

# Electric Circuits

ENGG\*2450

Winter 2010

## Instructor

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

## Teaching assistants

Mr. Omar Ahmed, THRN 304, [oahmed@uoguelph.ca](mailto:oahmed@uoguelph.ca)

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## Meetings

Lectures: Tuesdays and Thursdays, 10:00 to 11:20, MACN 113

Tutorials:

- (1) Tuesdays, 13:00 to 13:50, MACK 309
- (2) Wednesdays, 10:30 to 11:20, MACK 306
- (3) Wednesdays, 12:30 to 13:20, MACK 304

Laboratories:

- (1) Mondays 14:30 – 16:30
- (2) Tuesdays 14:30 – 16:30
- (3) Wednesdays 13:30 – 17:30
- (4) Thursdays 14:30 – 16:30

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

**References.** The textbook is available on Course Reserve in the library. Additional references are indexed by library call numbers TK452 to TK454.4.

**Web.** The course will have a web page on Courselink (D2L). To access Courselink simply go to <http://courselink.uoguelph.ca/> and follow the login instructions.

## **Prerequisites**

**Topics:** 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 electro-magnetism (electromagnetic quantities and units of measurement, electrostatics, electric field and potential, conservation laws).

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

## **Course 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. Then it 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. Finally, the concept of ideal operational amplifier is presented.

## **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 properties of electric and magnetically-coupled circuits.
- Determine the dynamics of linear circuits in transient and low and high frequency.
- Analyze alternate-current circuits using the phasor method for sinusoidal steady-state.
- Apply fundamental principles to simplify and solve problems.

## Assessment

Students will be assessed on the following criterion:

Final exam	50%
Midterm exam	30%
Laboratory reports	5%
Quizzes	15%

## Notes:

- The midterm examination will be held on **Thursday, February 25, 2010, 17:00-19:00**. The location will be announced later.
- Recommended problems from the text book will be assigned for each chapter. Students are expected to work on these problems independently and discuss any difficulties during tutorial sessions. Quizzes based upon these problems will be written in the tutorial sessions.
- There will be laboratory sessions for Pspice (a computer-aided design software for electric circuits). There is a lab assignment to be performed and a lab report to be completed individually or in small groups. Students are expected to hand in the report within the deadline. Late submissions are not accepted.
- The final exam will cover all course material. Notes, books and programmable and graphic calculators are not permitted at exams.
- Requests for academic consideration due to illness or compassionate reasons must be in writing and accompanied by certification.
- Major Holy Days: Students must contact the instructor within the first two weeks of class if academic consideration is to be requested due to cultural/religious reasons.

## 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 students' responsibility to keep themselves informed about the course.

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**Disclaimer**

Changes to the course outline, subject to the University of Guelph academic regulations, will be communicated to students.