

EC/EE-208

ELECTRONIC CIRCUIT ANALYSIS

L T P C
4 1 - 3**COURSE OBJECTIVES:**

1. To provide basic knowledge on analysis, design, and measurement of linear analog electronics.
2. To gain the knowledge in low frequency and high frequency Transistor amplifier analysis.
3. To acquire knowledge on feedback topologies
4. To know about various power amplifier circuits.

COURSE OUTCOMES:**After successful completion of the course, the students are able to**

1. demonstrate knowledge in Single stage BJT and MOSFET amplifiers, Feedback amplifiers and Oscillators, Power amplifiers, Biasing of Integrated Circuits and Active loads.
2. analyze the electronic circuits BJT, MOSFET amplifiers, Oscillators and Power amplifiers for the given set of specifications.
3. design and Develop electronic circuits such as voltage amplifiers, oscillators, power amplifiers and current mirrors for the given specifications.
4. apply course knowledge and evaluate problems pertaining to electronic circuits such as BJT amplifiers, MOSFET amplifiers, feedback amplifiers, oscillators, power amplifiers and current sources to provide valid conclusions.
5. select and identify the appropriate frequency region of operation for understanding the frequency response, amplification factors and impedance matching properties of electronic circuits.

UNIT I*Text Book - 1 (14)***BJT AMPLIFIERS** : Basic BJT Amplifiers, Analog Signals and Linear Amplifiers, The Bipolar Linear Amplifiers, Common-Emitter Amplifiers, Common-Collector Amplifier, Common-Base Amplifier, Multistage Amplifiers.**FET AMPLIFIERS** : MOSFET DC Circuit Analysis, The MOSFET Amplifier, The Common Source Amplifier, The Common Drain Amplifier, The Common Gate Configuration, Single-Stage Integrated Circuit MOSFET Amplifiers, Multistage Amplifiers.**UNIT II***Text Book - 1 (10)***FREQUENCY RESPONSE** : Amplifier Frequency Response, System Transfer Functions, Transistor Amplifiers with Circuit Capacitors, Bipolar Transistor Frequency Response, The FET Frequency Response, High Frequency Response of Transistor Circuits.**UNIT III***Text Book - 2 (12)***FEEDBACK** : Classification of amplifiers, The feedback concept, the transfer gain with feedback, general characteristics of Negative Feedback, the Four Basic Feedback Topologies, voltage Series Feedback Amplifier, Current Series Feedback Amplifier, Current Shunt and Voltage Shunt Feedback Amplifiers.**UNIT IV***Text Book - 3 (10)***OSCILLATORS** : Barkhausen Criterion for Sinusoidal Oscillators, RC Phase Shift Oscillator using FET and BJT, Wein Bridge, Hartley, Colpitt's Oscillators using BJT, Tuned Resonant Oscillator, Crystal Oscillators, Frequency and Amplitude Stability Criterion for Oscillators.**UNIT V***Text Book - 1 (14)***INTEGRATED CIRCUIT BIASING AND ACTIVE LOADS** : Bipolar Transistor Current Sources, FET Current Sources, Circuits with Active Loads, Small Signal Analysis of Active Load Circuits.

OUTPUT STAGES AND POWER AMPLIFIERS : Power Amplifiers, Power Transistors, Classes of Amplifiers, Class-A Power Amplifiers, Class-AB Push-Pull Complementary Output Stages.

LEARNING RESOURCES:

TEXT BOOK(s):

1. Donald A. Neamen, Electronic Circuits Analysis and Design, 3rd Edition, TMH, 2007.
2. Adel S. Sedra and Kenneth C. Smith, Microelectronic Circuits, 5th Edition, Oxford University Press, 2004.
3. Jacob Millman and Christos C. Halkias, Integrated Electronics, TMH, 1972.

REFERENCE BOOK(s):

Paul R Gray, Gray J. Hurst, Stephen H. Lewis and Robert G. Meyer, Analysis and Design of Analog Integrated Circuits, 4th edition, John Wiley and Sons, 2001.

WEB RESOURCES:

1. <http://nptel.ac.in/courses/117101106>
2. <http://nptel.ac.in/courses/117107094/22>