Area of Interest: Construction and Skilled Trades

Heating, Refrigeration and Air Conditioning Technician

Ontario College Diploma

Program Code: 0590X04FWO

42 Weeks

Ottawa Campus

Our Program

Make yourself more employable. In addition to the diploma, this program prepares you to write TSSA exams.

The two-year Heating, Refrigeration and Air Conditioning Technician Ontario College Diploma program delivered in a compressed format over 42 weeks, is approved by the Technical Standards and Safety Authority (TSSA) and is taught in Algonquin`s state-of-the-art Algonquin Centre for Construction Excellence (ACCE) building. By studying in the ACCE building, you have the opportunity to work in a fully-outfitted facility where you learn both traditional and advanced technologies used in the industry.

Start the program by learning electrical, refrigeration and heating essentials - all courses have a strong hands-on component. To better prepare you for a career in the industry, vocational subjects are enriched with courses in:

- communications
- mathematics
- related sciences

Continue to enhance your knowledge and skills throughout the remainder of the program, and learn about controls, forced air gas/oil heating systems, hydronics and advanced refrigeration.

Algonquin College`s program also includes an approved curriculum for:

- Gas Technician 3 (G3) and Gas Technician 2 (G2)
- Oil Burner Technician 3 (OBT3)

This means that you have an opportunity to prepare for and write your TSSA exams, in order to become licensed as a Gas Technician and Oil Burner Technician during the program. At the end of your second term, you may be eligible to apply to write your TSSA G3 and OBT3 certificates of qualification. At the end of your final term, you may be eligible to apply for your TSSA G2 certificate of qualification, making you more employable in the field.

Upon completing the TSSA exams, you will be able to install, service, maintain and troubleshoot residential heating systems.

Upon graduation, you may find employment opportunities as a service technician or installer. Graduates may also pursue a career in parts or equipment sales with a variety of employers such as:

- residential and commercial heating companies
- air conditioning or refrigeration contractors
- wholesalers
- public utilities
- oil distribution companies

- government

SUCCESS FACTORS

This program is well-suited for students who:

- Enjoy a hands-on approach to learning about the heating, refrigeration and air conditioning industry.
- Are team-oriented and enjoy working with others.
- Are self-reliant and enjoy challenges.

Employment

Graduates may find employment as service technicians, installers, parts or equipment sales with a variety of employers, such as residential and commercial heating, air conditioning and refrigeration contractors, wholesalers, public utilities, oil distribution companies and different levels of government.

Learning Outcomes

The graduate has reliably demonstrated the ability to:

- Relate effectively to heating, refrigeration, and air conditioning supervisors, coworkers, and customers.
- Work safely and in accordance with all applicable acts, regulations, legislation, and codes to ensure personal and public safety.
- Select and use a variety of heating, refrigeration, and air conditioning tools and equipment safely and properly.
- Solve math and applied science problems required to effectively install and maintain heating, refrigeration, and air conditioning systems, and associated components.
- Prepare and interpret electrical, mechanical, and piping drawings.
- Install, service, and troubleshoot heating, refrigeration, air conditioning systems, and associated components.
- Develop strategies for ongoing personal and professional development that will lead to enhanced work performance and career opportunities, and keep pace with industry changes.
- 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

Level: 01	Courses	Hours
ELE8131	Electrical Fundamentals	84.0
ENL1813T	Communications I	42.0
HRA8130	Refrigeration Concepts	70.0
HRA8151	Heating System Fundamentals	112.0
MGT8100	Career and College Success Skills	42.0
SCI8510	Math and HRAC Science	28.0
Level: 02	**Courses**	**Hours**

ELE8132	Control Fundamentals	56.0
ENL2003	Communications II for Technicians	42.0
HRA8140	Climate Control and the Environment	42.0
HRA8142	Gas Heating Systems	112.0
HRA8143	Oil Heating Systems	98.0
SCI8511	Advanced HRAC Science	28.0
Level: 03	**Courses**	**Hours**
ELE8133	Advanced Controls	42.0
HRA8139	Forced Air Systems	112.0
HRA8144	Hydronics and Space Heating	126.0
HRA8160	Refrigeration II	56.0
Choose one from equivalencies:	**Courses**	**Hours**
GED0590	General Education Elective	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 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:

- Books and supplies total approximately $2,000 for the program and can be purchased in the campus bookstore.

