**EOPC2001 ANALOG ELECTRONIC CIRCUIT (3-0-0)**

**COURSE OBJECTIVE:**

1. Understand Bipolar Junction Transistors and Metal Oxide Semiconductors.
2. Analysis of DC biasing of Semiconductor Circuits using BJT and MOSFET.
3. Understand Input and Output characteristics of Single Stage Amplifier (both BJT and MOSFET).
4. Apprehend characteristics of Feedback and Power amplifier.

**MODULE 1:** [8hrs]
**Biasing of BJT:**DC Analysis, DC Load line, Operating Point, Fixed bias, Emitter bias, Voltage-divider bias, DC bias with voltage feedback, Bias stabilization.

Small Signals Modelling of BJT and their analysis: The $r_e$ transistor model, Hybrid equivalent model, small signal analysis of CE, CC, CB amplifier. Emitter Follower; Cascade Amplifier, Darlington connectionsand Current Mirror Circuit.

**MODULE 2:** [8 hrs]
**Biasing of FET and MOSFET:** Fixed bias configuration, Self-bias configuration, Voltage divider bias and design.
**Small Signal operation and models of FET and MOSFETs:** Small signal equivalent models, Single-stage MOSFET Amplifiers: Common-Source (CS) amplifiers, Common-Source amplifiers with a source resistance, Common-Gate (CG) amplifiers, Common-Drain (CD) or Source follower amplifiers and cascaded system.

**MODULE 3:** [4 hrs]
**Frequency Response of BJTs and FETs:**Low Frequency Response of BJTs (CE) Amplifier, Low Frequency Response of FETs (CS) Amplifier, Miller Effect Capacitance, HIgh Frequency Response of BJTs (CE) Amplifier, High Frequency Response of FETs (CS) Amplifier, Multi stage frequency effect, Square Wave testing of amplifiers.

**MODULE 4:** [4hrs]
**Operational Amplifiers:** OP-AMP Specifications, DC offset parameters, frequency parameters, Gain-bandwidth, Slew rate, OP-AMP Applications:voltage buffer, differentiator, andIntegrator, Instrumentation amplifier.

**MODULE 5:** [6 hrs]
**Oscillators and power amplifiers:** Positive feedback circuit as Oscillator, Barkhausen's criteria for oscillation, Oscillators (Wien Bridge Oscillator, R-C phase shift oscillator and Crystal Oscillator).

Classification of Power Amplifiers, Power dissipation and power conversion efficiency of Class A, Class B amplifiers, Push-pull amplifier.


**COURSE OUTCOME:** After completion of course, student should be able to
        CO1: Understand BJT biasing and stabilization and analyse transistor re and hybrid models.
        CO2: Understand the characteristics and configurations of single stage MOSFET amplifiers.
        CO3: Design amplifier circuits using BJT, FET and study the low and high frequency response of BJT, FET amplifiers.
        CO4: Understand operational amplifier's specifications, parameters, and its various applications.
        CO5:Explain various oscillator circuits and power amplifiers.

TEXT BOOKS
1. Microelectronic Circuits – Sedra& Smith, International Student Edition
2. Electronic Devices and Circuit Theory – Robert L.Boylestad and LowisNashelsky, Pearson Publication, New Delhi, 10$^{th}$ edition


REFERENCE BOOKS

1. Millman's Integrated Electronics –Jacob Millman and Christos Halkias,  Chetan D Parikh, Mcgraw Hill
2. Electronic Devices – Floyd, Pearson Education