

**UNIT I**

**Chapter 1 : Embedded Systems 1-1 to 1-11**

**Syllabus :** Introduction to Embedded systems, Characteristics, Challenges, Processors in Embedded systems, hardware Unit s and devices in an embedded system - Power source, memory, real-time clocks, timers, reset circuits, watchdog-timer reset, Input-output ports, buses and interfaces, ADC, DAC, LCD, LED, Keypad, pulse dialer, modem, transceivers, embedded software, software are tools for designing an embedded system.

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**UNIT II**

**Chapter 2 : Embedded System on Chip (SOC) 2-1 to 2-44**

**Syllabus :** Embedded SOC, ASIC, IP core, ASIP, ASSP, examples of embedded systems. Advanced architectures / processors for embedded systems- ARM, SHARC, DSP, Superscalar Units. Processor organization, Memory organization, Performance metrics for a processor, memory map and addresses, Processor selection and memory selection for real-time applications. Networked embedded systems- I2C, CAN, USB, Fire wire. Internet enabled systems - TCP, IP, UDP. Wireless and mobile system Protocols- IrDA, Bluetooth, 802.11, ZigBee.

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**Chapter 3 : I/O Communication 3-1 to 3-17**

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**UNIT IV**

**Chapter 4 : Real Time Operating System 4-1 to 4-53**

**Syllabus** : Introduction to real-time operating systems. Hard versus soft real-time systems and their timing constraints. Temporal parameters of real-time process: Fixed, Jittered and sporadic release times, execution time. Types of real-time tasks, Precedence constraints and data dependency among real-time tasks, other types of dependencies for real-time tasks. Functional parameters and Resource parameters of real-time process, Real-time applications: Guidance and control, Signal processing, Multimedia, real-time databases. Real-time task and task states, task and data. Approaches to real-time scheduling : clock driver, weighted round-robin, priority-driven-Fixed priority and dynamic priority algorithms - Rate Monotonic (RM), Earliest-Deadline-First (EDF), Latest-Release-Time (LRT), Least-Slack-Time-First (LST). Static and Dynamic systems, on-line and off-line scheduling, Scheduling a-periodic and sporadic real-time tasks.

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**UNIT V**

**Chapter 5 : Inter-process Communication**

**5-1 to 5-16**

**Syllabus** : Resources and resource access control-Assumption on resources and their usage, Enforcing mutual exclusion and critical sections, resource conflicts and blocking, Effects of resource contention and resource access control - priority inversion, priority inheritance. Inter-process communication-semaphores, message queues, mailboxes and pipes. Other RTOS services-Timer function, events, Interrupts - enabling and disabling interrupts, saving and restoring context, interrupt latency, shared data problem while handling interrupts. Interrupt routines in an RTOS environment.

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