ECE109(L): Analog Electronics Lab

Programme: B.Tech. (ECE) Year: 1st Semester : II
Course : Core for ECE Credits : 2 Hours : 30

Course Context and Overview (100 words):

The objective of the course is, for a student to appreciate the significance of different electronics devices in real world applications and verify them in the laboratory using different circuits. The students would learn about diodes and applications of diodes in rectifiers, power supplies and various signal shaping circuits. To be able to design amplifiers and switches using BJTs. Also be capable of designing AC and DC biasing for different BJTs. The students would also be introduced to different Analog to digital and Digital to Analog converters.

Prerequisites Courses: Basic Electronics, Basic electronics lab

Course outcomes (COs):

On completion of this course, the students will have the ability to:
CO1 Know the basics of Diode and diode based circuits.
CO2 Describe both AC and DC biasing of BJTs.
CO3 Design flash ADC and DACs.
CO4 Analyze and design various oscillators.
CO5 Design NE555 based circuits for real world applications.

Experiment list:

Experiments:	**Lab Sessions**
1. To analyze and design a clipping and clamping circuit.	1
2. To analyze and design of a dc power supply.	1
3. I-V characteristics of different types of LEDs and photodiodes.	1
4. To find Common Emitter (CE) current gain (β) and design basic switch and digital gates.	1
5. To design and analyze self-biased CE amplifier.	1
6. Design and analyze RC coupled CE amplifier.	1
7. Design and analyze oscillator using BJT and OP-AMPs.	1
8. To study mono-stable and astable modes of NE555 timer.	1
9. To design and analyze DAC and ADC circuits.	1
10. Lab project.	1

Textbook references (IEEE format):

Text Book:

1. *Microelectronic Circuits*, Sedra and Smith, Oxford University Press.
2. *Electronic Devices and Circuits*, Millman and Halkias, Tata McGraw Hill.

Reference books:

Additional Resources (NPTEL, MIT Video Lectures, Web resources etc.):

1. *http://www.nptel.ac.in/courses/Webcourse-contents/IIT-ROORKEE/BASIC-ELECTRONICS/home_page.htm*
2. *http://nptel.ac.in/video.php?subjectId=117103063*

Evaluation Methods:

Item	Weightage
Attendance*	10
Lab Report	10
Regular Viva	20
Lab Quiz	20
Final Examination**	20
Final Project	20

*****60% Attendance is mandatory. This means you have to attend minimum six labs on your **regular time slots** to appear for the final examination. Marks for attendance will be awarded only for the labs attended on regular sessions. Any experiments performed during make-up lab sessions will not contribute towards attendance. All your missed experiments must be completed in your makeup labs.

******Final examination will consist of lab viva, lab exam.