

Lecture Plan
Microelectronics Technology (GEC-103)

Units	Lecture	Topics Covered
Unit 1		Introduction
	Lecture 1	Basic Structure of BJT, NMOS, CMOS, BiCMOS Devices
	Lecture 2	Crystal Growth & Silicon Wafer Preparation: Introduction, Structure of semiconductor,
	Lecture 3	Electronic Grade Silicon, CZ Crystal Growth,
	Lecture 4	Silicon shaping, Processing Considerations
	Lecture 5	Epitaxy: Introduction, Vapour Phase Epitaxy
	Lecture 6	Molecular Beam Epitaxy
	Lecture 7	Silicon on Insulator, Epitaxial Evaluation
	Lecture 8	Numericals
Unit 2		Oxidation
	Lecture 1	Introduction, Growth Mechanism and Kinetics,
	Lecture 2	Thin Oxidation, Oxidation Technique and System
	Lecture 3	Oxidation Properties, Redistribution of dopants at interface,
	Lecture 4	Oxidation of Polysilicon, Oxidation induced Defects
	Lecture 5	Dielectrics and Polysilicon Film Deposition: Introduction, Deposition Process,
	Lecture 6	Polysilicon, Silicon dioxide,
	Lecture 7	Silicon nitride
	Lecture 8	Plasma Assisted Deposition
	Lecture 9	Numericals
Unit 3		Lithography, Etching, Diffusion
	Lecture 1	Lithography: Introduction, Optical Lithography, Electron Lithography,
	Lecture 2	X-ray Lithography, Ion Lithography
	Lecture 3	Etching: Wet and Dry Chemical Etching
	Lecture 4	Reactive Plasma Etching
	Lecture 5	Introduction of Diffusion
	Lecture 6	Model of diffusion in solid
	Lecture 7	Diffusivities of B, P, As and Sb.,
	Lecture 8	Measurement Techniques
Unit 4		Ion Implantation , Metallization
	Lecture 1	Ion Implantation: Introduction, Range Theory,
	Lecture 2	Annealing, Shallow Junction,
	Lecture 3	High Energy Implantation.
	Lecture 4	Metallization: Chemical Vapour Deposition (CVD),
	Lecture 5	Physical Vapour Deposition (PVD),
	Lecture 6	Evaporation Technique,
	Lecture 7	Sputtering Technique
	Lecture 8	Practice Test/Quiz 1
Unit 5		Fabrication steps of IC
	Lecture 1	Fabrication of Bipolar IC
	Lecture 2	Fabrication of MOS IC
	Lecture 3	Fabrication of BiCMOS IC

	Lecture 4	Fault Detection
	Lecture 5	Characterization Technique
	Lecture 6	Practice Test 2
	Lecture 7	Practice Test 3

References:

1. S. M Sze “VLSI Technology”, Mc Graw Hill
2. S. Gandhi, “VLSI fabrication principles”, Wiley Publications.

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