

We acknowledge and respect that we are gathered on the traditional lands of the Anishnaabe People of Turtle Island and proudly recognize our local host Atikameksheng Anishnawbek. We also recognize the contributions of Wahnapiatae First Nation and the Metis Nation of Ontario.

Course Title	Mechatronics I				
Course Code:	MEC1000	Credit Value:	4	Credit Hours:	56
Programs:	COEM Common Electromechanical EMTN Electromechanical Engineering Technician - Mechatr EMTY Electromechanical Engineering Technology - Mechatr MEDC Mechatronics Dual Credit				
Equivalencies		Prerequisites		Corequisites	

This course may be delivered in a variety of different formats: 100% in-class, 100% online (or a blend of both), videoconferencing, distributed learning or off-campus. Please confirm with your faculty member which format will be used for your section of this course.

General Education Course: ☐

Eligible for PLAR: ☒

Degree Breadth Course: ☐

Experiential Learning: ☐

Research Intensive Course Designation: ☐

COURSE DESCRIPTION

In this course, students will be introduced to the foundations of computer programming using practical examples related to the Mechatronics field. Fundamentals of robotics and industrial automation, including system configurations, applications, methods of power transmission, types of control, tooling and interfacing with peripherals will also be covered. Arduino microcontrollers will be used to provide students with opportunities to program interface and controller units.

Date: May 27, 2026

Alison Caruso

Approved by: _____

ALISON CARUSO
 Chair, Schools Of Engineering Tech & Enviro.
 Studies, Schools Of Skilled Training, Engineering
 Technology & Environmental Studies

Effective: Fall 2026, Winter 2027, Spring 2027

RELATIONSHIP TO PROGRAM VOCATIONAL LEARNING OUTCOMES

PROGRAM LEVEL	
This course contributes to your program by allowing you to demonstrate the following vocational learning outcomes:	
Program(s)	Vocational Learning Outcomes
Electromechanical Engineering Technician – Mechatronics	Ministry Standards 1. Fabricate and build electrical, electronic, and mechanical components and assemblies in accordance with operating standards, job requirements, and specifications. 2. Interpret and produce electrical, electronic, and mechanical drawings and other related technical documents and graphics for a variety of stakeholders in compliance with industry standards. 3. Select and use a variety of troubleshooting techniques and equipment to assess, maintain, and repair electromechanical circuits, equipment, processes, systems, and subsystems. 4. Maintain and repair electrical, electronic, and mechanical components, equipment, and systems to ensure that they function according to specifications and to optimize production. 5. Apply, analyze, build, install, commission, and troubleshoot a variety of mechanical, electrical, and electronic control systems, logic and digital circuits, passive AC and DC circuits, and active circuits. 6. Install and troubleshoot basic computer hardware and programming to support the electromechanical engineering environment. 7. Maintain and troubleshoot automated equipment including robotic systems. 8. Develop strategies for ongoing personal and professional development to enhance work performance and to remain current in the field and responsive to emergent technologies and national and international standards. 9. Contribute as an individual and a member of an electromechanical engineering team to the effective completion of tasks and projects. College Standards 1. Determine safety requirements of robotics and automated systems and apply them to the design of components and systems. 2. Describe and interpret information obtained from measuring devices and data acquisition systems for analysis and troubleshooting.
Electromechanical Engineering Technology – Mechatronics	Ministry Standards 1. Fabricate and build electrical, electronic, and mechanical components and assemblies in accordance with operating standards, job requirements, and specifications.

Program(s)	Vocational Learning Outcomes
	2. Analyze, interpret, and produce electrical, electronic, and mechanical drawings and other related technical documents and graphics necessary for electromechanical design in compliance with industry standards. 3. Select and use a variety of troubleshooting techniques and equipment to assess, modify, maintain, and repair electromechanical circuits, equipment, processes, systems, and subsystems. 4. Modify, maintain, and repair electrical, electronic, and mechanical components, equipment, and systems to ensure that they function according to specifications and to optimize production. 5. Design, analyze, build, select, commission, integrate, and troubleshoot a variety of industrial motor controls and data acquisition devices and systems, digital circuits, passive AC and DC circuits, active circuits and microprocessor-based systems. 6. Install and troubleshoot computer hardware and programming to support the electromechanical engineering environment. 7. Analyse, program, install, integrate, troubleshoot and diagnose automated systems including robotic systems. 8. Develop strategies for ongoing personal and professional development to enhance work performance and to remain current in the field and responsive to emergent technologies and national and international standards. 9. Contribute as an individual and a member of an electromechanical engineering team to the effective completion of tasks and projects. College Standards 1. Determine safety requirements of robotics and automated systems and apply them to the design of components and systems. 2. Analyze and interpret information obtained from measuring devices and data acquisition systems for analysis and troubleshooting.

COURSE CURRICULUM

Topics/Concepts Covered in This Course

- Hydraulics
- Power Transmission
- Pneumatics
- Control Circuits
- Safety
- Automation
- Arduino
- Project Design

COURSE LEVEL: Learning Outcomes and Objectives	
To earn credit for this course, you must reliably demonstrate your ability to:	
Learning Outcome	Objectives
1. Discuss methods of power transmission and automation	1.1 Describe hydraulic controls 1.2 Describe power transmission 1.3 Describe robotics and other forms of industrial automation
2. Discuss Arduino microcontrollers	2.1 Describe the inputs and outputs of an Arduino 2.2 Demonstrate programming of an Arduino
3. Discuss methods of interfacing with peripherals	3.1 Describe different types of peripherals 3.2 Describe how peripherals may be utilized in automation
4. Discuss types of controls	4.1 Describe PLC Controls 4.2 Describe control circuits and discuss the difference between control and power circuits

Essential Employability Skills

Communication

- communicate clearly in written, spoken, and visual form that fulfills purpose/needs of audience.
- respond to written, spoken, or visual messages in a manner that ensures effective communication.

Numeracy

- execute mathematical operations accurately.

Critical Thinking and Problem Solving

- apply a systematic approach to solve problems.
- use a variety of thinking skills to anticipate and solve problems.

Information Management

- locate, select, organize, and document information using appropriate technology and info systems.
- analyze, evaluate, and apply relevant information from a variety of sources.

Interpersonal

- show respect for the diverse opinions, values, belief systems, and contributions of others.
- interact with others in groups in ways that contribute to effective working relationships.

Personal

- manage the use of time and other resources to complete projects.
- take responsibility for one's own actions, decisions, and consequences.

Delivery Method

- Classroom: Course is delivered through scheduled synchronous teaching that may be face-to-face and/or virtual.

Learning Activities

- Lectures
- Class Discussions
- Labs
- Group Work
- Self-Directed Learning
- In-Class Exercises
- eLearning Components

Resources Required

Additional Supplies

Computer
Specifications as per the program requirements.

PPE
Safety boots and safety glasses required in lab.

Evaluation Plan

Grading Scheme

A	80% - 100%
B	70% - 79%
C	60% - 69%
D	50% - 59%
F	0% - 49%

Evaluation Method	Value (%)
Assignments	40%
5 assignments of equal value for a total of 40%	
Test/Exam	40%
2 tests of equal value worth a total of 40%	
Applied Activities (G)	10%
1 applied activity worth 10%	
Professional Conduct	10%
Professional conduct is central to the objective of developing a respectful, safe and professional atmosphere in and around the classroom/lab.	
Please see the course syllabus for additional information regarding evaluation rubrics as pertaining to achieving learning outcomes.	

ADDITIONAL INFORMATION

A course outline is the College's commitment to the students. It supports educators, students, employers, and external partners in determining the depth of knowledge and level of performance that a student will be able to demonstrate upon successful completion of a course. Both instructor and

student are obligated to follow the content of the course outline. It is your responsibility to meet these outcomes as assigned.

Note: You should maintain a copy of this course outline for your records. You may require this course outline if you seek transfer credits or further studies at other institutions.

Cambrian Email Addresses

All email correspondence with currently registered students must be via the students' College-issued email, as per the College's [IT Acceptable Use Policy](#). Students must familiarize themselves with the IT Acceptable Use Policy, as it outlines the acceptable use of College information systems and technology, and mitigates risks to the College's IT infrastructure.

Bring Your Own Device (BYOD) and Apps Anywhere

Cambrian College is a BYOD institution, which means that students bring the device of their choice that meets program-specific minimum technology requirements. Program-specific minimum technology requirements can be viewed on program pages on the Cambrian College website. AppsAnywhere is an easy-to-use app store-like platform providing students with a way to access their College apps and software on demand, anywhere, anytime both on and off campus. These both enrich the student learning experience in and out of the classroom, while providing maximum flexibility.

