MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

VI Semester: ECE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AEC108	Core	-	-	3	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes: 45		

I. COURSE OVERVIEW:

This laboratory course will facilitates the students to program 8086 microprocessor and 8051 micro- controller. Win862 software will be used for writing and debugging assembly language programs. The course includes performing arithmetic and logical operations, string manipulations, code conversions and interfacing of I/O devices to processor/controller. The hands-on experience acquired by the stu- dent's during the course makes them to carry out processor/controller based projects and extend their knowledge on the latest trends and technologies in the field of embedded system.

II. OBJECTIVES:

The course should enable the students to:

- **I** Assembly language programming skills ranging from simple arithmetic operations tointerfacing real time systems.
- **II** The usage of software tools to design, debug and test microprocessor/microcontroller based projects using assembly language programming.
- **III** The design of microcomputer and microcontroller based real-time applications in the fields of communication systems, home based automation systems, automobiles and unmanned applications.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Make use of** emulators and assemblers for writing, compiling and running an assembly language programs on training boards.	Apply
CO 2	**Develop** Assembly language programs for accomplishing code conversions, string manipulations and sorting of numbers.	Apply
CO 3	**Choose** serial or parallel communication for transmitting the data between microprocessor or microcontroller and peripherals.	Apply
CO 4	**Utilize** Analog to Digital and Digital to Analog converters with processor or controller for data conversion.	Apply
CO 5	**Select** suitable registers of microcontroller and write assembly language program to verify timer or counter operations.	Apply
CO 6	**Build** an interface between processor or controller and peripherals toprovide solutions to the real world problems.	Apply

IV. SYLLABUS:

LIST OF EXPERIMENTS

WEEK - l	DESIGN A PROGRAM USING WIN862

Design and develop an Assembly language program using 8086 microprocessor and to show the following aspects.

a) Programming
b) Execution
c) Debugging

To Demonstrate the win 862 software and Trainer kit for 8086 Microprocessor

WEEK-2	16 BITARITHMETIC AND LOGICAL OPERATIONS

Write an ALP program to perform 16 Bit arithmetic and logical operations using WIN862 software

WEEK-3	**MULTIBYTE ADDITION AND SUBRACTION**
a) Write an ALP program to perform multi byte addition and subtraction b) Write an ALP program to perform 3*3 matrix multiplication and addition	
WEEK -4	**PROGRAMS TO SORT NUMBERS**
a) Write an ALP program to perform ascending order using 8086 b) Write an ALP program to perform descending order using 8086	
WEEK -5	**PROGRAMS FOR STRING MANIPULATIONS OPERATIONS**
a) Write an ALP program to insert or delete a byte in the given string b) Write an ALP program to search a number/character in a given string c) Write an ALP program to move a block of data from one memory location to the other &Write an ALP program for reverse of a given string	
WEEK -6	**CODE CONVERSIONS**
a) Write an ALP program to convert packed BCD to Unpacked BCD b) Write an ALP program to convert packed BCD to ASCII c) Write an ALP program to convert hexadecimal to ASCII	
WEEK -7	**INTERFACING STEPPER MOTOR**
a) Write an ALP program to rotate stepper motor in clockwise direction b) Write an ALP program to rotate stepper motor in anti clockwise direction	
WEEK -8	**INTERFACING ADC & DAC DEVICES**
a) Write an ALP program to convert analog to digital using 8086 b) Write an ALP program to convert digital to analog using 8086	
WEEK-9	**INTERFACING KEYBOARD TO 8086**
Write an ALP program to interface keyboard to 8086	
WEEK-l0	**SERIAL AND PARALLEL COMMUNICATION**
a) Parallel communication between two microprocessors using 8255 b) Serial communication between two microprocessor kits using 8251	
WEEK-l1	**INTERFACING TRAFFIC LIGHT CONTROLLER AND TONE GENERATOR**
a) Write a program to interface traffic light controller b) Write an ALP program to interface tone generator	
WEEK-l2	**ARITHMETIC AND LOGICAL OPERATIONS USING 8051**
Write an ALP program to perform 16 Bit arithmetic and logical operations using 8051 microcontroller	
WEEK-l3	**TIMER/COUNTER**
Write an ALP Program and verify Timer/Counter using 8051	
WEEK-l4	**INTERFACING KEYBOARD TO 8051**
Write an ALP program to interface keyboard to 8051	
Reference Books:	
1. Ray A.K, Bhurchandi K.M, "Advanced Microprocessor and Peripherals", 2/e TMH, 2012 2. Muhammad Ali Mazidi, J.G. Mazidi and R.D McKinlay, "The 8051 Microcontroller and Embedded systems using Assembly and C", 2nd Edition, Pearson education, 2009.	

Web References:

1. http://www.nptel.ac.in/downloads/106108100/
2. http://www.the8051microcontroller.com/web-references
3. http://www.iare.ac.in

Course Home Page:

HARDWARE AND SOFTWARE REQUIRED FOR A BATCH OF 36 STUDENTS

HARDWARE: Desktop Computer Systems 36 nos

SOFTWARES: win 862

LIST OF EQUIPMENT REQUIRED FOR A BATCH OF 36 STUDENTS

S. No	Name of the Equipment	Range
1	Regulated Power Supply	0-5V & 12V DC
2	DCRO	0-20 MHz
3	8086 Trainer Kits with keyboard	8MHz/ 5V
4	8051 Trainer kits with keyboard	12 MHz/5V
5	Serial Interface cable	--
6	Stepper Motors	--
7	A/D Device	--
8	A/D and Dual D/A Devices	--
9	Dual D/A Devices	--
10	PPI 8255	--
11	USART 8251	--
12	Keyboard/ Seven segment controller	--
13	Traffic Light Controller	--
14	RTC/ Tone generator	--
15	Elevator	--
16	SRAM and DRAM	--
17	DMA Controller	--
18	LCD Display	--
19	Timer/Counter, UART and Interrupt	--
20	Keyboard	--