

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

II MCA - II Semester

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EMBEDDED SYSTEMS

Course Objectives:

- To have basic knowledge of embedded systems.
- To understand the RTOS concepts
- To describe the Hardware and Software architecture of any Embedded System
- Understand the various Kernel objects of Embedded operating system.
- Understand the basics of Embedded operating system and availability of Various Embedded operating system in the market

Syllabus:

UNIT I : Introduction to Embedded Systems

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT II : Typical Embedded System

Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT III : Embedded Firmware, Design and Development

Embedded Firmware: Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT IV : RTOS Based Embedded System Design

Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT V : Task Communication

Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

Course Outcome:

- To understand Real-Time Operating System requirements and concepts.
- To solve design issues involved with real-time embedded systems
- To analyze the performance of a hard real time system.
- To inculcate an ability to program an embedded system with multitasking concepts

TEXT BOOKS:

1. Introduction to Embedded Systems -Shibu K.V, Tata McGraw Hill Publication.

REFERENCE BOOKS:

1. Embedded Systems, Raj Kamal, TMH.
2. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
3. Embedded Systems, Lyla, Pearson, 2013
4. An Embedded Software Primer, David E. Simon, Pearson Education

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