Policies

It is the student's responsibility to be aware of the College's policies. Policies, procedures and forms can be found on the [College website](#).

Academic and Student Services

Cambrian has a variety of student and academic services to support students during their academic journey at the College.

- [Academic Integrity Office](#)
- [Academic Success Centre](#)
- [Bookstore and Campus Store](#)
- [International Student Support Services](#)
- [KPMG Pride Centre](#)
- [Career Centre](#)
- [Registrar's Office \(Enrolment Centre\)](#)
- [First Step Centre](#)
- [Accessibility Services](#)
- [Library](#)
- [Pathways](#)
- [Available Scholarships and Bursaries](#)
- [Cambrian Student Council \(CSC\)](#)
- [Cambrian Indigenous Student Circle \(CISC\)](#)
- [Cambrian Athletic Association \(CAA\)](#)
- [Student Life Centre](#)
- [Test Centre](#)
- [The Learning Centre \[Tutoring Services\]](#)
- [Wabnode Centre for Indigenous Services](#)
- [Women's Resource Centre](#)

Copyright

Copyright is the exclusive legal right given to a creator to reproduce, publish, sell, or distribute his/her work. All members of the Cambrian community are required to comply with Canadian copyright law, which governs the reproduction, use and distribution of copyrighted materials. This means that the copying, use and distribution of copyright-protected materials, regardless of format, are subject

to certain limits and restrictions. For example, activities such as photocopying or scanning an entire textbook or uploading class materials to a course sharing site are prohibited.

See the [Cambrian Library website](#) for additional information regarding copyright and for details on allowable limits.

Audio/Visual Capture

Sounds and images from this class, and contributions made by a participant, virtually or in-person, are recorded under the authority of the *Ontario Colleges of Applied Arts and Technology Act, 2002*. The main purpose of these recordings is to allow students enrolled in the course to review content and engage in activities, whether they attend any given class in person, virtually, or at all. Class recordings are for personal use only and shall not be shared or transferred. Faculty may also review these recordings to prepare for future classes, evaluate students, collaborate in program reviews, or provide feedback to faculty and/or students. Any questions about the use of multimedia recordings may be addressed to your respective Dean.

Equity, Diversity, and Inclusivity

Cambrian is committed to building and preserving an equitable, diverse, and inclusive learning community where students, faculty, and staff may achieve their full potential in an environment characterized by equality of respect and opportunity. All students and employees have the right to live and work in an environment that is free from discrimination and harassment. Therefore, Cambrian College will not tolerate any form of discrimination or harassment in its employment, education, accommodation, or business dealings. For more information, please visit: [Equity, Human Rights, and Accessibility](#).

Prior Learning Assessment and Recognition (PLAR)

Students wishing to have work or life experience that meets course learning outcomes considered for credit through Prior Learning Assessment and Recognition should email the Enrolment Centre at records@cambriancollege.ca.

Transfer Credit

Students wishing to have courses from other programs or institutions assessed for equivalency and/or transfer credit should visit the [Transfer Credits page](#) on the Cambrian website. The student should maintain a copy of this course outline for their records. Students may require this course outline if seeking transfer credits or further studies at other institutions.

Test Proctoring at Cambrian

Many courses include major tests and/or final exams. The practice at Cambrian requires that these types of test situations involve proctoring to ensure academic integrity. Online tests/exams may employ a proctoring services to enable you to take your exam from a location of your choosing within a period specified by your instructor. When you are taking an online test/exam, the proctoring service may capture your video, screen, audio, and web surfing data to protect academic integrity. Cambrian College collects, uses, discloses, and retains personal information in compliance with the *Freedom of Information and Protection of Privacy Act (FIPPA)*. Your personal information is being collected under the authority of the *Ontario Colleges of Applied Arts and Technology Act S.O. 2002, c.8, Sched. F*. This information will be used for the purpose of administering a test/exam through an online proctoring service acting as an authorized agent of the College. Please refer to Cambrian's [Official Student Records Policy](#) for more details. If you have any questions regarding the collection of your personal information, please contact Vice President Academic, Cambrian College, 1400 Barry Downe Rd., Sudbury ON P3A 3V8, 1-705-566-8101 ext. 6245.

Schools of Skilled Training, Engineering Technology & Environmental Studies Regulations

Lab Attendance

This course includes a mandatory lab component. The grading in this course will include the evaluation of lab reports and performance during labs.