

**Advanced Microprocessors and Micro Controllers**

**Unit I**

**Microprocessor with Memory Management and Protection:** Features of 80286 – Internal Architecture: Register organization – Internal block diagram - Interrupts – Real and Protected Virtual Addressing – Interfacing memory and I/O devices with 80286 – Addressing modes – Math Coprocessor.

**Unit II**

**Beginning of 32-bit Microprocessors:** Architecture of 80386 – Register organization – Addressing modes of 80386 – Data types – Concepts of addressing in real and protected modes – Segmentation and Paging – Conversion of a linear address to a Physical address – features of 80486 – Architecture and Register organization of 80486.

**Unit III**

**Processors of new millennium:** Salient features of Pentium 4 – Modules of Pentium 4 Architecture: Front end module, Out of order execution engine, Execution module, Memory subsystem module – Superscalar Execution – Pipelining –Hyperthreading in Pentium – RISC processors: Basic features and Advantages only.

**Unit IV**

**Microcontrollers:** Architecture of 8051 – Register set – Memory and I/O addressing – Interrupts – Six addressing modes – Ports of 8051 and their operation - Architecture of 16-bit microcontroller 80196.

**Unit V**

**Embedded systems and Real Time Operating Systems (RTOS):** Introduction to multitasking – simple Embedded multitasking systems – RTOS – Tasks in RTOS – Scheduling of tasks – Resource protection by Semaphore concept – Examples of Applications: Temperature Monitor (Tasks, Programming, Hardware requirements, Dealing with numbers) – A model Train Controller – Length measurement for rolling paper.

**Text Books:**

1. Advanced Microprocessors and Peripherals – A.K.Ray & K.M.Bhurchandi, TMH, 2<sup>nd</sup> Edition, 2007.
2. 8051 Microcontroller & Embedded systems – Rajiv Kapadia, Jaico Publishing House, 2006.

**Reference Books:**

1. An introduction to the design of small scale embedded systems – Tim Wilmshurst, Palgrave publishers, 2004.
2. The 8051 Microcontroller and Embedded systems – Muhammad Ali Mazidi et al., - Pearson Education – 2<sup>nd</sup> Edition, 2006.