

## 3<sup>rd</sup> Semester

### Analog Electronics (REC3C001)

#### Module — I (12 Hours)

**MOS Field-Effect Transistor:** Principle and Operation of FETs and MOSFETs; P-Channel and N-Channel MOSFET; Complimentary MOS; V-I Characteristics of E- MOSFET and DMOSFET; MOSFET as an Amplifier and as a Switch.

**Biasing of BJTs:** Load lines (AC and DC); Operating Points; Fixed Bias and Self Bias, DC Bias with Voltage Feedback; Bias Stabilization; Examples.

**Biasing of FETs and MOSFETs:** Fixed Bias Configuration and Self Bias Configuration, Voltage Divider Bias and Design

#### Module — II (12 Hours)

**Small Signal Analysis of BJTs:** Small-Signal Equivalent-Circuit Models; Small Signal Analysis of CE, CC, CB amplifiers. Effects of  $R_s$  and  $R_L$  on CE amplifier operation, Emitter Follower; Cascade amplifier, Darlington Connection and Current Mirror Circuits.

**Small Signal Analysis of FETs:** Small-Signal Equivalent-Circuit Model, Small Signal Analysis of CS, CD, CG Amplifiers. Meets of  $R_{siG}$  and  $R_L$  on CS Amplifier; Source Follower and Cascaded System.

#### Module — III (8 hours)

**High Frequency Response of FETs and BJTs:** High Frequency equivalent models and frequency Response of BM and FETs; Frequency Response of CS Amplifier, Frequency Response of CE Amplifier.

#### Module — IV (6 hours)

**Feedback amplifier and Oscillators:** Concepts of negative and positive feedback; Four Basic Feedback Topologies, Practical Feedback Circuits, Principle of Sinusoidal Oscillator, WeinBridge, Phase Shift and Crystal Oscillator Circuits, Power Amplifier (Class A, B, AB, C).

**Module — V (7 hours)Operational Amplifier:** Ideal Op-Amp, Differential Amplifier, Op-Amp Parameters, Non-inverting Configurations, Open-loop and Closed-loop Gains, Differentiator and Integrator, Instrumentation amplifier.

#### Books:

- Micro Electronics Circuits , Adel Sedra and Kenneth C Smith, Oxford Press, New Delhi, 5<sup>th</sup> Edition, International student edition 2009.(Selected portions of chapter 2,4,5,6, 8 ,13 and 12)
- Electronic Devices and Circuit Theory, R. L. Boyelstad and L. Nashelsky, Pearson Education, New Delhi , 9<sup>th</sup> /10<sup>th</sup> edition 2013.(Selected portions of chapter 4,5,6,7,8,9,10,11,12 and 14)
- Milliman’s Electronic Devices and Circuits, J. Milliman, C. Halkias, S. Jit., Tata Mcgraw Hill Education Pvt. Ltd. 2<sup>nd</sup> Edition 2008.
- Electronic Devices and circuits, Jimmie, J. Cathey adapted by Ajay Kumar Singh Tata Mcgraw Hill publishing company ltd, New Delhi 3<sup>rd</sup> edition( For Problem Solving)
- Electronics Circuit Analysis and Design, Donland A. Naeman, Tata Mcgraw Hill publishing company ltd, New Delhi, 3<sup>rd</sup> Edition, 2002.
- Integrated Electronics: Analog and Digital circuits and systems, J. Milliman, C. Halkias Tata Mcgraw Hill Education Pvt. Ltd, New Delhi , 2<sup>nd</sup> Edition 2004.
- Microelectronic circuits: Analysis and Design, M. H. Rashid, PWS publishing company, a division of Thomson Learning Inc. India Edition.
- Electronics devices and circuits, David A. Bell, Oxford Press, 5<sup>th</sup> Edition 2008.
- Electronics devices and circuits, Anil K. Maini, Wiley India Pvt. Ltd, 2009.