RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Computer Science and Engineering VII-Semester

CS-7004 Elective-III (1) Embedded Systems

1. Embedded computing: Characteristics of embedded computing applications, challenges in embedded computing system design, design hardware and software components.

   Hardware fundamentals: Microprocessor, Buses, DMA, UART Programmable Array Logic Application specific IC, Watch dog timers, memory caches and instruction pipelines, interrupt basics, interrupt latency.

2. Embedded system development tools: Host and target machines, linkers and locators, JTAG port, monitor, build process in an embedded system.

   Hardware debugging aids like in build circuit emulators and logic analyzers.

3. Software architecture for implementing various tasks: round robin with / without interrupts, function queue scheduling architecture, real time operating system.

4. Rate monotonic and EDF scheduling, priority inversion, Shared data problems and intertask communication techniques : semaphores, message queue, buffers, mailboxes, reentrancy issue, timer functions, interrupts and I/O. Evaluating Operating System Performance, Power optimization strategies for professes, ACPI.

5. Network embedded system, distributed embedded architecture, hardware and software architecture, 1^2 C bus, CAN bus, Myrinet, networked based design: Communication analysis performance analysis, hardware platform design, allocation and scheduling, internet embedded system.

Text Books

1. Computers as Components: Principles of Embedded Computing System Design, Wayne Wolf, Morgan Kaufman Publishers
2. An Introduction Software Primer, David E. Simon, Pearson Education

Reference Books

1. Embedded System Design – A Unified Hardware/ Software Introduction, Frank Vahid & Tony Givargis John Wiley
2. Embedded System Design, Steve Heath, Oxford: Newnes
3. Fundamentals of Embedded Software where C and Assembly Meet, David W. Lewis, Pearson LPE
4. Embedded System Architecture Programming and Design, Raj Kamal, Tata-McGraw Hill
5. Introduction to the Design of Small-scale Embedded Systems, Wilmshurst, Tim, Palgrave Macmillan
6. The 8051 Micro-controller and Embedded Systems using Assembly and C, Muhammad Ali Mazidi, Prentice Hall