

## **Embedded System.**

*Theory L/T (Hours per week): 4/0, Credit: 4*

### **Module - I (12 Hours)**

Introduction: Features of Embedded systems, Design matrices, Embedded system design flow, SOC and VLSI circuit.

ARM: An advanced Micro Controller, Brief history, ARM pipeline, Instruction Set Architecture ISA: Registers, Data Processing Instructions, Data Transfer Instructions, Multiplications instructions, Software interrupt, Conditional execution, branch instruction, Swap instruction, THUMB instructions. FPGA

### **Module - II (12 Hours)**

Devices and device drivers, I/O devices, Serial peripheral interfaces, IIC, RS232C, RS422, RS485, Universal serial bus, USB Interface, USB Connector IrDA, CAN, Bluetooth, ISA, PCI, PCI - X and advance busses, Device drivers.

Real time operating system: Hard real time, firm real time, soft real time, Task periodicity: periodic task, sporadic task, aperiodic task, task scheduling, scheduling algorithms: clock driven scheduling, event driven scheduling.

### **Module - III (08 Hours)**

Software and programming concept: Processor selection for an embedded system, State chart, SDL, PetriNets, Unified Modeling Language (UML).

Low power embedded system design: Dynamic power dissipation, Static power dissipation, Power reduction techniques, system level power management.

### **Module - IV (08 Hours)**

Hardware and software partitioning: K-L partitioning, Partitioning using genetic algorithm, particle swarm optimization, Functional partitioning and optimization: functional partitioning, high level optimizations. Hardware software co-simulations

### **Text Books:**

1. "Embedded System Design " by SantanuChattopadhyay, PHI
2. "Embedded system architecture, programming and design" By Raj Kamal, TMH

### **Reference Books:**

1. "Hardware software co-design of Embedded systems" By Ralf Niemann, Kulwer Academic.
2. "Embedded real time system programming" By Sriram V Iyer, Pankaj Gupta, TMH.