PVP-19

EMBEDDED SYSTEMS

Course Code	19EC1801E	**Year**	IV	**Semester**	II
Course Category	Program Elective VI	**Branch**	ECE	**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
CO2	Implement embedded systems design with specifications and technological choice.
CO3	Build fundamental systems such as sensors, actuators, converters, processors, intra- and inter-communication networks and interfaces.
CO4	Use modern hardware/software tools for building prototypes of embedded systems.

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	3	3	3	2	3							2	3	3
CO-2	3	3	3	2	3							2	3	3
CO-3	3	3	3	2	3							2	3	3
CO-4	3	3	3	2	3							2	3	3
EC7T4A*	3	3	3	2	3							2	3	3

Syllabus

Unit No.	Contents	Mapped CO
I	**Introduction to Embedded Systems:** Embedded systems vs general computing systems, history of embedded systems, classification of embedded systems, major application of embedded systems, purpose of embedded systems, elements of an embedded systems, core of the embedded systems, memory.	CO1
II	**Communication Buses in Embedded Systems:** On board communication interfaces: I2C, SPI bus,1 Wire bus, parallel interface, External Communication interfaces:RS-232,RS485,USB,IEEE 1394 firewire bus, IrDA, Bluetooth, Wi-Fi, Zigbee.	CO2, CO4
III	**Software Development Tools:** Software Development environment-IDE, assembler, compiler, linker, simulator, debugger, In-circuit emulator, target hardware debugging, need for hardware-software partitioning and co-design, Overview of UML, scope of UML modeling, conceptual model of UML, architectural, UML basic elements-diagram- Modeling techniques - structural, behavioral, activity diagrams	CO2, CO3

IV	**Introduction to Real-Time Operating Systems:** A brief history of operating systems, defining an RTOS, the scheduler, introduction to task, task states and scheduling, round-robin scheduling algorithm, co-operative scheduling algorithm, pre-emptive scheduling algorithm, introduction to semaphores.	CO3
V	**Embedded System Application Development:** Objectives, different phases & modeling of the embedded product development life cycle (edlc), case studies on smart card- adaptive cruise control in a car - mobile phone software for key inputs.	CO3, CO4

Learning Resources
Text Books:
1. Rajkamal, 'Embedded system-Architecture, Programming, Design', 3e, TMH, 2017. 2. Shibu.K.V, "Introduction to Embedded Systems", Tata McGraw Hill,2017
References:
1. Peckol, "Embedded system Design",JohnWiley&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