



## LESSON PLAN

Sub Code & Name: U14EC735 & EMBEDDED SYSTEMS

Branch : ECE

Semester: VII



### UNIT I OVERVIEW OF EMBEDDED SYSTEMS

S.No.	Topics to be covered	Time	Ref	Teaching Method
1.	Introduction to Embedded Systems	45 m	T1,R3	BB
2.	Basics of Embedded hardware units & devices and Software in a system.	45 m	T1,R3	BB
3.	Embedded system initialization	45 m	T1,R3	BB
4.	I/O Devices: Types and Examples	45 m	T1,R3	BB
5.	Synchronous, Iso Synchronous Communication from serial devices	45 m	T1,R3	BB
6.	Asynchronous Communication from serial devices	45 m	T1,R3	BB
7.	Serial Communication Devices- RS232C/RS485, UART	45 m	T1,R3	BB
8.	Parallel Device Ports- Interfacing with Switches, Keypad & Encoders	45 m	T1,R3	BB
9.	Parallel Device Ports- Interfacing with Stepper motor, LCD Controller & Touchscreen	45 m	T1,R3	BB
10.	Reset Circuitry	45 m	T1,R3	BB
11.	Serial Communication Protocols : I <sup>2</sup> C Bus, CAN Bus	45 m	T1,R3	BB
12.	Serial Communication Protocols : USB	45 m	T1,R3	BB
13.	Parallel Bus Device Protocols: ISA, PCI	45 m	T1,R3	BB
14.	Parallel Bus Device Protocols: ARM, CPU	45 m	T1,R3	BB

### UNIT II ARCHITECTURE OF PIC MICROCONTROLLER

S.No.	Topics to be covered	Time	Ref	Teaching Method
15.	Introduction to PIC Microcontroller	45 m	T1,R1	BB
16.	Architecture of PIC 16F8xx	45 m	T1,R1	BB
17.	Pin Configuration of PIC	45 m	T1,R1	BB
18.	FSR Reservation	45 m	T1,R1	BB
19.	Oscillator Circuit	45 m	T1,R1	BB
20.	Program Memory Organization	45 m	T1,R1	BB
21.	Register file Structure	45 m	T1,R1	BB
22.	Addressing Modes	45 m	T1,R1	BB

23.	Instruction Set	45 m	T1,R1	BB
24.	Assembly Language Programming	45 m	T1,R1	BB
25.	Interfacing Sensor using PIC microcontroller	45 m	T1,R1	BB

### UNIT III PIC PROGRAMMING USING EMBEDDED C

S.No.	Topics to be covered	Time	Ref	Teaching Method
26.	Interrupts Constraints	45 m	T2,R1	BB
27.	Interrupt Servicing	45 m	T2,R1	BB
28.	PIC Interrupt Programming	45 m	T2,R1	BB
29.	External Interrupts	45 m	T2,R1	BB
30.	Internal Structure and Programming	45 m	T2,R1	BB
31.	Timers-Capture module	45 m	T2,R1	BB
32.	Timers- Compare module	45 m	T2,R1	BB
33.	Timers- PWM module	45 m	T2,R1	BB
34.	I/O Ports- Interfacing with LCD	45 m	T2,R1	PPT
35.	I/O Ports- Interfacing with ADC	45 m	T2,R1	PPT
36.	Programming Tools: MP Laboratory IDE	45 m	T2,R1	PPT
37.	Programming Tools: HEX file format	45 m	T2,R1	PPT
38.	Temperature Controller using Embedded C	45 m	T2,R1	PPT

### UNIT IV CASE STUDIES OF PIC MICROCONTROLLER

S. No.	Topics to be covered	Time	Ref	Teaching Method
39.	Case Study on Washing Machine	45 m	T2,R2	PPT
40.	Washing Machine Control- Actuators	45 m	T2,R2	PPT
41.	Washing Machine-Interfacing with Sensors	45 m	T2,R2	PPT
42.	Case Study on Electronic Voting Machine	45 m	T2,R2	PPT
43.	Interfacing	45 m	T2,R2	PPT
44.	Closed loop control of DC motors	45 m	T2,R2	PPT
45.	Real time experiment-Train controller	45 m	T2,R2	PPT
46.	Train controller -Working operation	45 m	T2,R2	PPT
47.	Embedded C Programming	45 m	T2,R2	PPT
48.	Elevator Controller using Embedded C	45 m	T2,R2	PPT

## UNIT V REAL-TIME OPERATING SYSTEM CONCEPTS

S.No.	Topics to be covered	Time	Ref	Teaching Method
49.	Architecture of the Kernel	45 m	T2,R3	PPT
50.	RTOS Availability	45 m	T2,R2	PPT
51.	Testing and Verification	45 m	T2,R2	PPT
52.	Task and Task Scheduler	45 m	T2,R2	PPT
53.	Interrupt Service Routines	45 m	T2,R2	PPT
54.	Semaphore	45 m	T2,R2	PPT
55.	Mutex Mailbox	45 m	T2,R2	BB
56.	Message Queue	45 m	T2,R3	BB
57.	Other Kernel Objects	45 m	T2,R3	BB
58.	Memory Management	45 m	T2,R3	BB
59.	Priority Inversion Problem	45 m	T2,R3	BB
60.	Generating PWM and interfacing LED using Arduino	45 m	T2,R3	BB

### TEXT BOOKS:

1. Raj Kamal, "Embedded Systems Architecture Programming and Design", 2nd Edition, Tata McGraw Hill, New Delhi, 2013.
2. K. V. K. K. Prasad, "Embedded /Real-Time Systems: Concepts, Design and Programming", Dream tech Press, 2009.

### REFERENCES:

1. John B Peatman, "Designing with PIC Micro Controller", reprint twenty, Pearson, 2011.
2. C. M. Krishna, Kang. G. Shin, "Real-time systems", 1st Edition, Tata McGraw Hill, New Delhi, 2009.
3. Steve Yeath, "Embedded system design", 2nd Edition, Elsevier, 2008.

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