Area of Interest: Construction and Skilled Trades

Residential Air Conditioning Systems Mechanic (Apprenticeship)

College Certificate

Program Code: 0500R01FWO

16 Weeks

Ottawa Campus

Our Program

Become a journeyperson in the residential air conditioning industry.

The Residential Air Conditioning Systems Mechanic Algonquin College Certificate program is designed for registered apprentices who are invited to register at the Ministry of Training, Colleges and Universities (MTCU). Residential Air Conditioning Systems Mechanic is a compulsory trade in Ontario and requires certification.

If you are considering a future as a residential air conditioning systems mechanic, you may find a career as a(n):

- installer
- field service technician
- designer
- consultant

You may also find employment as an entrepreneur, sales representative or parts counter clerk. If you want to learn more about apprenticeships, visit http://earnwhileyoulearn.ca/ for detailed information.

For Registered Apprentices:
This program fulfills the in-class requirements for your apprenticeship. It is broken into two levels where you alternate between going to class for 8-weeks and honing your skills through working in the field for 8 - 12 months.

During your labs you learn about:

- mechanical and cooling cycle components
- electricity and installation procedures
- construction health and safety

You are also introduced to soldering and brazing with a torch. In the advanced level, you study AC systems and controls, plan reading and sketching, cooling load calculations and psychrometrics.

At the end of this program, you qualify to write the exam to receive a certificate of qualification in the Residential Air Conditioning Systems Mechanic trade in Ontario.

SUCCESS FACTORS

This program is well-suited for apprentices who:

- Enjoy working with their hands, constructing and repairing mechanical and electrical equipment.
- Have good spatial comprehension and mechanical aptitude.

- Have an aptitude for math and applied science.
- Have strong communication skills, both verbal and written.
- Enjoy logic-based decision making.
- Are willing to work at heights, in confined spaces and out-of-doors in all conditions.
- Can work independently.
- Seek variety in their career.
- Enjoy challenges, problem solving and innovation.
- Enjoy working in a residential environment, and interacting with homeowners, tenants and clients.

Employment

Graduates are apprentices and mechanics employed as installers, field service technicians, designers, consultants, entrepreneurs, sales representatives, and parts counter clerks with a variety of employers, such as residential contractors, subcontractors, manufacturers,engineering and design firms, real estate developers and housing boards. It is common for residential air conditioning mechanics to hold other trade licenses.

Program of Study

Level: 01	Courses	Hours
ACR1410	Introduction to Electricity and Controls for AC and R	72.0
ACR1412	AC and R System Operation and Components	72.0
ACR1413	AC and R Piping Installation	48.0
ACR1711	AC and R System Installation and Maintenance	48.0
Level: 02	**Courses**	**Hours**
ACR1440	Electricity and Electronics for Residential HVAC	96.0
ACR1441	Residential HVAC Systems and Thermofluids	96.0
ACR1442	Residential HVAC Design, Distribution and Blueprints	48.0

Fees for the 2023/2024 Academic Year

Tuition Fees: $400 per level.

Incidental Fee: $150 per level.

Information Technology Fee: $43.86 per level.

Apprentices are responsible for supplying their own textbooks as required. Books and supplies can be purchased at the campus store. Expenses total approximately $1,000 for each in-school level.

Students are responsible for parking and locker fees, if applicable.

All students are responsible to supply their own personal protective equipment (such as CSA-approved safety footwear, non-tinted protective eyewear, hearing protection, gloves, hard hat, fire-resistant coveralls) as required in each lab environment.

Admission Requirements for the 2024/2025 Academic Year

Program Eligibility

- Eligibility is determined by the Ministry of Labour, Training and Skills Development.

- Applicants must be formally registered as apprentices and be released by their sponsor to attend the College.

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Application Information

RESIDENTIAL AIR CONDITIONING SYSTEMS MECHANIC (APPRENTICESHIP)
Program Code 0500R01FWO

Registration for Apprenticeship programs takes place through the Ministry of Labour, Training, and Skills Development.

