

West Virginia University
College of Engineering and Mineral Resources
Lane Department of Computer Science and Electrical Engineering

EE 355 Analog Electronics
Fall 2018

Class Info

Meeting Time: 2:00-2:50 MWF
Location: AGR G06
Prerequisites: EE 223, EE 251
Credit Hours: 3 (Lecture)

Instructor

Dr. David W. Graham
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AER 355
304-293-9692

Office Hours

Mondays 1:00-1:50 (AER 355 or ERB 216)
Wednesdays 3:00-3:50 (AER 355 or ERB 216)

Text

Microelectronics: Circuit Analysis and Design, Fourth Edition
By Donald A. Neamen, published by McGraw Hill, Copyright 2010
ISBN: 0073380644

Webpage

<http://community.wvu.edu/~dwgraham/classes/ee355>
Contains a detailed schedule of course coverage, reading assignments, and homework assignments.

Course Description

This course deals with the design, analysis and understanding of analog electronic circuits. Analog electronic circuits find wide applications in many electrical engineering disciplines including signal processing, communication, control systems, biomedical engineering, consumer electronics, and others.

Course Objectives

The objective of this course is to develop in the students an understanding of the various analog electronic circuits as well as the ability to design simple analog circuits to achieve specified performance levels.

Expected Learning Outcomes

1. Students will be able to identify key system-related issues in analog electronic circuits including impedance matching, gain-bandwidth product and loading effects.
2. Students will be able to model BJT and FET transistors and diodes using the small and large signal models.
3. Students will be able to calculate the gain and input/output impedances of several amplifier circuits.
4. Students will be able to design several different types of amplifier circuits for specified parameters.
5. Students will be able to calculate the frequency response of analog circuits.
6. Students will be able to design a simple active filter circuit.
7. Students will be able to design a simple oscillator circuit.
8. Students will be able to design DC power supplies using Zener diode regulators and IC regulator chips.

Attendance

Students are responsible for all material covered in class and any announcements made during class time (including changes to test dates, etc.). Additionally, please arrive to class on time. Any announcements made outside of class will be done through your MIX e-mail accounts. You must check your MIX account daily. Any cancellations to class (e.g. due to inclement weather) will be announced by e-mailing your mix account.

Class Policies

The use of portable phones in the classroom is not permitted. Please remember to turn off your ringers before class. If there are extenuating circumstances that warrant the need of a cell phone in class, let me know *beforehand*.

Homework

Regular homework assignments will be given to help provide understanding of the material and also practice solving problems. Solutions for the homework problems will be provided at the time the problems are assigned. These problems should be completed, but they do not need to be turned in. You are encouraged to discuss these problems with one another.

Quizzes and Tests

Several quizzes will be given throughout the semester. These quizzes will cover all material that has been presented in class and/or homework up to the date of the quiz, unless otherwise indicated. The duration of the quizzes will generally be between 3-5 minutes, but some may be shorter or longer. *The lowest quiz grade will be dropped, so you will not be able to make up a quiz for any reason.*

Three 50-minute tests will be given during the semester. A cumulative Final Exam will be given in the regularly scheduled exam period during finals week.

No smart phones may be used during quizzes, tests, or exams for *any* reason. Smart watches must also be removed during tests. Failure to comply will result in an immediate termination of the quiz, test, or exam with a grade of 0 for that student.

Honor Code

All work you turn in must be completely your own unaided work. I will not tolerate cheating, copying, helping others, or harming others; these are strictly forbidden and are in violation of the university's academic honesty policy, as listed in the undergraduate catalog. Plagiarism and any other forms of cheating will be severely penalized and may result in an F grade for the course or receive no credit for the specific test or exam or component of the course. Students are expected to exhibit the same level of professionalism and integrity that will distinguish them in their professional careers. Both the person who reproduced in whole or in any part from the work of others and the person who allowed the work to be copied will be penalized. Consequences and procedures for dealing with cases of academic dishonesty are outlined in the WVU Student Code of Rights and Responsibilities. For more information, please see the "Academic Honesty Statement" below.

Assessment

Test 1 (50 minutes)	20%	Sept. 19	* Test dates are tentative
Test 2 (50 minutes)	20%	Oct. 10	
Test 3 (50 minutes)	20%	Nov. 7	
Cumulative Final Exam	35%	Dec. 10 (11:00 a.m. – 1:00 p.m.)	
Quizzes	10%	(Lowest Quiz Dropped)	
Total	105%	(Built-In 5% Extra Credit)	

Grading A ≥ 90% 90 > B ≥ 80% 80 > C ≥ 70% 70 > D ≥ 60% F < 60%

Make-Up Policy

You are expected to attend all quizzes, tests, and exams at the scheduled time and location. If you will not be able to attend a test or exam for legitimate reasons (e.g. religious observance), let me know within the first week of the semester. Otherwise, you will not be permitted to make up missed tests or exams unless there is documented proof of urgent medical care or an emergency. Any make up tests or exams that are granted may be given as oral examinations, at my discretion. *The lowest quiz grade will be dropped, so you will not be able to make up a quiz for any reason.*

Social Justice and Disability Statement

West Virginia University is committed to social justice. I concur with that commitment and expect to foster a nurturing learning environment, based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with Disability Services (293-6700).

Academic Honesty Statement

The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code at <http://www.arc.wvu.edu/admissions/integrity.html>. Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me *before* the assignment is due to discuss the matter.

Statler College Policies for Enforcing Academic Integrity

- Grades assigned during the semester on exams, quizzes, reports, or homework assignments are considered final and are not subject to negotiation for any reason other than an indisputable mistake in grading.
- Use of cell phones, smart wearable devices, or possession of other external communication devices are strictly prohibited during exams, tests, or quizzes administered inside the classroom. Departments may specify acceptable calculators and additional restrictions.
- Common standards of academic integrity prohibit not only cheating or plagiarizing, but also the unethical conduct of trying to obtain grades that the student has not earned. Violations of academic integrity are described in the WVU Catalog: <http://bit.ly/2hDAeUa>.
- Incidents of student misconduct or academic dishonesty will be handled promptly and appropriately in accordance with the WVU Student Conduct Code and Discipline Procedure. The case will be referred to the Office of Student Conduct. Violations may lead to dismissal from the Statler College and expulsion from the University.

Disclaimer

The professor reserves the right to make changes in the syllabus. Any changes that are made will be in, what the professor deems, the best interests of the class.

Tentative Schedule

- Review of Circuit Analysis
- Operational Amplifier Circuits
- Device Physics Overview
- Diode-Based Circuits
- Bipolar Junction Transistors and Circuits
- Frequency Response of Active Circuits
- MOSFET Transistors