SRI VENKATESWARA COLLEGE OF ENGINEERING

Department of Information Technology		LP: **IT22402**
B.E/B.Tech/M.E/M.Tech : **B.Tech-INT**	Regulation: **2022**	Rev. No: **01**
PG Specialisation : -		Date: 21/1/25
Sub. Code / Sub. Name : **IT22402 – Microprocessors and Microcontroller Interfacing**		
Unit : **I**		

Unit Syllabus: THE 8086 MICROPROCESSOR

Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation.

Objective:

This unit enables to study the architecture and instruction set of 8086 and to understand interrupt process and to write assembly language programs.

Session No *	Topics to be covered	Ref	Teaching Aids
1.	Introduction to 8086 -Overview of Microcomputer system,Generation of Processor	1- Ch.1 ; Pg.1-24 , 3- Ch. 2 ; Pg.23-27, 4-Ch. 1 ; Pg.1-2.	LCD/BB
2.	Microprocessor architecture-CPU Architecture,Internal operation	1-Ch. 2 ; Pg.25-34 3-Ch.2 ; Pg.28-32, 4-Ch. 1 ; Pg.3-8.	LCD/BB
3.	Addressing modes-Types of Addressing mode with example	1-Ch. 2 ; Pg.35-38 , 3-Ch. 2 ; Pg. 34-35 , 4-Ch. 2 ; Pg.41-45.	LCD/BB
4.	Instruction set- Arithmetic,branch,loop,logical,data transfer,shift and rotate and assembler directives	1-Ch. 3 ; Pg.53-140 , 3-Ch.3; Pg.41-59 , 3-Ch.6; Pg.131-162 , 4-Ch. 2 ; Pg.38-40,74-81.	LCD/BB
5.	Assembly language programming- Programming using 8086 instruction set	1-Ch. 3 ; Pg.58-134, 3-Ch.6 ; Pg.131-162, 4-Ch.3 ; Pg. 84-128.	Experient ial Learning
6.	Modular Programming - Linking and Relocation- Segment Combination,Access to External identifier	1-Ch. 4 ; Pg.141-150, 3-Ch.4 ; Pg.71-93.	Experient ial Learning
7.	Stacks - Procedures – Macros-calls,returns and procedure definition	1-Ch. 4 ; Pg.151-168 , 174-182, 3-Ch. 5 ; Pg. 99-129, 4-Ch.4 ; Pg. 131-137,145-154.	LCD/BB
8.	Interrupts and interrupt service routines-internal,external interrupt and interrupt sequence	1-Ch. 4 ; Pg.169 -173, 3-Ch. 8 ; Pg.207-240, 4-Ch. 4 ; Pg.138-144.	LCD/BB
9.	Byte and String Manipulation-string instructions and text editor	1-Ch. 5 ; Pg.207-226, 3-Ch. 5 ; Pg. 95-99.	LCD/BB
10.	Summary & Tutorial		

Content beyond syllabus covered:

* Session duration: 50 minutes

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Sub. Code / Sub. Name: **IT22402 – Microprocessors and Microcontroller Interfacing**

Unit : II

Unit Syllabus : 8086 SYSTEM BUS STRUCTURE

8086 signals – Basic configurations – System bus timing – System design using 8086 – IO programming – Introduction to Multiprogramming – System Bus Structure - Multiprocessor configurations

Objective:

This unit gives an overview to design and understand the high end multiprocessor configurations and system bus structure of 8086.

Session No *	Topics to be covered	Ref	Teaching Aids
11.	8086 signals – Basic configurations-Minimum mode,Maximum mode	1-Ch. 8 ; Pg.310-324, 4-Ch. 1 ; Pg.21-27.	LCD/BB
12.	System bus timing –System design using 8086-Timing diagram of 8086 minimum mode,maximum mode and interupt acknowledgement	1-Ch.8 ; Pg.324-329, 4-Ch. 1; Pg.28-35.	LCD/BB
13.	IO programming-Programmed I/O, Interrupt I/O, and Block Transfer	1-Ch. 6 ; Pg.229-267, 4-Ch. 8 ; Pg.420-428.	LCD/BB
14.	Introduction to Multiprogramming - process management, semaphore operations,Memory management.	1-Ch. 7 ; Pg.272-305.	LCD/BB
15.	System Bus Structure-Minimum mode	1-Ch. 8 ; Pg.308-342, 4-Ch. 8; Pg.423-427	LCD/BB
16.	,Maximum mode,	1-Ch.11 ; Pg.450-455, 3-Ch. 11 ; Pg.365-379, 4-Ch.8 ; Pg.393-422.	LCD/BB
17.	System bus timing	1-Ch.11 ; Pg.450-455, 3-Ch. 11 ; Pg.365-376, 4-Ch.8 ; Pg.393-422	LCD/BB
18.	Interrupt priority management	1-Ch.11 ; Pg.450-455, 3-Ch. 11 ; Pg.365-376, 4-Ch.8 ; Pg.393-422	LCD/BB
19.	Multiprocessor configurations -Queue status and lock facility,Coprocessor configuration	1-Ch.11 ; Pg.455-460, 3-Ch. 11 ; Pg.376-379, 4-Ch.8 ; Pg.393-422	LCD/BB
20.	Summary & Tutorial		

Content beyond syllabus covered:

* Session duration: 50 mins

Sub. Code / Sub. Name: **IT22402 – Microprocessors and Microcontroller Interfacing**

Unit : **III**

Unit Syllabus: 8086 INTERFACING

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller

Objective:

This unit enables to understand various interfacing concepts and its circuits, necessary for the various applications using 8086 microprocessor.

