

20ES001 - Real Time Systems

UNIT I - INTRODUCTION TO TASK SCHEDULING (9 hours)

Introduction - Issues in Real Time Computing, Structure of a Real Time System, Task classes, Performance Measures for Real time Systems, Task Assignment and Scheduling – Classical uniprocessor scheduling algorithms, RM algorithm with different cases-Priority ceiling- precedence constraints- using of primary and alternative tasks.

UNIT II - UNI AND MULTI PROCESSOR SCHEDULING (9 hours)

Uniprocessor scheduling of IRIS tasks, Task assignment, Utilization balancing – Next fit- Bin packing- Myopic off-line - Focused addressing and bidding- Buddy strategy- Fault Tolerant Scheduling.- Aperiodic scheduling - Spring algorithm, Horn algorithm- Bratley. - Sporadic scheduling.

UNIT III - REAL TIME COMMUNICATION (9 hours)

Introduction – VTCSMA – PB CSMA- Deterministic collision resolution protocol- DCR for multi packet messages- dynamic planning based- Communication with periodic and aperiodic messages.

UNIT IV - REAL TIME DATABASES (9 hours)

Basic Definition, Real time Vs General purpose databases, Main Memory Databases, Transaction priorities, Transaction Aborts, Concurrency control issues, Disk Scheduling Algorithms, Two-phase Approach to improve Predictability, Maintaining Serialization Consistency, Databases for Hard Real Time System.

UNIT V - REAL-TIME MODELING AND CASE STUDIES (9 hours)

Petrinets and applications in real-time modeling, Air traffic controller system – Distributed air defense system

Reference Books:

1. C.M. Krishna, Kang G. Shin, “Real Time Systems”, Tata McGraw - Hil, 2010.
2. Giorgio C. Buttazzo, “Hard real-time computing systems: predictable scheduling algorithms and applications”, Springer, 2008.
3. C. Siva Ram Murthy, G. Manimaran, “Resource management in real-time systems and networks”, PHI, 2009.