

## Course Outline

<b>Course Title:</b>	Trade Science		
<b>Course Number:</b>	MECH418	<b>Approval Date:</b>	2025/1/3
<b>Course Hours:</b>	45 hours	<b>Academic Year:</b>	2024
<b>Academic School:</b>	School of Trades & Technology		

<b>Faculty:</b>	Harmen Minnema - Harmen.Minnema@flemingcollege.ca Gary Johnston - Gary.Johnston2@flemingcollege.ca
<b>Program Co-ordinator or Equivalent:</b>	Susan Brown - Susan.Brown2@flemingcollege.ca
<b>Dean (or Chair):</b>	Allison MacGregor - Allison.MacGregor@flemingcollege.ca

## Course Description

The course covers the basic concepts and principles of science and its relation to the skilled trades. Course topics will include lessons in mechanics, heat, light, sounds, electricity, weights, fluids and magnetism related to trades through hands on learning.

**Prerequisites:** None.

**Corequisites:** None.

## Course Delivery Type

**Face to face.**

All course hours are delivered in person at the delivery location specified on the academic timetable.

## Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Assess the role of science, as related to the trades.
2. Trace the history of physics, and chemistry and the evolution of science from ancient to modern times.
3. Define and solve basic concepts of velocity, force, inertia, mass, work, energy, momentum, gravity, power, pressure, density, temperature, thermal expansion, heat, specific heat, sound, magnetism, and light.

4. Solve a variety of basic problems in chemistry, fluid mechanics, thermodynamics, basic electricity, and how they relate to construction techniques.
5. Interpret the results of simple experiments and demonstrations of physical principles.
6. Compare science topics to everyday applications

## Learning Resources

Materials as supplied in class and in the Learning Management System.

Costs for learning resources can be found on the Campus Store website, using the links below, or by visiting the Campus Store location at your campus.

- Sutherland: <https://www.bkstr.com/sfleming-sutherlandstore/home>
- Frost: <https://www.bkstr.com/sfleming-froststore/home>

## Assessment Summary

Assessment Task	Percentage
In-class activities	35%
Quizzes	30%
Assignments	10%
Tests	25%

## Student Success: Policies and Procedures

Mutually, faculty and learners will support and adhere to college Academic Regulations, and Student Rights and Responsibilities. The following policies and guidelines have been developed to support the learning process.

Please click on the link for information about:

- [Academic Integrity \(2-201A\)](https://department.flemingcollege.ca/hr/attachment/7750/download)  
(<https://department.flemingcollege.ca/hr/attachment/7750/download>)
- [Accessibility for Persons with Disabilities \(3-341\)](https://department.flemingcollege.ca/hr/attachment/5619/download)  
(<https://department.flemingcollege.ca/hr/attachment/5619/download>)
- [Grading and Academic Standing \(2-201C\)](https://department.flemingcollege.ca/hr/attachment/7752/download)  
(<https://department.flemingcollege.ca/hr/attachment/7752/download>)
- [Guidelines for Professional Practice: Students and Faculty](https://flemingcollege.ca/PDF/guidelines-for-professional-practice-students-faculty.pdf)  
(<https://flemingcollege.ca/PDF/guidelines-for-professional-practice-students-faculty.pdf>)
- [Student Rights and Responsibilities \(5-506\)](https://department.flemingcollege.ca/hr/attachment/269/download)  
(<https://department.flemingcollege.ca/hr/attachment/269/download>)

If you will need academic accommodations (for example if you have a learning disability, mental health condition such as anxiety or depression or if you had an IEP in high school), please contact the [Accessible Education Services \(AES\)](https://department.flemingcollege.ca/aes/) department (<https://department.flemingcollege.ca/aes/>) to meet with a counsellor.

**Alternate accessible formats of learning resources and materials will be provided, on request.**

## Program Standards

The **Ministry of Colleges and Universities** oversees the development and the review of standards for programs of instruction. The **Ministry of Labour Training and Skills Development** oversees the development and the review of standards for programs of instruction for Apprenticeship training in the province of Ontario. Each college is required to ensure that its programs and program delivery are consistent with these standards, and must assist students to achieve these essential outcomes.

