DIGITAL LOGIC DESIGN

III Semester: CSE / IT

Course Code	Category	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CIA	SEE	Tota
AEC020	Foundation	3	1	-	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

I. COURSE OVERVIEW:

This course intended to logic gates, various logic families. Design of digital circuits using logic gates, combinational circuits and sequential circuits. Apply op-amp characteristics to design analog to digital converters and digital to analog converters. Classification and characteristics of memories such as Read-only memory, Random access memory and programmable logic devices such as programmable logic array and programmable array logic.

II. OBJECTIVES:

The course should enable the students to:

I	Simplification of the logic functions using Boolean algebraic theorems andtechniques.
II	Implementation of conventional combinational and sequential circuits includingconversions of flip-flops
III	The exploration of the logic families and semiconductor memories.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Understand** the different forms of number representations andbinary codes in digital logic circuits.	Understand
CO 2	**Make use of** Boolean postulates, theorems and k-map for obtaining minimized Boolean expressions.	Remember
CO 3	**Implement** the combinational logic circuits using the logic gates.	Apply
CO 4	**Utilize** the functionality and characteristics of flip-flops and latches for designing sequential circuits	Apply
CO 5	**Construct** the synchronous and asynchronous modules using flip flops used for memory storing applications.	Apply
CO 6	**Extend** the knowledge of memories and programmable logic devices for understanding the architectural blocks of FPGA.	Apply

IV. SYLLABUS:

UNIT-I	NUMBERS SYSTEMS AND CODES	Classes: 09

Review of number systems, number base conversion; Binary arithmetic: Binary weighted and non-weighted codes; Complements: Signed binary numbers; Error detection and correcting codes; Binary logic.

UNIT-II	BOOLEAN ALGEBRA AND GATE LEVEL MINIMIZATION	Classes: 09

Postulates and theorems; representation of switching functions; SOP and POS forms; Canonical forms; Digital logic gates; Karnaugh Maps: Minimization using three variable; four variable; five variable K-Maps; Don't Care Conditions; NAND and NOR implementation; Other Two-level implementation; Exclusive –OR function.

UNIT-III	DESIGN OF COMBINATIONAL CIRCUITS	Classes: 09
Combinational circuits: Analysis and design procedure; Binary adder and subtractors; Carry look-a-head adder; Binary multiplier. Magnitude comparator; BCD adder; Decoders; Encoders; Multiplexers; Demultiplexer.		
UNIT-IV	**DESIGN OF SEQUENTIAL CIRCUITS**	**Classes: 10**
Combinational vs sequential circuits ; Latches, flip flops: RS flip flop, JK flip flop, T flip flop, D flip flop, Master-Slave flip flop, flip flops excitation functions; Conversion of one flip flop to another flip flop; Shift registers; Design of asynchronous and synchronous circuits; State table, state diagram, state reduction and state assignment for mealy and moore machines.		
UNIT-V	**MEMORY**	**Classes: 08**
Random access memory; Types of ROM; Memory decoding; Address and data bus; Sequential memory; Cache memory; Programmable logic arrays; Memory hierarchy in terms of capacity and access time.		

Text Book:

1. M. Morris Mano, "Digital Design", Pearson Education/PHI, 3rd Edition, 2001.

Reference Books:

1. Charles H. Roth Jr, "Fundamentals of Logic Design", Thomson Brooks/Cole, 5th Edition, 2004.
2. C. V. S. Rao, "Switching Theory and Logic Design, Pearson Education, 1st Edition, 2005.
3. M. Rafiquzzaman, "Fundamentals of Digital Logic and Micro Computer Design", John Wiley, 5th Edition, 2005.
4. Zvi. Kohavi, "Switching and Finite Automata Theory", Tata McGraw Hill, 2nd Edition, 1991.

Web References:

1. http://www.american.cs.ucdavis.edu/academic/ecs154a.sum14/postscript/cosc205.pdf
2. http://www.engrcs.com/courses/engr250/engr250lecture.pdf
3. http://www.ece.rutgers.edu/~marsic/Teaching/DLD/slides/lec-1.pdf
4. http://www.iare.ac.in

E-Text Books :

1. https://drive.google.com/file/d/0B4ChICvNGHlfN2NmODE1NjAtZWI5Zi00MmU0LWIyMmQtOTU3ZGUyMzAwODc1/view
2. https://accessengineeringlibrary.com/browse/digital-logic-design-and-computer-organization-with-computer-architecture-for-security
3. http://www.ece.rutgers.edu/~marsic/Teaching/DLD/syllabus.html

Course Home Page: