



# Electric Circuits

ENGG\*2450

Winter Semester 2011

## 1 Instructor

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## 2 Teaching assistants

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## 3 Laboratory technician

**Nathaniel Groendyk.** THRN 2308, 519-824-4120 ext. 53729, groendyk@uoguelph.ca

## 4 Meetings

**Lectures.** Tuesdays and Thursdays, 14:30 to 15:50, ROZH 101

### Tutorials.

Tuesdays, 11:30 to 12:20, MACK 305  
Wednesdays, 14:30 to 15:20, MACK 315  
Thursdays, 8:30 to 9:20, MACK 315  
Thursdays, 9:30 to 10:20, MACK 306  
Fridays, 13:30 to 14:20, MACK 315  
Fridays, 14:30 to 15:20, MACK 315

### Laboratories.

Mondays, 14:30 to 16:20, THRN 2307  
Tuesdays, 9:30 to 11:20, THRN 2307  
Tuesdays, 12:30 to 14:20, THRN 2307  
Wednesdays, 12:30 to 14:20, THRN 2307  
Thursdays, 10:30 to 12:20, THRN 2307  
Thursdays, 12:30 to 14:20, THRN 2307

## 5 Materials

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

**References.** S. Gregori, *Electric circuits in pills*, McGraw-Hill 2011.

J. G. Tront, *PSpice for basic circuit analysis with CD*, McGraw-Hill 2007.

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.

**Web.** The course has a web page on [courselink.uoguelph.ca](http://courselink.uoguelph.ca)

## 6 Prerequisites

**Topics.** Success in this course requires the fundamentals of engineering mathematics (linear algebra, trigonometry, complex numbers, calculus, and differential equations) and the fundamentals of electromagnetism (electromagnetic quantities and units of measurement, electrostatics, electric and magnetic fields, conservation laws).

**Courses.** As stated in the Undergraduate Calendar.

## 7 Description

The course explores the fundamentals of electric circuit analysis, which are the foundation of micro and nano-scale electronic devices and modern communication, control, and power systems. The course begins with a discussion of the lumped circuit abstraction and simple resistive circuits, followed by the analysis techniques under direct-current conditions. The concept of ideal operational amplifier is presented next and 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.

## 8 Learning objectives

After successfully completing the course you will be able to **analyse 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.
- Analyse the energetic properties of electric and magnetically coupled circuits.
- Determine the dynamics of linear circuits in transient and at low and high frequency.
- Analyse alternate-current circuits using the phasor method for sinusoidal steady-state.

## 9 Evaluation

The breakdown for grading the whole course is as follows.

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

## 10 Approach

**Lectures** focus on important relationships, clarify concepts, and present examples. As you review the lecture material, I encourage you to go through the textbook examples and solve the practice problems. **Tutorials** concentrate on problem solving and are a useful preparation for the exams. Short **assignments** (i.e. problem sets to be completed individually) are issued on a weekly basis. **Laboratories** 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. 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.

The **midterm** and the **final exam** (comprehensive) are used to determine the extent to which you have achieved the course learning objectives. The use of notes, books, programmable calculators, or other aids 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.

## 11 Obtaining help

You can obtain help from me during my office hours (posted on the course web page) and after lectures, from the teaching assistants during their office hours and after tutorials and laboratories, and from the laboratory technician during the laboratory time slots.

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.

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. If you have a disability or a temporary disability, refer to the Centre for Students with Disabilities and you are welcome to discuss with us your specific learning needs at the earliest possible time. I have made every effort to avoid conflicts with religious obligations. If there is a discrepancy, please contact me as soon as possible.

## 12 Scholastic integrity

The value of an academic degree depends on the integrity of the work done to earn that degree. **It is imperative that you keep a high level of honour 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. I recommend that you review the tutorial on [academicintegrity.uoguelph.ca](http://academicintegrity.uoguelph.ca) and that you discuss any question you may have with me or the teaching assistants.

## 13 Communication

Communication is through announcements in class. Some information will be posted on the course web page or sent via email messages to your University address. It is your responsibility to keep yourself informed. Please do not expect instant reply to your emails; because of the large enrolment, we usually go through students' messages twice a week.

## 14 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 and solely for the use of the authorized student.

## 15 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.