ORIGINAL COURSE IMPLEMENTATION DATE:	September 2020
REVISED COURSE IMPLEMENTATION DATE:	September 2024
COURSE TO BE REVIEWED (six years after UEC approval)**:**	January 2026

Course outline form version: 28/10/2022

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: ELTR 230	**Number of Credits:** 3 Course credit policy (105)
Course Full Title: Electrical Machines: Principles, Application, and Control **Course Short Title:** Electrical Machines	
Faculty: Faculty of Applied and Technical Studies	**Department (or program if no department):** Electronics

Calendar Description:

Learn and practice common motor controls methods, common motors, and actuators including DC motors. Learn motor controls and related issues such as noise, shielding and isolation, and variable speed drives. Gain knowledge of pumps, compressors, and mechanical drives. Understand motor applications through common use in agriculture.

Prerequisites (or NONE):	ELTR 190.
Corequisites (if applicable, or NONE):	
Pre/corequisites (if applicable, or NONE):	

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number:

Cross-listed with:

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar	30
Supervised laboratory hours (science lab)	15
Total hours	**45**

Scheduled Laboratory Hours

Labs to be scheduled independent of lecture hours: ☒ No ☐ Yes

Course Details

Special Topics course: **No**

(If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: **No**

(See policy 207 for more information.)

Grading System: **Letter grades**

Delivery Mode: **Face-to-face only**

Expected frequency: **Fall only**

Maximum enrolment (for information only)**: 20**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See **bctransferguide.ca**.)*

Transfer credit already exists: **No**

Submit outline for (re)articulation: **No**

(If yes, fill in transfer credit form.)

Department approval	**Date of approval:**	October 27, 2023
Faculty Council approval	**Date of meeting:**	December 2023
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	March 1, 2024

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

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

1. Interface with motors and actuators.
2. Test various motor control methods, DC, single phase, and 3 phase systems.
3. Investigate the operation and setup of generators and power generation.
4. Investigate the operation and setup of pumps compressors and mechanical drives commonly used in agriculture.
5. Explore the fundamentals of electrical controls and control components including starters troubleshooting techniques, various protective devices, schematics, and diagrams.
6. Analyze function and operation, troubleshoot variable speed drives.
7. Analyze motors applications through common use in agriculture.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Quizzes/tests:	30%	Lab work:	70%		%
	%		%		%

Details:

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Lecture and lab work

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Textbook	Miller, R.	Industrial Electricity and Motor Controls	2014
2.				
3.				
4.				
5.				

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

Course Content and Topics

- Switches, magnetism, solenoids, and relays
- Electric motors, motor control and protection, 3 phase controllers, and drives
- Transformers, power generation, and power distribution systems
- Troubleshooting and maintenance
- Timers, sensors, solenoids, and valves
- Motor starting methods and solid-state reduced voltage starters
- Speed control and monitoring