Session No *	Topics to be covered	Ref	Teaching Aids
21.	Memory Interfacing and I/O interfacing	4-Ch. 5 ; Pg.158-183.	LCD/BB
22.	Parallel communication interface	1-Ch.9 ; Pg.369-374, 3-Ch. 9 ; Pg.245-250, 4-Ch.5; Pg.184-211.	LCD/BB/Experiential Learning
23.	Serial communication interface -Asynchronous and synchronous communication	1-Ch. 9 ; Pg.349-369, 3-Ch. 14 ; Pg.487-493, 4-Ch.6 ; Pg.278-289.	LCD/BB/Experiential Learning
24.	D/A and A/D Interface	1-Ch.9 ; Pg.374-377, 3-Ch. 10 ; Pg.301-307, 4-Ch.5; Pg.212-227.	LCD/BB
25.	Timer – Keyboard /display controller	1-Ch. 9 ; Pg.378-395, 3-Ch. 8; Pg.221-232, 3-Ch. 9 ; Pg.260-277, 4-Ch.6 ; Pg.235-248,266-277.	LCD/BB
26.	Interrupt controller	1-Ch. 8; Pg.329-338, 3-Ch.8; Pg.207-221,232-242, 4-Ch.6 ; Pg.249-265.	LCD/BB
27.	DMA controller	1-Ch.9 ; Pg.395-402, 3-Ch.11; Pg.348-353 , 4-Ch.7; Pg. 294-317.	LCD/BB
28.	Summary & Tutorial		
Content beyond syllabus covered : Programming and applications Case studies: Traffic Light control LED display .			

* Session duration: 50 mins

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Sub. Code / Sub. Name: **IT22402 – Microprocessors and Microcontroller Interfacing**

Unit : **IV**

Unit Syllabus:THE 8051 MICROCONTROLLER

Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.

Objective:

This unit introduces the design of 8051 microcontroller and its various instruction sets and addressing modes.

Session No *	Topics to be covered	Ref	Teaching Aids
29	Architecture of 8051	2-Ch. 1 ; Pg.19-26, 4-Ch. 17 ; Pg. 649-651, 5-Ch. 3 ; Pg. 54-61.	LCD/BB
30	Special Function Registers(SFRs)	2-Ch. 2 ; Pg.40-49, 4-Ch.17 ; Pg.654-658, 5-Ch.3 ; Pg.60-66.	LCD/BB
31	I/O Pins Ports and Circuits	2-Ch 4 ; Pg.75-85, 4-Ch.17 ; Pg. 653, 5-Ch. 3 ; Pg.66-69.	LCD/BB
32	Instruction set - arithmetic, logic and program instructions	2-Ch.3 ; Pg.55-71, 4-Appendix A ; Pg.682-690, 5-Ch.6,7 ; Pg.138-164.	LCD/BB
33	Instruction set - jump, loop and call	2-Ch. 6 ; Pg.115-146, 4-Appendix A ; Pg.682-690, 5-Ch. 8 ; Pg.169-185.	LCD/BB
34	Addressing modes - immediate, register, and various addressing modes	2-Ch.5 ; Pg.89-110, 4-Ch. 17 ; Pg.662-665, 5-Ch. 5 ; Pg.121-130.	LCD/BB
35	Assembly language programming - program based on instruction set	2-Ch.2 ; Pg.30-35, 5-Ch. 6 ; Pg.138-145.	Experiential Learning
36	Assembly language programming - program based on instruction set	2-Ch. 6; Pg.115-135, 5-Ch. 7 ; Pg.152-164.	Experiential Learning
37	Assembly language programming - program based on instruction set	2-Ch. 6; Pg.135-146, 5-Ch. 8 ; Pg.169-185.	Experiential Learning
38	Summary & Tutorial		

Content beyond syllabus covered :

* Session duration: 50 mins

Sub. Code / Sub. Name: **IT22402 – Microprocessors and Microcontroller Interfacing**
Unit : **V**

Unit Syllabus: 8051 INTERFACING AND ARM PROCESSOR

Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor
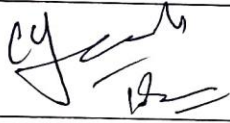
Objective:

This unit enables to impart knowledge about interfacing 8051 microcontroller.

Session No *	Topics to be covered	Ref	Teaching Aids
39	Programming 8051 Timers	2-Ch. 9; Pg.201-222, 5-Ch.11; Pg.287-304.	LCD/BB
40.	Serial Port Programming ,Interrupts Programming	2-Ch.10 ; Pg.237-260, 5-Ch. 9 ; Pg. 218-225.	LCD/BB
41.	LCD & Keyboard Interfacing	2-Ch.11 ; Pg.271-290, 4-Ch.17 ; Pg. 661-662.	LCD/BB
42.	ADC & DAC interfacing	2-Ch.12 ; Pg.299-315, 5-Ch. 10 ; Pg.231-259.	Experiential Learning
43.	Stepper Motor Interfacing	2-Ch.13 ; Pg.322-342, 5-Ch.10 ; Pg.267-268.	LCD/BB
44.	ARM Design Philosophy	4-Ch. 13 ; Pg.344-347, 5-Ch. 10 ; Pg.265-267.	LCD/BB
45.	,Overview of ARM architecture-States [ARM, Thumb, Jazelle].	4-Ch.13 ; Pg.348-351, 5-Ch.10 ; Pg.260-264.	LCD/BB
46.	Summary & Tutorial		

REFERENCES:

1. Yu-Cheng Liu, Glenn A.Gibson, "Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design", Second Edition, Prentice Hall of India, 2007.

2. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", Second Edition, Pearson Education, 2011.

3. Doughlas V.Hall, "Microprocessors and Interfacing, Programming and Hardware:,TMH, 2012.

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