Programme	:	**Diploma in** ET/CE/**EE**//ME/MT/CM/IT/DDGM
Programme Code	:	01/**02**/03/04/05/06/07/08/21/**22**/23/24/26/**16**/17
Name of Course	:	**Digital Electronics And Microprocessor**
Course Code	:	**ET 390**

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**03**	**48**
Practical	**02**	**32**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	**Practical**	**Oral**	**Term work**
Duration	**Three class tests, each of 60 minutes**	**3 hrs.**	--	--	--
Marks	**20**	**80**	**50**	--	--

Course Rationale:

Now a day's application of digital circuits and microprocessors are extensively used in measurement and control applications in the field of electrical engineering and electrical power systems. So the digital electronics and microprocessor has been introduced as a subject in electrical engineering curriculum. This course covers digital circuits logic gates Flip-flop, microprocessor 8085 architecture, its instruction set, programming and applications. After completing this subject the student can write and execute programs for microprocessor based applications.

Course Objectives:

After studying this course, the student will be able to

•	Observe logic circuits
•	Assemble Logic circuits
•	Test the logic circuit
•	Observe logic circuits
•	Describe architecture and operation of microprocessor 8085
•	Design and develop microprocessor based systems

•	Explain various applications of microcontrollers
•	Develop assembly language programs using instruction set of 8085
•	Describe architecture and operation of microprocessor 8085

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Marks
1.	**Introduction to Digital Technique**			
	1.1	Digital signal and Digital Circuit.		
	1.2	Advantages and Disadvantages of digital circuit.		
	1.3	Generation of Digital signal.		
	1.4	Number system- Introduction, decimal, binary, octal & hexadecimal		
	1.5	Conversion of Decimal to Binary Number & vice versa.	08	12
	1.6	Decimal to Hex and vice versa		
	1.7	Hex to binary and vice versa		
	1.8	Octal to decimal and vice versa		
	1.9	Octal to binary and vice versa.		
	1.10	BCD number system.		
	1.11	1's compliments and 2's compliment.		
	1.12	Addition and Subtraction of Binary number.		
2.	**Logic gates and Boolean Algebra**			
	2.1	Logical symbol, logical expression and truth table of AND, OR, NOT, NAND, NOR, EX-OR and EX-NOR gates.		
	2.2	Universal gates – NAND, NOR Gates.		
	2.3	Logical circuit of basic gates using universal gates.		
	2.4	TTL and CMOS Logic gates IC's and their Pin configuration.		
	2.5	Boolean Algebra – Fundamental concept, Basic Laws of Boolean Algebra.	08	16
	2.6	Half-adder and Full – adder.		
	2.7	Introduction to Flip-Flop. - RS Flip-Flop, J.K.Flip-Flop, T & D Flip-flop and their Field of applications of flip-flop.		
	2.8	Introduction to Registers , shift to right and shift to left registers		
	2.9	Introduction to counter – up counter, down counter and decade counter		
3.	**Introduction to Microprocessor**		06	12

	3.1	Microprocessor as Physical system, pin diagram & Pin configuration of Intel 8085 Microprocessor.		
	3.2	Architecture and organization of INTEL 8085.		
	3.3	Data bus, Control bus, CPU, ALU, accumulator.		
	3.4	Programming model of INTEL 8085		
4.		**INTEL 8085 Assembly Language Programming**		
	4.1	Instruction set for 8085/8085A Microprocessor.		
	4.2	Addressing modes of 8085 Microprocessor.		
	4.3	Data movement instruction, PUSH and POP, increment & decrement instruction, Rotate and shift instruction. Arithmetic Instructions such as add, sub.		
	4.4	Compliment /decimal adjustment instruction.	**10**	**20**
	4.5	Logical instructions such as AND OR & EX-OR instruction.		
	4.6	Branching instructions: - Jump, Call & instruction, conditional Jump call & Return instruction.		
	4.7	Looping instructions Simple Programming on Addition, subtraction, multiplication, division, data movement, sorting, find largest/smallest number**.**		
5.		**Memories**		
	5.1	Semiconductor memories: RAM, ROM volatile and non-volatile RAM.	**02**	**04**
	5.2	Memory Map.		
6.		**Timing Diagram**		
	6.1	Timing diagram of fetch operation , read operation & right operation (with & without ATT States**)**	**04**	**06**
7		**Interfacing the Microprocessor**		
	7.1	General purpose programmable devices IC's:8255, 8253, 8237& key board interfacing 8279.		
	7.2	Introduction to serial communication RS-232C		
		Total	**48**	**80**

List of Practicals/Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment
1	Verification of Truth table of logic gates.
2	Verification of De Morgan's Theorem
3	Verification of Truth Table of Flip-flops
4	Study of A/D Convertor.
5	Study of data sheets related to digital IC's
6	Assembly Language programming on – • 1's compliment • shift left operator • 8 bit addition of two numbers • 16-bit addition of two numbers • 8-bit subtraction of two numbers • Binary division • To find larger number • To find smaller number • To find largest number • To find smallest Number • To arrange numbers in ascending order • To arrange numbers in descending order.
7	Study of 8255 PPI IC
8	Study of 8279 PPI IC

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1	Introduction to Digital Technique.	Classroom teaching and laboratory work.
2	Logic gates and Boolean Algebra.	Classroom teaching and laboratory work.
3	Introduction to μP.	Classroom teaching and laboratory work.
4	INTEL 8085 Assembly Language Programming	Classroom teaching and laboratory work.
5	Memories	Classroom teaching and laboratory work.
6	Timing Diagram	Classroom teaching and laboratory work.
7	Interfacing the microprocessor	Classroom teaching and laboratory work.

Text Books:

Sr. No	Author	Title	Publication
1	Malvino	Principles of Digital Electronics	Mcgraw Hill
2	R.P.Jain	Digital Electronics	Tata Mcgraw Hill
3	B.Ram	Microprocessor &	S.Chand

Reference Books:

Sr. No	Author	Title	Publication
1.	Pal mer	Introduction to digital systems	Mcgraw Hill
2.	Mathur	Introduction to microprocessor	Tata Mcgraw Hill

Learning Resources: Class room & laboratory work, Reference books, Machine catalogs, Transparencies.

Specification Table:

Sr. No.	Topic	Knowledge	Comprehension	Application	Total
1	Introduction to Digital	04	02	06	12
2	Technique.	04	06	06	16
3	Logic gates and Boolean	06	04	02	12
4	Algebra.	04	06	10	20
5	Introduction to µP.	02	02	00	04
6	INTEL 8085 Assembly	02	04	00	06
7	Language Programming	04	04	02	10
	Total	26	28	26	80

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