

S.E. (ELECTRONICS) SEMESTER III
DIGITAL SYSTEMS DESIGN I

Period per week	Lecture	4	
	Practical	2	
	Tutorial	--	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	3	50
	Oral Examination	---	25
	Term Work	---	25
	TOTAL	---	200

Detailed Syllabus		Lectures/Week
1.	Introduction and Digital Codes: Analog Vs Digital Systems Digital Devices, Binary codes, Gray codes, Character codes, Codes for detecting and correcting errors	06
2.	Logic Circuits: Boolean Algebra, theorems, combinational circuit analysis, combinational circuit synthesis, minimization, Karnaugh Map, Sum of Products, Product of Sums form, and their minimization, Programmed minimization-Quine Mc-Cluskey minimization algorithm, timing hazards-Static, Dynamic Hazards	14
3	Combinational MSI, LSI Devices: Combinational design using SSI, MSI devices, Decoders (74x139,74x138), Encoders (74x148), Tri state buffers (74x244,74x245), Multiplexers (74x151), Parity circuits(74180), Comparators(7485), Adders (7483) , Subtractors, BCD adders - subtractors , ALU (74181), Combinational Multipliers, Combinational PLDs	10
4	Logic families: Basics of TTL, CMOS, ECL Circuits for basic logic operations just Circuits and working of them in all above families. No Characteristics of families.	10
5.	Sequential Logic Practices:	08

	Basic Elements, Latches and Flip flops, S-R, D.T, J-K latches and Flip flops, Flip Flop conversions, Applications of Latches and Flip-Flop in switch debouncing, bus holder circuits, Flip-flop Timing Considerations and Metastability.	
6	Counters –Asynchronous, Synchronous counters, Up down counters, Mod counters, Ring counters. Shift Registers, Universal Shift register.	08

Text Books

1. RP Jain: Modern Digital Design, forth edition, Tata McGraw Hill.
2. Morris Mano, Digital Design , Pearson Education ,Asia,2002

Reference Books

1. John F. Wakerley, Digital Design Principles and Practices, third edition updated, Pearson Education, Singapore, 2002.
2. John M. Yarbrough, Digital Logic :Applications and Design, Thomson Brooks/Cole , 2004

Term Work

The term work shall consist of at least eight laboratory experiments covering the whole of syllabus, duly recorded and graded. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.

SUGGESTED LIST OF EXPERIMENTS

The experiments must include:

1. Verification of basic gates (1 Experiment)
2. Applications like comparators/ parity generators / adders / Subtractors etc using gates or MSI devices (2 Experiments)
3. Use of Decoders, Encoders, Multiplexers (2 Experiments)
4. Flip Flop Conversion (1 Experiment)
5. Applications using of Synchronous / Asynchronous counters, Shift Registers (2 Experiments)