ORIGINAL COURSE IMPLEMENTATION DATE: September 2015
REVISED COURSE IMPLEMENTATION DATE: September 2024
COURSE TO BE REVIEWED (six years after UEC approval)**:** December 2020
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 214	Number of Credits: 5 Course credit policy (105)

Course Full Title: Control Systems
Course Short Title: Control Systems

Faculty: Faculty of Applied and Technical Studies	Department (or program if no department): Electronics

Calendar Description:

Open and closed loop control systems. Analog and digital control systems, including P, PI, and PID. Foundation of control and robotic systems in agriculture application setting practicing the use of pressure, flow, level, temperature, optical, and electromechanical control interfaces.

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

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

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.)

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: **Winter only**

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

Typical Structure of Instructional Hours

Lecture/seminar	45
Supervised laboratory hours (science lab)	45
Total hours	**90**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Scheduled Laboratory Hours

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

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. Analyze, test and troubleshoot servo-mechanism.
2. Troubleshoot open and closed loop control systems
3. Setup and test control devices such as relays, optoelectronics components, Thyristors and Triac circuit.
4. Analyze computerized and automated systems in agricultural application
5. Investigate analog and digital, linear and no linear control systems including P,PI,PID controls
6. Analyze and test automation vision processing systems as applied in agriculture
7. Analyze display and recording systems using automation
8. Configure Robotic systems and their controllers in agriculture applications
9. Experiment with pressure, flow, level, temperature, optical, and electro-mechanical systems with feedback, feed forward and ration control concepts.

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

Final exam:	50%	Quizzes/tests:	20%	Lab work:	30%
	%		%		%

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.)*
Lectures and lab work with occasional guest lecturer

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	Bartelt, T.	Industrial Automated Systems: Instrumentation and Motion Control	2011
2.				
3.				
4.				
5.				

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

Course Content and Topics

Unit 1: Industrial controls overview
- Introduction to industrial control systems
- Interfacing devices
- Thyristors

Unit 2: Controllers
- Controller operation

Unit 3: Electric Motors
- DC motors
- AC motors
- Servo motors

Unit 4: Variable speed drives
- DC drives
- AC drives

Unit 5: Process control and instrumentation
- Pressure systems
- Temperature controls
- Process control methods
- Instrumentation symbology
- Instrumentation calibration

Unit 6: Detection sensors
- Detection sensors and interfacing
- Wireless technology