Lab TA: TBA; will administer the lab day-to-day basis.

Instructor in charge: Dr. Nazmul Islam

Course Description:
This course provides laboratory support for ELEE 3301, Electronics I course. Topics include operational amplifier circuits, diode circuits, voltage regulators, MOSFET and BJT transistors, and transistor amplifier circuits. Circuits will be built, tested and analyzed.

Lab Schedule:
W 4:30pm-7:10pm at Electronics Laboratory

Text:
Lab handouts distributed by instructor.

Course Topics:
Lab topics include inverting, non-inverting operational amplifier (Op Amp) circuit, integrator circuit design, diode fundamentals, voltage regulator design, Metal Oxide Semiconductor Field Effect Transistor (MOSFET) and Bipolar Junction Transistor (BJT) circuits, and high gain amplifier design.

Detailed laboratory topics are:

- Op Amp circuits
  - Inverting/ Non-inverting op amp
  - Differential op amp
  - Integrator
  - Circuit design contain addition and subtraction
- Diode fundamentals
  - Rectifier circuit design
  - Diode as a switch
- Voltage regulator design
- MOSFET circuit characterization.
- Amplifier using MOS transistors.
• Characteristics of BJT transistors
• High gain single stage amplifier design

**Detailed Contents (Labs and Projects):**

Lab 1: Digital System
Lab 2: PSPice simulation of Op-amp and electronics circuit
Lab 3: Operational Amplifier Basics
Lab 4: Operational Amplifier imperfections and Applications
Lab 5: Additional Operational Amplifier Circuits
Lab 6: Junction Diode Basics

**Project 1:** Regulated Power Supply Design

Lab 7: Metal-Oxide-Semiconductor Field-Effect Transistor Basics
Lab 8: Bipolar Junction Transistor Basics

**Project 2:** Transistor Amplifier design using MOSFET and BJT

**Course Evaluation and Requirements:**

**Partnerships:** Students will work in teams of two. You should pick your own partner during the first day of class. Changing of partners during the semester is not allowed.

**Hardbound Notebook:** It is highly recommended, to obtain a hardbound notebook for each of you to make laboratory notes and drawings. This notebook should hold a detailed, real time record of your work in the lab. Each students will have a notebook and alternate labs are done in the notebook. While one lab (in a notebook) is graded, the other notebook will be worked on the next lab report. You will alternate the lab report in each notebook.

**Reports:** There will be multiple laboratory experiments to be completed during scheduled lab time. Each team will be required to submit one printed-out report for each laboratory exercise (one report per team). Reports should be arranged as follows:

• A cover page (includes laboratory title and number, student names and IDs)
• Several pages demonstrating laboratory results
• Simulation results, and comments on your results also need to included
• A page of summary and conclusions
Reports are to be turned in a week after the lab experiment is done. Submission takes place at the beginning of the laboratory class; after that, reports are considered as late.

Late reports are generally considered disrespectful. You first late report will have a 20% penalty. Your second late report will have a 50% penalty. Any other late reports will not be accepted at all, and no credit will be given for these.

Every assignment should be finished in time and by yourselves as a team. Any copied submission will imply the failure of the course. Reports should be computer made, but if you need to turn in something in writing (for example, large amounts of math calculations and circuit schematics), you are allowed to do so, but be sure to make your writing recognizable and understandable.

Attendance: Attendance is mandatory. Attending the laboratory sessions and always being on time reflects your interest towards the course. Absences will definitely have an impact on your final grade. Being late could also affect your final grade. You are allowed to be late up to two times without penalty. Starting with the third time and afterwards, you will be counted as absent.

Grading: The following is the grading criteria for the course:

- Lab Attendance 10%
- Lab Quizzes 15%
- Lab Reports 40%
- Lab Projects 35%

Letter grade for this lab course will be assigned according to the following scale:

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Student Learning Outcomes
At the end of the semester, it is expected that students should be able to:

1. Design circuits using diodes, MOSFETs, and/or BJTs
2. Design voltage regulator circuits for various load resistances
3. Simulate electronic circuits using PSpice software
4. Design a single stage amplifier circuit and analyze the performance