For further information, contact:

Ministry of Labour, Training, and Skills Development
347 Preston Street 3rd Floor, Suite 310
Ottawa, ON K1S 3H8

https://www.ontario.ca/page/start-apprenticeship
Telephone: 613-731-7100
Toll-free: 1-877-221-1220

Contact Information

Program Coordinator(s)

- Trevor Root, mailto:rootT@algonquincollege.com , 613-727-4723, ext. 2464

Course Descriptions

ACR1410 Introduction to Electricity and Controls for AC and R

Electricity forms the power source and control method of a typical air conditioning and refrigeration (AC and R) system. The apprentice learns the fundamentals of electrical and electromagnetic operation, including the use and measurement of voltage, current, resistance and capacitance in both theoretical and applied settings. The apprentice also develops a theoretical understanding of power and inductance. The knowledge is applied to the operation of single phase motors, heaters and related auxiliary components. The apprentice becomes proficient at identifying safety and operation controls and how they relate to a control system. The apprentice also studies the creation and use of wiring diagrams, including schematic, ladder and pictorial types. Theoretical concepts are explored through the use of lectures and research assignments and then applied in a lab through equipment disassembly, and the use of simulators and test equipment.

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

ACR1412 AC and R System Operation and Components

The complexity of installing and servicing ACR systems requires an understanding of the four crucial mechanical components and a multitude of auxiliary components. The apprentice learns the key concepts behind an electro-mechanical vapour compression refrigeration system. The apprentice also learns key concepts of physics and thermodynamics as they relate to ACR, including thermal energy, pressure-temperature relationships, changes of operating state, as well as pressure and vacuum measurements and application. Typical system pressures and temperatures and the application of various refrigerants and lubricants are a key focus. The theoretical concepts are explored through the use of lectures and research assignments and then applied in a lab through equipment disassembly, and the use of simulators and test equipment.

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

ACR1413 AC and R Piping Installation

Brazing and soldering are the common techniques for installing and modifying flow components and piping in ACR systems. The apprentice learns the safe use of air-acetylene and oxy-acetylene torches as they relate to ACR. The process of igniting, adjusting and extinguishing torches is covered, as well as hot work safety and preparation. Soldering and brazing of copper are key focuses, using both copper phosphorus and high silver brazing alloys. The apprentice demonstrates the ability to braze copper tubing to trade standard. The skills learned are transferrable to any air-fuel or oxy-fuel process. The apprentice also learns correct techniques for system pressure testing, evacuating and leak detection.

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

ACR1440 Electricity and Electronics for Residential HVAC

Electricity and its various applications, through either electrical, electro-mechanical or electronic methods is central to every ACR system. Apprentices learn about single phase motors including compressor and fan motors. Electrical control system terminologies are discussed. Troubleshooting of control circuits is covered. Apprentices learn to identify and describe electronic control systems including input/output sensors and electronic controllers. Methods of communicating with and programming control systems and energy conservation methods and strategies are covered. The knowledge required is developed through a blend of classroom instruction, including lectures and assignments, as well as time spent wiring, verifying, energizing and measuring electrical equipment in the lab.

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

ACR1441 Residential HVAC Systems and Thermofluids

Apprentices will develop a deep understanding of the components in an air conditioning or heat pump system, their function, and how to install and service those components. Advanced installation techniques and requirements will be covered, and apprentices will develop skills in sizing refrigeration piping, air ducts and hydronic piping. The operation of compressors, fans and pumps will be discussed. Typical sequences of operation and operating pressures and temperatures will be developed. Split and packaged air conditioning, air source and geothermal heat pumps, electric resistive heating, and the role of hydronic heating will all be developed. The characteristics of refrigerants, glycols, oils, water and air, including the study of psychrometrics form a key part of the program of study.

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

ACR1442 Residential HVAC Design, Distribution and Blueprints

Residential air conditioning installation and servicing requires a thorough knowledge of ductwork, piping and plans. Apprentices learn the layout and components of residential air distribution systems. The operation, application and servicing of blowers and fans are discussed. Air filtration,

ventilation and indoor air quality requirements are covered. Apprentices learn to interpret residential construction drawings and sources of building heat gain are discussed. Apprentices learn the concepts of sizing HVAC systems for residential applications. The proper application of required skills is proven through the examination and creation of drawings in both the classroom, as well as the lab environment.

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

ACR1711 AC and R System Installation and Maintenance

Service and installation skills are foundational to a career in ACR. Environmental issues related to trade, codes, acts and regulations are examined. The selection and use of general and specialized hand and power tools and measurement instruments are covered. The apprentice learns procedures for the inspection and maintenance of ACR systems, including charging and recovering refrigeration. Codes and regulations are examined through lectures and research assignments.

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