EMBEDDED SYSTEM DEVELOPMENT

Module I Hardware Concepts   10Hrs
Application and characteristics of embedded systems, Overview of Processors and hardware units in an embedded system, General purpose processors, Microcontrollers, ARM-based Systems on a Chip (SoC), Application-Specific Circuits (ASICs), Levels of hardware modelling, VHDL, Sensors, A/D-D/A converters, Actuators, Interfacing using UART, USB, CAN bus, SRAM and DRAM, Flash memory.

Module II Real-Time Operating Systems   12Hrs
Real-Time Task Scheduling: Some important concepts, Types of real-time tasks and their characteristics, Task scheduling, Clock-Driven scheduling, Hybrid schedulers, Event-Driven scheduling, Earliest Deadline First (EDF) scheduling, Rate monotonic algorithm (RMA). Commercial Real-time operating systems: Time services, Features of a Real-time operating system, Unix-based Real-time operating systems, POSIX-RT, A survey of contemporary Real-time operating systems, Microkernel-based systems.

Module III Embedded Application Development   8Hrs
Embedded system development life cycle, State charts, General language characteristics , Features of MISRA C for embedded programming, Hardware/Software Co-design, Hardware/software partitioning, Testing embedded systems, Design for testability and Self-test.

TEXTBOOKS
1. Frank Vahid and Tony Givargis, Embedded Systems Design – A unified Hardware /Software Introduction, John Wiley, 2002. **(For Module 1)**

2. David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000. **(For Modules 2 and 3)**

REFERENCES
1. S. Chattopadhyay, Embedded System Design, PHI
2. Shibu KV, Introduction to Embedded Systems, TMH
3. Wayne Wolf, Computers as Components; Principles of Embedded Computing System Design – Harcourt India, Morgan Kaufman Publishers, 2001
4. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, 2003