Syllabus – ECE 294 (101) - Analog and Digital Circuits Laboratory

Tuesday 6:00 PM – 10:05 PM | FMH 211

Course Description

This laboratory addresses some of the areas covered in ECE 231, ECE 232, and ECE 251. It will involve assembly, testing and analysis of basic analog and digital circuits. Electronic measurement techniques, instrumentation and data analysis will be covered. Simulations will be performed for measurements of AC, DC, and transient response of basic analog circuits.

Prerequisites: ECE 231, ECE 251, ENGL 101
Corequisites: ECE 232

Textbooks and Manuals

Laboratory Manual for Analog and Digital Circuits - ECE 294

Grading

PreLab	30%
Lab Report - Presentation and Format - Experimental data - Analysis, simulations and discussions	50% - 10% - 20% - 20%
Participation/Quiz	20%

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

Quizzes will be conducted at the end of each session. Depending upon your score in the quizzes, you will be awarded the grade for that experiment.

Course Learning Outcomes (CLO)

(1) Combinational and Sequential Circuits
(2) Shift Registers and Counters
(3) Gate Function Detector
(4) Introduction to the Basic Laboratory Instruments: Oscilloscope
(5) The superposition principle and the Thevenin Equivalent Circuit

(6) Internal Impedance of Instruments; Influence of Instruments on Circuits
(7) AC Measurements; Amplitude and Phase
(8) Input Impedance of an Oscilloscope and the Scope Probe
(9) The Diode and Diode Circuits
(10) The Transistor; MOS and Bipolar

Course Schedule

Week 1	Combinational Circuits
Week 2	Combinational Circuits
Week 3	Sequential Circuits
Week 4	Shift Registers
Week 5	Counters
Week 6	Design Project – A Gate Function Detector
Week 7	Introduction to the laboratory basic electronics instruments: Oscilloscope
Week 8	The Superposition Principle and the Thevenin Equivalent Circuit
Week 9	Internal Impedance of Circuits; Influence of Instruments on Circuits
Week 10	AC Measurements; Amplitude and Phase
Week 11	Input Impedance of an Oscilloscope and the Scope Probe
Week 12	The Diode and Diode Circuits
Week 13	The Transistor; Comparison of two basic types: MOS and Bipolar
Week 14	Remedial Lab Session

Instructor Information

Instructor: Neel Adwani
Contact: na657@njit.edu
Office Hours: Wednesday 2:30 PM to 3:30 PM at FMH 211

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 uploaded to canvas, 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. The PreLab assignments can be found at https://ecelabs.njit.edu/ece294/ for each experiment.

Laboratory Reports are prepared by each group of three/four 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 submit a pre-laboratory assignment before the lab session. Not delivering the assignments on time will result in a grading penalty.

A common laboratory report is delivered by each group with all the members responsible for its content. After the experiment series is finished, the report is due by the end 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 regraded, disregarding the corrected errors. Reports and pre-labs submitted late will be penalized by deducting 10% of the points. Extension may be granted only in special circumstances when requested prior to the deadline.

Academic Integrity

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: NJIT Academic Integrity Code.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu.