ELECTIVE: III

BEIT803T1 **EMBEDDED SYSYTEMS**

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction to Embedded System:

Introduction, Embedded system vs General computing system, History of embedded system, Processor embedded into a system, Embedded hardware units and devices in a system, Embedded software in a system, examples in a embedded system, Embedded SoC, Complex system design and processors, Design process in ES, Formalization of system design, Classification of Es, Skills required in Embedded system design, Characteristics and quality attributes of Embedded system.

UNIT II:

Embedded System Design:

Hardware and Software design, Co-design, Embedded Software development Tools: In Circuit Emulators, Cross compilers, cross assemblers and tool chain, linker locator, Address resolution, PROM programmer, Rom Emulator. Memories: EPROM, PROM, Flash.

UNIT III:

RTOS for Embedded System:

Architecture of the kernel, Tasks and Task Scheduler, Threads , ISR, Multiprocessing and Multitasking, Semaphore and Shared Data, Mutex, Mailboxes, Message Queue, Events, Pipes, Timers, Signals, Memory Management, RTOS Task Scheduling Models, Interrupt Latency, Response of the task, OS Security issues, Introduction to Android.

UNIT IV:

Devices and Communication:

Serial Communication devices, Parallel device port, Buses: I^2C, UART, USART, CAN Bus, Devices: Wireless Devices, Timer and Counting Devices, Watch Dog Timer, Real Time Clock, Network Embedded System.

UNIT V:

Programming for Embedded System:

Software programming in assembly language (ALP) and High Level language 'C', C program element: Header and Source Files, Preprocessor Directives, Macros and Functions, Data Types, Data Structures, Modifiers, Statements, Loops and Pointers, Object Oriented Programming, Embedded Programming in C++, Embedded Programming in Java.

UNIT VI:

Microcontroller 8051:

Introduction, Architecture, Memory Management, Addressing Modes and Instruction Sets, I/O Ports, Timers/Counters, Routing Interface with OS, Wireless Communication Protocol, Routing Methodologies

Text Books:

1. Embedded System Architecture, Programming and Design by Raj Kamal, 3rd Edition TMH.
2. Introduction to Embedded System by Shibu K. V. 3rd Edition TMH.
3. The 8051 Microcontroller Based Embedded System By Manish K. Patel TMH.
4. An Embedded Software Primer by David E. Simon (Pearson Edu. Asia).
5. 8051 Microcontroller and Embedded System by Muhammad Ali Mazidi, Janice Mazidi, Janice Gillispie Mazidi, Pearson Edition.
6. Embedded / Real Time Systems: Concepts, Design and Programming (Black Book) By Dr. K. V. K. K. Prasad Dreamtech Press.
7. Embedded Systems Engineering, C. R. Sarma, University Press.

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