EC100: Basic Electronic Circuits (3-1-0: 4)

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Course Contents:

Unit 1: Introduction to Circuit Elements & Sources

Resistor, Capacitor, Inductor, Voltage and Current Sources, Controlled Sources, Thevenin and Norton Theorem.

Unit 2: Basics of Semiconductors

Semiconducting Materials, Intrinsic and Extrinsic Semiconductors, Charge-carrier Density and Distribution, Fermi level.

Unit 3: Diodes

p-n Diode, Zener Diode, *I-V* Characteristics, Diode Models, Rectifiers and Voltage Regulators, Clippers and Clampers, Introduction to Special Purpose Diodes: Varactor Diode, LEDs, Solar Cells, Photo-diodes, Tunnel Diode, Schottky Diode.

Unit 4: Bipolar Junction Transistors (BJTs)

BJT structure, Basic BJT operation mechanism, Input and Output characteristics of common-emitter configuration, Transistor Bias Circuits-Base Bias, Emitter Bias, Voltage-Divider Bias, Emitter Feedback Bias, Collector Feedback Bias, Emitter-Collector Feedback Bias, ac Models, Voltage Amplifiers, Common Collector and Common Base Amplifiers, and Frequency Response.

Unit 5: Field Effect Transistors

JFETs-Device structure, Drain Curves, Transconductance Curve, Biasing Circuits, JFET Amplifiers, MOSFETs-Device structure, Depletion-Mode MOSFET, D-MOSFET Curves, Amplifiers, Enhancement-Mode MOSFET, Digital Switching, CMOS.

Unit 6: Operational Amplifier

Op-Amp pin configuration, Ideal and Practical Characteristics of Op-Amp, Inverting and Non-Inverting Amplifiers, Active Filters, Summing Amplifier, Differential and Integrating Amplifiers, Comparators, Frequency response of an Op-Amp.

Text Books:

1. *Electronic Devices*; 9th Edition, Thomas L. Floyd, Pearson.
2. *Electronic Principles*, 9th Ed, Albert Malvino, and David Bates, Tata McGraw-Hill, 2021.
3. *Microelectronic Circuits: Theory and Applications,* A.S. Sedra and K.C. Smith, Oxford University Press, Sixth Edition.

Course Evaluation Policy
Mode of Evaluation: Pen & Paper

S. No.	Evaluation	Evaluation Scheme	Weightage	Contents
1.	Continuous	Weekly Quiz	10%	Topics covered during the week.
		Assignment /Unit	5%	Based on the entire unit. (*Submission on or before the due date.*)
		Tutorial / Week	10%	Topics covered during the week. (*NO Submission*)
2.	Mid-Semester	2 hrs.	30%	Units/Topics covered up to the last lecture before the exam date.
3.	End-Semester	3 hrs.	45%	Entire Course. (*The exam paper consists of 75% of questions from the topics covered after Mid-Semester and 25% are from the rest of the topic.)*