

The University of Maine
Department of Electrical and Computer Engineering
ECE 209 – Fundamentals of Electric Circuits

Fall 2019

Fundamentals of Electric Circuits

Course Number: ECE 209

Credits: 3

Lecture: 9:30 - 10:45 pm, Tuesday and Thursday; 115 Donald P. Corbett

Prerequisites: MAT 127 – Calculus II and PHY 122 – Physics for Engineers II

Course Website: <http://web.eece.maine.edu/kotecki/ECE209>

Instructor

Dr. David E. Kotecki

Office: 277 Barrows / ESRB

Tel: 207 581-2248

e-mail: kotecki@maine.edu

Office Hours

You are encouraged to drop by my office to ask questions and discuss homework problems. My office hours are:

9:30 - 11:30 am, Monday and Wednesday

1:00 - 2:00 pm, Tuesday and Thursday

Text Book

Title: [Electric Circuits \(11th edition\)](#)

Authors: James W. Nilsson and Susan A. Riedel

Publisher: Prentice Hall

Year: 2018

ISBN: 978-0134746968

Calculators

It is strongly recommended that you have a calculator capable of solving simultaneous linear equations with complex variables. Calculators may be used when solving homework problems and taking exams. The most popular calculators are the TI-89, TI-89 Titanium, and the TI Nspire CX CAS. If you do not own one of these calculators, try to borrow one for use during the examinations.

Goals

This is a foundation course in circuit analysis. You will acquire the fundamental tools to analyze linear circuits. You will learn how to analyze and solve circuit problems containing basic circuit elements including: wires, resistors, capacitors, inductors, independent and dependent voltage and current sources, and operational amplifiers. Both time-independent (DC), transient, and steady-state analysis will be introduced. This course will prepare you for more advanced courses in circuit analysis, signals and systems, and electronics. This course should help you pass the PE exam.

Homework

The homework problems are located at the end of each chapter. All of the assigned problems are listed **Page 5** of this syllabus. You may submit your solutions to the homework problems in class, or give them directly to the homework grader. Homework must be submitted no later than 4:00 pm on the due date. Late homework is not normally accepted.

Not all homework problems will be graded; a selected number of problems from each assignment will be corrected and used to determine your homework grade. The homework score will be based on the correct method and the correct answer. Circle your final answers! Presentation will not be separately graded, but poor presentation of your work will lower your grade – be neat!

You may work on the homework problems individually or with others in the class. You are encouraged to work together and discuss your solution to the problem with other students in the class. Each student is required to submit their own homework solutions.

Homework Grader

Teaching Assistant: Sri Srimat
e-mail: sri.srimat@maine.edu
Office: 253 Barrows Hall

Exams

There are three preliminary exams and one final exam. You may bring an 8.5" x 11" sheet of paper with notes along with any information stored in your calculator to the exams. Only hand held calculators (no tablets, phones, or laptops) may be used. The exam grade will be based on both the method used to solve the problem and the answer. Answers to problems not supported by a correct method will not earn credit. Presentation will not be separately graded and I will do my best to figure out what you meant to do on a problem, but if the work is poorly laid out or just a mess, your grade will suffer.

The exams are designed to test your knowledge of fundamental concepts and your ability to apply those concepts to solve problems. It is important to learn and master the key concepts rather than memorize how to do individual problems. Problems on the exams will be similar to but different from the problems in the homework. However all exam problems can be solved using the same concepts and techniques used to solve the homework problems.

Examination Dates

| | |
|-------------|-------------------------------|
| Exam #1: | 3 October 2019 |
| Exam #2: | 31 October 2019 |
| Exam #3: | 26 November 2019 |
| Final Exam: | 17 December 2019 (9:30-11:30) |

Anyone who is unable to attend class during one of the scheduled examination dates must notify the instructor prior to the exam. If you are excused from the exam for cause, a make-up exam will be offered during the last week of classes.

