

(*)REAL TIME EMBEDDED SYSEM DESIGN

Module – 1:

Introduction to Embedded Systems:

Embedded system overview, Design challenges, Common design metrics, Time-to-market design metric, NRE and unit cost design metrics, Performance design metric, Processor technology, General purpose processors – software and hardware, Application specific processors, IC technology, Semi-custom ASIC.

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Text Book:

“Embedded System Design A Unified HW.SW Introduction”, by Vahid G Frank and Givargis Tony, John Wiley & Sons, 2002. Chapter 1 (1.1-1.4)

Reference Book:

“Fundamental of Embedded System Design & Applications” by Vijay Nath, K.S. Yadav, L.K. Singh, ACM Learning, New Delhi.

INTRODUCTION TO EMBEDDED SYSTEMS, [K. Shibu](#), TMH Edition.

Module – 2:

Embedded System Processors:

Combinational logic and transistors, RT-level combinational and sequential components, Custom single purpose processor design. RT-level custom single– purpose processor design, Optimization, Optimization of FSM, Optimization of data path.

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Text Book:

1. “Embedded System Design A Unified HW.SW Introduction”, by Vahid G Frank and Givargis Tony, John Wiley & Sons, 2002. Chapter 2 (2.1-2.6)

Reference Book:

1. “Fundamental of Embedded System Design & Applications” by Vijay Nath, K.S. Yadav, L.K. Singh, ACM Learning, New Delhi.

Module-3:

Memory:

Write ability and data permanence, memory devices type of memory and basic form, EEPROM, flash memory, SRAM and DRAM, basic DRAM characteristics, memory selection for embedded systems, allocation of memory to the program segment blocks.

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Text Book:

1. “Embedded Systems Architecture, Programming and Design”, by Raj Kamal, TMH-2003.

Module – 4:

Device and Interrupt service:

Bus models, time multiplexed bus, strobe and handshake protocols, strobe handshake compromise priority arbiter multilevel bus, and architecture.

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Text Book:

1. “Embedded Systems Architecture, Programming and Design”, by Raj Kamal, TMH-2003.

Module -5

Embedded System Peripherals:

Timers, Counters, Watch-dog timers, Example of reaction timer, Watchdog timer, UART, PWM, Controlling a dc motor using a PWM. General purpose processor, ASIP's and ASIC's, semiconductor IC's programmable logic devices of CGD, Processor selection for embedded systems, special purpose processor.

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Text Book:

1. “Embedded System Design A Unified HW.SW Introduction”, Vahid G. Frank and Givargis Tony, John Wiley & Sons, 2002. Chapter 4 (4.1-4.4)

2. “Embedded Systems Architecture, Programming and Design”, by Raj Kamal, TMH-2003.

Reference Book:

1. “Fundamental of Embedded System Design & Applications” by Vijay Nath, K.S. Yadav, L.K. Singh, ACM Learning, New Delhi.

Module – 6:

Interfacing:

Communication basics, Basic protocol concepts, ISA bus protocol, Microprocessor interfacing, I/O addressing, Interrupts, Example of DMA I/O and ISA Bus protocol, Arbitration, Priority arbiter, Daisy-chain arbiter, Parallel, Serial and Wireless communication, infrared-TRDA, radio frequency, error detection, CAN, USB, Blue tooth, IEEE 802-II, shared memory models

(8)

Text Book:

1. “Embedded System Design A Unified HW.SW Introduction”, Vahid G Frank and Givargis Tony, John Wiley & Sons, 2002. Chapter 6 (6.1-6.8).

2. “Embedded Systems Architecture, Programming and Design”, by Raj Kamal, TMH-2003.

Module – 7:

Digital Camera and Systems

Simple digital camera, User’s perspective, Designer’s perspective, Requirement specification, Design, Micro controller alone, Micro controller and CCDPP Digital thermometer, handheld computer, navigation system, IP phone, software defined-radio, smart card.

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Text Book:

1-“Embedded System Design A Unified HW.SW Introduction”, Vahid G Frank and Givargis Tony, John Wiley & Sons, 2002. Chapter 7 (7.1-7.4)

2. “Embedded Systems Architecture, Programming and Design”, by Raj Kamal, TMH-2003.