

IV B.Tech I SEMESTER

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA
19ACS75b-REAL TIME OPERATING SYSTEMS AND APPLICATIONSOpen Elective-III

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Course Objectives:**COURSE OBJECTIVES:**

The objective of this course is to

- develop an understanding of various Real Time systems Application
- obtain a broad understanding of the technologies and applications for the emerging and exciting domain of real-time systems
- get in-depth hands-on experience in designing and developing a real operational system.

UNIT – 1: Introduction**8 Hrs**

Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Dead-lines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.

Learning Outcomes:

At the end of this unit, the student will be able to

- List a range of different software testing techniques and strategies and be able to apply specific(automated) unit testing method to the projects. **L1**
- Distinguish characteristics of structural testing methods **L2**

UNIT – II: Real Time Scheduling**8 Hrs**

Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Rate Monotonic Algorithm, Offline Versus Online Scheduling, Scheduling A periodic and Sporadic jobs in Priority Driven and Clock Driven Systems..

Learning Outcomes:

At the end of this unit, the student will be able to

- Demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible. **L3**
- Discuss about the functional and system testing methods **L3**

UNIT – III: Resources Sharing**8 Hrs**

Effect of Resource Contention and Resource Access Control (RAC), Non-preemptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-Module Resources, Controlling Concurrent Accesses to Data Objects.

Learning Outcomes:

At the end of this unit, the student will be able to

- Discuss about the functional and system testing methods. **L4**
- Demonstrate various issues for object oriented testing. **L4**
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UNIT – IV: Real Time Communication

7 Hrs

Basic Concepts in Real time Communication, Soft and Hard RT Communication systems, Model of Real Time Communication, Priority-Based Service and Weighted Round-Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols..

Learning Outcomes:

At the end of this unit, the student will be able to

- Distinguish characteristics of structural testing methods. L5
- Demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible. L4

UNIT – V:Real Time Operating Systems and Databases

08Hrs

Features of RTOS, Time Services, UNIX as RTOS, POSIX Issues, Characteristic of Temporal data, Temporal Consistency, Con-currency Control, Overview of Commercial Real Time databases..

Learning Outcomes:

At the end of this unit, the student will be able to

- Discuss about the functional and system testing methods. L5
- Demonstrate various issues for object oriented testing. L5

Text Books:

1. Real Time Systems – Jane W. S. Liu, Pearson Education Publication.

Reference Books:

1. Real Time Systems – Mall Rajib, Pearson Education.
2. Real-Time Systems: Scheduling, Analysis, and Verification – Albert M. K. Cheng, Wiley.

Course Outcomes:

At the end of this Course the student will be able to

- List a range of different software testing techniques and strategies and be able to apply specific(automated) unit testing method to the projects. L3
- Distinguish characteristics of structural testing methods. L4
- Demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible. L5
- Discuss about the functional and system testing methods. L5