

<b>REAL TIME SYSTEMS</b>			
<b>B.E., VII Semester, Electronics &amp; Communication Engineering</b>			
<b>/Telecommunication Engineering</b>			
<b>[As per Choice Based Credit System (CBCS) Scheme]</b>			
<b>Course Code</b>	<b>17EC743</b>	<b>CIE Marks</b>	<b>40</b>
<b>Number of Lecture Hours/Week</b>	<b>03</b>	<b>SEE Marks</b>	<b>60</b>
<b>Total Number of Lecture Hours</b>	<b>40 (08 Hours per Module)</b>	<b>Exam Hours</b>	<b>03</b>
<b>Credits – 03</b>			
<b>Course Objectives:</b> This Course will enable students to: <ul style="list-style-type: none"> <li>• Discuss the historical background of Real-time systems and its classifications.</li> <li>• Describe the concepts of computer control and hardware components for Real-Time Application.</li> <li>• Discuss the languages to develop software for Real-Time Applications.</li> <li>• Explain the concepts of operating system and RTS development methodologies.</li> </ul>			
<b>Module-1</b>			
<b>Introduction to Real-Time Systems:</b> Historical background, Elements of a Computer Control System, RTS- Definition, Classification of Real-time Systems, Time Constraints, Classification of Programs.			
<b>Concepts of Computer Control:</b> 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) <b>L1, L2</b>			
<b>Module-2</b>			
<b>Computer Hardware Requirements for Real-Time Applications:</b> 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) <b>L1, L2</b>			
<b>Module-3</b>			
<b>Languages for Real-Time Applications:</b> 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) <b>L1, L2, L3</b>			
<b>Module-4</b>			
<b>Operating Systems:</b> 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) <b>L1, L2</b>			
<b>Module-5</b>			
<b>Design of RTS – General Introduction:</b> Introduction, Specification Document, Preliminary Design, Single-Program Approach, Foreground/Background System.			
<b>RTS Development Methodologies:</b> 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) <b>L1, L2, L3</b>			

**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.