

Course code	Course Name	L-T-P - Credits	Year of Introduction
EC209	Analog Electronics	3-1-0-4	2016
Prerequisites :Nil			
Course Objectives			
<ul style="list-style-type: none"> To familiarize basic electronic elements and their characteristics To develop understanding about BJT and FET circuits To understand the concept of power amplifier and differential amplifiers 			
Syllabus			
Diode: Diode as a circuit element-diode clipping circuits-clamping circuits-voltage regulators- BJT: Operating point of a BJT-thermal runaway-h parameter model of a BJT-frequency response of amplifiers-FET: Construction and characteristics of JFET and MOSFET-Feedback: - Concepts – negative and positive feedback-Power Amplifiers- Class A, B, AB, C, D & S power amplifier-Differential Amplifiers:- The BJT differential pair- Large and small signal operation-MOS differential amplifier- Large and small signal operation-UJT- 555 Timer IC, PLL.			
Expected outcome.			
<ul style="list-style-type: none"> Will get knowledge on electronic elements and their characteristics. 			
Text Book:			
1. Allen Mottershead, <i>Electronic Devices and Circuits: An Introduction</i> , Prentice Hall of India. 2. V. Boylestad and Nashelsky, <i>Electronic Devices and Circuits</i> , Pearson Education 3. Ramakant A Gayakwad, <i>Op- Amps and Linear Integrated Circuits</i> , Prentice Hall of India			
References:			
1. Schilling and Belove, <i>Electronic Circuits</i> , McGraw Hill 2. Theodore F. Bogart Jr., <i>Electronic Devices and Circuits</i> , 3. Coughlin and Driscoll, <i>Operational amplifiers and Linear Integrated Circuits</i> , 4. K. R. Botkar, <i>Integrated Circuits</i> , Khanna Publishers 5. Somanathan Nair, <i>Linear Integrated Circuits – Analysis, Design & Application</i> , Wiley-India			
Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Diode: Diode as a circuit element - load line - piecewise linear model – single-phase half wave and full wave rectifier circuits – voltage regulation - ripple factor - rectifier efficiency - bridge rectifier - rectifier filters - diode clipping circuits - single level and two level clippers - clamping circuits –Zener diodes - Zener voltage regulators.	9	15%
II	BJT: Operating point of a BJT – DC biasing - bias stability - thermal runaway - AC Concepts –role of capacitors in amplifiers – common emitter AC equivalent circuit - amplifier gain and impedance calculations- h parameter model of a BJT –cascaded amplifiers, frequency response of amplifiers	9	15%

FIRST INTERNAL EXAMINATION			
III	FET Construction and characteristics of JFET and MOSFET, biasing a JFET and MOSFET, JFET and MOSFET small signal model - CS and CD amplifiers. feedback: - Concepts – negative and positive feedback feedback -feedback connection types - practical feedback circuits	9	15%
IV	Power Amplifiers Class A, B, AB, C, D & S power amplifiers - harmonic distortion efficiency -wide band amplifier - broad banding techniques - low frequency and high frequency compensation -cascode amplifier - broad banding using inductive loads - Darlington pairs.	10	15%
SECOND INTERNAL EXAMINATION			
V	OSCILLATORS & MULTI VIBRATORS Classification of oscillators – Barkhausen criteria- operation and analysis of RC phase shift – Hartely and Colpitts oscillators – Multi vibrators – astable, mono stable and bi stable multi vibrators	9	20%
VI	UJT-construction –working-UJT oscillator-UPS-brief overview of online UPS &off line UPS-SMPS-operation Timer IC 555: Functional diagram- astable and monostable modes Phase Locked Loops: Principles – building blocks of PLL-VCO-lock and capture ranges - capture process - frequency multiplication using PLL	10	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN

Maximum Marks : 100

Exam Duration:3 hours

PART A: FIVE MARK QUESTIONS

8 compulsory questions –1 question each from first four modules and 2 questions each from last two modules
(8 x 5= 40 marks)

PART B: 10 MARK QUESTIONS

5 questions uniformly covering the first four modules. Each question can have maximum of three sub questions, if needed. Student has to answer any 3 questions
(3 x10 = 30 marks)

PART C: 15 MARK QUESTIONS

4 questions uniformly covering the last two modules. Each question can have maximum of four sub questions, if needed. Student has to answer any two questions
(2 x15 = 30 marks)