PANIPAT INSTITUTE OF ENGINEERING & TECHNOLOGY
Department of Electronics & Communication Engineering

LESSON PLAN

Subject Name: - VLSI Technology **Subject Code: -**ECP-5
Year: -3rd **Semester:-5th**

Lecture No	Unit No	Topic	COs Covered
L 1	UNIT-I	Introduction to VLSI Technology	CO1
L 2		Crystal Growth: Monolithic and Hybrid IIs, Crystal Growth	
L 3		Czochralski Technique of Crystal Growth	
L 4		Wafer Preparation and Specifications	
L 5		Defects, Measurements of Parameters of Crystals	
L 6		Fabrication Steps	
L 7		Oxidation: Theory of Growth of Silicon Dioxide Layer, Oxidation Kinetics	
L 8		Dry, Wet and High Pressure Oxidation, Plasma Oxidation	
L 9		Properties of Oxidation, Defects Induced Due to Oxidation	
L10		Revisions	
L 11	UNIT-II	Epitaxial Process: Epitaxy and Its Concept	CO2
L 12		Growth Kinetics of Epitaxial Growth	
L 13		Low Temperature Epitaxy, Growth Chemistry of Si Epitaxial Layer	
L14		Apparatus for Epitaxial Layer	
L15		MBE System Diffusion Process: Diffusion Models of Solid	CO3
L 16		Fick's Theory of Diffusion, Solution of Fick`s Law,	
L 17		Diffusion Parameters Measurements	
L 18		Ion Implantation: Scattering Phenomenon	
L 19		Range Theory, Channeling, Implantation Damage	
L 20		Ion Implantation Systems, Annealing	
L 21		Revisions	
L 22	UNIT-III	Lithography: Optical and non-optical lithography	CO3
L 23		electron, X-ray	

L 24		ion-beam lithography	
L 25		contact/proximity and projection printers, alignment.	
L 26		Photoresist and Etching: Types of photoresists, polymer and materials	
L 27		Etching- Dry & Wet etching	
L 28		basic regimes of plasma etching, reactive ion etching and its damages	
L 25		lift-off, and sputter etching	
L 26		Revisions	
L 27	UNIT-IV	Metallization: Applications and choices	CO4
L 28		Physical vapor deposition,	
L 29		Patterning	
L 30		VLSI process fabrication steps: PMOS IC technology	
L31		VLSI process fabrication steps: NMOS IC technology	
L32		VLSI process fabrication steps: CMOS IC technology	
L33		Packaging : Package types, packaging design consideration	
L34		VLSI assembly technologies	
L35		Yield and reliability in VLSI.	
L36		Revision	

Text Books:

S.M. SZE, VLSI Technology , McGraw Hill. 2009, 2nd Edition

References:

1. S. K. Gandhi, VLSI Fabrication Principles, Wiley, 2nd edition
2. S.A. Campbell, The Science and Engineering of Microelectronic Fabrication ,Oxford 2008,2nd edition
3. Sedra & Smith, Microelectronic Circuits 2004, Oxford, 5th edition
4. J.D. Plummer, Silicon VLSI Technology: Fundamentals, Practice, and Modeling, Pearson

Web resources:

https://archive.nptel.ac.in/courses/117/106/117106093/
https://www.youtube.com/playlist?list=PL-vRnk5CwD-0X344HTgE-HrI1NmOAmFZh