ECE 202 Circuit Analysis II

Old Dominion University
Department of Electrical and Computer Engineering
Fall Semester 2018

Instructor

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Teaching Assistant - Grader

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Teaching Assistant - Tutor

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Office Hours: Tuesday, Thursday 11:30 - 13:00

Lectures

Time: Monday, Wednesday, Friday, 14:00 - 14:50
Location: Kaufman Hall, Room 215

Prerequisites

MATH 307 and a grade of C or better in ECE 201 or its equivalent (power & energy, Kirchhoffs laws, mesh-current and node-voltage equations, Thevenin, Norton, maximum power transfer, and superposition theorems).

Course Webpage

http://www.ece.odu.edu/~gray/classes/ece202

*Note:* Use other editions at your own risk.

**References**


**Course Objectives**

ECE 202 introduces time and frequency domain analysis of first- and second-order electrical circuits, phasor analysis of AC circuits, Laplace transforms and the analysis of circuits using Laplace transforms, transfer functions, frequency response, and frequency selective filters.

**Grading Policy**

Final grades are determined using the weighted numerical averages as computed below and the following table:

- Homework - 10 %
- Midterm Exam 1 - 25 % (week 6: October 1, 2018, Monday, 14:00-14:50)
- Midterm Exam 2 - 25 % (week 11: November 5, 2018, Monday, 14:00-14:50)
- Final Exam - 40 % (final exam week: December 14, 2018, Friday, 12:30 - 15:30)

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Course Policies

1. On average homework will be assigned once a week and collected the following week. All homework must be submitted in person at the beginning of class. Late homework will not be accepted since solutions will be posted on the course webpage shortly after the homework is collected. See your instructor in advance in case of extenuating circumstances. All grading appeals concerning homework should first be addressed to the grader.

2. The text is an integral part of the course. You are responsible for the material in the sections cited in the course outline below. It will not be possible to cover every important topic in detail in lecture. If you are not reading the text, then your performance will not be as good as a student who is.

3. The tutor is available to assist you with homework, exam preparation, and any remedial help you might require.

4. The course webpage is the clearinghouse for all information concerning the course. It will be updated frequently, so check it first when you have any question or concern about the course. Note that the webpage is independent of the product Blackboard, which is not used in this course.

5. The ECE faculty passed a motion to make attendance mandatory for all sophomore level ECE courses. Therefore, attendance will be taken during each lecture, and students with 20% or more unexcused absences will automatically fail ECE 202. The instructor has no discretion in enforcing this policy. An absence will be excused if suitable documentation is provided to the instructor within one week of the absence.

6. MatLab and some circuit simulation software will be used in a few homework assignments. MatLab is currently available on most department laboratory machines including the machines in Kaufman Hall, Rooms 228, 229 and 230. You can install MatLab on your laptop at https://www.odu.edu/ts/software-services/matlab. The circuit simulation software will be made available when it is first needed in the course.

Honor System

The Honor System at Old Dominion University is based on individual integrity. In registering for ECE 461-561, you have agreed to adhere to the following Honor Pledge:

“I pledge to support the Honor System at Old Dominion University. I will refrain from any form of academic dishonesty or deception, such as cheating or plagiarism. I am aware that as a member of the academic community it is my responsibility to turn in all suspected violators of the Honor Code. I will report to an Honor Council hearing if summoned.”
Educational Accessibility

The Old Dominion University’s educational accessibility policy is:

“Students are encouraged to self-disclose disabilities that have been verified by the Office of Educational Accessibility by providing Accommodation Letters to their instructors early in the semester in order to start receiving accommodations. Accommodations will not be made until the Accommodation Letters are provided to instructors each semester.”

Additional information is available at the website:

http://www.odu.edu/educationalaccessibility/

Course Outline

Chapter 7 Response of First-Order RL and RC Circuits
7.1 The Natural Response of an RL Circuit
7.2 The Natural Response of an RC Circuit
7.3 The Step Response of RL and RC Circuits
7.4 A General Solution for Step and Natural Responses

Chapter 8 Natural and Step Responses of RLC Circuits
8.1 Introduction to the Natural Response of a Parallel RLC Circuit
8.2 The Forms of the Natural Response of a Parallel RLC Circuit
8.3 The Step Response of a Parallel RLC Circuit
8.4 The Natural and Step Response of a Series RLC Circuit

Chapter 9 Sinusoidal Steady-State Analysis
9.1 The Sinusoidal Source
9.2 The Sinusoidal Response
9.3 The Phasor
9.4 The Passive Circuit Elements in the Frequency Domain
9.5 Kirchhoffs Laws in the Frequency Domain
9.6 Series and Parallel Connections
9.7 Source Transformations, Superposition, and Thévenin-Norton Equivalent Circuits
9.8 The Node-Voltage Method
9.9 The Mesh-Current Method
9.10 The Transformer
9.11 The Ideal Transformer
9.12 Phasor Diagrams
Chapter 12 Introduction to the Laplace Transform
12.1 Definition of the Laplace Transform
12.2 The Step Function
12.3 The Impulse Function
12.4 Functional Transforms
12.5 Operational Transforms
12.6 Applying the Laplace Transform in Circuit Analysis
12.7 Inverse Laplace Transforms
12.8 Poles and Zeros of a Rational Function $F(s)$
12.9 Initial- and Final-Value Theorems

Chapter 13 The Laplace Transform in Circuit Analysis
13.1 Circuit Elements in the s Domain
13.2 Circuit Analysis in the s Domain
13.3 Applications
13.4 The Transfer Function
13.5 The Transfer Function in Partial Fraction Expansions
13.6 The Transfer Function and the Convolution Integral
13.7 The Transfer Function and the Steady-State Sinusoidal Response
13.8 The Impulse Function in Circuit Analysis

Chapter 14 Introduction to Frequency Selective Circuits
14.1 Some Preliminaries
14.2 Low-Pass Filters
14.3 High-Pass Filters
14.4 Bandpass Filters
14.5 Bandreject Filters