

1.	Title of the course	Device Fabrication and Characterization Laboratory
2.	Course number	EE533P
3.	Structure of credits	0-0-3-2
4.	Offered to	PG
5.	New course/modification to	Modification To EE5298/16
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 various fabrication processes like deposition, lithography, etching. To introduce the fabrication and characterization of various semiconductor devices.	
10.	Course Content: Introduction to semiconductor wafer manufacturing, scribing and cleaving, orientation effects; Unit process demonstrations: demonstration of various processes like RCA cleaning, oxidation, metal/dielectric deposition using thermal evaporation/sputtering, lithography, annealing; Electrical characterization of semiconductors: carrier-type identification, hot-probe, resistivity measurements: two-probe, four-probe and Hall resistivity, bandgap extraction; Fabrication and characterization of metal-semiconductor contacts: ohmic and Schottky contacts, analysis of I-V curves and extraction of important parameters like barrier height, carrier concentration, Richardson constant, contact resistivity; Fabrication and characterization of MOS capacitors: C-V characteristics for low and high frequency, extraction of MOS parameters like oxide thickness, doping, Interface state density.	
11.	Textbook(s): 1. Schroder D K, <i>Semiconductor Material & Device Characterization</i> , 3rd Edition, Willey Press (2015).	
12.	Reference(s): 1. Ghandhi S K, <i>VLSI Fabrication Principles: Silicon and Gallium Arsenide</i> , 2nd Edition, WileyBlackwell (1994). 2. Plummer J D, Deal M D and Griffin P B, <i>Silicon VLSI Technology: Fundamentals, Practice, and Modeling</i> , 1st Edition, Pearson Education (2009). 3. Sze S M, <i>VLSI Technology</i> , 2nd Edition, McGraw Hill Education (2017).	