Principles I**

Students are introduced to the fundamentals of direct current circuit analysis. The standards for electrical measurement are studied and practiced. Electrical circuit design, construction and documentation are also practiced. The first module is a compulsory orientation to safe electrical work practices.

Prerequisite(s): none
Corerequisite(s): none

**ELE8913 Codes and Regulations**

Students locate and interpret the Canadian Electrical Code rules that ensure that electrical systems and equipment do not create hazardous conditions to person or property. This forms the basis for building electrical system design.

Prerequisite(s): none
Corerequisite(s): none

**ELE8919 Achieving Success in the 21st Century**

Rapid changes in technology have created new employment and business opportunities that challenge each of us to find our place as citizens in the emerging society. Life in the 21st century presents significant opportunities, creates potential hazards, and demands that we face new responsibilities in ethical ways. Students explore the possibilities ahead, assess their own aptitudes and strengths, and apply critical thinking and decision making tools to help resolve some of the important issues present in our complex society with its competing interests.

Prerequisite(s): none
Corerequisite(s): none

**ELE8944L Utility Electrical Systems with AutoCAD**

Students expand their AutoCAD skills to include layers, blocks, PaperSpace, ModelSpace, block attributes, templates (DWT), drawing standards and Drawing Web Format (DWF). Standards, particularly the Canadian Electrical Code, specifications, and manufacturers' data are used to the design overhead and underground electrical distributions and transmission systems.

Prerequisite(s): DAT8942
Corerequisite(s): none
**ELE8945 Distributed Power Systems**

Students examine power generation, transmission and distribution with particular emphasis on the province of Ontario. This includes an understanding of standard voltage levels, energy sources, cost of electricity, environmental impact, major system components, reactive loads, power quality, arc flash safety, effects of weather on the delivery of electricity and organizational structures that control electricity in Ontario.

Prerequisite(s): none  
Corerequisite(s): none

**ELE8949 Project Management for Electrical Engineering Technicians**

Students develop the planning, scheduling, budgeting and organizing skills required to manage projects. Relevant industrial examples are used.

Prerequisite(s): ENL1813T  
Corerequisite(s): ENL2019T and ENL8720

**ENL1813T Communications I**

Communication remains an essential skill sought by employers, regardless of discipline or field of study. Using a practical, vocation-oriented approach, students focus on meeting the requirements of effective communication. Through a combination of lectures, exercises, and independent learning, students practise writing, speaking, reading, listening, locating and documenting information and using technology to communicate professionally. Students develop and strengthen communication skills that contribute to success in both educational and workplace environments.

Prerequisite(s): none  
Corerequisite(s): none

**ENL8720 Technical Communication for Technicians**

Clear, concise and detailed communication is essential for technical workplaces. Students plan and execute a variety of formal and informal visual, oral and written communication tasks. Exercises and activities foster confidence and competence in workplace communication.

Prerequisite(s): ENL1813T  
Corerequisite(s): none

**FIT4711 Physical Fitness I**

Students learn about healthy lifestyle and fitness guidelines to prepare for job-specific fitness and overall wellness. Students engage in hands-on fitness labs to attain and maintain an appropriate level of physical fitness for the physically active workplace.

Prerequisite(s): none  
Corerequisite(s): none

**GED1511 General Education Elective**

Students choose one course, from a group of general education electives, which meets one of the following five theme requirements: Arts in Society, Civic Life, Social and Cultural Understanding, Personal Understanding, and Science and Technology.

Prerequisite(s): none  
Corerequisite(s): none

**MAT8001 Math Fundamentals**
Students review the manipulation of algebraic expressions as foundation for advanced mathematical concepts. Students solve 2x2 and 3x3 systems of linear equations, and factor algebraic expressions using common factors and techniques for factoring trinomials. They simplify, add, subtract, multiply and divide rational expressions and solve equations involving algebraic fractions. Students study the trigonometry of right triangles and solve trigonometric problems involving both acute and obtuse angles in standard position. Linear, quadratic and trigonometric functions are graphed using a table of values. Delivered in a modular format, this course is equivalent to the completion of all of the following math modules: MAT8100 - a, b, c, e, k

Prerequisite(s): none
Corerequisite(s):none

**PHY8201 Environmental Impact of Technology**

Every day newspaper headlines, movies, and television have warnings of the dire consequences of some environmental issues, such as global warming, acid rain, climate change and a host of other problems. Students are provided some of the science behind the headlines so they can make informed decisions as citizens, consumers and professionals.

Prerequisite(s): none
Corerequisite(s):none

**WKT1100 Powerline Work Term 1 (optional)**

This course includes a work placement, a weekly recording of the activities done in a journal and a final summary report of the overall experience to be submitted before returning to school. The placement has to be within the Powerline-related industry. The timing of the placement depends on the progression pattern of the program and cannot be done before completion of the second level of the Powerline program. The placement is monitored by the College. Feedback from the employer is considered in the final evaluation of the course. All assignments (journal entries and final report) must be provided to pass the course. The College Co-op office assists in finding a placement. It is the student’s responsibility to find, apply and get the work term as if they were applying for a job.

Prerequisite(s): none
Corerequisite(s):none