This course contributes to Program Standards as defined by the [Ministry of Colleges and Universities](#) (MCU). Program standards apply to all similar programs of instruction offered by colleges across the province. Each program standard for a postsecondary program includes the following elements:

- **Vocational standards** (the vocationally specific learning outcomes which apply to the program of instruction in question);
- **Essential employability skills** (the essential employability skills learning outcomes which apply to all programs of instruction); and
- **General education requirement** (the requirement for general education in postsecondary programs of instruction that contribute to the development of citizens who are conscious of the diversity, complexity and richness of the human experience; and, the society in which they live and work).

Collectively, these elements outline the essential skills and knowledge that a student must reliably demonstrate in order to graduate from the program. For further information on the standards for your program, follow the MCU link ([www.tcu.gov.on.ca/pepg/audiences/colleges/progstan/](http://www.tcu.gov.on.ca/pepg/audiences/colleges/progstan/)).

## Detail Plan

<b>Term:</b>	2025 Winter
<b>Faculty:</b>	Harmen Minnema - Harmen.Minnema@flemingcollege.ca Gary Johnston - Gary.Johnston2@flemingcollege.ca
<b>Program Co-ordinator or Equivalent:</b>	Susan Brown - Susan.Brown2@flemingcollege.ca
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## Learning Plan

<b>Wks/Hrs Units</b>	<b>Topics, Resources, Learning, Activities</b>	<b>Learning Outcomes</b>	<b>Assessment</b>
	Module #1 Mechanical Aptitude and Measurement	1,6	In Class - Activities Quiz
	Module #2 Mass and Weight	1,2,3	In Class - Activities Quiz
	Module #3 Pulleys and Gears	1,3,5	In Class - Activities Quiz
	Module #4 Energy	1,2,3,4	In Class - Activities Assignment
	Module #5 Fuel Cells and Batteries	1,3,5,6	In Class - Activities Quiz
	Module #6 Power	4,5,6	In Class - Activities Quiz
	Module #7 Moving and Storing Heat	1,3,5,6	In Class - Activities Quiz Midterm Assessment
	Module #8 Independent Learning Week		
	Module #9 Thermal Comfort		In Class - Activities Quiz
	Module #10 Properties of Water	1,2,5,6	In Class - Activities Quiz
	Module #11 Siphons and Pumps	1,2,3,4,6	In Class - Activities Assignment
	Module #12 Pressure and Velocity	1,3,5,6	In Class - Activities Quiz
	Module #13 Hydraulics and Pneumatics	1,2,3	In Class - Activities Quiz
	Module #14 Concrete	1,2,5,6	In Class - Activities Quiz
	Module #15 Fun Facts	1,2,3,4,5,6	In Class - Activities Quiz Final Assessment

## Assessment Requirements

<b>Assessment Task</b>	<b>Date/Weeks</b>	<b>Course Learning Outcome</b>	<b>Percentage</b>
In Class - Activities	Module(s) #1 - #15	1,2,3,4,5,6	35%
Quizzes	Module(s) #1 - #15	1,2,3,4,5,6	30%
Midterm Assessment	Module(s) #1 - 7	1,3,5,6	10%
Assignment(s)	Module #4, 11	1,2,3,4,5,6	10%
Final Assessment - Mechanical Aptitude	Module(s) #1 -15	1,2,3,4,5,6	15%

## Exemption Contact

Contact Coordinator

Susan Brown

susan.brown2@flemingcollege.ca

## Prior Learning and Assessment and Recognition (PLAR)

PLAR uses tools to help learners reflect on, identify, articulate, and demonstrate past learning which has been acquired through study, work and other life experiences and which is not recognized through formal transfer of credit mechanisms. PLAR options include authentic assessment activities designed by faculty that may include challenge exams, portfolio presentations, interviews, and written assignments. Learners may also be encouraged and supported to design an individual documentation package that would meet the learning requirements of the course. Any student who wishes to have any prior learning acquired through life and work experience assessed, so as to translate it into a college credit, may initiate the process by applying through the Registrar's office. For more information please click on the following link: <http://flemingcollege.ca/admissions/prior-learning-assessment-and-recognition>

## Course Specific Policies and Procedures

It is the responsibility of the student to retain this course outline for future reference. Course outlines may be required to support applications for advanced standing and credit transfer to other educational institutions, portfolio development, PLAR and accreditation with professional associations.

