

**(EC504) EMBEDDED SYSTEM DESIGN****Objective of the Course :**

To introduce the different stages in embedded system design, design considerations. It helps the students to write the software for embedded systems, and downloading the software.

**UNIT - 1**

**Embedded Design Life Cycle:** Introduction, Product Specification, Hardware/software partitioning, Iteration and Implementation, Detailed hardware and software design, Hardware/Software integration, Product Testing and Release, Maintaining and upgrading existing products. Selection Process: Packaging the Silicon, Adequate Performance, RTOS Availability, Tool chain Availability, Other issues in the Selection process, Partitioning decision : Hardware/Software Duality, Hardware Trends, ASICs and Revision Costs.

**UNIT - II**

**Development Environment:** The Execution Environment, Memory Organization, System Startup. Special Software Techniques: Manipulating the Hardware, Interrupts and Interrupt service Routines (ISRs), Watchdog Times, Flash Memory, Design Methodology. Basic Tool Set: Host – Based Debugging, Remote Debuggers and Debug Kernels, ROM Emulator, Logic Analyzer.

**UNIT - III**

**BDM:** Background Debug Mode, Joint Test Action Group (JTAG) and Nexus.ICE – Integrated Solution: Bullet Proof Run Control, Real time trac, Hardware Break points, Overlay memory, Timing Constrains, Usage Issue, Setting the Trigger. Testing: Why Test? When to Test? Which Test? When to Stop? Choosing Test cases, Testing Embedded Software, Performance Testing Maintenance and Testing, The Future

**UNIT - IV**

**Writing Software for Embedded Systems:** The compilation Process, Native Versus Cross-Compilers, Runtime Libraries, Writing a Library, Using alternative Libraries, using a standard Library, Porting Kernels, C extensions for Embedded Systems, Downloading.

**UNIT -V**

**Emulation and debugging techniques:** Buffering and Other Data Structures: What is a buffer? Linear Buffers, Directional Buffers, Double Buffering, Buffer Exchange, Linked Lists, FIFOs, Circular Buffers, Buffer Under run and Overrun, Allocating Buffer Memory, Memory Leakage. Memory and Performance Trade-offs.

**Text Books:**

1. Arnold Burger, "Embedded System Design – Introduction to Processes, Tools, Techniques", CMP Books
2. Steve Heath, "Embedded Systems Design", Newnes