Course Title	VLSI Technology	Course No			
Specialization	Electronics Engineering	Structure (IPC)	3	0	3
Offered for	EDM / EVD / EDS	Status	Elective		
Pre-requisite	CoT	To take effect from			
Objectives	To familiarize with the various technologies used to fabricate VLSI devices				
Course Outcomes	Students would be able to appreciate the intricacies involved in VLSI circuit fabrication; Students would know the various processes needed to fabricate the VLSI devices.				
Contents of the course	Introduction on VLSI Design, Bipolar Junction Transistor Fabrication, MOSFET Fabrication. (4) Crystal Structure of Si, Defects in Crystal, Crystal growth (3) Epitaxy, Vapour phase Epitaxy, Doping during Epitaxy, Molecular beam Epitaxy (3) Oxidation – Kinetics, Rate constants, Dopant Redistribution, Oxide Charges (5) Diffusion-Theory of Diffusion, Doping Profiles, Diffusion Systems (2) Ion Implantation - Process, Annealing of Damages, Masking during Implantation (3) Lithography, immersion lithography, e-beam lithography (5) Etching-Wet Chemical Etching, Dry Etching, Plasma Etching, Si,SiO2,SiN and other materials (3) Deposition-Plasma Deposition, Metallization, Problems in Aluminium Metal contacts, Copper interconnects (4) IC BJT - LOCOS, Trench isolation, Poly-emitter-poly-base BJT and its suitability for high-speed applications (3) MOSFET - Metal gate vs. Self-aligned Poly-gate, Tailoring of Device Parameters, CMOS Technology, Latch - up in CMOS, MOSFET structures with strained channels and high-k gate dielectrics, BiCMOS Technology (7)				
Text Books	1. S. K. Ghandhi, VLSI Fabrication Principles- Silicon and Galium Arsenide, John Wiley and Sons, 2009				
References	1. S. M. Sze, VLSI Technology, Tata McGraw Hill, 2008 2. J. Plummer, M. D. Deal, P. B. Griffin, Silicon VLSI Technology, Fundamentals, Practice and Modeling, Pearson Higher Education & Professional Group, 2000				