Syllabus – ECE 294 (003) - Analog and Digital Circuits Laboratory

Wednesday 08:30 AM – 12:50 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. Moreover, the course will go over experiments and design of digital circuits from basic gates to complex logic, including sequential circuits, the arithmetic/logic unit, and computer memories.

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

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 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 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.