

EMBEDDED & REAL TIME SYSTEMS

Course Code	20EC2701A	Year	IV	Semester	I
Course Category	Open Elective-III	Branch	Common to All	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Apply design methodologies for embedded systems. (L3)
CO2	Build embedded systems with specifications and technological choice. (L3)
CO3	Develop fundamental systems such as sensors, actuators, converters, processors, intra-and inter-communication networks and interfaces. (L3)
CO4	Utilize modern hardware/software tools for building prototypes of embedded systems. (L3)

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)

Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation

* - Average value indicates course correlation strength with mapped PO

CO/PO & PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	2									2			2	2
CO-2	2									2			2	2
CO-3	3									3			3	3
CO-4	2									2			2	2
Average* (Rounded to nearest integer)	2	2								2			2	2

Syllabus

Unit No.	Contents	Mapped CO
I	Introduction: History of Embedded Systems, Major Application Areas of Embedded Systems, Purpose of Embedded Systems, Core of the Embedded System, Sensors and Actuators, Communication Interface, Embedded Firmware.	CO1

II	Hardware Software Co-Design And Programme Modeling: Characteristics of an Embedded System, Quality Attributes of Embedded Systems, Fundamental Issues in Hardware Software Co-Design, Computational Models in Embedded Design, Hardware Software Trade-offs.	CO2
III	Devices in Embedded Systems: Types of supporting devices for an embedded system – various forms of ROM, RAM devices, interrupt sources, Interrupt Service Mechanism, serial port devices, parallel port devices, timers and counting devices.	CO3
IV	Communication Buses for Device Networks: Interfacing Features in Device Ports, Wireless Devices, Networked Embedded Systems, Serial Bus Communication Protocols, Parallel Bus Device Protocols-Parallel Communication Network Using ISA, PCI, PCI-X and Advanced Buses.	CO3
V	Design of Real Time Systems: processors in complex embedded systems, design process in embedded system, optimizing design metrics, Case study for adaptive cruise control system in car.	CO4

Learning Resources

Text Books:

1. Embedded Systems Architecture, Programming and Design- Raj Kamal, Second Edition, McGrawHill Education.
2. Introduction to Embedded System- Shibu KV, Mc-Graw Hill Edition.

References:

1. Peckol, "Embedded system Design", John Wiley & Sons, 2010
2. Lyla B Das, "Embedded Systems-An Integrated Approach", Pearson, 2013
3. Embedded/Real-Time Systems, Dr. K.V.K.K. Prasad, dream Tech press

e- Resources & other digital material

1. Microsoft PowerPoint - pcp_embedded_system_intro (iitb.ac.in)
2. NPTEL :: Electrical Engineering - Embedded Systems