Grading

| | |
|--------------|-------------|
| Exams 1 – 3 | 20% each |
| Homework | 20% |
| Final Exam | 20% |
| Total | <u>100%</u> |

Letter Grade Assignment Floor

| | |
|-------------|-----|
| $\geq 90\%$ | A |
| 88% – 90% | B + |
| 80% – 88% | B |
| 78% – 80% | C + |
| 70% – 78% | C |
| 68% – 70% | D + |
| 60% – 67% | D |
| $< 60\%$ | F |

Tentative Class Schedule

| Class | Date | Topics | Sections |
|-------|---------------|---|-------------------------------|
| 1 | 3 Sept. 2019 | Course Overview; Systems of Units; Power & Energy | Chapter 1 – all sections |
| 2 | 5 Sep. 2019 | Voltage, Current, and Resistance | Chapter 2, Sections 1–3 |
| 3 | 10 Sept. 2019 | Kirchhoff's Laws | Chapter 2, Sections 4 and 5 |
| 4 | 12 Sept. 2019 | Series and Parallel Resistance; Measuring Current and Voltage | Chapter 3, Sections 1–7 |
| 5 | 17 Sept. 2019 | Nodal Analysis | Chapter 4, Sections 1 and 2 |
| 6 | 19 Sept. 2019 | Nodes and Dependent Sources | Chapter 4, Sections 3 and 4 |
| 7 | 24 Sept. 2019 | Mesh Analysis | Chapter 4, Section 5 |
| 8 | 26 Sept. 2019 | Loops and Dependent Sources | Chapter 4, Sections 6 – 8 |
| 9 | 1 Oct. 2019 | Source Transformations, Thévenin and Norton Equivalents | Chapter 4, Sections 9 – 11 |
| 10 | 3 Oct. 2019 | Exam #1 | — |
| 11 | 8 Oct. 2019 | Superposition | Chapter 4, Sections 12 and 13 |
| 12 | 10 Oct. 2019 | Operational Amplifiers | Chapter 5, Sections 1–4 |
| 13 | 17 Oct. 2019 | Op Amp Circuits | Chapter 5, Sections 5–6 |
| 14 | 22 Oct. 2019 | The Inductor and Capacitor | Chapter 6, Sections 1 – 3 |
| 15 | 24 Oct. 2019 | Mutual Inductance | Chapter 6, Sections 4 and 5 |
| 16 | 29 Oct. 2019 | Natural Response RL and RC Circuits | Chapter 7, Sections 1 and 2 |
| 17 | 31 Oct. 2019 | Exam #2 | — |
| 18 | 5 Nov. 2019 | Step Response and General Solutions | Chapter 7, Sections 3 and 4 |
| 19 | 7 Nov. 2019 | Sequential Switching | Chapter 7, Section 5 |
| 20 | 12 Nov. 2019 | The Sinusoid | Chapter 9, Sections 1 and 2 |
| 21 | 14 Nov. 2019 | The Phasor and Passive Elements | Chapter 9, Sections 3 and 4 |
| 22 | 19 Nov. 2019 | Kirchhoff's Law | Chapter 9, Sections 4 and 6 |
| 23 | 21 Nov. 2019 | Thévenin and Norton Equivalents; Nodal and Mesh Analysis | Chapter 9, Sections 7 – 9 |
| 24 | 26 Nov. 2019 | Exam #3 | — |
| 25 | 3 Dec. 2019 | Transformer | Chapter 9, Sections 10 and 11 |
| 26 | 5 Dec. 2019 | Instantaneous, Average and Reactive Power | Chapter 10, Sections 1 – 3 |
| 27 | 10 Dec. 2019 | Complex Power and Power Transfer | Chapter 10, Sections 4 – 6 |
| 28 | 12 Dec. 2019 | Review of Entire Course | — |
| 29 | 17 Dec. 2019 | Final Exam | — |

