4134 - DIGITAL ELECTRONICS- I

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
					Theory		Practical Ex.	Total
Lectures	Practical	Credits						
3	2	5	25	25	3 Hrs	100	50	200

Pre-requisite	Source
4132	EXN

Semester	Theory	Test	Total	TW	PR	Gr Total
	75	25	100	25	50	175

Rationale: This course introduces the basics to Digital world. So study of Karnaugh mapping techniques, flip-flops, registers and counters becomes very essential.

COURSE CONTENTS	Hrs	Mks
1. NUMBER SYSTEM AND CODES Concept of digital and analogue signals, binary, decimal , octal and hexadecimal number system, conversion from one system to another, BCD codes, ASCI code, Gary code, Binary Addition, Subtraction, 1`s compliment, 2`s compliment methods, Duality, Positive and Negative logic systems.	9	20
2. BOOLEAN ALGEBRA AND LOGIC GATES Principles of Boolean algebra and De Morgan`s theorems, symbol, basic concepts, truth table of logic gates, NOT, AND, OR, NOR, NAND, EXOR, EXNOR. Implementation of simple logic expressions using gates.	9	20
3. FLIP- FLOP Principle of operation schematic and truth tables of basic flip flop RS FF, DFF, JK FF, JK Master FF, T FF.	12	25
4. REGISTERS AND COUNTERS Concept of sequential and combination digital systems. Principles of operation, schematic of shift registers various modes of operation. Principles of operation, schematic of counters such as synchronous and asynchronous counters, ripple, up, down, and up down, BCD, decade, mod, ring counter. Simple application of counters and shift registers.	12	25
5. DIGITAL LOGIC FAMILIES Characteristics of digital ICs- flexibility, speed, power, and noise considerations, fan-in, and fan-out. RTL, DCTL, DTL, HTL characteristics. TTL, TTL series and characteristics. ECL, MOS, CMOS, logic gates. Tristate logic CTL, I2I and ECL comparison between various logic families.		
Total	48	100

PRACTICALS:

Students are required to perform any eight experiments from the following.

1. Verification of logic gates.
2. Study of Universal gates.
3. Verification of De Morgan`s Theorem.
4. Verification of Boolean expression.
5. Construction and testing of RS FF, Clocked RS FF using gates.
6. Construction and testing of JK FF, JK MS FF, DFF, TFF.
7. Conversion of Gary Code to Binary and Vice Versa using gates.

8. Application of XOR gate as Parity Checker.
9. Study of following Counter using ICs: a) UP, b) down, c) Up-down, d) Mod-K, e) Frequency divid circuits.
10. Study of following synchronous counters: a) Binary, b) Decade.
11. Study of following shift registers using ICs: a) SISO, b) SIPO, c) PISO, d) PIPO.

REFERENCE BOOKS:

1. Micro-electronics by Milman and Grabel.
2. Digital Computer Fundamentals by Bartee.
3. Pulse and Digital Electronics by G. K. Mithal and A.K. Vanwasi.
4. Digital Computer Electronics by Malvino and Leach