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***CSX444 Real Time Systems***

**L-T-P-Cr: 3-0-0-3**

**Course Objectives:**

* To make students acquainted with the principles and design methods of **real**-**time** computer **systems**.

**Course Outcomes:**

At the end of the course, students will come to know:

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| **Sl. No** | **Outcome** | **Mapping to PO** |
|  1. | Various types of Real Time Systems, Periodic and Aperiodic tasks, different types of scheduling algorithms in RTS (Clock Driven, Priority Driven), Priority Driven Scheduling Of Periodic Tasks, Priority Driven Scheduling Of Aperiodic and Sporadic Jobs.  | PO1, PO2, PO3, PO5 |
|  2. | Different protocols for resource access controls, Scheduling approaches in multiprocessor Real Time Systems. | PO1, PO2, PO3, PO5 |
|  3. | Protocols and disciplines of real time communication | PO1, PO2, PO3, PO5 |

**UNIT I: Lectures: 4**

**Introduction:** Hard vs. Soft real time systems, A reference model of real time system.

**UNIT II: Lectures: 6**

**Real-time scheduling:** Clock driven approach, Weighted Round-robin approach, Priority driven approach, Dynamic vs. static system, EDF and LST algorithm, Off line vs. online Scheduling.

**UNIT III: Lectures: 10**

**Resource and Resource Access control:** Resource contention, resource access control, Non-preemptive critical section, Basic Priority-Inheritance protocol, Basic Priority Ceiling Protocol, Stack based, Priority-ceiling protocol, preemption ceiling protocol, Controlling access to multiple-Unit resource and data object.

**UNIT IV: Lectures: 12**

**Multiprocessor scheduling, Resource Access Control, and Synchronization:** Model of multiprocessor & distributed systems, task assignment, multiprocessor Priority-ceiling protocol, Scheduling algorithm for end-to-end periodic tasks, Schedulability of fixed-priority end-to-end periodic Tasks, Predictability & Validation of dynamic multiprocessor system, Scheduling flexible computations and tasks with temporal distance constraints.

**UNIT V: Lectures: 10**

**Real-Time Communication:** Model of Real-Time communication, Priority based service discipline for switched network, weighted round-robin service disciplines, medium access-control protocol of broadcast network.

**Text/Reference Book:**

1. Real-Time system by Jane W. S. Liu, Pearson Education
2. Real-Time Systems by C. M. Krishna and K. G. Shin, McGraw Hill