

UEI603 MICROELECTRONICS AND ICs

L	T	P	Cr
3	1	0	3.5

Integrated circuits: Introduction and advantages of IC technology, Effects of IC's on industry, Scales of integration.

Microelectronics circuits: Introduction to Analog Devices, Digital integrated circuit, Amplifier, Filter, Operational amplifier, Digital logic inverter.

Devices and basic circuits: Device structure, Physical operation and VI characteristics of diode, BJT, Zener diode, Schottkey diode, Varactor diode, Photo diode, LED, MOSFET.

Analog and digital integrated circuits: Circuit model and frequency response of Single stage integrated circuits amplifier, Differential and multistage amplifier, Feedback circuit.

Growth of single crystal of silicon: Growth from melt using Czochralski's method, Intrinsic and doped single crystals, Zone refining.

Wafer preparation: Slicing and polishing, Epitaxial layer growth, Defects in epitaxial layer and their removal, Types of epilaxy: VPE, MBE, MOCVD.

Diffusion: Impurity diffusion in a semiconductor crystal, Fick's law, Gaussian and complimentary error function distribution of impurities, Design of junction diode, Transistor, FET and MOSFETs.

Subsequent process: Oxidation, ion-implantation, photolithography etching and metallization, monolithic and hybrid IC's. IC Packaging.

Advanced digital circuits: Latches, RAM, Decoder circuit, Timer.

Text Books:

1. Nagchoudhri, D., *Principles of Microelectronics Technology*, A.H.Wheeler (1998).
2. Sedra, A.S. and Smith, K.C., *Microelectronic Circuitry*, Oxford University Press (2006).

Reference Books:

1. Botkar, K.R., *Integrated Circuits*, Khanna Publishers (2007).
2. Sze, S.M., *Semiconductor Devices, Physics and Technology*, John Wiley and Sons (2002).

Evaluation Scheme:

Sr. No.	Evaluation Elements	Weightage (%)
1	MST	30
2	EST	45
3	Sessionals (May include Assignments/Projects/Tutorials/Quizzes/Lab Evaluations)	25