

1.	Title of the course	CAD for VLSI Systems
2.	Course number	EE514L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To EE5028/7
6.	To be offered by	Department of Electrical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	<b>Course Objective(s):</b> This course deals with the fundamentals of Computer-Aided Design (CAD) tools for the design, analysis, synthesis, test, verification, routing and placement of digital Very Large Scale Integration (VLSI) systems.	
10.	<b>Course Content:</b> Overview of digital logic design; Simplification of switching functions; K-map based reduction of switching functions; Combinational logic design; Complex combinational logic modules such as multiplexers/ demultiplexers, decoders, PLAs and their use in standardized combinational logic design; Memory elements and time delay concepts, Flip-flops, latches, registers; Sequential circuit concepts and state diagrams; Clock-mode sequential circuits analysis and design; Synthesis of state diagrams; Fundamental-mode sequential circuits; Analysis and design, hazards, races and cycles. Logic element realization; Ideal switch based implementation; Logic families; FET switches; MOS switch based logic realization; NMOS and CMOS logic-Pass transistor logic; Algorithmic optimization of combinational logic; VLSI realization of combinational logic. Language based description of complex digital systems; RTL descriptions and design language representation; Levels of description; Behavioral and structural descriptions; VHDL and Verilog	
11.	<b>Textbook(s):</b> 1. De Micheli G, <i>Synthesis and Optimization of Digital Circuits</i> , McGraw Hill (1994). 2. Devadas S A, Abhijith Ghosh A, and Keutzer K, <i>Logic Synthesis</i> , Kluwer Academic (1998).	
12.	<b>Reference(s):</b> 1. Brunvand E, <i>Digital VLSI Chip Design with Cadence and Synopsys CAD Tools</i> , Addison-Wesley (2010). 2. Gerez S H, <i>Algorithms for VLSI Design Automation</i> , Wiley (1999). 3. Pan D Z, <i>VLSI Physical Design Automation</i> , The University of Texas at Austin, (2015). 4. Nowick S M, Bhardwaj K, <i>Computer-Aided Design of Digital Systems</i> , Columbia University, (2016).	