

Course Name : Electronics Engineering Group

Course Code : ET/EJ/EN/EX/IE/IS/IC/DE/EV/MU/IU/ED/EI

Semester : Fourth

Subject Title : Digital Techniques & Microprocessor **Subject Code :** 9071

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	Paper Hrs	TH	TEST	PR	OR	TW	TOTAL
3	-	2	3	80	20	50 @	-	-	150

Rationale:

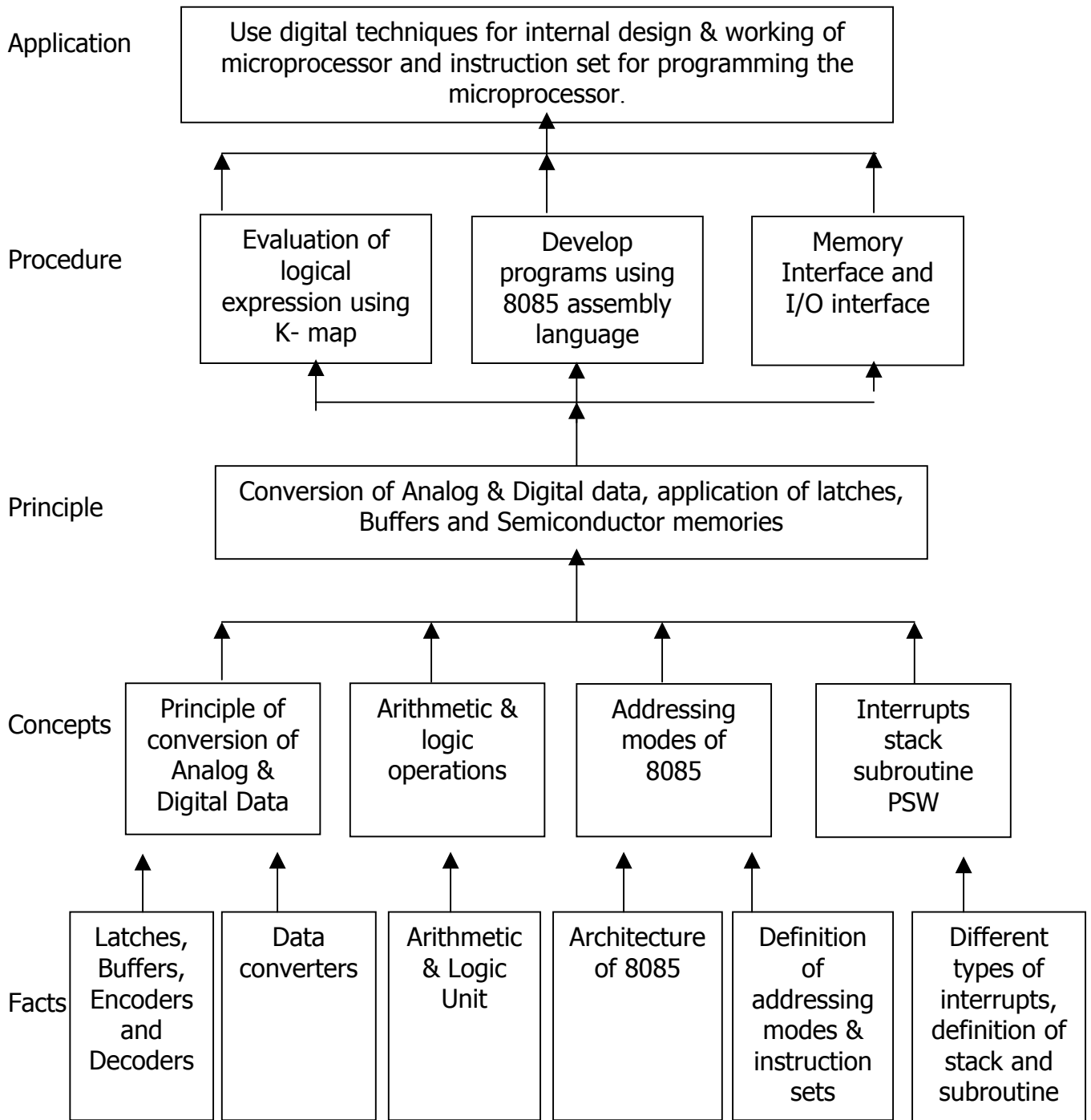
Digital techniques and microprocessor have a wide range of applications in most of the consumer, industrial and computer industries. This course enables the students to use the concept of digital systems and microprocessor for developing systems required for various fields. A thorough understanding of microprocessor is developed using in depth concepts of hardware and programming skills.

Objectives:

The student will be able to:

1. Perform arithmetic operations with help of a standard ALU design.
2. Describe the operational features of A/D and D/A converters.
3. Differentiate between the different types of memories and their applications.
4. Describe the basic architecture of a microprocessors based system.
5. Develop a minimum system with 8085 microprocessors.

