

ANALOG ELECTRONICS I

Paper Code ECS-302

Course Credits 4

Lectures/ Week 3

Tutorials/ Week 1

Course description **UNIT-I ANALYSIS OF BJT**

Transistor biasing and stabilization, Single stage CE transistor amplifier, Cascaded amplifiers, Multistage stage CE transistor amplifier, Frequency response of RC- Coupled amplifiers, h-parameters.

UNIT – II JFET AND MOSFET AMPLIFIERS

Construction of JFET and MOSFETS, characteristics of JFET and MOSFETs, Biasing of JFETs, and MOSFETs, Analysis of low frequency small signal FET amplifiers, CMOS, Design problems.

UNIT- III THE TRANSISTOR AT HIGH FREQUENCY

The hybrid- π CE transistor model, CE short circuit current gain, gain with resistive load, the gain band width products, emitter follower at high frequencies.

UNIT- IV LARGE SIGNAL AMPLIFIERS

Power dissipation in transistor, harmonic distortion, amplifiers Classification (Class A, Class B, Class AB and Class C) efficiency, Push-pull and complementary push-pull amplifiers, Introduction to tuned amplifiers.

UNIT-V FEED BACK AMPLIFIERS AND OSCILLATORS

Ideal feedback configuration, Voltage-series and shunt feedback, current-series and shunt and its effects on input and output impedances, tuned oscillators (Hartley and Colpitt's), Introduction to crystal oscillators.

Pre-requisite Basic Electronics

Text books

1. Millman and Grabel, "Microelectronics", Mc Graw Hill, 2nd edition
2. Sedra and Smith, "Microelectronic circuits", Oxford University Press, 7th edition

3. R. Boylestad and Nashelsky, "Electronic devices and Circuit Theory", Pearson, 10th edition.

4. Horenstein, "Microelectronic circuits and Devices", PHI, 1996.

5. Jacob Millman and Christos. C. Halkias 'Integrated Electronics', Tata Mc Graw Hill, 1991

Reference Book

P. Gray, R. Meyer, S. Lewis and P. Hurst, "Analog Integrated Circuits", 3rd edition, John Wiley, 2007.

Course Outcomes

CO1: To understand and analyze the different biasing techniques used in BJTs and analyze different amplifier circuits using h-parameter ac equivalent models.

CO2: A thorough understanding of a working principles, characteristics and basic applications of FET and analyze low frequency small signal FET amplifier circuits.

CO3: Student should be able to analyze high frequency response of BJT amplifier using hybrid- π model and derive the gain under loaded and unloaded conditions. Understand high frequency response and gain bandwidth relationship for amplifier design.

CO4: Student should be able to classify the power amplifiers such as class A class B etc. and interpretation of performance characteristics of these transistors amplifiers

CO5: Student should be able to understand the effect of negative feedback and positive feedback and apply the knowledge gained in the design of transistorized circuit amplifiers and Oscillators.

Computer Usage/

PSpice

Software required: