

2EL03: ANALOG ELECTRONICS
CREDITS -3 (LTP:3,0,0)

Course Objective:

1. The goal of this course is to introduce and verify basic principles, operation and applications of the various analog electronic circuits and devices like: BJT and MOSFET for various functions.
2. To make students understand and analyze the design and working of amplifiers and their configurations.

Teaching and Assessment Scheme:

Teaching Scheme (Hours per week)			Credits	Assessment Scheme				Total Marks
L	T	P		Theory		Practical		
			ESE	CE	ESE	CE		
3	0	0	3	60	40	00	00	100

Course Contents:

Unit No.	Topics	Teaching Hours
1	Transistor as an Amplifier: Biasing of BJT and MOS amplifier circuits, Thermal stabilization, Small-Signal Operation and Models for BJT, Basic BJT/HBT Amplifier Configurations, Discrete-Circuit BJT Amplifier, Introduction to Small-Signal Operation and Models for MOSFET, Basic MOSFET Amplifier Configurations, Discrete-Circuit MOS Amplifiers.	12
2	Building Blocks of Amplifiers: Comparison of the MOSFET and BJT, IC Design Philosophy, The Basic Gain Cell, Cascade Amplifier, Cascode Amplifier, IC Biasing-Current Sources & Current Mirrors Circuits, Cascade Configurations: CC-CE, CD-CS, CD-CE, Darlington, CC-CB and CD-CG	08
3	Differential Amplifiers: MOS Differential Pair and Small-Signal Operation, BJT Differential Pair, Non ideal Characteristics of Differential Amplifier, Multistage Amplifiers.	08
4	Frequency Response of Amplifiers: Low-Frequency Response of CS and CE Amplifiers, Internal Capacitive Effects, High-Frequency Models of MOSFET and BJT, High-Frequency Response of CS and CE Amplifiers, High-Frequency Response of Source and Emitter Followers.	08
5	Feedback Amplifiers: General Feedback Structure, Properties of Negative Feedback, Basic Feedback Topologies for Amplifiers, Feedback Voltage-Amplifier (Series-Shunt) , Feedback Trans conductance-Amplifier (Series-Series) , Feedback Trans resistance-Amplifier (Shunt-Shunt) , Feedback Current-Amplifier (Shunt-Series).	08
6	Power Amplifiers:	06

List of References:

1. Sedra/Smith, "*Microelectronic Circuits*", Sixth Edition, Oxford University, 2010.
2. Jacob Millman and Christos C. Halkias, "*Integrated Electronics*", Ninth Edition, Tata McGraw Hill Publication.
3. Robert Boylestad and Louis Nashelsky, "*Electronic Devices and Circuit Theory*", Tenth Edition, Pearson Publication.
4. Albert Malvino and David J. Bates, "*Electronic Principles*", Seventh Edition, Tata McGraw-Hill.
5. Schilling And Beloved "*Electronic circuits, discrete and integrated*", McGraw-Hill.
6. Steve Cripps "*Power amplifier design*"

Course Outcomes (COs):

At the end of this course, students will be able to:

1. To analyze the BJT and MOS amplifiers.
2. To analyze the differential amplifiers.
3. To analyze negative feedback amplifiers.
4. To analyze the power amplifiers.