LEARNING STRUCTURE:



Contents : Theory

Chapter	Name of the Topic	Hrs.	Marks
1.	Review of Combinational & Sequential Logic Circuits	08	16
	Encoders – Definition , Decimal to BCD, Octal to Binary, Hexadecimal to Binary, Tristate logic, Buffers, Unidirectional buffer – IC 74244, Bidirectional buffers – 74245, Latches – IC 74373, IC 8282 4 – bit serial / parallel binary adder, Single digit BCD adder using IC 7483, Study of ALU ICs- 74181, 74381, Carry look ahead adder.		
2.	Data Converters	08	12
	Introduction – Necessity and their types, Digital to analog converters, Weighted – Resistor D/A converter (Mathematical derivation), R – 2R ladder D/A Converter (Mathematical derivation), Specifications of D/A converter, Analog to Digital Converter, Principle of A/D conversion, Dual slope A/D converter (Mathematical derivation), Specifications of A/D converters, Study of ICs DAC – 0800, ADC – 0809.		
3.	Semiconductor Memories	06	08
	Introduction of memories, Memory organization & operation, Characteristics & classification of memories – Random access & Sequential access memory. RAM & ROM, volatile & non- volatile, static & dynamic, Types of ROM, PROM, EPROM, EEPROM & mask programmable ROM, Memory ICs – 2716, 7481, 6116.		
4.	Microprocessor – 8085		
	4.1 Basic organization of microprocessor based system (Hardware & Software), Features of 8085, Architecture of 8085, Pin definition of 8085.	08	16
	4.2 Programming - Instruction format, Addressing modes, opcode format, 8085 Instruction Set, Machine Cycle and Timing diagram, Interrupts, Necessity of interrupts, Types of interrupts.	10	16
5.	Minimum System Design with 8085	08	12
	5.1 Memory interfacing: RAM/ ROM Memory map.		

	5.2	I/O Interfacing Techniques (I/O mapped I/O, memory mapped I/O) - I/O Interfacing – A/D, D/A, Keyboard (using memory mapped I/O), Serial I/O lines – SOD & SID.		
	5.3	Comparison of I/O mapped I/O and memory mapped I/O.		
		Total	48	80

PRACTICAL:

Skills to be developed :

Intellectual Skills:

1. Identification of different ICs of buffers, latches, data converters, memories.
2. Ability to design algorithm, flowchart, assembly language program & decode.

Motor Skills:

1. Ability to test the different digital ICs.
2. To load the program in user memory of microprocessor kit.
3. To provide commands to execute the program.
4. To observe the result in specific memory locations and registers.

List of Practical:

1. Verify Truth Table of bi directional buffer – IC 74245.
2. Verify function table of ALU 74181.
3. Verify the operational features of ADC – IC 0809, IC 0808 and DAC – IC 0800.
4. Verify the operational features of RAM (use suitable RAM IC).
5. Write assembly language programs for addition and subtraction of two 8 bit & 16 bit numbers.
6. Write assembly language programme to transfer data bytes from memory block to another memory block.
7. Write Assembly Language Programme to multiply two 8 bit numbers using add and shift techniques **OR**
Arrange the given bytes in ascending & descending order using bubble sort.
8. Find one's and two's complement of a given number.
9. Write Assembly Language Programme to exchange the lower & upper nibble of a byte.
10. To sort odd and even byte from given 10 bytes.
11. Using any hardware interrupt write a program to count the interrupt events.
12. Write Assembly Language Programme to Transmit / Receive a 8 bit serial data using SID & SOD lines.

Mini Project: (ANY ONE)

1. Design a stepper motor interface card using driver IC.
2. Design an interface A/D converter using memory mapped input output.
3. Interface D/A converter using memory mapped input output.
4. Design 4 bit R-2R D/A converter.

LEARNING RESOURCES:**BOOKS:**

Sr. No.	Author	Title	Publisher
01.	Malvino	Digital Principles	Tata McGraw Hill (TMH)
02.	R. P. Jain	Modern Digital Electronics	TMH
03.	Malvino & Leach	Digital Principles and Applications	TMH
04.	Floyd	Digital Fundamentals	Pearson Education, New Delhi
05.	M. Morris Mano	Digital Logic and Computer Design	PHI
06.	M. Morris Mano	Digital Logic Design	PHI
07.	Ramesh S. Gaonkar	Microprocessor Architecture, Programming and Applications with 8085	Penram International
08.	B. Ram	Fundamentals of Microprocessors and Microcomputers	Dhanpat Rai Publications
09.	P.K. Gosh, P.R. Shridhar	0000 to 8085 Introduction to Microprocessor for Engineers & Scientist	Prentice Hall of India