**Synchronous sessions may be recorded. As a result, your image, voice, name, personal views and opinions, and course work may be collected under legal authority of section 2 of the Ontario Colleges of Applied Arts and Technology Act, 2002. This information will be used for the purpose of supporting student learning. Any questions about this collection can be directed to the Privacy and Policy Officer at [freedomofinformation@flemingcollege.ca](mailto:freedomofinformation@flemingcollege.ca) or by mail to 599 Brealey Drive, Peterborough, ON K9J 7B1.**

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Mutually, faculty and learners will support and adhere to college Academic Regulations and Student Rights and Responsibilities. In addition, the following guidelines have been developed to support the learning process. It is important to submit assignments and projects at a specified time and location. The faculty member(s) for this course will provide the detail. It should be noted that the Academic Planning & Operations Office, Student Services, and

Admissions and Records, will not accept any assignments or projects. Final grades in this course are assigned based on the level of academic achievement which corresponds to the assessment components as cited in this course outline. It is important to note that faculty member(s) will not offer additional evaluation activities beyond those cited in this course outline. Whatever the reason, missed evaluations and due dates for assignments, including those missed due to illness, will be dealt with by your faculty member. Lab activities in this course support skill and knowledge development. In order to be eligible for 100% of the marks associated with this course, attendance and participation is required. Students are eligible to participate in lab activities if they have not missed consecutive labs and are present for 13 out of 15 labs offered. This policy supports a safe learning environment for all individuals. Any exceptions will be dealt with on an individual bases with your instructor. Cell phones are not allowed during testing. Each student has the responsibility to support academic integrity. Students are expected to work individually on assignments: no student should have direct input into another student's solution. If group work is permitted, each student in the group is expected to contribute an equitable amount of effort. Reports must be type-written and the sole work of each individual. A student may not write up a lab assignment unless he/she has documented authorization. Assignments that are submitted below a minimum level of competence as determined by the professor will be returned as incomplete. Assignments must be handed in to the professor no later than the beginning to the scheduled lab on the assigned due date. Any assignment handed in after the due date will receive a mark of **ZERO**. Make-up arrangements for tests and assignments are normally not allowed. In the event of documented illness or circumstances that prohibit the student from completing work, make-up provisions may be provided. All requests must be received in writing. Classes will begin on time. Those students arriving late may be refused admission. If a student misses a lecture or lab, it is the student's responsibility to obtain the material and information from those lectures and labs. Learning sequence is subject to change.

#### **MANDATORY REQUIREMENTS (As per course)**

- CSA Approved Hard Hat (Class E), CSA approved Safety Glasses, Prescription safely glasses must have side shields, CSA Approved 8 inch work boots, Work Gloves, Utility Knife, Tape Measure, Code Book, Pencil, and Calculator. **STUDENTS MUST HAVE ALL MANDATORY EQUIPMENT FOR LABS**
- A professional work environment will be stressed at all times, locations and activities. This includes attitude, communication skills, ability to work in teams or groups, safety and appearance.
- Any student who has any restrictions on his or her ability to participate or perform any aspect of the Mechanical Techniques – Plumbing Program, must contact Program Co-ordinator at the beginning of the semester.
- Operating equipment in an unsafe manner or, even worse, unlawful manner, will result in ejection from the lab, plus possible disciplinary action.
- Any student considered by the instructor to be abusive to the equipment, fellow students or the instructor, will be ejected from the course.
- Students not actively participating in assignments must keep safely away from equipment and tools in operation.
- The shop must be left clean at all times before leaving lab. Failure to do so may result not being able to participate in future lab activities.
- At the end of each lab period, tools and equipment must be cleaned and returned to their proper places. Failure to do so may result not being able to participate in future lab activities.
- Stealing tools is unlawful; missing equipment affects all users of the Plumbing and Mechanical shops

- Any student arriving late without a valid reason will be considered absent.
- Any person found in possession of, using or still under the influence of intoxicating beverages or stimulants, will be ejected from the lab and could face disciplinary action.
- All exposed jewelry to be removed prior to labs.
- Long hair must be tied back to the base of the neck and tucked under coveralls.
- No hoodies or loose fitting clothing
- Only MOL approved safety equipment and apparel will be allowed during class
- The best safety tool is your own common sense. USE IT.