



Electric Circuits

ENGG*2450

Winter Semester 2009

1 Instructor

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Office hours posted on the course web page, other times by appointment.

2 Teaching assistants

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Office hours posted on the course web page, other times by appointment.

3 Meetings

Lectures. Tuesdays and Thursdays, 10:00 to 11:20, ROZH 102.

Tutorials.

- (1) Tuesdays, 13:00 to 13:50, MACK 311
- (2) Wednesdays, 10:30 to 11:20, MACK 304
- (3) Thursdays, 13:00 to 13:50, MACK 311

Laboratories.

- Tuesdays, 14:30 to 16:30, THRN 2307
- Wednesdays, 13:30 to 15:30, THRN 2307
- Thursdays, 14:30 to 16:30, THRN 2307

4 Materials

Textbook. C. K. Alexander, M. N. O. Sadiku, *Fundamentals of electric circuits*, 4th ed., McGraw-Hill 2009.

References. The textbook and other reference books are available on Course Reserve in the library. Additional references are indexed by library call numbers TK452 to TK454.4.

As a reference manual for the laboratories you can use: J. G. Tront, *PSpice for basic circuit analysis with CD*, 2nd ed., McGraw-Hill 2007.

Web. The course has a web page on Courselink (Blackboard). To access Courselink simply go to <http://courselink.uoguelph.ca/> and follow the login instructions.

5 Prerequisites

Topics. Success in this course requires a good understanding of the fundamentals of engineering mathematics (linear algebra, trigonometry, complex numbers, calculus, and differential equations) and of the fundamentals of electromagnetism (electromagnetic quantities and units of measurement, electrostatics, electric field and potential, conservation laws). If you do not have this background, you will have to bring yourself up to speed. Please contact me, I will be happy to talk to you about your prospects.

Courses. As stated in the Undergraduate Calendar.

6 Description

This course explores the fundamentals of electric circuit analysis, which are the foundation of modern communication, control, and power systems and micro and nano-scale electronics. The course begins with a discussion of lumped circuit abstraction and simple resistive circuits, followed by a study of the analysis techniques under direct-current conditions. The concept of ideal operational amplifier is presented next. Then the course continues with the dynamics of circuits with energy-storage elements. The course concludes with the study of alternate currents, leading to an overview of magnetically coupled circuits.

7 Learning objectives

After successfully completing the course you will be able to **analyze and model electric circuits** and to apply the studied concepts to **obtain numerical solutions to engineering problems involving electric circuits**. To this purpose you will learn to:

- Identify terms, quantities, and models used by engineers for describing electric circuits.
- Analyze the energetic properties of electric and magnetically-coupled circuits.
- Determine the dynamics of linear circuits in transient and at low and high frequency.
- Analyze alternate-current circuits using the phasor method for sinusoidal steady-state.
- Apply fundamental principles to simplify and solve problems.

8 Evaluation

The breakdown for grading the whole course is as follows:

Final exam	50%
Midterm exam	35%
Laboratory reports	10%
Assignments	5%

9 Approach

Lectures focus on important relationships, clarify concepts, and present examples. Since **problem solving** is essential, I encourage you to study the textbook as you review the lecture material, go through additional examples, and solve as many problems as you can.

Tutorials concentrate on problem solving and are a useful preparation for the exams. You can discuss with the teaching assistants your difficulties in solving problems. On a weekly basis, I issue **assignments**, i.e. problem sets to be completed individually.

Two **laboratory sessions** introduce you to computer-aided design software for electric circuits and help you assimilate and put into practice the subject matter. There are two **laboratory reports** to be completed individually or in small groups. To ensure your safety and the safety of others, you have to conform to the laboratory safety regulations.

Any student not handing in an assignment or a report receives a grade of zero. There are **no makeup** assignments or reports and late submissions are not accepted for marking.

There are two **exams** used to determine the extent to which you have achieved the course learning objectives. The final exam is comprehensive. The use of notes, books, and programmable or graphic calculators is not permitted at exams.

Any student not taking an exam receives a grade of zero for that exam. In case you have a legitimate reason for missing an exam session, I may consider an accommodation upon presentation of a written request and suitable documentation before the time of the exam.

10 Obtaining help

You can obtain help from me during my office hours and after lectures and from the teaching assistants during their office hours and after tutorials and laboratories.

Please contact us if you need help or you have fallen behind in your work. **We are willing to put in as much effort to help you as you are willing to put in to help yourself.** We are happy to work with you on difficult concepts and hear your suggestions for improving the course. If you are busy during our office hours, then email us with some days and times you are free, and we will set an appointment that works for both you and us.

Getting together regularly with your classmates to study and work on problems is also a good way to understand the material and to develop confidence about your understanding. You may make use of the resources available through the Learning Commons as well.

Help is available, please be informed about the following services. If you are ill, call the Student Health Services or a medical doctor. If you have emotional, family, or living environment problems that affect your ability to study, visit the Counselling Services or your academic advisor. For disabilities or temporary disabilities contact the Centre for Students with Disabilities. I have made every effort to avoid conflicts with religious obligations. If there is a discrepancy, please contact me as soon as possible.

11 Scholastic integrity

The value of an academic degree depends on the integrity of the work done by you to earn that degree. **It is imperative that you keep a high level of honor in your work.** The policies on scholastic dishonesty reported in the Undergraduate Calendar will be enforced.

I invite you to familiarize yourself with your responsibilities outlined in the Undergraduate Calendar and with the School of Engineering Code of Ethics. I recommend that you review the tutorial available on <http://www.academicintegrity.uoguelph.ca/>, that you visit the School of Engineering web page on academic misconduct, and that you discuss any question you may have with me or the teaching assistants.

12 Communications

Communication is through announcements in class. Some information will be posted on the course website, on the board in the front hall of the Engineering Building, and sent through email messages to your University of Guelph address. It is your responsibility to keep yourself informed about the course. Please do not expect immediate reply to your emails; because of the large class enrollment, we usually go through students' messages twice a week.

13 Copyright

The instructor reserves the right to all materials made available for this course and all interpretations presented in class, which may not be reproduced or transmitted to others without the written consent of the instructor. The electronic recording of classes is only allowed with prior consent of the instructor. When recordings are permitted, they are solely for the use of the authorized student and may not be reproduced or transmitted to others without the written consent of the instructor.

14 Disclaimer

I reserve the right to change any or all of the above in the event of appropriate circumstances, subject to the University of Guelph academic regulations.