

ANALOG ELECTRONICS SEMESTER - III (EC/TC) [As per Choice Based Credit System (CBCS) Scheme]			
Course Code	17EC33	CIE Marks	40
Number of Lecture Hours/Week	04	SEE Marks	60
Total Number of Lecture Hours	50 (10 Hours per Module)	Exam Hours	03
CREDITS - 04			
Course objectives: This course will enable students to: • Explain various BJT parameters, connections and configurations. • Explain BJT Amplifier, Hybrid Equivalent and Hybrid Models. • Explain construction and characteristics of JFETs and MOSFETs. • Explain various types of FET biasing, and demonstrate the use of FET amplifiers. • Construct frequency response of BJT and FET amplifiers at various frequencies. • Analyze Power amplifier circuits in different modes of operation. • Construct Feedback and Oscillator circuits using FET.			
Module -1			
BJT AC Analysis: BJT Transistor Modeling, The re transistor model, Common emitter fixed bias, Voltage divider bias, Emitter follower configuration. Darlington connection- DC bias; The Hybrid equivalent model, Approximate Hybrid Equivalent Circuit- Fixed bias, Voltage divider, Emitter follower configuration; Complete Hybrid equivalent model, Hybrid π Model. L1, L2, L3			
Module -2			
Field Effect Transistors: Construction and Characteristics of JFETs, Transfer Characteristics, Depletion type MOSFET, Enhancement type MOSFET. FET Amplifiers: JFET small signal model, Fixed bias configuration, Self bias configuration, Voltage divider configuration, Common Gate configuration. Source-Follower Configuration, Cascade configuration. L1, L2, L3			
Module -3			
BJT and JFET Frequency Response: Logarithms, Decibels, Low frequency response - BJT Amplifier with RL, Low frequency response-FET Amplifier, Miller effect capacitance, High frequency response - BJT Amplifier, High frequency response-FET Amplifier, Multistage Frequency Effects. L1, L2, L3			
Module -4			
Feedback and Oscillator Circuits: Feedback concepts, Feedback connection types, Practical feedback circuits, Oscillator operation, FET Phase shift oscillator, Wien bridge oscillator, Tuned Oscillator circuit, Crystal oscillator, UJT construction, UJT Oscillator. L1, L2, L3			

Module -5

Power Amplifiers: Definition and amplifier types, Series fed class A amplifier, Transformer coupled class A amplifier, Class B amplifier operation and circuits, Amplifier distortion, Class C and Class D amplifiers.

Voltage Regulators: Discrete transistor voltage regulation - Series and Shunt Voltage regulators. **L1, L2, L3**

Course Outcomes: After studying this course, students will be able to:

- Describe the working principle and characteristics of BJT, FET, Single stage, cascaded and feedback amplifiers.
- Describe the Phase shift, Wien bridge, tuned and crystal oscillators using BJT/FET/UJT.
- Calculate the AC gain and impedance for BJT using r_e and h parameters models for CE and CC configuration.
- Determine the performance characteristics and parameters of BJT and FET amplifier using small signal model.
- Determine the parameters which affect the low frequency and high frequency responses of BJT and FET amplifiers and draw the characteristics.
- Evaluate the efficiency of Class A and Class B power amplifiers and voltage regulators.

Text Book:

Robert L. Boylestad and Louis Nashelsky, "Electronics devices and Circuit theory", Pearson, 10th/11th Edition, 2012, ISBN:978-81-317-6459-6.

Reference Books:

1. Adel S. Sedra and Kenneth C. Smith, "Micro Electronic Circuits Theory and Application", 5th Edition ISBN:0198062257
2. Fundamentals of Microelectronics, Behzad Razavi, John Wiley ISBN 2013 978-81-265-2307-8
3. J. Millman & C.C. Halkias—Integrated Electronics, 2nd edition, 2010, TMH. ISBN 0-07-462245-5
4. K. A. Navas, "Electronics Lab Manual", Volume I, PHI, 5th Edition, 2015, ISBN:9788120351424.

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