

Area of Interest: Health Sciences

Cardiovascular Technology

Ontario College Diploma

Program Code: 1628X01FWO

2 Years

Ottawa Campus

Our Program

Using hands-on learning, explore a career that supports cardiac care.

The two-year Cardiovascular Technology Ontario College Diploma program provides you with the essential knowledge and technical skills required to perform electrocardiograms, exercise tolerance tests and ambulatory monitoring in the role of a cardiovascular technologist. Professionals in this field work closely with patients to diagnose cardiac conditions.

Emphasizing a hands-on approach through in-class laboratory simulation and clinical practice, this program is aligned with the competencies outlined by the Canadian Society of Cardiology Technologists (CSCT) National Occupational Competency Profile (NOCP). Areas of focus include performing various non-invasive cardiac testing such as:

- electrocardiography
- stress testing
- ambulatory monitoring
- pacemaker follow-up

You develop critical thinking by integrating knowledge of cardiac anatomy, pharmacology and various pathophysiology to provide accurate diagnostic information to members of the health care team.

Graduates of this program are eligible to write the CSCT national certification exam. Upon successful completion of this exam, graduates become a Registered Cardiology Technologist (RCT). This provides employment opportunities across Canada in:

- hospitals
- private cardiac clinics
- physician offices
- cardiac rehabilitation centres
- pacemaker clinics
- ambulatory monitoring health services
- medical sales or research

Graduates may pursue post-graduate studies in such areas as diagnostic cardiac sonography, pacemaker technology or cardiac electrophysiology technology.

SUCCESS FACTORS

This program is well-suited for students who:

- Are able to work effectively under stressful situations.

- Are compassionate and caring.
- Possess excellent communication and interpersonal skills.
- Enjoy physical and hands-on work.
- Find value in problem solving and critical thinking.
- Are attentive to detail.
- Enjoy working as a member of a team.

Employment

Graduates may find employment as cardiology technologists, cardiovascular technologists, ECG technicians, pacemaker/cardiac device technologists, electrophysiology technologists or clinical applications specialists. Upon successful completion of the program, a student must write the Canadian Society of Cardiology Technologist (CSCT) certification exam to become credentialed. With this credential, students may also consider international opportunities. For example, students may write the Cardiac Rhythm Analysis Technician (CRAT) certification exam to open up employment opportunities in the United States of America.

Learning Outcomes

The graduate has reliably demonstrated the ability to:

- Perform cardiac procedures by integrating knowledge of cardiovascular anatomy, physiology, pathophysiology and pharmacology.
- Perform all clinical duties in accordance with legal and ethical requirements, as well as institutional directives.
- Provide patient-centred care to ensure quality healthcare service.
- Perform appropriate and relevant test procedures as required by the patient's cardiac status.
- Assist physicians during emergency life support by utilizing proper patient care techniques and identifying cardiovascular agents.
- Operate cardiac-related medical equipment and perform basic maintenance and troubleshooting to ensure quality diagnostic testing.
- Perform, analyze and document results of electrocardiograms, exercise tolerance tests and ambulatory monitoring.
- Assess implantable cardiac devices through programming and device interrogation.
- Observe routine practices, standard precautions and follow sterile field and operating room protocols.
- Engage in reflective practice and ongoing professional development to enhance competence in Cardiovascular Technology.
- 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
ENL1813S	Communications I	42.0
HLT0311	Introduction to Research Methods	42.0

HLT0312	Anatomy and Physiology	70.0
HLT0313	Cardiovascular Anatomy and Physiology	42.0
HLT0314	Introduction to Cardiovascular Technology and Equipment Maintenance	42.0
HLT0315	Electrocardiography	70.0
Level: 02	Courses	Hours
HLT0320	Cardiovascular Pathophysiology	42.0
HLT0321	12-Lead ECG Interpretation	84.0
HLT0322	Ambulatory Monitoring 1	42.0
HLT0323	Cardiovascular Pharmacology	42.0
HLT0324	Stress Testing	84.0
HLT0340	Basic Venipuncture	14.0
Level: 03	Courses	Hours
ENV0002	Environmental Citizenship	42.0
GEN1001	Ethics: What Is the Big Deal?	42.0
HLT0325	Clinical Practicum 1	300.0
Level: 04	Courses	Hours
HLT0330	Cardiac Devices	70.0
HLT0331	Cardiac Diagnostic and Interventional Procedures	70.0
HLT0332	Ambulatory Monitoring 2	28.0
HLT0333	Pediatric Cardiology	42.0
HLT0334	Advanced Electrocardiography	42.0
HLT0335	Electrophysiology	42.0
Level: 05	Courses	Hours
HLT0341	Cardiac Rehabilitation	42.0
HLT0345	Clinical Practicum 2	300.0
Choose one from equivalencies:	Courses	Hours
GED1628	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.

The fees to write the National Certification exam are approximately \$600, plus applicable taxes (subject to change). These fees are current at the time of publication and are subject to change. Further information may be obtained by browsing the Canadian Society of Cardiology Technologists website (<http://www.csct.ca/>).

Books, supplies and clinical items (uniforms, stethoscope, name tag, etc.) cost approximately \$3,500 for the program duration (subject to change).

Some clinical placements are outside of Ottawa. It is the responsibility of the student to research the cost of living and to finance all expenses related to Clinical Practicum.

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 of \$50 (subject to change) will be charged.

Program Eligibility

- English, Grade 12 (ENG4C or equivalent) with a grade of 60% or higher.
- Mathematics, Grade 12 (MAP4C or equivalent) with a grade of 60% or higher.
- Biology, Grade 11 or 12 with a grade of 60% or higher.
- Chemistry, Grade 11 or 12 with a grade of 60% or higher.
- Physics, Grade 11 or 12 with a grade of 60% or higher.
- All applicants must complete an assessment of their knowledge and skills through the Test Centre, and pay an exam fee. Results from the Algonquin College Health Program Admissions Test (AC-HPAT) will be utilized to establish minimum eligibility and applicant ranking. The AC-HPAT can only be written once per academic cycle. For further information on the HPAT and how to book your assessment, please visit Algonquin's Test Centre.
- 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 6.5 with a minimum of 6.0 in each band; OR TOEFL-Internet-based (iBT)-overall 88, with a minimum of 22 in each component: Reading 22; Listening 22; Speaking 22; Writing 22; OR Duolingo English Test (DET) Overall 120, minimum of 120 in Literacy and no score below 105.

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

International Applicants:

International applicants who meet the program eligibility requirements are required to complete preparatory courses (4-months in duration): Introduction to Canadian Health Studies (ICHS). Students who successfully complete the introduction will then proceed to their original health program of choice. The ICHS requires applicants to submit an academic IELTS score.

Please click this link for more information:

<https://www.algonquincollege.com/healthandcommunity/ICHS/> .

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Application Information

CARDIOVASCULAR TECHNOLOGY **Program Code 1628X01FWO**

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

If at any time during the program there is a break in the student's progress of one term or more, the student is required to enroll and pass a mandatory Continuing Education course to update practicum skills. The student is responsible for the cost of the required Continuing Education course and must advise the Program Coordinator of their intentions to return to the program six weeks in advance of the start of the semester in which they would like to return. Returning status will be granted based on the availability of placement sites.

Contact Information

Program Coordinator(s)

- Karen Tran, <mailto:trank1@algonquincollege.com>,

Course Descriptions

ENL1813S 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. 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

ENV0002 Environmental Citizenship

Environmental citizenship is based on the principles of national citizenship, yet it goes beyond political borders to emphasize global environmental rights and responsibilities. An environmental citizen is committed to learning more about the environment and to taking responsible environmental action. Through a combination of interactive activities, assignments and discussions, students learn how they are personally connected with current environmental issues. Students are also encouraged to adopt attitudes and behaviours that foster global environmental responsibility.

