

Course Syllabus – ECE 392 - Electrical Engineering Laboratory II

THU 10:00am – 12:50 pm / FMH 109

Course Description

This laboratory addresses some of the areas covered in ECE 232, ECE 271 and ECE 372, which includes design, computer simulation, testing and performance analysis of analog and digital electronic circuits. Engineering design and measurement concepts using selected design projects are introduced. You will have to use Multisim for solving DC, AC and transient problems on the personal computer.

Prerequisites: ECE 271 and ECE 291

Co-requisite: ECE 372

Textbooks and Manuals

[Manual for Electrical Engineering Laboratory II - 392](#)

Grading

PreLab	20%
Lab Report	60%
- Presentation and Format	- 15%
- Experimental data	- 20%
- Analysis, simulations and discussions	- 25%
Project	20%
Bonus Quizzes (optional)	~10%

The course grade is based on the average grade of all experiments. The grades of individual students in the same team may be different, based on their attendance and participation in the Laboratory.

Bonus Quizzes will be conducted at the end of each topic and are optional. Depending upon your score in the quizzes, you will be awarded extra points based on the average percentage. The maximum bonus that you can earn is 10%, which will be added to your final grade. You won't lose any points regardless of your attendance in the quizzes.

Course Learning Outcomes (CLO)

- (1) Use a FET transistor to build a constant current source and a variable resistor.
- (2) Build Emitter Follower circuit with a BJT transistor
- (3) Design the Common Emitter Amplifier with specific gain.
- (4) Design and build active low pass and high pass filters using operational amplifiers.
- (5) Design and build sine wave oscillator using an operational amplifier with positive feedback.
- (6) Distinguish operational characteristics of logic TTL and CMOS gates.
- (7) Complete a circuit project based on your own design and methods learned in this laboratory.

ABET Criterion 3 student outcomes addressed by the course

ABET Criterion 3 Student Outcome	Learning Outcomes
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	1 - 6
(g) an ability to communicate effectively	1 - 6 (Lab Reports)
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	1 - 6 (Assignments)

Topics to be covered

The course follows the [ECE Laboratory Manual](#), which describes the following experiments:

1. Field Effect Transistor (J-FET), Basic characteristics
2. Design a basic emitter follower circuit
3. Design of a single stage amplifier (Common Emitter Amplifier)
4. OP-AMP Basics
5. OP-AMPS; Active Filters
6. Non-linear Circuits; Positive Feedback
7. Digital Circuits (Introduction to digital circuits. TTL and CMOS digital integrated circuits)

Deliverables

Pre-laboratory assignments precede each set of experiments, which prepares you for work in the laboratory. PreLabs are supposed to be completed at home by each student individually and are to be handed to the instructor prior to doing the experimental work. Besides entry of the experimental plan in the notebook, the prelabs usually consist of simulations and schematics of the experimental design.

Laboratory Reports are prepared by each group of three students, who have worked together on experiments, after all measurements and analysis are completed. Professional style reports are expected at this upper-level laboratory. Reports should be typed and have the standard properly filled cover page. All pages must be numbered, and all figures and graphs must have captions and numbers. The axes of the graphs must be labeled, and the units indicated. Schematics of all circuits should be included and the conditions under which data were obtained (such as input voltage, frequency etc.) must be clearly indicated.

Each student must bring an individual pre-laboratory assignment and submit it online or hand it to the instructor at the beginning of a lab session, before starting a new experiment series. Not delivering the assignments on time will result in a grading penalty.

A common laboratory report is delivered by each team with all team members responsible for its content. After the experiment series is finished, the report is due by the start of the next laboratory session.

Reports after first grading may be returned for corrections. If the corrected report is resubmitted within one week, it will be regarded disregarding the corrected errors. Reports and pre-labs submitted late will be penalized by subtracting 20% of the points. Extension may be granted only in special circumstances when requested prior to the deadline.

Honor Code: The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students.