

COURSE CODE: <b>1151EE105</b>	COURSE TITLE: <b>DIGITAL ELECTRONICS</b>	L	T	P	C
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>COURSE CATEGORY:</b>					
Program Core					
<b>PREAMBLE :</b>					
The primary aim of this course is to understand the fundamental behind digital logic design and gain experience in using them for meeting any design specification. The course includes fundamentals of Boolean algebra, combinational and sequential circuits and introduction to HDL.					
<b>PREREQUISITE COURSES:</b>					
Basic Electrical Engineering					
<b>RELATED COURSES:</b>					
Microprocessor and Microcontroller, VLSI design					
<b>COURSE EDUCATIONAL OBJECTIVES :</b>					
The objectives of the course are to make the students, <ul style="list-style-type: none"> <li>• Know numerical values in various number systems and perform number conversions between different number systems and simplification using Boolean algebra.</li> <li>• Understand combinational circuits</li> <li>• Understand sequential digital circuits like flip-flops, registers, counters.</li> <li>• Understand to write the code for digital circuits using Verilog HDL.</li> <li>• Study the applications of digital electronics.</li> </ul>					
<b>COURSE OUTCOMES :</b>					
Upon the successful completion of the course, students will be able to:					
CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)			
CO1	Apply the fundamentals of digital electronics for designing Combinational circuits like decoders, encoders etc .	K3			
CO2	Design synchronous sequential circuits for simple application	K3			
CO3	Implement the combinational and sequential circuits using hardware description language.	K3			
CO4	Solve asynchronous sequential circuits for simple application	K3			
CO5	Explain the applications of digital electronics	K2			

**CORRELATION OF COs AND POs**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M		M	L								L
CO2	M	L	M									
CO3	L		L		M							
CO4	M	L	L	L								
CO5	L											L

**COURSE CONTENT:**

<b>UNIT I</b>	<b>DIGITAL FUNDAMENTALS AND COMBINATIONAL CIRCUITS</b>	<b>9</b>
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Introduction to Boolean algebra and Switching Functions; Boolean Minimization using K Map and Tabulation method; combinational circuits: Design procedure – Half adder – Full Adder – Half subtractor – Full subtractor – Parallel binary adder, parallel binary Subtractor – Fast Adder - Carry Look Ahead adder – Serial Adder/Subtractor - BCD adder – Binary Multiplier – Binary Divider - Multiplexer/ Demultiplexer – decoder - encoder – parity checker – parity generators – code converters - Magnitude Comparator.

<b>UNIT II</b>	<b>SEQUENTIAL CIRCUITS</b>	<b>9</b>
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Flip Flops and Memory devices: RAM – Static and Dynamic, ROM, PROM, EPROM, EEPROM; Counters and Shift registers: Binary, BCD and programmable modulo counters, Shift register counters; Sequential circuit design: using Mealy and Moore model.

<b>UNIT III</b>	<b>INTRODUCTION TO HARDWARE DESCRIPTION LANGUAGE</b>	<b>9</b>
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Introduction to Verilog / VHDL- Structural, Dataflow and Behavioral modeling. Structural, Dataflow and Behavioral modeling of combinational logic circuits (Multiplexer, Demultiplexer, decoder and encoder). Structural, Dataflow and Behavioral modeling of sequential logic circuits (counters and shift registers).

<b>UNIT IV</b>	<b>ASYNCHRONOUS SEQUENTIAL CIRCUITS</b>	<b>9</b>
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Analysis Procedure, Circuits with latches; Design Procedure, Reduction of state and flow table; Race free state assignment; Hazards; ASM chart; Design examples.

<b>UNIT V</b>	<b>APPLICATIONS OF DIGITAL ELECTRONICS</b>	<b>9</b>
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Multiplexing displays - Frequency counters - Time measurements - using the ADC0804 - Slope alone operation, span adjust, zero shift, testing - microprocessor compatible A/D converters.

**TOTAL: 45 PERIODS****TEXT BOOKS:**

1. M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 / Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.
2. Donald .P.Leach, Digital principles and applications, 7th Edition, McGraw-Hill ,2012

**REFERENCE BOOKS:**

1. John F.Wakerly, Digital Design, Fourth Edition, Pearson/PHI, 2006.
2. Thomas L. Floyd, Digital Fundamentals, 8th Edition, Pearson Education Inc, New Delhi, 2003 Donald D.Givone, Digital Principles and Design, TMH.
3. William H. Gothmann, Digital Electronics, 2nd Edition, PHI, 1982.