

<b>4<sup>th</sup> Semester</b>	<b>RCI4G003</b>	<b>Analog Electronic Circuits</b>	<b>L-T-P 3-0-0</b>	<b>3 CREDITS</b>
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**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 D-MOSFET; 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. Effects 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 BJTs 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, Wein-Bridge, 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:**

- Microelectronics Circuits, Adel Sedra and Kenneth C Smith, Oxford University Press, New Delhi, 5<sup>th</sup> Edition, International Student Edition, 2009. (Selected portion of Chapter 2, 4, 5, 6, 8, 13, and 14)
- Electronic Devices and Circuits theory, R.L. Boylestad 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 Electronics Devices and Circuits, J. Milliman, C. Halkias, S. Jit., Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2<sup>nd</sup> Edition, 2008.

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- 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 Circuits Analysis and Design, Donald A. Neamen, 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 Publishing Company 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.
- Electronic device and circuits, David A. Bell, Oxford University Press, 5<sup>th</sup> edition, 2008.
- Electronics devices and circuits, Anil.K.Maini, Wiley India Pvt.Ltd, 2009