

Area of Interest: Construction and Skilled Trades

Powerline Technician

Ontario College Diploma

Program Code: 1511X03FWO

2 Year

Ottawa Campus

Our Program

Learn the essential skills and knowledge to become a Powerline Technician in Ontario.

The 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 fundamentals and move on to design, planning, construction and maintenance of overhead and underground power systems.

You will learn:

- how to use AutoCAD to design overhead and underground electrical power systems
- about electrical machinery and metering
- about street lighting and communications systems
- to identify, control and eliminate potential health and safety hazards
- about hoisting, rigging and guying
- how to solve design problems associated with power transmission and distribution lines
- about protection relays and fault protection used in power distribution and transmission

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 practise 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 work term are subject to availability and academic eligibility. Please note admission to the co-op program does not guarantee a co-op placement.

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 College Powerline Technician program to fill their positions for Powerline Maintainer Apprentices and Cable Joints 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.

Program of Study

Level: 01	Courses	Hours
DAT8942	Computer Applications - Electrical	42.0
ELE8909	Electrical Principles I	84.0
ELE8913	Codes and Regulations	42.0
ELE8919	Achieving Success in the 21st Century	42.0
ENL1813T	Communications I	42.0
FIT4711	Physical Fitness I	28.0
GEP1001	Cooperative Education and Job Readiness	18.0
MAT8001	Math Fundamentals	42.0
Level: 02	Courses	Hours
ELE8023	Alternating Current Circuits	42.0
ELE8024	Rigging Theory and Practice	42.0
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
WKT1100	Powerline Work Term 1	0.0
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 2023/2024 Academic Year

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

Further information on fees can be found by visiting the Registrar's Office website at <http://www.algonquincollege.com/ro>

Fees are subject to change.

Additional program related expenses include:

- Books, etextbooks and school supplies, including safety glasses and safety boots, cost approximately \$1,000. Most supplies can be purchased at the campus store. For more information visit <http://www.algonquincollege.com/coursematerials> .
- All students are required to have CSA-approved work boots, at least 6 tall, and protective eyewear.
- There will be an Ancillary fee in level 01 of \$54.00 for Pearson My Mathlab. There will be an Ancillary fee in level 02 of \$2,675 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 2024/2025 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 will be charged.

Program Eligibility

- English Grade 12 (ENG4C or equivalent).
- Mathematics Grade 12 (MAP4C or equivalent).
- 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; OR Duolingo English Test (DET) Overall 110, minimum of 110 in Literacy and no score below 95.

Not sure if you meet all of the requirements? Academic Upgrading may be able to help with that: <https://www.algonquincollege.com/access>

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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- * 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).

Program Eligibility

- * English Grade 12 (ENG4C or equivalent).
- * Mathematics Grade 12 (MAP4C or equivalent).

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).

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Application Information

POWERLINE TECHNICIAN Program Code 1511X03FWO

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
Contact: <https://www.algonquincollege.com/ro>

Additional Information

CO-OP INFORMATION

All applicants apply directly to the co-op version of this program through OntarioColleges.ca or our International Application Portal. Applicants not wishing to pursue the co-op version will have the opportunity to opt-out after being admitted to the program but prior to the first co-op work term.

Co-operative education (Co-op) allows students to integrate their classroom learning with a real-world experience through 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 course, readiness activities and 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 College and other Canadian and international colleges and universities. Algonquin College's Co-op Department provides assistance in developing co-op job opportunities and guides 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 relocate 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. For more information on your program's co-op level(s), visit the courses tab on your program's webpage.

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 part of an academic program. The Co-op/Internship Work Permit does not authorize international students to work outside the requirements of their academic program.

For more information on co-op programs, the co-op work/study schedule, as well as general and program-specific co-op eligibility criteria, please visit <http://www.algonquincollege.com/coop> .

PROGRAM INFORMATION

Students at Level 01 are required to pay for and attend an extracurricular 8-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 at 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.

As part of the Powerline Technician program, there are courses that involve working at heights and in confined spaces. The necessary equipment that a student must wear or use to successfully complete the course (e.g. safety harnesses, ladders and aerial devices) have weight limitations, often to a maximum weight of 300 lbs. This weight limitation includes the weight of the student, their clothing, tools, and equipment. Students who are not able to safely work at heights or in confined spaces due to exceeding maximum weight limitations, will be unable to complete the courses at the Hydro Ottawa partner site.

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.

Students are trained on a Windows-based platform which is the industry 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. A valid Class G driver's license may also be a condition of employment.

Contact Information

Program Coordinator(s)

- Kathryn Reilander, <mailto:reilank@algonquincollege.com> , 613-727-4723, ext. 3431

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 guying. The relationship between angles, distances and forces is studied with applications to guying and cable installation. Students experiment in the lab to develop their ability to apply physical principles to work related situations.

Prerequisite(s): none
Corerequisite(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
Corerequisite(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.

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
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

To understand how electrical circuits, systems and equipment work, knowledge of electrical principles is essential. Students study safe practices for working with electrical systems. Students explore electrical measurement standards and develop the ability to design, construct, test and document circuits. Through applied activities and labs, students apply the skills required to analyze, test and troubleshoot electrical systems.

Prerequisite(s): none

Corerequisite(s):none

ELE8913 Codes and Regulations

Codes and Regulations serve to ensure electrical systems are consistent, reliable, safe and effective. Students locate and interpret the Canadian Electrical Code rules that ensure that electrical systems and equipment do not create hazardous conditions to human life or property. This forms the basis for building electrical system design. Through case studies and in-class activities, students practice applying various regulatory codes to ensure safe practices.

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):none

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

GEP1001 Cooperative Education and Job Readiness

Students are guided through a series of activities that prepare them to conduct a professional job search and succeed in the workplace. Through a detailed orientation students learn the cooperative education program policies and procedures related to searching and securing a work term opportunity. Students identify their strengths and transferable skills and participate in workshop-style sessions that focus on cover letter and resume development, interview techniques and job search strategies. Students learn how to navigate a web-based resource centre, which is used to post employment and cooperative education job opportunities. Students reflect on workplace success, ethics and responsibilities.

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 and T.

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

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