

Digital Logic Design and Applications				
CLASS S.E (INFORMATION TECHNOLOGY)				
SEMESTER III				
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:		
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL			
	ORAL		-	25
	TERM WORK		-	25

A basic course in digital electronic logic circuitry. This course will introduce the students to digital logic circuits. Basic logic elements such as AND, OR, NAND and NOR gates will be introduced and characterized. Combinational and Sequential logic circuits will be designed and analyzed in the lab. Implementation of digital circuits with the help of MSI ,LSI and VLSI technology is covered.

1. Number Systems: Decimal, Binary, Octal and Hexadecimal number system and conversion, Binary weighted codes and inter-conversion, Binary arithmetic including 1's Complement and 2's Complement, Error detection and correction codes.
2. Boolean Algebra and Combinational Logic: Boolean Algebra Theorems, Realization of switching functions using logic gates, canonical logic forms, sum of product & product of sums, Karnaugh maps, Simplification of expressions, Variable Entered Maps ,Quine-McCluskey minimization techniques, Mixed logic combinational circuits and multiple output functions.
3. Analysis and Design of Combinational Logic: Introduction to combinational circuit, Decoder, Encoder, Priority encoder, Multiplexers as function generators, Binary adder, Subtractor, BCD adder, Binary comparator, Arithmetic and logic units.
4. Sequential Logic: Sequential circuits, Flip-flops, Clocked and edge triggered flip-flops, Timing specifications , Asynchronous and synchronous counters, Counter design with state equations, Registers, Bidirectional Shift registers.

5. Programmable Logic Devices: PLAs ,PALs, CPLD, FPGA Architectures, Finite state machines- Mealy and Moore design, Introduction to VHDL, Implementation of above combinational and sequential circuits using VHDL, Examples of system design applications like Washing machine, Candy Vending machine, traffic lights
6. CAD Tools: Introduction to Computer Aided Synthesis and Optimization, Circuit models, Synthesis, Optimization, Computer Aided Simulation, Verification, Testing, and Design for Testability

RECCOMENDED BOOKS

1. Raj Kamal, "Digital Systems Principle and Design" ,Pearson Education
2. Balabaniam ,Carlson, "Digital Logic Design Principles"Wiley Publications
3. Morris Mano, "Digital Design",Third Edition, Pearson edition
4. R P Jain " Modern Digital Electronics", McGraw Hill.
5. D. P. Leach, A. P. Malvino, "Digital Principles and Applications", TMH.
- 6 Tocci, Digital systems: Principles and applications, Pearson
7. J. Bhasker, "A VHDL Primer",Third Edition.
8. Sudhakar Yalamanchili, "Introductory VHDL" John M. Yarbrough, Pearson Ed.

TERM WORK

1. Term work should consist of atleast 10 practical experiments.
2. A minimum of 4 experiments should be performed on VHDL and other stimulation Packages such as Tinapro, Multisim, Spice etc.

1. Attendance (Theory and Practical)	05 Marks
2. Laboratory work (Experiments and Journal)	10 Marks
3. Test (at least one)	10 Marks

The final certification and acceptance of TW ensures the satisfactory

performance of laboratory Work and Minimum Passing in the term work.

Suggested Experiments

1. Study of basic Logic gates on IC's
2. 2's complement subtraction using IC 7483
3. Study of ALU IC 74181 (Active high and Active low)
4. 4 bit magnitude comparator using 7485.
5. Study of flips flops using IC 7474/74
6. Mod -100 counter using IC 7490 and IC 7493
7. Study of bidirectional shift register IC 74194/7495
8. Basic logic gates on VHDL and implementation on CPLD/ FPGA
9. Design of BCD adder on any stimulation package
10. Implementation of Combinational circuits on VHDL
11. Implementation of Sequential circuits on VHDL
12. Study of basic system design eg. Traffic light control

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