COURSE TITLE : DIGITAL ELECTRONICS AND MICROPROCESSOR
COURSE CODE : 4032
COURSE CATEGORY : A
PERIODS/WEEK : 4
PERIODS/SEMESTER : 56
CREDITS : 4

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Digital Fundamentals and Logic Gates.	14
2	Combinational Logic Circuits and Flip Flops	14
3	Sequential Logic Circuits.	14
4	Fundamentals of Microprocessor 8085.	14
Total		56

Course Outcome:

Sl.	Sub	**On completion of this course the student will be able:**
1	1	To understand number systems and logic gates.
2	1	To comprehend combinational logic circuits.
	2	To analyze the basic building blocks of sequential circuits.
3	1	To comprehend the working of shift registers.
	2	To comprehend the working of counter circuits
4	1	To understand the architecture of microprocessor 8085.

Specific Outcome:

MODULE I Digital Fundamentals and Logic Gates.

1.1.1 To understand number systems and logic gates.
1.1.2 To describe the number systems - binary and hexadecimal.
1.1.3 To describe the conversion of decimal system to hexadecimal and binary and vice-versa.
1.1.4 To explain the binary addition, subtraction, multiplication and division.
1.1.5 To explain how the BCD code is formed
1.1.6 To describe the 1`s and 2`s complement.
1.1.7 To describe the subtraction by complement method.
1.1.8 To list the logic gates.
1.1.9 To explain the operations of different types of gates in digital circuits.
1.1.10 To draw the truth table of different types of gates OR, AND, NOT, NAND, NOR AND EX-OR.
1.1.11 To distinguish between TTL,ECL and CMOS
1.1.12 To describe the different logic families and properties.
1.1.13 To explain the sourcing and sinking current of different logic families.
1.1.14 To discriminate the different logic gates.

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MODULE II Combinational Logic Circuits and Flip Flops

2.1.1 To illustrate the Boolean algebra.
2.1.2 To explain the universal gates using NAND and NOR gates.
2.1.3 To state the De Morgan's Theorem.
2.1.4 To explains SOP and POS.
2.1.5 To describe use of K map for solving Boolean expressions having 2 and3 variables.
2.1.6 To explain the half adder & full adder circuit.
2.1.7 To Illustrate Encoder-decoder.
2.1.8 To explain multiplexing and de multiplexing.
2.1.9 To explain the operation of basic flip flop circuit.
2.1.10 To explain the operation of clocked flip flop.
2.1.11 To describe the working of SR.
2.1.12 To describe the working of clocked SR.
2.1.13 To describe the working master slave SR, J K, JK Master Slave and D flip-flop.

MODULE III Sequential Logic Circuits.

3.1.1 To identify the different types of shift registers.
3.1.2 To describe a typical shift register using flip-flops(JK,D).
3.1.3 To comprehend the working of counter circuits.
3.1.4 To illustrate the operation of an Up counter.

3.1.5 To illustrate the operation of a Down counter.
3.1.6 To distinguish between the asynchronous counter and synchronous counter.
3.1.7 To describe the Synchronous binary counter and its wave forms.
3.1.8 To Illustrate the BCD decade counter and its wave forms.
3.1.9 To describe different modes of asynchronous counter.
3.1.10 To describe the analog to digital conversion.
3.1.11 To describe the digital to analog conversion.

MODULE IV Fundamentals of Microprocessor 8085.

4.1.1 To describe the functions of a microprocessor.
4.1.2 To explain the features of 8085 microprocessor.
4.1.3 To describe the pin diagram and pin functions of 8085 microprocessor.
4.1.4 To illustrate the 8085 CPU architecture and its functional blocks.
4.1.5 To describe the programming model of 8085.
4.1.6 To explain the instruction classifications of 8085.
4.1.7 To explain the instruction and data formats.
4.1.8 To write simple assembly language programs and execute.
4.1.9 To describe different addressing modes and instruction sets.
4.1.10 To describe data transfer instructions and arithmetic instructions.

CONTENT DETAILS

MODULE I

Digital fundamentals and logic gates - Introduction-number systems - binary number system -conversion of decimal to binary and vice versa - arithmetic operations on binary - binary coded decimal - one's and two's complement - use of complements - Hexadecimal number system -conversion of decimal to hex to binary and vice versa - arithmetic operations on hex – BCD - Packed and Unpacked BCD Numbers – HEX - ASCII codes - Logic gates-truth tables - different logic families-Diode Logic-Transistor Logic-Resistor -Transistor- Diode-Transistor Logic – Transistor - Transistor Logic - Complementary Metal Oxide Semiconductor Logic - Propagation delay - current sourcing and current sinking - Fan in - Fan out - Power dissipation - Speed.

MODULE II

Combinational logic circuits and flip-flops - Boolean algebra - De morgan's theorem- Sum of product and product of sum equations - minterm and maxterms - simplification of Boolean expressions -Karnaugh maps - solutions of Boolean expressions using k map up to 4 variables - Universal gates - Arithmetic operations by digital circuits - Half adder-full adder - half subtractor –full subtractor - Encoder –

Decoder – Multiplexer - de-multiplexer - Sequential logic circuits-synchronous and asynchronous - Flip-flops – SR – D – MS – JK - Truth tables – working – applications of flip flops - Flip flop ICs.

MODULE III

Sequential logic and Data conversion circuits - Shift registers-serial in-serial out - parallel in - parallel out-applications – Counters – need – classification - asynchronous and synchronous counters - up counter - down counter - Asynchronous ripple counter - Mod-N asynchronous counter using Flip Flops - Mod-N synchronous counter (up to 4 bit) using Flip Flops – applications - Digital to analog conversion – Binary weighted D – R - 2R ladder type network for D – Analog to digital conversion – Ramp type ADC – Successive Approximation ADC-applications.

MODULE IV

Fundamentals of Microprocessor - Introduction to Microprocessors - Evolution of Microprocessors – Features of 8085 microprocessor –Pin diagram-Block diagram - Arithmetic Logic Unit - Control Unit-registers-Program counter-DATA transfer-Bus structure-DATA and Address bus - Basic Microprocessor Instructions - Data Transfer Instructions - Arithmetic Instructions - Logic Instructions - Control transfer or Branch or Program Control Instructions - Machine Control Instructions - Addressing Modes - Memory Direct Addressing Mode - Immediate Addressing Mode - Register Direct Addressing Mode - Register Indirect Addressing Mode – simple programmes. Microprocessor Selection - Selection Criteria - Microprocessor Selection table for Common Applications

REFERENCES

1. Anil K. Maini. Digital Electronics Principles, Devices and Applications: Wiley Publications
2. Albert Paul Malvino & Donald P. Leach. Digital principles and applications: McGraw-Hill
3. Ramesh S Gaonkar. Microprocessor architecture programming and applications with the 8085: Prentice Hall