

## IV B.Tech – I Semester

### (20EC7321) EMBEDDED SYSTEMS (Program Elective-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	0	0	3

**Pre-Requisites:** Digital Electronics

#### **Course Objectives:**

- To understand the hardware units of embedded system
- To understand and analyze Memory organization of microcontrollers
- To understand PIC Microcontroller
- To understand and analyze various Device Drivers
- To understand Communication buses of Embedded System

#### **UNIT – I:**

Overview of Embedded Systems, Processor Embedded into a system, Embedded Hardware Units and Devices in system, Embedded Software, Complex System Design, Design Process in Embedded System, Formalization of System Design, Classification of Embedded Systems.

#### **UNIT – II:**

Microcontrollers and Processor Architecture & Interfacing 8051 Architecture. Real world interfacing, Introduction to advanced architectures, processor & memory organization, Instruction-level parallelism, and performance metrics.

#### **UNIT – III:**

PIC Microcontroller Hardware Introduction, Architectural overview, Memory organization, interrupts and reset, I/O ports, Timers.

#### **Unit – IV:**

Device Drivers & Interrupt service Mechanism Programmed-I/O Busy-wait approach without ISM,ISR concept, Interrupt sources, Interrupt service mechanism, Multiple Interrupts, context and the periods for context switching, Interrupt latency and deadline, Classification of processors ISM from context-saving angle, Direct Memory Access, Device driver programming.

#### **UNIT – V:**

Devices: Communication Buses for Devices Network, IO Types and examples, Serial communication Devices, Parallel Device ports, Networked Embedded systems, Serial Bus communication protocols.

**Course Outcomes:**

After successful completion of the course, the students can be able to

S. No	Course Outcome	BTL
1	Understand the hardware units of embedded system	L2
2	Analyse Memory organization of microcontrollers.	L4
3	Demonstrate PIC Microcontroller	L3
4	Summarize analyze various Device Drivers	L2
5	Understand Communication buses of Embedded System	L2

**Correlation of COs with POs & PSOs:**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	-	-	-	-	-	-	-	-	-	3	-
CO2	2	3	2	-	-	-	-	-	-	-	-	-	2	-
CO3	2	1	1	-	-	-	-	-	-	-	-	-	3	-
CO4	2	2	2	-	-	-	-	-	-	-	-	-	2	-
CO5	2	2	1	-	-	-	-	-	-	-	-	-	2	-

**Text Books:**

1. Embedded Systems - Architecture Programming and Design – Raj Kamal, 2nd ed., 2008, TMH.
2. Embedded C Programming and the Microchip PIC-Richard Barnett, O” Cull, Cox, 2009, Cengage Learning.

**Reference Books:**

1. Embedded Microcomputer Systems, Real Time Interfacing – Jonathan W. Valvano – Brookes Cole, 1999, Thomas Learning