GUJARAT TECHNOLOGICAL UNIVERSITY

Syllabus for Integrated M.Sc. (Computer Science)
(With Specialization: AI and Data Science/IoT/ Cyber Security)

With effective from academic year 2022-23

Subject Code: 1330302
Semester- III
Subject Name: Digital Electronics

Teaching and Examination Scheme

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE(E)	PA (M)	PA (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Teaching Hours	Module Weightage (%)
1.	**Number system and codes:** Binary, octal, hexadecimal and decimal Number systems and their inter conversion, BCD numbers (8421-2421), gray code, excess–3 code, cyclic code, code conversion, ASCII, EBCDIC codes. Binary addition and subtraction, signed and unsigned binary numbers, 1's and 2's complement representation.	5	15
2.	**Boolean Algebra:** Basic logic circuits: Logic gates (AND, OR, NOT, NAND, NOR, Ex-OR, ExNOR and their truth tables,), Universal Gates, Laws of Boolean algebra, De-Morgan's theorem, Min term, Max term, POS, SOP, KMap, Simplification by boolean theorems, don't care condition	7	20
3.	**Logic Families:** Introduction to digital logic family such as RTL, DTL, TTL, ECL, CMOS, IIR, HTL etc., their comparative study, Basic circuit, performance characteristics, Wired logic, open collector output etc	7	15
4.	**Combinational Logic:** The Half adder, the full adder, subtractor circuit. Multiplxer-demultiplexer, decorder, BCD to seven segment Decorder, Encoders	7	15
5.	**Flip flop and Timing circuit:** set-reset laches, D-flipflop, R-S flip-flop, J-K Flip-flop, Master slave Flip flop, edge triggered flip-flop, T flip-flop.	7	15
6	**Registers & Counters:** Synchronous/Asynchronous counter operation, Up/down synchronous counter, application of counter, Serial in/Serial out shift register, Serial in/Serial out shift register, Serial in/parallel out shift register, parallel in/ parallel out shift register, parallel in/Serial out shift register, Bi-directional register.	7	20

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Reference Books:

1. Digital Fundamentals by Morris and Mano, PHI Publication
2. Fundamental of digital circuits by A.ANANDKUMAR, PHI Publication
3. Digital Fundamaentals by FLOYD & JAIN, Pearson Pub
4. Fundamentals of Logic Design by Charles H. Roth Thomson

Course outcomes:

After learning the course, the students should be able to:

No.	CO statement
CO-1	Develop a digital logic and apply it to solve real life problems.
CO-2	Develop competence in Combinational Logic Problem formulation and Logic Optimization.
CO-3	Develop competence in analysis of synchronous and asynchronous sequential circuits.
CO-4	Analyze and solve various engineering problems with finite state machine.
CO-5	Design and analyze Logic gates with different technologies.