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

GED1628 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

GEN1001 Ethics: What Is the Big Deal?

In today's society there is increasingly more attention focused on questions of right or wrong, good or evil. Ethical issues relating to a wide variety of concerns are examined. Students clarify their own moral values and explore how these values impact the course of their lives. Students practise using tools and decision-making models to deal with personal and professional dilemmas.

Prerequisite(s): none

Corerequisite(s):none

HLT0311 Introduction to Research Methods

Generating accurate and meaningful conclusions from quantitative and qualitative research requires knowledge of research principles and methods. The importance of critical-thinking processes, levels of evidence, scientific research principles and information evaluation skills are introduced. Methods used to locate, present and describe data are practised. A basic ability to draw conclusions about populations based on sample data is developed. The selection and use of summary values, such as measures of central tendency and measures of variation are examined, as well as some inferential statistical techniques. An overview of research methodology, rigor, bias and research ethics is applied in order to critically appraise a research paper.

Prerequisite(s): none

Corerequisite(s):none

HLT0312 Anatomy and Physiology

An understanding of human biology is essential to cardiovascular technologists. Learners are introduced to the human body and its functions. Learners build foundational knowledge of anatomy, cells, tissues, and body membranes. This knowledge is applied to the anatomy and physiology of the integumentary, skeletal, muscular, nervous, endocrine systems, special senses, reproductive, respiratory, urinary, digestive, and lymphatic systems. Through a combination of face-to-face and online lectures, exercises, and independent study, students learn differing anatomy and physiology concepts.

Prerequisite(s): none

Corerequisite(s):none

HLT0313 Cardiovascular Anatomy and Physiology

The human heart is a complex organ that functions as a pump for the movement of blood throughout the human body. Providing foundational knowledge, students begin critically evaluating patient symptoms and underlying etiology. Students examine the anatomy and physiology of the heart's structures and its relation to other aspects of the human body. Students are introduced to the regulation of heart rate and various pressures of the body. Attention is directed to the heart's electrical system as well as the cardiac cycle.

Prerequisite(s): none

Corerequisite(s):none

HLT0314 Introduction to Cardiovascular Technology and Equipment Maintenance

Students are exposed to the field of Cardiovascular Technology and the role of a cardiology technologist. Learners practice with various cardiac equipment and their basic maintenance. Students focus on principles and techniques of patient care and safety. Through role-play, case scenarios and group discussions, the importance of ethics and values in the workplace and society are emphasized. Legal aspects of informed patient consent, privacy, confidentiality and medical

health records are discussed. Students work with various equipment in a lab to familiarize themselves with basic equipment operation, maintenance and troubleshooting.

Prerequisite(s): none

Corequisite(s):none

HLT0315 Electrocardiography

Electrocardiography (ECG) is a fundamental diagnostic tool routinely used to assess the heart's electrical activity. Students integrate knowledge of the heart's electrophysiology with the basic cardiac cycle, lead theory and basic measurements. Through in-class practice, students familiarize themselves with ECG paper and the different components of an ECG report. Students build upon this knowledge to analyze cardiac rhythms and arrhythmia. Lectures, visual aids, case studies and hands-on practice provide the framework for ECG interpretation.

Prerequisite(s): none

Corequisite(s):HLT0313

HLT0320 Cardiovascular Pathophysiology

Each cardiovascular disease or condition is unique requiring different diagnostic tests and treatment. Therefore, it is important for students to identify various cardiovascular pathophysiology to provide effective care. Students identify and describe various cardiovascular pathophysiology, explore their clinical presentation and be introduced to treatment options. Through lectures, case studies, primary literature, videos, visual aids and group discussions, students integrate knowledge of normal cardiac physiology to various cardiac abnormalities and their effects on a patient.

Prerequisite(s): HLT0313

Corequisite(s):none

HLT0321 12-Lead ECG Interpretation

A 12-lead electrocardiogram (ECG) is a fundamental diagnostic tool used to analyze the heart's electrical activity. Students systematically examine the various parts of a 12-lead ECG to present an accurate and full interpretation. Applying knowledge of cardiac rhythms, students integrate additional electrical signals to a 12-lead ECG. Focus is placed on acute coronary syndrome and ischemic heart disease. Students work in a lab setting to practice 12-lead ECG hook-ups and interpretations. Case studies and group discussions reinforce knowledge.

Prerequisite(s): HLT0313 and HLT0314 and HLT0315

Corequisite(s):HLT0324

HLT0322 Ambulatory Monitoring 1

Ambulatory monitoring allows for patients to wear devices that monitor either their blood pressure or their electrocardiogram for a specific period outside a health centre. Students familiarize themselves with various devices to explain patient symptoms. Indications and contraindications are explored. Through in-lab experiences, students analyze and document Holter scans. Students have the opportunity to analyze case studies to solidify and integrate knowledge.

Prerequisite(s): HLT0313 and HLT0314 and HLT0315

Corequisite(s):none

HLT0323 Cardiovascular Pharmacology

Different classes of cardiovascular drugs are used to treat conditions of the cardiac, circulatory or vascular system. Students learn about the benefits and side effects of each class of pharmacological agents. Students study common medications that are routinely used, as well as emergency drugs. Emphasis is placed on cardiac-related medication and their pharmacokinetics in relation to cardiac testing.

Prerequisite(s): HLT0313 and HLT0315

Corerequisite(s):none

HLT0324 Stress Testing

Stress testing is a non-invasive cardiac diagnostic test that aids in the detection of coronary artery disease (CAD), as well as various cardiac arrhythmia abnormalities. The purpose is to gain perspective in performing an exercise tolerance test. Students familiarize themselves with indications, contraindications and emergency procedures. Pharmacological and nuclear stress testing are introduced. Students simulate responses to emergency situations using resuscitation equipment through in-lab practice. Students have the opportunity to practise an exercise tolerance test. Case scenarios are also provided to further solidify knowledge of abnormal exercise reports.

Prerequisite(s): HLT0313 and HLT0314 and HLT0315

Corerequisite(s):HLT0321

HLT0325 Clinical Practicum 1

Clinical practicum provides students with an opportunity to apply their developing knowledge and skills in a health care facility. Students gain an appreciation for the pressures that affect decision-making in today's healthcare environment, enabling them to identify additional skills needed for a rewarding career in Cardiovascular Technology. The practicum focuses on three areas: Electrocardiography, Ambulatory Monitoring and Stress Testing. Students rotate through these areas in an in-field clinical setting.

Prerequisite(s): HLT0314 and HLT0315 and HLT0321 and HLT0322 and HLT0324

Corerequisite(s):none

HLT0330 Cardiac Devices

Various malfunction of the cardiovascular conduction system may require an artificial pacemaker as treatment. Cardiovascular technologists must be able to determine if a pacemaker is functioning appropriately on an electrocardiogram (ECG). Cardiac device technology is introduced. Students discuss indications and contraindications of different cardiac devices. Students discuss telemetry and relate to patient symptoms and medications. Special focus is placed on pacemaker ECG interpretation. Through case studies, group discussions and in-class practice, students are able to identify artificial pacer beats, pacer codes and recognize pacer malfunctions.

Prerequisite(s): HLT0313 and HLT0315 and HLT0320 and HLT0321 and HLT0323

Corerequisite(s):none

HLT0331 Cardiac Diagnostic and Interventional Procedures

Students are introduced to both invasive and non-invasive cardiac diagnostic procedures. Students recognize and identify procedures a cardiac patient may encounter. Students examine indications, contraindications and complications for each procedure to determine proper patient care. Students are able to describe each procedure and any electrocardiographic changes if applicable. Through videos, in-class lectures, case studies and group discussions, students focus on the variety of interventional procedures that a cardiac patient may encounter.

