



C. U. SHAH UNIVERSITY – WADHWAN CITY

FACULTY OF TECHNOLOGY AND ENGINEERING DEPARTMENT OF COMPUTER ENGINEERING M. TECH. SEMESTER: - II

SUBJECT NAME: Real Time System (RTS)

SUBJECT CODE: 5TE02RTS1

Teaching & Evaluation Scheme: -

| Subject Code | Subject Name | Teaching Scheme (Hours) | | | | Credits | Evaluation Scheme | | | | | | | |
|--------------|------------------|-------------------------|----|----|-------|---------|-------------------|-------|-----------------|-------|-------------------|----|------------|-------|
| | | Th | Tu | Pr | Total | | Theory | | | | Practical (Marks) | | | Total |
| | | | | | | | Sessional Exam | | University Exam | | Internal | | University | |
| | | | | | | | Marks | Hours | Marks | Hours | Pr/Viva | TW | Pr | |
| 5TE02RTS1 | Real Time System | 4 | 0 | 2 | 6 | 5 | 30 | 1.5 | 70 | 3.0 | - | 20 | 30 | 150 |

Objectives:

- To provide understanding of real time system and their use in the development of embedded multitasking application software. It begins with the fundamental of processor and operating system and then focusing on scheduling, inter task communication and synchronization.

Prerequisites:

- Programming in C, Operating Systems and basics of Computer Communication

Course outline:

| Sr. No. | Course Contents |
|---------|--|
| 1 | Introduction: Characteristics, Processor architecture, Inter task Communication and Synchronization Overview, Messages and Message Queues, Semaphores, Mutex |
| 2 | Basics of Real-Time Task Scheduling: Cyclic Scheduler, Event - Driven Scheduling, Rate Monotonic Scheduler, RMA Scheduling : Further Issues, Few Issues in Use of RMA |
| 3 | Handling Resource sharing among real-time tasks: Resource Sharing Among Real-Time Tasks, Highest Locker and Priority Ceiling Protocols, An Analysis of Priority Ceiling Protocol, Handling Task Dependencies, Scheduling Real-Time Tasks in Multiprocessor and Distributed systems |
| 4 | Real-time operating systems: General concepts, Unix and Windows as RTOS |
| 5 | Real-Time Communication: |

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| | Few Basic Issues in Real - Time Communications, Real - Time Communication in a LAN, Performance of Real -Time Communication Protocols |
| 6 | Kernel Topics: Dynamic Memory Allocation and Fragmentation Issues, RTOS Timers, Relative and Absolute Timing, Asynchronous Signals, Device I/O Supervisor, Sockets Interface, Device Drivers, Interrupt Service Routines |

Learning Outcomes:

1. Students will be able to implement real world problems.
2. It is for practicing systems software development and for the designing and implementing the software for real-time computer systems.

Books Recommended:

1. Real-Time Systems, **Jane W. Liu**; Pearson Education (2001)
2. Real-Time Systems: Theory and Practice, **Rajib Mall**; Pearson (2008)
3. Real-Time Systems, **Krishna and Shin**; Tata McGraw Hill (1999)