SES's L. S. RAHEJA COLLEGE OF ARTS AND COMMERCE

(AUTONOMOUS)

Syllabus of Digital Electronics & Logic Design under NEP 2020 vertical - Major with effect from 2024-25

Department of Information Technology and Data Science

HoD/Sr. Person of the Department: Prajakta Joshi

Date of approval by the BoS: 27/04/4024

Approved by the Academic Council: 29/04/2024

Ratified by the Governing Body on: 06/05/2024

Programme: B.Sc.(IT)				Semester : I	
Course : Digital Electronics & Logic Design Academic Year: 2024-2025 Batch: 2024-2027				Code: UGBSCITIMJ224	
Teaching Scheme			Evaluation Scheme		
Lectures	Practical	Tutorials	Credits	Internal Continuous Assessment (ICA) (weightage)	Term End Examinations (TEE) (weightage)
45	Nil	Nil	3	40%	60%

Learning Objectives :	**1. To introduce the basics of logic in digital electronics as an entry level course.** **2. To interpret and assess number systems and the conversions of number systems** **3. To analyze the Boolean expressions and reduce the expression to the minimum.** **4. To design simple logic circuits using tools such as Boolean algebra and Karnaugh Mapping.** **5. To understand the state of a memory cell and its types using flip-flops.** **6. To create simple digital systems using counters, registers etc.**
Learning Outcomes :	**1. Apply number conversion techniques in real digital systems** **2. Solve Boolean algebra expressions** **3. Derive and design logic circuits by applying minimization in SOP and POS forms** **4. Design and develop Combinational and Sequential circuits Understand and develop digital applications**
Pedagogy:	**Experiential learning, problem-based learning, logic building, hardware simulators and kits**

Detailed Syllabus: (per session plan)

Session Outline For: Digital Electronics & Logic Design

Each lecture session would be of one hour duration (45 sessions).

Module	Module Content	Module Wise Pedagogy Used	Module Wise Duration
I	**Digital Systems and Binary numbers:** Introduction to Number systems, Positional Number systems, Conversions (converting between bases), Non positional number systems, Unsigned and Signed binary numbers, Binary Codes, Number representation and storage in computer system. **Logic gates and Logic Circuits**: Basic and Universal Gates **Boolean algebra and Gate level minimization:**	Experiential learning, problem-based learning, logic building	15

	Introduction, Postulates of Boolean Algebra, Two Valued Boolean Algebra, Principle of Duality, Basic Theorems of Boolean Algebra"		
II	**Boolean Functions:** Boolean Functions and their Representation, Gate-Level Minimization (Simplification of Boolean Function), K-map (variables level 4 to 5) Quine- McCluskey Method **Combinational logic:** Introduction, Analysis and Design Procedure for Combinational Logic Circuits, Types of Combinational Circuit	Experiential learning, problem-based learning, hardware simulators and kits	15
III	**Sequential circuits:** Introduction, Latch, Flip-flops (SR, JK, T & D), Counters: synchronous and asynchronous Counter **Applications:** Binary Multiplication and Division algorithm, Booth's multiplication algorithm, ALU architecture	Experiential learning, problem-based learning, peer learning	15

REFERENCE BOOKS

1. Sonali Singh (2015), Digital Logic Design, BPB publications
2. Subir Kumar Sarkar, Asish Kumar De, Souvil Sarkar (2014), Fundamentals of Digital Electronics and Logic Design, Pan Stanford Publishing
3. Anil K Maini Kinney (2015), Digital Electronics Principles, Design and Applications Design, Wiley Learning