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22EE205 DIGITAL ELECTRONIC CIRCUITS

Hours Per Week :

L	T	P	C
2	2	0	3

PREREQUISITE KNOWLEDGE: Basic Arithmetic.

COURSE DESCRIPTION AND OBJECTIVES:

- This course deals with the fundamentals of number systems, and Boolean expressions that are used to realize combinational and sequential circuits.
- Its objective is to minimize the logical expressions using Boolean postulates, to design various combinational and sequential circuits.
- To provide a sufficient number of applications/case studies to demonstrate the techniques used.

MODULE-1

UNIT-1

8L+8T+0P=16 Hours

FUNDAMENTALS OF DIGITAL SYSTEMS:

Concept of Number systems, Binary Arithmetic, One's and two's complements, Canonical and Standard Forms - SOP and POS forms, Basic Logic gates, and universal gates, Simplification of logic functions using Karnaugh maps.

UNIT-2

8L+8T+0P=16 Hours

COMBINATIONAL LOGIC DESIGN:

Design using conventional logic gates, Half adder, Full adder, Half subtractor, and Full subtractor, Code converters, Comparators, and Parity generator/detector, Decoders, Encoders, De-multiplexers, and Multiplexers, Design of combination circuits using Decoders and Multiplexers.

PRACTICES:

- 7-Segment LED display.
- Digital Watch Design.

MODULE-2

UNIT-1

8L+8T+0P=16 Hours

SEQUENTIAL LOGIC CIRCUITS:

Latches, Flip-Flops and Triggering, Shift registers, Counters - Ripple counters, Mod-n counter and Concept of State diagram and State table.

UNIT-2

8L+8T+0P=16 Hours

FINITE STATE MACHINES:

Design of sequential counter, Design of Mealy FSM, Design of Moore FSM.

PRACTICES:

- Sequence Detectors.
- Traffic light control system.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Apply the knowledge of digital logic concepts to optimize digital circuits.	Apply	1	1, 2, 3, 4, 9, 11
2	Analyze sequential digital circuits for given problem statement.	Analyze	2	1, 2, 3, 4, 9, 11
3	Design and practical implementation of Sequential logic circuits.	Create	2	1, 2, 3, 4, 9, 11
4	Design and practical implementation of Combinational logic circuits.	Create	1	1, 2, 3, 4, 9, 11

TEXT BOOKS:

1. Digital Logic and Computer Design, M. Morris Mano, Pearson India, 2017, ISBN: 9789332586048.
2. Digital Electronics, G. K. Kharate, Oxford University Press, 2012, ISBN: 9780198061830.

REFERENCE BOOKS:

1. A Anand Kumar, "Fundamentals of Digital Circuits", Prentice-Hall of India Pvt.Ltd, 2006, ISBN: 9788120317451.
2. J.F. Walkerly, "Digital Design Principles and Practices", 5th edition, PHI/Pearson Education, 2018, ISBN: 9780134460093.
3. M. Predko, "Digital Electronics Demystified", McgrawHill, 2005, ISBN: 9780071471244.

SKILLS:

- ✓ Minimize Boolean expression.
- ✓ Construct different combination-al and sequential circuits.
- ✓ Verify the functionality of digital circuits.
- ✓ Design combinational and sequential circuits for a given application
- ✓ Data acquisition using ADC & DAC