

REAL TIME SYSTEMS B.E., VII Semester, Electronics & Communication Engineering /Telecommunication Engineering [As per Choice Based Credit System (CBCS) Scheme]			
Course Code	17EC743	CIE Marks	40
Number of Lecture Hours/Week	03	SEE Marks	60
Total Number of Lecture Hours	40 (08 Hours per Module)	Exam Hours	03
Credits – 03			
Course Objectives: This Course will enable students to: <ul style="list-style-type: none"> • Discuss the historical background of Real-time systems and its classifications. • Describe the concepts of computer control and hardware components for Real-Time Application. • Discuss the languages to develop software for Real-Time Applications. • Explain the concepts of operating system and RTS development methodologies. 			
Module-1			
Introduction to Real-Time Systems: Historical background, Elements of a Computer Control System, RTS- Definition, Classification of Real-time Systems, Time Constraints, Classification of Programs.			
Concepts of Computer Control: Introduction, Sequence Control, Loop Control, Supervisory Control, Centralized Computer Control, Hierarchical Systems. (Text Book: 1.1 to 1.6 and 2.1 to 2.6) L1, L2			
Module-2			
Computer Hardware Requirements for Real-Time Applications: Introduction, General Purpose Computer, Single Chip Microcomputers and Microcontrollers, Specialized Processors, Process-Related Interfaces, Data Transfer Techniques, Communications, Standard Interface.(Text Book: 3.1 to 3.8) L1, L2			
Module-3			
Languages for Real-Time Applications: Introduction, Syntax Layout and Readability, Declaration and Initialization of Variables and Constants, Modularity and Variables, Compilation of Modular Programs, Data types, Control Structures, Exception Handling, Low-level facilities, Co-routines, Interrupts and Device Handling, Concurrency, Real-Time Support, Overview of Real-Time Languages. (Text Book: 5.1 to 5.14) L1, L2, L3			
Module-4			
Operating Systems: Introduction, Real-Time Multi-Tasking OS, Scheduling Strategies, Priority Structures, Task Management, Scheduler and Real-Time Clock Interrupt Handler, Memory Management, Code Sharing, Resource Control, Task Co-Operation and Communication, Mutual Exclusion.(Text Book: 6.1 to 6.11) L1, L2			
Module-5			
Design of RTS – General Introduction: Introduction, Specification Document, Preliminary Design, Single-Program Approach, Foreground/Background System.			
RTS Development Methodologies: Introduction, Yourdon Methodology, Ward and Mellor Method, Hatley and Pirbhai Method. (Text Book: 7.1 to 7.5 and 8.1, 8.2, 8.4,8.5) L1, L2, L3			

Course Outcomes: At the end of the course, students should be able to:

- Understand the fundamentals of Real time systems and its classifications.
- Understand the concepts of computer control, operating system and the suitable computer hardware requirements for real-time applications.
- Develop the software languages to meet Real time applications.
- Apply suitable methodologies to design and develop Real-Time Systems.

Text Book:

Real-Time Computer Control, by Stuart Bennet, 2nd Edn. Pearson Education. 2008.

Reference Books:

1. C.M. Krishna, Kang G. Shin, "Real -Time Systems", McGraw -Hill International Editions, 1997.
2. Real-Time Systems Design and Analysis, Phillip. A. Laplante, second edition, PHI, 2005.
3. Embedded Systems, Raj Kamal, Tata McGraw Hill, India, third edition, 2005.

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