Annexure 'D'

Course Title	Solid State Devices	Course No			
Specialization	Electronics Engineering	Structure (IPC)	3	0	3
Offered for	EDM / EVD	Status	Elective		
Pre-requisite		To take effect from			
Objectives	1. Understand and explain the fundamental principles of modern semiconductor devices. 2. Understand and describe the impact of solid-state device capabilities and limitations on electronic circuit performance.				
Course Outcomes	1. Students develop a fundamental understanding of the impact of material parameters and device design on the performance of selected solid-state devices. 2. Students develop a fundamental understanding of the static and dynamic behavior of P-N Junction, BJT and Metal Oxide Semiconductor structures.				
Contents of the course	Basic mechanism in semiconductors - Valence band and Valence band and Energy bank models of intrinsic semiconductors, Thermal equilibrium, carrier concentration. (8) Carrier transport – by drift, resistivity, Excess carriers, lifetime, carrier transport by diffusion, Continuity equation. (8) p-n junctions – Energy band diagrams, Forward and reverse biasing, Static analysis, Current Voltage equation, Breakdown processes, Equivalent circuit, Practical p-n diodes; Transient analysis (10) Bipolar junction transistors – structures, Current gain, Current-Voltage characteristics, BJT Models, Emitter efficiency, transport factor, transit time, Charge control description, Transient analysis. (8) MOS capacitors – CV characteristics, Threshold voltage, Flat-band voltage. (4) MOSFETs – I-V relationship, Equivalent models. (4)				
Text Book:	1. N. DasGupta and A. DasGupta, Semiconductor Devices: Modeling and Technology, Prentice Hall, 2007 2. B. G. Streetman and S. K. Banerjee, Solid State Electronic Devices, Prentice Hall India, 2014				
References	1. M. A. Achuthan and K. N. Bhat, Fundamentals of semiconductor devices, Tata McGraw Hill, 2006. 2. S. M. Sze, Physics of Semiconductor Devices, John Wiley, 2007. 3. D. Neamen, Semiconductors Physics and Devices, Tata Mc Graw Hill, 2003 4. M. S. Tyagi, Introduction to Semiconductor Materials and Devices, John Wiley, 2004 5. R. Pierret, Semiconductor Device Fundamentals, Pearson Education, 2006				