

## Course Outline

<b>Course Title:</b>	Electrical Fundamentals		
<b>Course Number:</b>	ELCT149	<b>Approval Date:</b>	2022/9/7
<b>Course Hours:</b>	45 hours	<b>Academic Year:</b>	2022
<b>Academic School:</b>	School of Trades & Technology		

<b>Faculty:</b>	Jeff Van de Moosdyk - Jeff.VandeMoosdyk@flemingcollege.ca
<b>Program Co-ordinator or Equivalent:</b>	Susan Brown - Susan.Brown2@flemingcollege.ca
<b>Dean (or Chair):</b>	Nick Stone - nick.stone@flemingcollege.ca
<b>Academic Planning and Operations Department:</b>	Jonathan Taylor - jonathan.taylor@flemingcollege.ca

## Course Description

This course will introduce students to basic wiring, circuits, connections and equipment involved in the residential electrical trade. It will provide students with a basic understanding of tools, equipment and materials used to install electrical connections and fixtures through practical, 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. Understand Shop Safety, Personal Protective Equipment (PPE), hazards and proper procedures for Lab Projects.
2. Understand and demonstrate a basic comprehension of Electrical Tools and their correct usage.

3. Understand the relationship of Electrical units of measure including Voltage, Amperage and Resistance. Using Ohm's Law to solve equations in Electrical circuits.
4. Understand and explain both Alternating Current (A/C) and Direct Current (D/C) circuits in everyday systems.
5. To become familiar with and be able to understand the different components in basic Electrical circuits.
6. To be able to read and understand drawings and basic Electrical circuit layout.
7. To become familiar with basic Low Voltage Electrical circuits and be able to demonstrate proper installation procedures and wiring terminations.
8. To be able to understand wire size (AWG) and specific amperages.
9. To be able to understand the fundamentals of a Multimeter to measure Voltage, Amperage and Resistance of AC and DC circuits.
10. To understand concepts of Ground Fault Circuit Interrupter (GFCI) and their use.
11. To be able to understand and demonstrate the correct installation methods for receptacles, in a residential dwelling.
12. To be able to understand and demonstrate the correct installation methods for switching and lighting in a residential dwelling.
13. To understand usage and importance of Smoke Detectors.

Students will learn Basic Electrical terms, codes, rules and applications. Students will be provided with an introduction to wiring circuits and drawings which will enable them to further wire shop labs.

## Learning Resources

- Electrical Code Simplified, House Wiring Guide, Book 1, Residential (Based on the 25th Edition of the Canadian Electrical Code) by PS Knight, copies to be accessible for Classroom use.
- Applicable PPE; CSA approved Work Boots and Safety Glasses (no tinted lenses). TBD
- Binder, paper, pencils, coloured pencils, ruler, calculator.
- Canadian Electrical Code, Part 1, 2021 25th Edition; handouts provided.
- Videos, You Tube, Power Points all provided and associated links.

## Assessment Summary

Assessment Task	Percentage
Labs	65%
Quizzes	5%
Tests	30%

## 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

**Term:** 2023 Winter

**Session Code:** 1

**Faculty:** Jeff Van de Moosdyk - Jeff.VandeMoosdyk@flemingcollege.ca

**Program Co-ordinator or Equivalent:** Susan Brown - Susan.Brown2@flemingcollege.ca

**Dean (or Chair):** Cody Simpson - Cody.Simpson@flemingcollege.ca

## Learning Plan

Wks/Hrs Units	Topics, Resources, Learning, Activities	Learning Outcomes	Assessment
Unit 1	Introduction to the Electrical Course. Review of Course Outline and Class objectives. Safety Equipment, Personal Protective Equipment (PPE) and Class requirements. Discuss Lab Rules.	1	Lab #1; Safety and PPE.
Unit 2	Understand Tool usage, care and operation.	1, 2	Lab #2; Tools, usage, descriptions.
Unit 3	Discuss Ohm's Law. Understand relationship of Voltage, Current, and Resistance.	1, 3, 4, 5	Lab #3; Ohm's Law and circuits.
Unit 4	Continue with Ohm's Law and introduce both AC and DC circuits. Interrupt circuits with AC and DC voltages.	1, 3, 4, 5	Lab #4; Ohm's Law and circuits.
Unit 5	View schematic and wiring diagrams. Introduce Ladder Logic diagrams. Quiz #1.	1, 2, 3, 4, 5	Lab #5; Concepts, Drawings and Schematics. Quiz #1.
Unit 6	Review CEC Code Tables. Select wire and AWG sizes. Introduce Grounding and Bonding Conductors.	1, 2, 3, 4, 5, 6, 7, 8, 9	Lab #6; Wire sizes (AWG). Wire an extension cord.
Unit 7	Continue with Grounding and Bonding. Mid Term Test #1.	1, 2, 3, 4, 5, 6, 7, 8, 9	Lab #7; Grounding exercise. Bonding exercise. Test #1.
Unit 8	Wiring of receptacles. GFCI, 15 amp and 20 amp T-slot.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	Lab #8; GFCI, duplex and T-slot receptacles.
Unit 9	Wiring of switched receptacles. Wiring of split receptacles.	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12	Lab #9; switched and split receptacles.

<b>Wks/Hrs Units</b>	<b>Topics, Resources, Learning, Activities</b>	<b>Learning Outcomes</b>	<b>Assessment</b>
Unit 10	Introduction to dryer and stove receptacles.	1, 2, 3, 4, 5, 6, 7, 8, 9, 11	Lab #10; dryer and receptacle wiring.
Unit 11	Introduction to switching and lighting circuits.	1, 2, 3, 4, 5, 6, 7, 8, 9, 12	Lab #11; single pole switch and keyless fixture.
Unit 12	Continue with switching and lighting. Different circuit layout and multiple lights. Quiz #2.	1, 2, 3, 4, 5, 6, 7, 8, 9, 12	Lab #12; single pole switch and multiple lights. Quiz #2.
Unit 13	Introduce three and four way switching.	1, 2, 3, 4, 5, 6, 7, 8, 9, 12	Lab #13; wiring of three way and four way switches.
Unit 14	Smoke alarms.	1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 13	Lab #14; wiring of smoke detectors in a residential dwelling.
Unit 15	Finish and missed Labs. Review of all materials. Final Test #2.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	Finish Labs. Test #2.

## Assessment Requirements

<b>Assessment Task</b>	<b>Date/Weeks</b>	<b>Course Learning Outcome</b>	<b>Percentage</b>
Labs #1 to 14. "Hands on" portion of Lab to be completed weekly. Questions and diagrams to be handed in, the following week.	Weekly Units.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	65%
Quiz #1. Assessment of learned material. Open book.	Quiz #1.	1, 2, 3, 4, 5,	2.5%
Mid-Term Test #1. Testing of all material covered to date. Open book.	Test #1.	1, 2, 3, 4, 5, 6, 7, 8, 9	15%
Quiz #2. Assessment of learned material. Open book.	Quiz #2.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12,	2.5%
Final Test #2. Testing of all materials from the Units, covered throughout the Semester. Open book.	Test #2.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	15%

Students will keep a notebook, complete with personal notes, diagrams, handouts and Labs. This material can be used for studying and Test purposes.

## Exemption Contact

Coordinator - Trades Fundamentals

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.**

As per Fleming College, Policies and Procedures applicable to Classroom and Lab stations.

Lab safety and necessary Personal Protective Equipment (PPE) as required.