



ENGG*2450 Electric Circuits

Winter 2019

Section(s): C01.C02

School of Engineering

Credit Weight: 0.50

Version 1.00 - January 18, 2019

1 Course Details

1.1 Calendar Description

This course explores the fundamentals of electric circuit analysis. Course topics include: lumped circuit abstraction; circuit elements and their characteristics; Ohm's and Kirchhoff's laws; resistive circuits; nodal and mesh analysis; linearity and superposition principles; fundamental circuit theorems; introduction to the ideal operational amplifier model; energy storage elements and dynamics of first and second order circuits including switched circuits; alternate-current circuits and sinusoidal steady-state analysis with phasor methods.

Pre-Requisite(s): ENGG*2400, (PHYS*1010 or PHYS*1130)

1.2 Course Description

The course will focus on the analysis of circuits and will explore circuit problems. The main goals of this course are to teach students how to analyse circuits with several different methods.

1.3 Timetable

Lectures:

Monday, Wednesday, Friday

Section 01

10:30AM - 11:20AM

ALEX, Room 200

Section 02

04:30PM - 05:20PM

RICH, Room 2520

For Tutorial/Lab times and location see webadvisor.

1.4 Final Exam

EXAM Tues

08:30AM - 10:30AM (2019/04/16)

Room TBD

2 Instructional Support

2.1 Instructional Support Team

Instructor: Christopher Collier Ph.D.
Email: ccollier@uoguelph.ca
Office: THRN 2405
Office Hours: TBA

Instructor: Mohamad Abou El Nasr Ph.D.
Email: maboueln@uoguelph.ca
Office: THRN 1513
Office Hours: TBA

Lab Technician: Hong Ma
Email: hongma@uoguelph.ca
Telephone: +1-519-824-4120 x53873
Office: THRN 1506

2.2 Teaching Assistant(s)

Teaching Assistant: Abu Raihan Mohammad Siddique
Email: asiddi04@uoguelph.ca

Teaching Assistant: Faisal Shahin
Email: fshahin@uoguelph.ca

Teaching Assistant: Syeda Manjia Tahsien
Email: stahsien@uoguelph.ca

Teaching Assistant: Katherine McLeod

Email:	kmcleo04@uoguelph.ca
Teaching Assistant:	Miguel Vigil Fuentes
Email:	mvigilfu@uoguelph.ca
Teaching Assistant:	Vikram Prasad
Email:	prasadv@uoguelph.ca
Teaching Assistant:	Isaac Spotts
Email:	ispotts@uoguelph.ca
Teaching Assistant:	Saipriya Ramalingam
Email:	sramalin@uoguelph.ca
Teaching Assistant:	Charles Brodie
Email:	hbrodie@uoguelph.ca
Teaching Assistant:	Junfei Li
Email:	jli64@uoguelph.ca
Teaching Assistant:	Carlos Sanchez Ramirez
Email:	sanchezc@uoguelph.ca

3 Learning Resources

3.1 Required Resource(s)

Course Website (Website)

<https://courselink.uoguelph.ca/>

Course material, news, announcements, and grades will be regularly posted to the ENGG*2450 Courselink site. You are responsible for checking the site regularly.

Fundamentals of Electric Circuits (Textbook)

C. Alexander and M. Sadiku, Sixth Edition, McGraw Hill Education, New York, NY, 2016

3.2 Recommended Resource(s)

Electric Circuits (Textbook)

W. Nilsson and S. Riedel, Tenth Edition, Prentice Hall, New Jersey, NY, 2014

3.3 Additional Resource(s)

Lab Information (Lab Manual)

The lab information will be posted on Courselink. You are responsible for printing the lab manuals and having them with you during the laboratory sessions.

Home Assignments (Other)

There will be problem sets posted in Courselink during the term. These problem sets will not be graded, but it is recommended that you do each problem set, as practice problems are the best way to learn the course.

Miscellaneous Information (Other)

Other information related to the ENGG 2450 course will be posted on the Courselink site.

4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Predict a circuit's behaviour (for DC, AC, and other inputs) using standard methods.
2. Analyse a circuit using Kirchhoff's laws, Nodal analysis, Mesh analysis, Ohm's law, superposition, Thevenin and Norton equivalent circuits, and source transformations to obtain mathematical descriptions of the circuit.
3. Describe (mathematically and graphically) the current, voltage, power, and energy properties of elements (resistors, capacitors, inductors, operational amplifiers, ideal sources, and dependent sources) that are part of circuits.
4. Demonstrate basic laboratory skills, including proper safety procedures and the use of a DC power supply, digital multimeter, function generator, and oscilloscope.

4.2 Engineers Canada - Graduate Attributes (2018)

Successfully completing this course will contribute to the following:

#	Outcome	Learning Outcome(s)
1	Knowledge Base	1, 2, 3
1.2	Recall, describe and apply fundamental principles and concepts in natural science	3
1.3	Recall, describe and apply fundamental engineering principles and concepts	1, 2, 3
2	Problem Analysis	1, 2
2.1	Formulate a problem statement in engineering and non-engineering terminology	2
2.2	Identify, organize and justify appropriate information, including assumptions	1
2.3	Construct a conceptual framework and select an appropriate solution approach	1, 2
5	Use of Engineering Tools	4

#	Outcome	Learning Outcome(s)
5.1	Select appropriate engineering tools from various alternatives	4
5.2	Demonstrate proficiency in the application of selected engineering tools	4
5.3	Recognize limitations of selected engineering tools	4

5 Teaching and Learning Activities

The following contains the tentative schedule of lecture topics.

5.1 Lecture

Topic(s):	Basic Concepts, Basic Laws
Topic(s):	Methods of Analysis, Circuit Theorems
Topic(s):	Op-Amps
Topic(s):	Capacitors and Inductors, First-Order Circuits
Topic(s):	Second-Order Circuits
Topic(s):	Sinusoids and Phasors, Sinusoidal Steady-State Analysis, AC Power Analysis (time-permitting)
Topic(s):	Magnetically Coupled Circuits

5.2 Lab

Topic(s):	Do online safety quiz (no tutorial or lab)
Topic(s):	Lab 0 - Introduction to Circuits
Topic(s):	Tutorial
Topic(s):	Lab 1 - Kirchhoff's Laws
Topic(s):	Tutorial
Lab 1 due	
Topic(s):	Tutorial
Topic(s):	Lab 2 - Op-Amp Circuits (day 1)
Topic(s):	Lab 2 - Op-Amp Circuits (day 2)
Topic(s):	Tutorial
Lab 2 due	
Topic(s):	Lab 3 - First Order Circuits

Topic(s): Tutorial
Lab 3 due

Topic(s): Tutorial

5.3 Other Important Dates

- **Monday, January 7**
 - Classes commence
- **Monday, February 18**
 - Winter Break (Reading Week) begins – NO CLASSES SCHEDULED THIS WEEK
 - Holiday
- **Friday, February 22**
 - Winter Break (Reading Week) ends
- **Monday, February 25**
 - Classes resume
- **Friday, March 8**
 - 40th class day--Last day to drop Winter 2019 course(s) without academic penalty
- **Friday, April 5**
 - Classes conclude
- **Monday, April 8**
 - Final Examinations commence

6 Assessments

6.1 Marking Schemes & Distributions

If you miss the midterm due to grounds for granting academic consideration or religious accommodation, the weight of the missed midterm will be added to the final exam. **There will be no makeup midterm tests.**

Name	Scheme A (%)	Scheme B (%)
Assignments	0	0
Tutorials	0	0
Quizzes	10	10
Labs	15	15

Name	Scheme A (%)	Scheme B (%)
Midterm Exam	25	0
Final Exam	50	75
Total	100	100

6.2 Assessment Details

Assignments (0%)

Learning Outcome(s): 1,2,3,4

There will be several Problem Sets. These are take-home problem sets and will be made available on the Courselink site. Students are encouraged to solve these Problem Sets and practice as much as possible.

Tutorials (0%)

Students should attend all tutorials. Tutorials will provide students with experience solving electric circuit examples.

Quizzes (10%)

Learning Outcome(s): 2

There will be two quizzes with each worth 5%. The quizzes will take place in class on January 28, 2019 and March 18, 2019.

Labs (15%)

Learning Outcome(s): 4

There is a safety quiz available online in Courselink. This is a pass/fail quiz and does not contribute to your final course grade. You must pass the safety lab (get 80% or higher) before you are allowed to enter the lab. If you do not pass this quiz, you will not be allowed to enter the lab and you will not be allowed to submit a lab report.

The Purpose of performing the Lab in this course is to verify the concepts learned during the lectures. **Several tutorial classes will be reserved for the ENGG*2450 Labs.** The detailed schedule will be posted on Courselink. The lab reports will be due one week after completion of the lab experiments.

Lab 0 is an introduction lab with no marks formally assigned. However, students will not be permitted to do Lab 1 if they have not fully attended Lab 0 and will therefore receive a grade of zero on Lab 1, Lab 2, and Lab 3 in this situation. **All labs must be attended and completed to receive a passing grade in ENGG 2450.**

Midterm Exam (25%)

Date: Sat, Feb 9, 1:00 PM - 2:30 PM, G ROZH 101

Learning Outcome(s): 1,2,3

The midterm exam is closed book.

Final Exam (50%)

Date: Mon, Apr 16, 8:30 AM - 10:30 AM, TBD

Learning Outcome(s): 1,2,3,4

The final exam is closed book.

7 Course Statements

7.1 Communication & Email Policy

Please use lectures and lab help sessions as your main opportunity to ask questions about the course. Major announcements will be posted to the course website. It is your responsibility to check the course website regularly. As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its student. You are encouraged to use [ENGG*2450] in the subject line while emailing your GTA and instructor.

7.2 Course Grading Policies

Missed Assessments: If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor. See the undergraduate calendar for information on regulations and procedures for Academic Consideration:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml>

Missed Midterm Exam: If you miss the midterm due to grounds for granting academic consideration or religious accommodation, the weight of the missed midterm will be added to the final exam. **There will be no makeup midterm tests.**

Lab Work: Lab safety quiz is available on Courselink. You will not be allowed to enter the lab until you have successfully completed this quiz. You must attend and complete all laboratories. If you miss a laboratory due to grounds for granting academic consideration or religious accommodation, arrangements must be made with the teaching assistant to complete a makeup lab. Attendance will be taken in the lab. All students are required to demo their lab during their lab session; this demo is graded. If you are not present for your lab and your demo, you will not be allowed to submit a lab report and you will get a zero on that lab. If you miss more than 25% of a lab period due to lateness or by leaving before you have finished the lab, you will be considered absent. Lab reports are due at 4:30 pm one week after the day that you did the in-lab component.

Late Lab Reports: Late submissions of lab reports that are less than 24 hours late will be penalized 50%. Late submissions of lab reports that are more than 24 hours late will not be accepted.

Passing grade: The passing grade of this course is 50%.

7.3 Relationships with other Courses & Labs

Previous Courses:

ENGG*2400

Follow-on Courses:

ENGG*3280; ENGG*3410; ENGG*3450; ENGG*3510; ENGG*3570; ENGG*3640; ENGG*4550; ENGG*4650

8 School of Engineering Statements

8.1 Instructor's Role and Responsibility to Students

The instructor's role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on Courselink but these are not intended to be stand-alone course notes. Some written lecture notes will be presented only in class. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for tests and labs.

8.2 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and lab sessions. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.

8.3 Lab Safety

Safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. As a student in a lab course you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, you are responsible for reporting all safety issues to the laboratory supervisor, GTA or faculty responsible.

9 University Statements

9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

9.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for course registration are available in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

More information can be found on the SAS website
<https://www.uoguelph.ca/sas>

9.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

9.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

9.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars
<https://www.uoguelph.ca/academics/calendars>