Course Objective:

- The aim of this course is to familiarize the student with the analysis and design of basic transistor amplifier circuits, oscillators and wave shaping circuits.

Course Learning Outcome (CLO): The Student Will Be Able To:

- Analyze different biasing circuits and low frequency response of an amplifier using h parameters.
- Develop an ability to analyse high frequency transistor model.
- Explain various multistage and power amplifier configurations.
- Explain the concept of feedback and its characteristics.
- Explain the principles of oscillation and design various oscillator circuits.
- Analyse various filters and multi-vibrators circuits.

Detailed Syllabus:

- Transistor Biasing: The Operating Point, Biasing Stability, Self-Biasing or Emitter Bias, Stabilization against Variations in I_{CO}, V_{BE}, and β, Bias Compensation, Transistor at Low Frequencies: h parameter, simplified CE hybrid model, analysis of a transistor amplifier circuit using h parameter.
- Transistor at High Frequencies: The Hybrid-pi (II) Common-emitter Transistor Model, Hybrid-II conductances, The Hybrid-II Capacitances, analysis of a transistor amplifier circuit at high frequencies.
- Multistage Amplifiers: Classification of amplifiers, Distortion in amplifiers, Frequency response of an amplifier. The RC-coupled amplifier, Low-frequency response of an RC-coupled stage, Effect of an emitter Bypass capacitor on low-frequency response.Class A, B, AB, Push pull & Class C amplifiers, Comparison of their Efficiencies, Types of distortion.
- Feedback Amplifiers: Classification of Amplifiers, The feedback concept, The transfer gain with feedback, General characteristics of negative-feedback amplifiers, Input resistance, Output resistance, Block diagrams of Voltage-series feedback, Current-series feedback, Current-shunt feedback, Voltage-shunt feedback.
- Stability and Oscillators: Sinusoidal Oscillator, The phase-shift oscillator, Resonant-circuit oscillators, A General form of oscillator circuit, The Wien Bridge oscillator, Crystal oscillator, Frequency Stability.
- Wave shaping circuits: Multi-vibrators (Astable, Mono-stable, Bi-Stable), High pass and low pass filters using R-C Circuits and R-L, R-L-C Circuits & their response to step input, Pulse input, Square input and Ramp Input, Attenuators.

Laboratory: Frequency response analysis of RC coupled amplifier, Tuned amplifiers, Push-pull amplifier, Feedback amplifier.Hartley and Colpitts Oscillator. RC Phase shift oscillator. Study of Multi-vibrators (Astable, Mono-stable, Bi-stable Multi-vibrator). Clipper and Clamper circuit, Schmitt Trigger.

Text Books:

1. Milliman, J. and Halkias, C.C., Intergrated Electronics, Tata McGraw Hill (2007).
2. Milliman, J. &Taub, H., Pulse, Digital and switching waveforms, Tata McGraw Hill (2007).

Reference Books:

1. Malvino, L., Electronic principles, Tata McGraw Hill (1998).
2. Cathey, J. J., 2000 Solved Examples in Electronics, McGraw Hill (1991).