

<b>4<sup>th</sup> Semester</b>	<b>REE4G003</b>	<b>Embedded System</b>	<b>L-T-P 3-0-0</b>	<b>3 CREDITS</b>
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**Module I (12 hrs)**

**Hardware Concepts**

Embedded System, Application and characteristics of embedded systems, Overview of Processors and hardware units in embedded system, embedded software in a system, Examples of Embedded system.

**ARM**

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.

**Module II (8hrs)**

**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.

**Module –III (9 hrs)**

**Real Time Operating System(RTOS):** 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)

**Module –IV (8 hrs)**

**Modelling Techniques:** Software and programming concept: Processor selection for an embedded system, State chart, SDL, Petri-Nets, Unified Modeling Language (UML). Hardware software co-design. Hardware and software partitioning: K-L partitioning, Partitioning using genetic algorithm,

**Module –V (8 hrs)**

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

**Books:**

- “Embedded system architecture, programming and design” By Raj Kamal, TMH.
- “Embedded System Design ” by Santanu Chattopadhyay, PHI
- Frank Vahid and Tony Givargis, Embedded Systems Design – A unified Hardware /Software Introduction, John Wiley, 2002.
- “Hardware software co-design of Embedded systems” By Ralf Niemann, Kulwer Academic.
- “Embedded real time system programming” By Sriram V Iyer, Pankaj Gupta, TMH.