Prerequisite(s): HLT0313 and HLT0315 and HLT0320 and HLT0321 and HLT0323

Corerequisite(s):none

HLT0332 Ambulatory Monitoring 2

Students review and explore a variety of arrhythmias that may explain patient symptoms. Opportunities to scan pacemaker tracings and advance arrhythmias are provided. During in-lab experiences, students have the opportunity to wear various monitors, to analyze and document the results. Students practice Holter scanning. Opportunities are given to critically analyze and solidify information.

Prerequisite(s): HLT0313 and HLT0314 and HLT0315 and HLT0321 and HLT0322

Corerequisite(s):none

HLT0333 Pediatric Cardiology

There is a wide spectrum of congenital heart defects. Students are introduced to a variety of congenital abnormalities and discuss their presentation. Normal age specific electrographic (ECG) criteria are introduced and compared with abnormal heart defects. Emphasis is placed on various congenital heart defects and their surgical repairs. Fetal heart anatomy and physiology are reviewed. Through videos, visual aids and case studies, students contrast normal and abnormal heart development.

Prerequisite(s): HLT0313 and HLT0315 and HLT0320 and HLT0321

Corerequisite(s):none

HLT0334 Advanced Electrocardiography

Abnormal electrocardiographic (ECG) changes can be caused by a variety of genetic, inflammatory conditions and electrolyte imbalances. Therefore, it is important to recognize these changes and respond appropriately. Students review normal 12-lead ECGs and integrate knowledge of associated cardiac abnormalities to expand their repertoire of ECG knowledge. Attention to special lead placement is introduced. Through in-lab practice, students are exposed to different case studies to reinforce their knowledge. Students also have the opportunity to practise special lead placements in a lab.

Prerequisite(s): HLT0313 and HLT0314 and HLT0315 and HLT0320 and HLT0321

Corerequisite(s):none

HLT0335 Electrophysiology

Patients with abnormal heart rhythms may be eligible for an electrophysiology (EP) study along with therapeutic ablation to treat their symptoms. Students explore their role as a cardiovascular technologist during an electrophysiology study. Special emphasis is placed on intracardiac mapping of the heart. Students integrate knowledge of different arrhythmias to an intracardiac electrogram. Through videos and case studies, students are introduced to the pacing system and its recordings.

Prerequisite(s): HLT0313 and HLT0315 and HLT0320 and HLT0321 and HLT0323

Corerequisite(s):none

HLT0340 Basic Venipuncture

Specific stress tests require an intravenous line to be inserted for injection of pharmacological agents. Students review the anatomy, physiology and location of veins. Emphasis is on intravenous insertion and prepping an intravenous bag. Using simulated arms, students have the opportunity to practice basic venipuncture.

Prerequisite(s): none

Corerequisite(s):none

HLT0341 Cardiac Rehabilitation

Cardiac rehabilitation is the process by which a person who has adverse consequences due to a cardiac event is encouraged to adopt healthy lifestyle changes to reduce further cardiac damage. Students are introduced to risk factor management and exercise programs. Emphasis on patient education and program standards will prepare students with the tools required as a member of the cardiac team. Students will have the opportunity through case studies and discussions, to identify the progression of a patient from the onset of cardiac disease to diagnostic testing and finally long-term management.

Prerequisite(s): none

Corerequisite(s):none

HLT0345 Clinical Practicum 2

The clinical practicum provides students with an opportunity to apply all knowledge and skills from

the entire program in a health care facility. The practicum allows students to reinforce experiences from the formative clinical practicum to enhance all clinical competencies. Students will rotate between three areas of focus: Electrocardiography, Ambulatory Monitoring and Stress Testing. Students practice all clinical aspects of working effectively with patients and members of the health care team.

Prerequisite(s): HLT0311 and HLT0312 and HLT0313 and HLT0314 and HLT0315 and HLT0320 and HLT0321 and HLT0322 and HLT0323 and HLT0324 and HLT0325 and HLT0330 and HLT0331 and HLT0332 and HLT0333 and HLT0334 and HLT0335 and HLT0341

Corerequisite(s):none