DHANALAKSHMI SRINIVASAN
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COURSE PLAN

Sub. Code	: EC8691	**Branch / Year / Sem**	: B.E. BME / III / VI
Sub. Name	: Microprocessor and Microcontroller	**Batch**	: 2017-2021
		Academic Year	: 2019-2020

COURSE OBJECTIVE:

1. Study the Architecture of 8086 microprocessor.
2. Learn the design aspects of I/O and Memory Interfacing circuits.
3. Study about communication and bus interfacing.
4. Study the Architecture of 8051 microcontroller.

TEXT BOOK:

T1. Yu-Cheng Liu, Glenn A.Gibson, "Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design", Second Edition, Prentice Hall of India, 2007.

T2. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", Second Edition, Pearson Education, 2011

REFERENCES BOOK:

R1. Doughlas V.Hall, "Microprocessors and Interfacing, Programming and Hardware: TMH, 2012

WEB RESOURCE:

W1.https://www.slideshare.net/poojithchowdhary/8086-micro-processor**(8086)**

W2. https://www.youtube.com/watch?v=VgkW2nU-cqg **(8086)**

W3.https://www.slideshare.net/thandaiah/8051-microcontroller-15593218**(8051)**

W4. https://www.youtube.com/watch?v=pA6K5NgWTow **(8051)**

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EC6504	MICROPROCESSOR AND MICROCONTROLLER	L T P C
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UNIT I THE 8086 MICROPROCESSOR 9

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.

UNIT II 8086 SYSTEM BUS STRUCTURE 9

8086 signals – Basic configurations – System bus timing –System design using 8086 – IO programming – Introduction to Multiprogramming – System Bus Structure - Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations – Introduction to advanced processors.

UNIT III I/O INTERFACING 9

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 – Programming and applications Case studies: Traffic Light control, LED display , LCD display, Keyboard display interface and Alarm Controller.

UNIT IV MICROCONTROLLER 9

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

UNIT V INTERFACING MICROCONTROLLER 9

Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

TOTAL: 45 PERIODS

Topic No.	Topic	Books for Reference	Page No.	Teaching methodology	No. of periods Required	Cumulative No. of Periods
UNIT I		**THE 8086 MICROPROCESSOR**				**(9)**
1	Introduction to 8086 , Microprocessor architecture	T1, W1, W2	25, 26 - 33	BB, PPT	1	1
2	Addressing modes	T1, W1, W2	35 - 39	BB	1	2
3	Instruction set and Assembler directives	T1, W1, W2	59 - 120	BB	1	3
4	Assembly language programming	R1, W1, W2	3.9 - 3.18	BB	1	4
5	Modular Programming	T1, W1, W2	141 - 143	BB	1	5
6	Linking and Relocation, Stacks	T1, W1, W2	143 - 151	BB	1	6
7	Procedures, Macros	T1, W1, W2	155 - 169	BB	1	7
8	Interrupts and interrupt service routines	T1, W1, W2	169 - 173	BB	1	8
9	Byte and String Manipulation.	T1, W1, W2	205 - 226	BB	1	9

LEARNING OUTCOME

At the end of unit, students should be able to

1. Demonstrate the programming proficiency using various addressing modes and instructions set of 8086.
2. Summarize the memory location and interrupt service routine of 8086 microprocessor.

UNIT II		**8086 SYSTEM BUS STRUCTURE**				**(9)**
10	8086 signals	T1	308 - 310	BB	1	10
11	Basic configurations	T1	310 - 324	BB	1	11
12	System bus timing	T1	324 - 329	BB	1	12
13	System design using 8086	T1	310 - 329	BB	1	13
14	IO Programming	T1	229 - 267	BB	1	14
15	Introduction to Multiprogramming	T1	272 - 297	BB	1	15
16	System Bus Structure	T1	308 - 310	BB	1	16

17	Multiprocessor Configurations	T1	450 - 477	BB	1	17
18	Introduction to advanced processors & controller (PIC)	T1	520	BB	1	18

LEARNING OUTCOME

At the end of unit, students should be able to

1. Explain the various types of system bus structures in 8086 microprocessor.
2. Summarize the coprocessor configurations and I/O circuits.

