Embedded System Design

Written by Administrator
Saturday, 07 November 2009 06:21 -

Subject Code		:

IA Marks	: 25

No. of Lecture Hrs/Week		: 04

Exam Hours	: 03

Total no. of Lecture Hrs.		: 52

Exam Marks	: 100

PART - A

Unit - 1

Introduction: Overview of embedded systems, embedded system design challenges, common design metrics and optimizing them. Survey of different embedded system design technologies, trade-offs.   Custom Single-Purpose Processors, Design of custom single purpose processors.

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4 Hours

Unit - 2

Single-Purpose Processors: Hardware, Combinational Logic, Sequential Logic, RT level Combinational and Sequential Components, Optimizing single-purpose processors. Single-Purpose Processors: Software, Basic Architecture, Operation, Programmer's View, Development Environment, ASIPS.

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6 Hours

Unit - 3

Standard Single-Purpose Peripherals, Timers, Counters, UART, PWM, LCD Controllers, Keypad controllers, Stepper Motor Controller, A to D Converters, Examples.

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6 Hours

Unit - 4

Memory: Introduction, Common memory Types, Compulsory memory, Memory Hierarchy and Cache, Advanced RAM. Interfacing, Communication Basics, Microprocessor Interfacing, Arbitration, Advanced Communication Principles, Protocolos - Serial, Parallel and Wireless.

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8 Hours

PART - B

Unit - 5

Interrupts: Basics - Shared Data Problem - Interrupt latency. Survey of Software Architecture, Round Robin, Round Robin with Interrupts - Function Queues - scheduling - RTOS architecture.

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8 Hours

Unit - 6

Introduction to RTOS: Tasks - states - Data - Semaphores and shared data. More operating systems services - Massage Queues - Mail Boxes -Timers – Events - Memory Management.

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8 Hours

Unit – 7&8

Basic Design Using RTOS, Principles- An example, Encapsulating semaphores and Queues.

Hard real-time scheduling considerations – Saving Memory space and power.   Hardware

software co-design aspects in embedded systems.

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12 Hours

Text Books:

1. **Embedded System Design: A Unified Hardware/Software   Introduction** - Frank Vahid, Tony   Givargis, John Wiley & Sons, Inc.2002

2. **An Embedded software Primer** - David E. Simon: Pearson Education, 1999

Reference Books:

1.   **Embedded Systems: Architecture and Programming,** Raj Kamal, TMH. 2008

2.   **Embedded Systems Architecture – A Comprehensive Guide for Engineers and Programmers**   , Tammy Noergaard, Elsevier Publication, 2005

3.   **Embedded C programming**, Barnett, Cox & O'cull, Thomson (2005).

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