

1.	Title of the course	Device Simulation Laboratory
2.	Course number	EE534P
3.	Structure of credits	0-0-3-2
4.	Offered to	PG
5.	New course/modification to	Modification To EE5195/16
6.	To be offered by	Department of Electrical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	Course Objective(s): To familiarize with the simulation of semiconductor devices. To introduce TCAD softwares for various process simulations and device designs.	
10.	Course Content: Introduction: Poisson's equation, carrier transport and continuity equations, drift-diffusion model, numerical methods for solving differential equations, finite difference method; device simulations: simulation of various semiconductor devices, namely, PN diode, Schottky diode, BJT, MOSCAP, MOSFET, and optoelectronic devices, examining the effect of various physical models on the terminal characteristics; process simulations: simulation of various processes like oxidation, diffusion, implantation etc. semiconductor device design using simulations.	
11.	Textbook(s): 1. Plummer J D, Deal M D and Griffin P B, <i>Silicon VLSI Technology: Fundamentals, Practice, and Modeling</i> , 1st Edition, Pearson Education (2009). 2. Streetman B G and Banerjee S K, <i>Solid State Electronic Devices</i> , 5th Edition, Pearson Education India (2015).	
12.	Reference(s): 1. User Manuals, <i>TCAD Softwares</i> , 1st Edition, Silvaco & Synopsys (2020). 2. Vasileska D, Goodnick S M and Klimeck G, <i>Computational Electronics</i> , 1st Edition, CRC Press (2016).	