

1.	Title of the course	Introduction to Semiconductor Manufacturing
2.	Course number	PH516L
3.	Structure of credits (L-T-P-C)	3-0-0-3
4.	New course/modification to	New
5.	To be offered by	Physics
6.	Proposed by	V Vasudeva Rao
7.	Prerequisite	None
8.	Course Objective(s): To explain the physics of semiconductor materials and devices. To discuss the processes involved in semiconductor manufacturing.	
9.	Course Content: Semiconductor materials (Si, Ge, GaAs, GaN, SiC): intrinsic and extrinsic semiconductors, crystal structure, Band gap and Fermi level, doping effects on electrical conduction in semiconductors, electronic grade polycrystalline silicon; Semiconductor manufacturing techniques: silicon wafer fabrication and polishing, vacuum based thin film deposition techniques for metals, semiconductors and dielectrics (physical vapour deposition, chemical vapour deposition), analytical characterisation techniques, plasma, lasers and ion beams for semiconductor manufacturing; Introduction to semiconductor device structures: integrated chip fabrication steps, clean room aspects, semiconductor based solar cells and displays, lab grown diamonds for semiconductor applications, semiconductor ecosystem and safety aspects.	
10.	Textbook(s): 1. Sze SM, and Lee MK, Semiconductor Devices: Physics and Technology, 3rd Edition, Wiley India (2016). 2. Swaminathan P, Semiconductor Materials, Devices and Fabrication, Wiley (2019).	
11.	Reference(s): 1. Neaman D, Semiconductor Physics and Devices, 4th Edition, McGraw Hill (2017). 2. Rao V V, Ghosh T B and Chopra K L, Vacuum Science and Technology, 2nd Edition, Allied Publishers (2012). 3. Shur M, Physics of Semiconductor Devices, 1st Edition, Pearson (2019). 4. MKS Handbook: Semiconductor Devices and process Technology, 2nd Edition (2017).	