Electronic Circuit Design

Code	Credit Hours
EE-313	3-1

Course Description

This course covers low and high frequency response of various amplifier configurations (based on BJTs and MOSFETs), feedback topologies and stability analysis, high power amplifiers and oscillator configurations. The course covers both the analysis and design aspects using discrete component circuits.

Text Book:

1. Microelectronic Circuits, By Sedra/ Smith., Oxford University Press.

Reference Book:

1. Fundamentals of Microelectronics, by Behzad Razavi, Wiley.

Prerequisites

EE-215 Electronic Devices and Circuits

ASSESSMENT SYSTEM FOR THEORY

Quizzes	10%
Assignments	10%
Mid Semester Exam	30%
ESE	50%

ASSESSMENT SYSTEM FOR LAB

Project	10%
Lab Work and Report	70-80%
Lab ESE/Viva	20-30%

Teaching Plan

Week No	Topics	Learning Outcomes
1	Introduction	Review of basic amplifier configurations. Frequency response of amplifiers, STC circuits, Bode plots.
2-6	Frequency Response	Low frequency response of common source and common emitter amplifier. Internal capacitive effects and high frequency model of MOSFET and BJT. High frequency response of common source and common emitter amplifier, Miller's theorem. Determining the 3 dB frequency, method of open circuit time constant. High frequency response of common gate and cascode amplifiers. High frequency response of source and emitter followers.
7-8 10-12	Feedback	General feedback structures. Properties of Negative feedback amplifiers. Feedback Voltage Amplifier, Feedback Current Amplifier, Feedback Transresistance Amplifier, Feedback Transconductance Amplifier. Stability study using Bode plots, Frequency compensation, Miller compensation and pole splitting.
9	**MID Semester Exam**	
13-15	Output Stages and Power Amplifiers	Classification of output stages, Class A output stage, Class B output stage. Class AB output stage, Variations of class AB configurations.
16-17	Oscillators	Oscillator theory, Op-Amp based oscillators, LC Oscillators
18	**End Semester Exam**	

Practical:

Experiment No	Description
1	Common source amplifier
2	Low frequency response of common source amplifier
3	Low frequency response of common emitter amplifier
4	High frequency response of common source amplifier
5	High frequency response of common emitter amplifier

6	High frequency response of common gate amplifier
7	Class B amplifier
8	Open Ended Lab
9	Feedback Voltage Amplifier (Series-Shunt)
10	Feedback Transconductance Amplifier (Series–Series)
11	Feedback Transresistance Amplifier (Shunt–Shunt)
12	Feedback Current Amplifier (Shunt–Series)
13	Wien Bridge Oscillator
14	Colpitts Oscillator