Homework Assignments

| Homework | Due Date | Problems |
|----------|---------------|--|
| #1 | 13 Sept. 2019 | 1.4, 1.7, 1.8, 1.10, 1.11, 1.18, 1.25, 2.5, 2.7, 2.9, 2.12, 2.15, 2.17, 2.23, 2.32, 2.33 |
| #2 | 20 Sept. 2019 | 3.3, 3.5, 3.9, 3.11, 3.16, 3.18, 3.20, 3.24, 3.31, 3.39, 3.52, 3.57, 3.60 |
| #3 | 27 Sept. 2019 | 4.3, 4.6, 4.7, 4.8, 4.12, 4.15, 4.17, 4.18, 4.23, 4.25, 4.29, 4.30, 4.39 |
| #4 | 11 Oct. 2019 | 4.45, 4.51, 4.55, 4.57, 4.58, 4.60, 4.64, 4.68, 4.74, 4.78, 4.82, 4.87, 4.97 |
| #5 | 18 Oct. 2019 | 5.1, 5.3, 5.5, 5.6, 5.8, 5.10, 5.16, 5.21 |
| #6 | 25 Oct. 2019 | 5.27, 5.31, 5.36, 5.38, 5.44, 6.5, 6.6, 6.10, 6.12, 6.17, 6.19, 6.20, 6.23, 6.28, 6.35 |
| #7 | 8 Nov. 2019 | 6.39, 6.45, 7.4, 7.6, 7.10, 7.20, 7.25, 7.29, 7.31, 7.36, 7.37, 7.41, 7.46, 7.57 |
| #8 | 15 Nov. 2019 | 7.68, 7.70, 7.73, 7.75, 7.78, 7.79, 7.82 |
| #9 | 22 Nov. 2019 | 9.2, 9.4, 9.7, 9.11, 9.18, 9.22, 9.23, 9.24, 9.25, 9.30, 9.33, 9.36, 9.37, 9.39 |
| #10 | 13 Dec. 2019 | 9.43, 9.49, 9.53, 9.58, 9.67, 9.74, 9.76, 9.80, 10.1, 10.3, 10.8, 10.22, 10.28, 10.41 |

Academic Honesty Statement

Academic honesty is very important. It is dishonest to cheat on exams, to copy term papers, to submit papers written by another person, to fake experimental results, or to copy or reword parts of books or articles into your own papers without appropriately citing the source. Students committing or aiding in any of these violations may be given failing grades for an assignment or for an entire course, at the discretion of the instructor. In addition to any academic action taken by an instructor, these violations are also subject to action under the University of Maine Student Conduct Code. The maximum possible sanction under the student conduct code is dismissal from the University.

Students with Disabilities Statement

If you have a disability for which you may be requesting an accommodation, contact Student Accessibility Services, 121 East Annex, 581.2319, as early as possible. Students who have already been approved for accommodations by SAS and have a current accommodation letter should provide a copy of the letter to me as soon as possible.

Course Schedule Disclaimer (Disruption Clause)

In the event of an extended disruption of normal classroom activities, the format for this course may be modified to enable its completion within its programmed time frame. In that event, you will be provided an addendum to the syllabus that will supersede this version.

Sexual Violence Policy: Sexual Discrimination Reporting

The University of Maine is committed to making campus a safe place for students. Because of this commitment, if you tell a teacher about an experience of sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct or any form of gender discrimination involving members of the campus, your teacher is required to report this information to the campus Office of Sexual Assault & Violence Prevention or the Office of Equal Opportunity.

If you want to talk in confidence to someone about an experience of sexual discrimination, please contact these resources:

For confidential resources on campus: Counseling Center: 207-581-1392 or Cutler Health Center: at 207-581-4000.

For confidential resources off campus: Rape Response Services: 1-800-310-0000 or Spruce Run: 1-800-863-9909.

Other resources: The resources listed below can offer support but may have to report the incident to others who can help: For support services on campus: Office of Sexual Assault & Violence Prevention: 207-581-1406, Office of Community Standards: 207-581-1409, University of Maine Police: 207-581-4040 or 911. Or see the OSVP website for a complete list of services at <http://www.umaine.edu/osavp/>