EC315:IC Technology

Details of course:-

Course Title	Course Structure			Pre-Requisite
	L	T	P	
IC Technology	3	1	0	Nil

Course Objective: To provide an understanding of the manufacturing methods and their underlying scientific principles in the context of technologies used for VLSI chip fabrication.

Course Outcomes:
CO1: Describe the CMOS Circuits.
CO2: Explain the Operating Principles of MOS Transistors.
CO3: Elucidate the Fabrication of CMOS Integrated Circuits.
CO4: Apply MOSFET based Circuit Characterization.

S. No.	Content	Contact Hours
Unit 1	Introduction to CMOS Circuits: MOS Transistor Switches, CMOS Logic, Circuit and System Representation	6
Unit 2	Operating Principles of MOS Transistors: Complementary Device Current Voltage equations, Complementary CMOS Inverter- DC characteristics	6
Unit 3	Fabrication of CMOS Integrated Circuits: Introduction, Crystal and growth, Cleaning and Etching of wafers, Oxidation of Silicon, Thin Film Deposition, Basic CMOS Technology, Basic n-well CMOS process, P-well process, Twin-Tub process, Ion-Implantation and Diffusion, Silicon-on-Insulator process, CMOS Process Enhancements, Interconnects, Circuit Elements, Latch-Up, Prevention techniques.	16
Unit 4	Circuit Characterization: Introduction, Resistance Estimation, Capacitance Estimation, Switching characteristics, Analytic delay models, Gate delay, CMOS-gate transistor sizing, Power Dissipation, Scaling of MOS transistor dimensions.	14
	Total	42

Books:-

S. No	Name of Books/Authors/Publisher
1	handhi, S. K. VLSI Fabrication Principles: Silicon and Gallium Arsenide. John Wiley and Sons Inc., New York , 1983.
2	Sze, S. M. Physics of Semiconductor Devices, Second edition Wiley Eastern Limited, New Delhi , 1981.
3	Sze, S. M. VLSI Technology, Second Edition, McGraw-Hill Book Company, New Delhi , 1988.
4	Nicollian, E. H. and J. R. Brews MOS (Metal Oxide Semiconductor) Physics and Technology , John Wiley and Sons, New York , 1982.
5	May G. S. and S. M. Sze , Fundamentals of Semiconductor Fabrication , Wiley, 2004.
6	Plummer J. D., Deal M. D. and P. B. Griffin , Silicon VLSI Technology: Fundamentals, Practice and Modeling , Pearson/PH, 2001.