S. No.	Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
								Sessional	Final Exam	Total
2	ECE-602	VLSI Circuit Design	PCC	4	3	1	0	50	100	150

Course Outcomes:

At the end of the course the student will be able to:	
CO1	Understand the fundamentals of the MOSFET and its performance analysis.
CO2	Design and analyze complex combinational circuits using the concepts of CMOS logic.
CO3	Classify various fabrication steps used in IC fabrication.
CO4	Recognize the Verilog HDL, contents, syntax of programming for the CMOS circuits.
CO5	Design of digital circuits using Verilog HDL.

Detailed Syllabus
Section-A

Unit 1: Introduction to MOSFET: Basics structure and operation of MOS, MOS Symbol, MOS device design equations,MOS I-V characteristics, MOS Transistor as a Switch, Device Capacitances

(10 Hrs)

Unit 2: CMOS Logic: CMOS Inverter, DC characteristics, Beta ratio effects, Combinational Logic, the NAND gate, theNOR gate, compound gates, Pass Transistor and Transmission Gate.

(10 Hrs)

Unit 3: Fabrication using CMOS technology: NMOS fabrication and CMOS fabrication using N-Well, P-Well & Twin-Tub processes. Layout design Rules.

(12 Hrs)

Section-B

Unit 4: Hardware Description Languages: Evaluation of CAD tools, Comparison of VHDL and Verilog. Importance of Verilog HDL. Introduction to Operators, Number specifications, Identifiers and Keywords, Modules and ports. Different types of modeling: Gate level, Data-flow and Behavioral Modeling.

(11 Hrs)

Unit 5: Verilog HDLs coding: logic gates, 2-to-4-line decoder, 4 to 1 multiplexer, half adder, full adder, half subtractor, full subtractor, 4-bit adder, 4-bit gray to 4-bit binary converter and 2-bit comparator.

(9 Hrs)

Text Books

S. No	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	CMOS Digital Integrated Circuits	Sung Ms Kang, Yusuf Lablebici	Tata McGraw Hill	4th (2018)
2	CMOS VLSI Design: A Circuits and Systems Perspective	Neil H.E. Weste, David Harris, Ayan Banerjee	Pearson	4th (2015)
3	A Verilog HDL primer	J. Bhaskar	BSP	3rd (2016)
4	A Guide to Digital Design and Synthesis	S. Palnitkar	Prentice Hall	2nd (2003)

Reference Books

S. No	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Verilog Digital System Design	Z. Navabi	McGraw-Hill	2nd (2017)
2	CMOS Circuit Design, Layout andSimulation	Jacob Backer	Wiley	3rd (2010)