

Electronic Devices Laboratory – ENGR 356 (1 credit hours)

Abilene Christian University

Spring 2016

Course Description (from the ACU Course Catalog)

Project-oriented laboratory focused on design and implementation of analog circuits with semiconductor devices. Must be taken concurrently with ENGR 355 (Electronic Devices)

Class Meeting Times and Location

This class meets Monday in Foster Science Building Room 330 from 2:00 pm to 4:50 pm.

Intended Audience

Any General Engineering student (BSE) or Physics student (BS) with an interest in electronic circuit design and an exposure to electric circuits through ENGR/PHYS 135 (Introduction to Electric Circuits) and calculus through MATH 286 (Calculus II)

Required Text and Software

Microelectronics Circuit Analysis and Design (4th Edition) by Donald A. Neamen, McGraw-Hill Higher Education, 2010, ISBN-13: 9780073380643.

Contact Information

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Office Hours: MWF (10:00 am to 11:00 am) MT (3:00 pm to 5:00 pm). Additional office hours can be arranged as needed.

Teaching Philosophy

Engineering is a well-respected professions. The public entrusts engineers to be honest, competent, and ethical. Many codes of ethics for these fields indicate that the commitment to protecting the health, safety, and welfare of the public is of paramount importance. These values are in harmony with Christian principles and ideals. Christian engineers should be honest (Matthew 5:37), work hard to ensure competency (Colossians 3:23), and put the public's interest ahead of his or her own (Luke 6:31). In light of these principles, this course will be taught such that you will gain an appreciation for the professional nature of engineering. It will be taught so as to give you every opportunity to begin to develop competency in these fields. This will require homework, quizzes, tests, and group discussion. The instructor especially encourages the discussion of topics that would bear on integrating faith and professional responsibilities (cheating on licensure exams, weapons design and manufacture, environmental laws and employment opportunities in developing nations, etc.)

Learning Objectives and Competencies

ABET Learning Objectives	Course Competencies	Measurement
3(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	Design common electronic circuits	Lab reports, Participation in lab activities
	Design a medium-scale electronic circuit based on given specifications and constraints	Project
3(e) an ability to identify, formulate, and solve engineering problems	Design common electronic circuits	Lab reports, Participation in lab activities
	Simulate common electronic circuits	Lab reports, Participation in lab activities
	Analyze common electronic circuits	Lab reports, Participation in lab activities
3(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	Simulate common electronic circuits	Lab reports, Participation in lab activities
	Analyze common electronic circuits	Lab reports, Participation in lab activities

Student Conduct

Academic integrity is defined as academic work completed as assigned for each class by the individual or group responsible for the work. Violations of academic integrity and other forms of cheating involve the intention to deceive, mislead, or misrepresent and therefore, are a form of lying. Such actions are contrary to behavioral norms that flow from the nature of God. Academic misconduct includes, but is not limited to, the following: 1) Failure to give credit to sources used in a work in an attempt to present the work as one's own, 2) Submission of papers or projects obtained from another source (e.g., research service or club paper file) as one's own, and 3) Falsifying information orally or

in writing. Academic misconduct may result in, but is not limited to, a zero on the assignment and/or an F in the course. Additionally, the department chair, Dean of the College of Arts and Sciences, and the Dean of Student Life will be notified. See the full university policy, including how to appeal a decision, by following this link:

<http://www.acu.edu/campusoffices/studentlife/judicialDocuments/AcademicIntegrityPolicy.pdf>.

Attendance

Attendance is expected at all class sessions. It is also expected that you will arrive promptly.

Grading Policy

Participation and lab practices–

This grade will be influenced by your attendance and preparedness for lab each week, and your ability to work professionally with others in the lab.

Lab notebooks–

Your lab notebook should include notes to yourself, calculations, and procedures used during your time in lab. It will be graded based on whether or not you are using it, but its content will not be graded for quantitative correctness.

Formal Lab Reports–

Formal lab reports will be turned in for each lab assignment. These will be graded according to the rubric that will be distributed with each lab prompt.

Project–

The project for this lab will consist of an open-ended design challenge in which you will propose a general project idea (i.e., to build a voltage-controlled oscillator) for which your instructor will then provide specifications. Your grade will be based on the simulated performance of your design and its conformity to the given specifications. Additionally, a formal oral and written report about the design will comprise part of the grade. Grading details will be distributed with the project prompt.

Calculation of Final Course Grade–

Participation and lab practices:	20 %
Lab notebooks:	15 %
Formal lab reports:	40 %
Project:	25 %

90% and above	A
80% - 89%	B
70% - 79%	C
60% - 69%	D
59% and below	F

ADA Compliance Statement

“Abilene Christian University is dedicated to removing barriers and opening access for students with disabilities in compliance with ADA and Section 504 of the Rehabilitation Act. The Alpha Scholars

Program facilitates disability accommodations in cooperation with instructors. In order to receive accommodations, you must be registered with Alpha Scholars Program, and you must complete a specific request for each class in which you need accommodations. If you have a documented disability and wish to discuss academic accommodations, please call our office directly at 325-674-2667."

Disclaimer: This syllabus is complete and correct to my knowledge at the present time; however, this syllabus may be modified at any time if I determine that it is in the best interest of the class to do so.

The mission of the Engineering and Physics Department:

The ACU engineering program strongly supports the university's mission of educating students for Christian service and leadership throughout the world. In support of this mission, ACU engineering graduates will attain:

- A deep and broad understanding of engineering principles and practices as evidenced by professional employment, continued professional development, and graduate study in engineering or other professional fields.
- An extensive knowledge of the innovative design processes unique to engineering professionals as demonstrated by using critical thinking skills to contribute to the scientific and technical literature, patents and intellectual property, professional societies, and creative designs.
- A thorough understanding of Christian service and leadership as shown in their commitments to professionalism, ethics, and service and leadership within the engineering profession, the church, and society.

The mission of the College of Arts and Sciences:

To educate students for worldwide Christian service and leadership through programs of study and other learning experiences that blend a liberal arts education with professional and career education.

The mission of ACU:

To educate students for Christian service and leadership throughout the world.

Electronic Devices Laboratory Schedule

Weeks	Lab Topic, project milestone
1, 2	DC power supply design and construction (project assigned)
3, 4	Audio amplifier design Part 1: systems and power supply considerations, power supply design (project proposal due)

5, 6	Audio amplifier design Part 2: signal path—preamp stages and power amplifier design; simulation and analysis
7, 8	Function generator design Part 1: specifications and necessary subsystems
9, 10	Function generator design Part 2: variable frequency and amplitude oscillator design, simulation, and analysis (Week 9: Project progress report due)
11, 12, 13	OPEN LAB PROJECT WORK WEEKS
14, 15	PROJECT PRESENTATIONS (Week 15: Project reports due)