Course Number and Name

BEE049 & Design of Embedded Systems

Credits and Contact Hours

3 & 45

Course Coordinator's Name

Mr.K.S.Prasad

Text Books and References

Text Books:

1. Raj Kamal, "Embedded Systems Architecture Programming and Design", 2nd Edition, Tata McGraw Hill, 2008, New Delhi.
2. Dr. K.V.K Prasad, "Embedded /Real-Time Systems: Concepts, Design and Programming", 1st Edition, Dream tech Press, 2009.

References:

1. Ajay V Deshmukh, "Microcontroller Theory and Applications", 1st Edition, Tata McGraw Hill, 2007, New Delhi.
2. Daniel .W Lewis, "Fundamentals of Embedded Software", 1st Ed., Pearson Education, 2005.
4. John B Peatman, "Designing with PIC Micro Controller", 1st Ed., Pearson,1998.
5. C. M. Krishna, Kang. G. Shin, "Real-time systems", 1st Ed., Tata McGraw Hill, 2009.
6. Steve yeath, "Embedded system design", 2 nd Edition, Elsevier, 2008.
7. http://hdl.handle.net/123456789/520

Course Description

To introduce students to the design issues of embedded systems.

Prerequisites	Co-requisites
Nil	Nil

required, elective, or selected elective (as per Table 5-1)

Required

Course Outcomes (COs)

CO1: To understand the Design and communication Protocols of of embedded systems.
CO2:To study the architecture of PIC controller.
CO3:To study the interfacing of PIC Programming.
CO4: Analyzing different case studies of PIC microcontroller.
CO5: To be familiar about different real time operating system concepts.

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	L	L	H	H	H	L	L	L	H	H	M	H
CO2	L	H	M	H	H	H	H	H	L	M	H	M
CO3	H	H	M	H	M	H	M	M	H	H	H	H
CO4	H	M				H						
CO5	L	L	H	H	H	H	M	H	H			M

List of Topics Covered

UNIT I OVERVIEW OF EMBEDDED SYSTEMS 9

Basics of Developing for Embedded Systems – Embedded System Initialization- I/O Devices – Types and Examples – Synchronous, Iso-synchronous and Asynchronous Communication – Serial Communication Devices – Parallel Device Ports- Reset Circuitry – Serial Communication Protocols : I2C, CAN,USB – Parallel Bus device Protocols: ISA, PCI, ARM bus

UNIT II CPU ARCHITECTURE OF PIC MICROCONTROLLER 9

PIC Microcontroller – Architecture of PIC 16F8xx – FSR – Reset action – Oscillatory Circuit – Program Memory Consideration- Register File Structure and Addressing Modes – Instruction Set- Simple Assembly Language Programming

UNIT III PIC PROGRAMMING 9

Interrupts – Constraints – Interrupt Servicing – Interrupt Programming – External Interrupts – Timers – Programming - I/O ports – LCD Interfacing– ADC – MPLAB IDE – Hex file format – Programming Tools

UNIT IV CASE STUDIES OF PIC MICROCONTROLLER 9

Driving a Multiplexed LED and LCD Display –Washing Machine control: actuators and sensor interfacing-Closed loop control of servo motor .

UNIT V REAL-TIME OPERATING SYSTEM CONCEPTS 9

Architecture of the Kernel – Task and Task Scheduler – Interrupt Service Routines – Semaphore – Mutex – Mailbox – Message Queue – Other Kernel Objects – Memory Management – Priority Inversion Problem