

Course Code	Course Title	L	T	P	C
1151EC103	ANALOG ELECTRONICS	2	2	0	3

a) Course Category

Program Core

b) Preamble

This Course provides the basic and design knowledge about electronic circuit analysis using BJT and CMOS which involves feedback, oscillator, high frequency amplifiers and its applications

c) Prerequisite

Basic Electronics Engineering

d) Related Courses

Linear Integrated Circuits, Communication Systems.

e) Course Outcomes

Upon the successful completion of the course, students will be able to

CO Nos.	Course Outcomes	Knowledge Level (Based on Revised Bloom's Taxonomy)
CO1	Classify the performance of different biasing types used for transistor operation	K2
CO2	Apply the h parameters for different transistor configuration	K3
CO3	Explain the effect of feedback with respect to transistor applications	
	Describe feedback amplifier and oscillators	K2
CO4	Discuss MOSFET amplifier with different types of load	K2
CO5	Illustrate the applications of transistors with power amplifiers, multi vibrators and CMOS linear applications	K2

f)	Correlation of COs with POs													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M	M	L	-	L	-	-	-	-	-	-	L	-	-

CO2	M	M	L	-	L	-	-	-	L	-	-	-	-	-
CO3	M	H	L	M	L	L	-	-	-	-	-	-	L	-
CO4	M	M	L	-	L	-	-	L	-	-	-	-	L	-
CO5	M	M	L	-	M	-	-	-	-	M	M	L	L	-

g) Course Content

UNIT I DC BIASING OF TRANSISTOR 12

Review of Transistor characteristics, Thermal runaway, thermal stability, DC Biasing-BJT: Different types of biasing circuits. Compensation techniques, Design of biasing for MOSFET

UNIT II TRANSISTOR AC ANALYSIS OR SMALL SIGNAL ANALYSIS 12

Amplification in AC Domain, BJT Transistor modeling, re model for CB, CE and CC, Two port system approach, The Hybrid Equivalent model, Approximate Hybrid equivalent circuit, Hybrid Π model: CE, CC and CB configurations. Small signal analysis of MOSFET, Source follower and common gate amplifier.

UNIT III FEEDBACK AMPLIFIER AND OSCILLATORS 12

Basic concept of Feedback, Feedback connection types, Input and output impedance of feedback configurations. Advantages of negative feedback, Oscillators: Principles of sinusoidal oscillator, Barkhausen criteria. RC oscillators: phase shift, Wienbridge. LC oscillators: Hartley, Colpitts, Clapp oscillator, crystal oscillator.

UNIT IV IC MOSFET AMPLIFIER 12

IC Amplifiers, IC biasing Current steering circuit using MOSFET: MOSFET current sources, PMOS and NMOS current sources. Amplifier with active loads, enhancement load, Depletion load and PMOS and NMOS current sources load, CMOS common source and source follower, CMOS differential amplifier, CMRR.

UNIT V APPLICATIONS OF TRANSISTORS AND CMOS 12

Tuned amplifier: Analysis of single tuned, double tuned and stagger tuned amplifier. Power amplifiers: Transformer coupled Class A power amplifier, Class B amplifier operation, Transformer coupled Push pull circuits, Complimentary symmetry circuits. Multivibrators :Bistable, Monostable and Astable operation, Schmitt trigger. CMOS Linear Applications - Cascading Amplifiers for Higher Gain.

Total 60 Hrs

h) Learning Resources

Reference Books

1. Bapat K N ,Electronic Devices & Circuits , McGraw Hill,1992
2. J. and Halkias .C., " Integrated Electronics ",2nd Edition, Tata McGraw-Hill, 2001
3. Sedra&Smith, Microelectronic circuits, Oxford University Press, 5th ed
4. Donald L.Schilling and Charles Belove, 'Electronic Circuits', Tata McGraw Hill, 3rd Edition,2003

Text Books

1. Boylestead&Neshelsky ,Electronic Devices & Circuits, Pearson Education/PHI Ltd, 10th edition, 2010.
2. David .A. Bell, Electric Circuits And Electronic Devices Oxford University Press, 2010.
3. BehzadRazavi, "Design of Analog CMOS Integrated Circuits", Tata McGraw-Hill, 2007.

Online Resources

1. www.nptel.ac.in
2. http://bitsavers.trailing-edge.com/pdf/national/_appNotes/AN-0088.pdf