UNIT III			**I/O INTERFACING**			**(9)**
19	Memory Interfacing and I / O interfacing	T1	423 - 444	BB, PPT	1	19
20	Parallel communication interface	T1	369 - 374	BB, PPT	1	20
21	Serial communication interface	T1	349 - 361	BB, PPT	1	21
22	D / A and A / D Interface	T1	374 - 377	BB, PPT	1	22
23	Timer , Keyboard / display controller	T1	380 - 383, 387 - 395	BB, PPT	1	23
24	Interrupt controller	T1	387 - 388	BB	1	24
25	DMA controller	T1	395 - 401	BB, PPT	1	25
26	Programming and applications Case studies: Traffic Light control, LED display	T1	383 - 387	BB	1	26
27	LCD display, Keyboard display interface and Alarm Controller.	T1	383 - 387	BB	1	27

LEARNING OUTCOME

At the end of unit, students should be able to

1. Apply interfacing with peripheral devices using 8086 Microprocessor.

UNIT IV			**MICROCONTROLLER**			**(9)**
28	Architecture of 8051	T2, W3, W4	23 - 28	BB, PPT	1	28
29	Special Function Registers (SFRs)	T2, W3, W4	113 - 114	BB	1	29
30	I / O Pins Ports and Circuits	T2, W3, W4	93 - 100	BB	1	30

31	Instruction set	T2, W3, W4	139 - 167	BB	2	32
32	Addressing modes	T2, W3, W4	109 - 131	BB	2	34
33	Assembly language programming.	T2, W3, W4	37 - 55	BB	2	36

LEARNING OUTCOME

At the end of unit, students should be able to

1. Demonstrate the programming proficiency using various addressing modes and instruction set of 8051.

UNIT V	**INTERFACING MICROCONTROLLER**					**(9)**
34	Programming 8051 Timers	T2	239 - 260	BB	1	37
35	Serial Port Programming	T2	277 - 306	BB	1	38
36	Interrupts Programming	T2	317 - 340	BB	1	39
37	LCD & Keyboard Interfacing	T2	351 - 363	BB	1	40
38	ADC, DAC Interfacing	T2	373 - 398	BB	1	41
39	Sensor Interfacing	T2	398 - 403	BB	1	42
40	External Memory Interface	T2	411 - 440	BB	1	43
41	Stepper Motor	T2	493 - 498	BB	1	44
42	Stepper Motor and its Waveform generation.	T2	493 - 498	BB	1	45

LEARNING OUTCOME

At the end of unit, students should be able to

1. Apply interfacing with peripheral devices using 8051 Microcontroller.

COURSE OUTCOME

At the end of the course, the student should be able to:

1.Demonstrate the programming proficiency using various addressing modes and instructions set of 8086 & 8051.

2.Summarize the memory location and interrupt service routine of 8086 microprocessor.

3.Explain the various types of system bus structures in 8086 microprocessor.

4.Summarize the coprocessor configurations and I/O circuits.

5.Apply interfacing with peripheral devices using 8086 Microprocessor and 8051 Microcontroller.

CONTENT BEYOND THE SYLLABUS

1. Advanced Microcontroller - PIC:

   i) Architecture

   ii) 8051 Vs. PIC

   iii) Applications of PIC

INTERNAL ASSESSMENT DETAILS

Assessment Number	I	II	MODEL
Topic Nos.	1 - 18	19 - 33	1 - 45
Date			

ASSIGNMENT DETAILS

Assignment Number	I	II	III
Topic Nos.	1 - 18	19 - 33	33-45
Submission Date			

Assignment number	Batch	Descriptive Questions / Topic
I	**B1 (R.Nos. 1-20),(60-80)** **WRITE UP**	• Explain in detail the architecture of 8086 microprocessor with neat diagram. • Discuss briefly about assembler directives.
	B2 (R.Nos. 21-40)(81-100) **PPT**	• Explain in detail advanced processor • Discuss briefly assembly language program
	B3 (R.Nos.41-66)(101-118,301) **SEMINAR**	• Explain in detail about the interrupts & interrupt service routines. • Discuss the operation of Multiprocessor and Coprocessor.
II	**B1 (R.Nos. 1-20)(60-80)** **SEMINAR**	• Explain in detail the architecture of 8051 microcontroller with neat diagram. • Compare the instruction set of 8051 & 8086.
	B2 (R.Nos. 21-40)(80-100) **WRITE UP**	• Explain in details serial communication interface
	B3 (R.Nos.41-60)(101-118,301) **PPT**	• Compare the addressing modes of 8051 & 8086. • Explain in detail about the DMA Controller.
III	**B1 (R.Nos. 1-20) (60-80)** **PPT**	• Discuss briefly about Keyboard/display controller. • Explain the different operating modes of 8253 timer & draw the control word of 8253. • Explain how D/A & A/D interfacing done with 8086 with an application.
	B2 (R.Nos. 21-40)(80-100) **SEMINAR**	• Explain in detail external memory interface • Discuss briefly stepper motor and waveform generation

	B3 (R.Nos.41-60)(101-118,301) WRITE UP	• -Describe the different modes of operation of timers/counters in 8051 microcontroller. • Draw and explain the ADC & DAC interfacing using 8051.