ORIGINAL COURSE IMPLEMENTATION DATE: September 2020

REVISED COURSE IMPLEMENTATION DATE:

COURSE TO BE REVIEWED (six years after UEC approval)**:** January 2026

Course outline form version: 05/18/2018

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

(Transcripts only display 30 characters. Departments may recommend a short title if one is needed. If left blank, one will be assigned.)

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 100, ELTR 130, and ELTR 150.
Corequisites (if applicable, or NONE):	NONE
Pre/corequisites (if applicable, or NONE):	NONE

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

Former course code/number:

Cross-listed with:

Dual-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 hours	30
Tutorials/workshops	
Supervised laboratory hours	15
Experiential (field experience, practicum, internship, etc.)	
Supervised online activities	
Other contact hours:	
Total hours	**45**

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

Special Topics *(Double-click on boxes to select.)*

This course is offered with different topics:

☒ No ☐ Yes *(If yes, topic will be recorded when offered.)*

Independent Study

If offered as an Independent Study course, this course may be repeated for further credit: *(If yes, topic will be recorded.)*

☒ No ☐ Yes, repeat(s) ☐ Yes, no limit

Transfer Credit

Transfer credit already exists: *(See **bctransferguide.ca**.)*

☒ No ☐ Yes

Submit outline for (re)articulation:

☒ No ☐ Yes *(If yes, fill in transfer credit form.)*

Grading System

☒ Letter Grades ☐ Credit/No Credit

Maximum enrolment (for information only): 20

Expected Frequency of Course Offerings:

Fall only *(Every semester, Fall only, annually, etc.)*

Department / Program Head or Director:	**Date approved:**	November 2019
Faculty Council approval	**Date approved:**	November 14, 2019
Dean/Associate VP: John English	**Date approved:**	November 14, 2019
Campus-Wide Consultation (CWC)	**Date of posting:**	January 17, 2020
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	January 31, 2020

Learning Outcomes

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

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

Prior Learning Assessment and Recognition (PLAR)

☒ Yes ☐ No, PLAR cannot be awarded for this course because

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion.)*

Lecture and Lab Work

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

Typical Text(s) and Resource Materials *(If more space is required, download Supplemental Texts and Resource Materials form.)*

	Author (surname, initials)	Title (article, book, journal, etc.)	Current ed.	Publisher	Year
1.	Miller, R	Industrial Electricity and Motor Controls	☒	McGrawHill	2014
2.			☐		
3.			☐		
4.			☐		
5.			☐		

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

Typical Evaluation Methods and Weighting

Final exam:	%	Assignments:	%	Field experience:		Portfolio:	%
Midterm exam:	%	Project:		Practicum:	%	Other:	%
Quizzes/tests:	30%	Lab work:	70%	Shop work:	%	Total:	100%

Details (if necessary):

Typical 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