Basic Electronics Laboratory

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Introduction

Introduction to Electronics laboratory is the first electronics laboratory in iMTech ECE curriculum. This is a two credit hours course and not one-credit hour, as most of the students think. Topics include, but are not limited to, the basics of electronics: passive, active, some part of analog and digital devices, debugging, and testing. Additionally, students will learn simulating circuits using software such as *Multisim*, and plotting readable graphs using *MS Excel* or *Libreoffice* or *gnuplot*.

Office Hours and Appointments

Dr. Madhav Rao, 112 IIITB, mr@iiitb.ac.in
Office Hours: Friday - 9 AM to 11 AM

Exams

There will be two exams: MidTerm and a Final Exam. All Mid-Term exams are tentatively scheduled on October 3 to 8. Final exams are tentatively scheduled on first week of December. The exams will test your practical knowledge on developing, simulating a circuit asked or given to you.

Experiments

There will be atleast 9 experiments. The students involvement and completion of the experiments will be judged. Once completed, the student will demonstrate the experiment to the instructor or lab-incharge. The instructor may ask to modify the experiment accordingly and will expect a clear justification on the behavior of the modified circuit to give points.

Lab reports and assignments

Students with their lab patners will write lab reports which will include only plots of the experiments performed in the lab. The lab reports will be graded on the presentation of the data. Students are encouraged to use either *Matlab*, *gnuplot*, *Libreoffice* or *MS Excel* softwares to plot the data. Incomplete data with no legends, labels will be rejected.

Quizzes and Assignments

Lab quizzes be held almost in every week, thereby no prior information will be given to you. Assignments will be given intermittently to get more practice.

Final Project

Students in group of four can work on a project. The students are encouraged to start working on their project after their midterm exam. The project will test the group of students skills on electronics. The project should be demonstrated to the instructor in the last week of the semester. The project submission involves poster, video, and source-code if any by the last week of the semester.

Catalog Statement

Two credit hours
This is an introductory laboratory course on electronics. Concepts includes: passive and active electronic devices, basic filtering circuits, basic rectifiers and regulator circuits, digital gates, combinational circuits, sequential circuits, and microcontrollers. Simulation of the circuits using Multisim.

Course Summary

This course introduces Electronics experiments and simulation, an important part of todays integrated circuit prototype designing. Students will learn the basics of electronics, including the designing, testing, and debugging of circuits.

Course Objectives

At the end of this class, a student should be understand the concepts of:

- *design an experiment to verify the concept*
- *design electronic circuits to solve a problem*
- *develop an interest in experimentation and learn to account for observations and debug*
- *familiar with the electronic components and circuits in the lab*
- *realize a circuit from simulation to physical system*

Textbook

The textbook *Introduction to Electronics circuits* by Richard Dorf and James Svoboda is recommended. Students are also recommended to refer *The art of electronics* by Paul Horowitz and Winfield Hill, which is available in IIIT-B library.

Lab hours

The lab hours will constitute the following:

Basic of Electronic topics	hours
Measuring instruments and signal generators	4
Electronic components	4
Multisim softwares	2
Passive and active devices	12
Digital circuits	8
Combinational circuits	8
Sequential circuits	8
Microcontroller (Arduino)	8
Total Hours	54

Grading

Grades will be determined by the following percentages:

Percentage	Task
25%	Midterm exam
25%	Final Exam
20%	Quizzes
10%	Demonstration of experiments
10%	Lab reports and assignments
10%	Project

Unexcused absence will result in losing of 2 points from the overall grade. For exams, grading is based upon the straight scale percentage of successfully completed problems. No make up quiz or an exam will be conducted.

Other Details

Please be in your seat by the beginning of class. There is to be no food or drink in the classroom. Sleep is allowed only in the event of a stultifyingly boring lecture. Being caught reading a newspaper, using the computer for purposes other than the class or texting on a cell phone will count as half an unexcused absence (1 point). Schedule changes, assignment clarifications, and such will be announced via the LMS. Lab reports, assignments are to be submitted electronically by 11:59:59 a.m. on the day they are due. If your writeup looks as if you have plagiarized someone else's writeup, both writeup's will be forwarded to the Director of the IIITB. Further you will be considered guilty of plagiarism. Interaction with fellow classmates on tasks and reports are encouraged, but there should be no sharing of write-ups, only an exchange of high-level ideas. The minimum punishment requested for plagiarism, or any other academic misconduct, is dismissal from the class with a failing grade. You are required to protect your work from plagiarism. If your work is plagiarized, it will be assumed that you were a willing participant in the plagiarism and you will receive the same punishment as the plagiarist, absent evidence to the contrary. Attendance is required. For each unexcused absence (except the first), your final percentage will suffer a deduction of 2 points (see previous section). Thus, five unexcused absences beyond the first may lower your score one full letter grade. Even one unexcused absence beyond the first will likely lower your final grade a plus/minus value. An absence will be excused if you alert your instructor prior to the start of the class you will be missing. If you do not inform your instructor before the start of a missed class, you will need to provide a written, institute authorized excuse in the subsequent class.