

ORIGINAL COURSE IMPLEMENTATION DATE:

REVISED COURSE IMPLEMENTATION DATE:

September 2014 September 2018

March 2024

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

Course outline form version: 09/15/14

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

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

Course Full Title: Circuit Analysis Course Short Title (if title exceeds 30 characters):  Faculty: Faculty of Science  Calendar Description:  Introduces mathematical models used to represent a variety of engineering problems (such as the solution of physical electric and electronic circuits). In particular, students will learn about network theorems, phasors, AC circuits, resonance, transformers, and three-phase circuits.  Prerequisites (or NONE):  Prefecrequisites (if applicable, or NONE):  Prefecreq	Course Code and Number: ENGR 210			Number of Credits: 4 Course credit policy (105)							
Paculty: Faculty of Science   Department (or program if no department): PHYSICS	Course Full Title: Circuit Analysis										
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Corequisites (if applicable, or NONE):   Pre/corequisites (if applicable, or NONE):   PHYS 221.	Introduces mathematical models used to represent a variety of engineering problems (such as the solution of physical electric and electronic circuits). In particular, students will learn about network theorems, phasors, AC circuits, resonance, transformers, and three-										
Pre/corequisites (if applicable, or NONE): PHYS 221.  Equivalent Courses (cannot be taken for additional credit) Former course code/number: Cross-listed with: Equivalent course(s): Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.  Transfer credit already exists: ☐ Yes ☐ No Transfer credit in transfer credit form) Resubmit revised outline for articulation: ☐ Yes ☐ No To find out how this course transfers, see betransferguide.ca.  Special Topics Will the course be offered with different topics? ☐ Yes ☐ No ☐ Yes, different lettered courses may be taken for credit: ☐ No ☐ Yes, repeat(s) ☐ Yes, no limit ☐ Note: The specific topic will be recorded when offered.  Maximum enrolment (for information only): 18 Expected frequency of course offerings (every semester, annually, every other year, etc.): Annually  Department / Program Head or Director: Jeff Chizma  Date approved: December 1, 2017  Pate approved: December 1, 2017  Date approved: December 1, 2017	Prerequisites (or NONE):	PHYS 112.									
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	Campus-Wide Consultation (CWC)					Date of posting:	February 9, 2018				
Undergraduate Education Committee (UEC) approval  Date of meeting: March 23, 2018	Dean/Associate VP: Lucy Lee (Greg Schlitt)					Date approved:	December 1, 2017				
	Undergraduate Education Committee (UEC) approval					Date of meeting:	March 23, 2018				

## **Learning Outcomes**

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

- Describe key circuit elements including resistors, capacitors, inductors, transformers, dependent and independent power
- State the fundamental laws (Kirchhoff's Laws) and theorems (Thevenin/Helmholtz's and Norton/Helmholtz's equivalences) needed for circuit design and analysis.
- Analyze electrical circuits containing a variety of circuit elements using the basic laws, theorems, and techniques.
- Use computer software Matlab to solve DC and AC circuit equations.
- Calculate both steady state and transient responses in 1st and 2nd order circuits.
- Analyze single and three phase AC circuits, including AC power.

Compare the	theoretical r	esults with measur	ements.									
Prior Learning Assessment and Recognition (PLAR)												
Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)												
Lectures.												
Grading system: Letter Grades: ☐ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☐												
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.)				:.)		Publisher	Year					
1. J. W. Nilsson and	Electric Circuits			Pearson	2014							
<u>2.</u>												
3.												
4.												
5.												
Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)												
None.												
Typical Evaluation Methods and Weighting												
Final exam:	45%	Assignments:	15%	Midterm exam:	25%	Practicum:	%					
Quizzes/tests:	%	Lab work:	15%	Field experience:	%	Shop work:	%					
Other:	%	Other:	%	Other:	%	Total:	100%					
Details (if necessary):	·		·	·		·						

## **Typical Course Content and Topics**

- Basic circuit variables, simple resistive circuits
- Techniques of circuit analysis (nodal analysis, mesh analysis, source transformation, superposition, Thevenin and Norton
- 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
- Basic concepts and performance characteristics of transformers
- Sinusoidal steady-state power calculations
- Balanced power three-phase circuits