- Students are responsible for the TSSA certification exam fees, which are approximately $250 per exam.

- Students must supply their own personal protective equipment such as CSA-approved safety footwear and non-tinted eye protection as required in each lab environment.

- 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

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Program Eligibility

- English, Grade 12 (ENG4C or equivalent)
- Mathematics, Grade 12 (MAP4C or equivalent)
- Mathematics, Grade 12 (MCT4C is recommended)
- 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 and mathematics.

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Application Information

HEATING, REFRIGERATION AND AIR CONDITIONING TECHNICIAN
Program Code 0590X04FWO

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

Electrical test meters and toolkits are provided by the College within the incidental fee and become the property of the student.

Students of this program will have the opportunity to obtain additional industry related certifications (such as IPEX System S636, and Gastite CSST).

Students are required to attend 80% and maintain a 75% grade in all core classes in order to write their TSSA Gas and Oil exams.

Apprenticeship is required after graduation for those who wish to become tradespersons.

Contact Information

Program Coordinator(s)

- Adam Boxall, mailto:boxalla@algonquincollege.com , 613-727-4723, ext. 7119

Course Descriptions

ELE8131 Electrical Fundamentals

Students are provided with both theoretical and practical concepts of basic electricity and electrical circuits that are related to heating, air conditioning and refrigeration systems and applications. Students also cover use and application of basic electrical test meters. Lab exercises reinforce both basic circuit design and meter usage.

Prerequisite(s): none
Corerequisite(s):HRA8151

ELE8132 Control Fundamentals

An overview of building electrical service and basic circuits is provided. Students learn principles and applications of electromechanical and electronic controls and control circuits that are used in heating, air conditioning and refrigeration systems. Skills in interpreting, designing, and applying different types of wiring diagrams are practiced and developed throughout the course.

Prerequisite(s): ELE8131
Corerequisite(s):HRA8142 and HRA8143

ELE8133 Advanced Controls

This course is a continuation of the interpretation and use of various wiring diagrams along with developing an understanding of control terms and concepts. Learners add to their troubleshooting skills and increase their knowledge in motors and motor applications.

Prerequisite(s): ELE8132
Corerequisite(s):HRA8139 and HRA8144

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

ENL2003 Communications II for Technicians

Communicating effectively in the workplace is a key component of career advancement and essential skills development. The ability to read, understand, reframe and deliver technical information to varied audiences is critical in a competitive marketplace. Students are exposed to a variety of common communication challenges related to working in their field of study. To meet these challenges, students are required to do basic research and data gathering, to summarize and reframe written, oral and visual information and to present their findings to a defined audience in an appropriate medium or media.

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

GED0590 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

HRA8130 Refrigeration Concepts

Students are introduced to heat transfer and thermodynamics related to air conditioning and refrigeration. The basic refrigeration cycle and its components are covered along with installation, service and troubleshooting skills for basic refrigeration systems. Lab exercises are used to reinforce theoretical aspects along with teaching basic hand tool usage, soldering, brazing and other piping and tubing practices. Installation and use of manifold gauges, vacuum pumps and other specialty tools are also taught in the class along with hands-on practise in the lab.

Prerequisite(s): none

Corerequisite(s):none

HRA8139 Forced Air Systems

Students acquire the theoretical and practical background required to install, maintain and service air handling systems including high efficiency gas furnaces. Students also learn about add-on devices, such as humidifiers, filters, electronic air cleaners and the installation of add-on air conditioning systems.

