ORIGINAL COURSE IMPLEMENTATION DATE:	September 2014
REVISED COURSE IMPLEMENTATION DATE:	September 2023
COURSE TO BE REVIEWED (six years after UEC approval)**:**	September 2028

Course outline form version: 09/08/2021

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

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

Course Code and Number: ENGR 210	**Number of Credits:** 5 Course credit policy (105)
Course Full Title: Circuit Analysis **Course Short Title:**	
Faculty: Faculty of Applied and Technical Studies	**Department (or program if no department):** Physics

Calendar Description:

Basic laws, current, voltage, power; DC circuits, network theorems, network analysis; transients, AC circuits, resonance, use and application of phasors and complex algebra in steady-state response; basic magnetic circuits, transformers; frequency response, Laplace transform, two-port networks.

Prerequisites (or NONE):	PHYS 112.
Corequisites (if applicable, or NONE):	
Pre/corequisites (if applicable, or NONE):	PHYS 221.

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	75
Supervised laboratory hours (science lab)	30
Total hours	**105**

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: **May be offered in multiple delivery modes**

Expected frequency: **Annually**

Maximum enrolment (for information only)**: 18**

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

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

Transfer credit already exists: **Yes**

Submit outline for (re)articulation: **Yes**

(If yes, fill in transfer credit form.)

Department approval	**Date of meeting:**	February 14, 2022
Faculty Council approval	**Date of meeting:**	April 14, 2022
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	September 23, 2022

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. Describe key circuit elements including resistors, capacitors, inductors, transformers, dependent and independent power sources.
2. State the fundamental laws (Kirchhoff's Laws) and theorems (Thevenin/Helmholtz's and Norton/Helmholtz's equivalences) needed for circuit design and analysis.
3. Analyze electrical circuits containing a variety of circuit elements using the basic laws, theorems, and techniques.
4. Solve circuit equations using software, such as MATLAB.
5. Calculate both steady state and transient responses in 1st and 2nd order circuits.
6. Analyze electric power in DC and AC circuits.
7. Analyze simple circuits in frequency domain.
8. Compare the theoretical results with measurements.

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

Final exam:	40%	Assignments:	15%	Quizzes/tests:	25%
Lab work:	20%		%		%

Details:

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

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	J.W. Nilsson and S.A. Riedel	Electric Circuits (E10)	2014
2.	Textbook	C.K. Alexander and M. Sadiku	Fundamentals of Electric Circuits	2017
3.				
4.				
5.				

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

None.

Course Content and Topics

- Basic circuit variables, simple resistive circuits
- Techniques of circuit analysis (nodal analysis, mesh analysis, source transformation, superposition, Thevenin and Norton theorem)
- Inductance, capacitance, and mutual inductance
- Response of first-order RL and RC circuits
- Natural and step responses of RLC circuits
- Sinusoidal steady-state analysis (phasors, nodal analysis, mesh analysis, source transformation, Thevenin and Norton theorem)
- Magnetically coupled circuits
- Basic concepts and performance characteristics of transformers
- Sinusoidal steady-state power calculations
- Frequency response
- Laplace transform
- Two-port network