Prerequisite(s): HRA8142
Corerequisite(s):ELE8133 and HRA8144

HRA8140 Climate Control and the Environment

The heating and cooling systems that we use to stay comfortable affect our environment. Students examine the alternatives to fossil fuels and refrigerants, as well as historical, contemporary and future technologies. Through a combination of online assignments, discussions and activities, students focus on the human contribution to global warming and climate change, and learn about the effects of, and alternatives to, current climate control technologies.

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

HRA8142 Gas Heating Systems

Students are introduced to gas and propane fired water heaters, forced warm air heating systems, and other gas appliances in both classroom and lab environments. Theoretical and practical application of cylinders, tanks, gas meters and regulators are also covered along with code requirements. Students learn how to determine venting and combustion air requirements for propane and natural gas fired heating systems, and the installation and application of conversion burners.

Prerequisite(s): HRA8151
Corerequisite(s):ELE8132

HRA8143 Oil Heating Systems

Theoretical and hands-on activities in relation to familiarization, installation, wiring, start-up, and troubleshooting of oil fired furnaces and water heaters are provided. Students also perform annual maintenance and combustion efficiency testing on oil fired equipment along with sizing venting systems and applying proper venting practices. The concept of the building as a system is also studied.

Prerequisite(s): none
Corerequisite(s):ELE8132

HRA8144 Hydronics and Space Heating

Students acquire the theoretical and practical background for the service, installation, and maintenance of water heaters, combination systems and hydronic heating systems. Installation, maintenance, and service of a variety of vented and non-vented appliances are also covered in theory and lab classes.

Prerequisite(s): HRA8142
Corerequisite(s):ELE8133 and HRA8139

HRA8151 Heating System Fundamentals

A theoretical and practical introduction to the fundamental principles of natural gas, propane and fuel oil heating systems is provided. Students are introduced to government codes and regulations regarding the industry and to the principles of combustion. Safety requirements, use and selection of various tools, instruments and fasteners are also studied in both theory and lab environments.

The fundamental principles required to plan and install different types of piping for a variety of heating appliances are also covered.

Prerequisite(s): none
Corerequisite(s):ELE8131

HRA8160 Refrigeration II

Students apply the fundamentals learned in Refrigeration Concepts. Students advance their theoretical knowledge by addressing residential and commercial air conditioning systems, compressors and compressor components, electrical control systems, domestic refrigerators and freezers, heat pumps, ductless air conditioners and their applications.

Prerequisite(s): HRA8130
Corerequisite(s):none

MGT8100 Career and College Success Skills

To succeed at college, in the workforce, and in the community, we must adapt to changing environments, manage our time effectively, study efficiently, think independently and make difficult decisions. At the same time, we are often required to collaborate and cooperate with others, make use of available resources and services, cope with pressure and take responsibility for our learning and actions. Through discussions, assignments, and group work, students develop and apply these skills in a supportive and collaborative learning environment.

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

SCI8510 Math and HRAC Science

The heating, refrigeration and air conditioning industry has a long and rich history based on many scientific principles, from thermodynamics and the law of conservation of energy, to the expansion of solids due to temperature changes. Students first develop the skills to efficiently add, subtract, multiply and divide, as well as calculate distances, areas, and volumes in both metric and U.S. customary units. Students explore exponents and algebra to assist them in solving equations for unknown variables. They also study the properties of matter, and the gas laws.

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

SCI8511 Advanced HRAC Science

The heating, refrigeration and air conditioning industry has a long and rich history based on many scientific principles from thermodynamics and the law of conservation of energy to the expansion of solids due to temperature changes. Students develop the skills to appropriately explain the concepts of heat, temperature, freezing and boiling, as well as convert between the temperature scales. Students determine the changes in length, area or volume of objects when undergoing a temperature change. They investigate heat transfer methods and calculate the rate of heat transfer through walls. Students use Ohm's law to solve for current, voltage and resistance in parallel, series and mixed circuits.

Prerequisite(s): SCI8510
Corerequisite(s):none