

## **(CS611) REAL TIME SYSTEMS & SOFTWARE**

(ELECTIVE - IV)

### **Objective of the Course :**

*In this course the student learns about the basics of Real time systems, Classification of Real Time Systems and Different Real time applications.*

### **UNIT - I**

**Introduction** : Real-time Versus Conventional Software, Computer Hardware for Monitoring and Control, Software Engineering Issues. Process and State-based Systems model, Periodic and Sporadic Process, Cyclic Executives, CE definitions and Properties, Foreground-Background

### **UNIT - II**

**Organizations, Standard OS and Concurrency** : Architectures, Systems Objects and Object-Oriented Structures, Abstract Data Types, General Object Classes Requirements and Design Specifications: Classification of Notations, Data Flow Diagrams, Tabular Languages, State Machine, Communicating Real Time State Machine- Basic features, Timing and clocks, Semantics Tools and Extensions, Statecharts-Concepts and Graphical Syntax, Semantics and Tools

### **UNIT - III**

**Declarative Specifications** : Regular Expressions and Extensions, Traditional Logics-Propositional Logic, Predicates, Temporal logic, Real time Logic Deterministic Scheduling : Assumptions and Candidate Algorithms, Basic RM and EDF Results, Process Interactions-Priority Inversion and Inheritance

### **UNIT - IV**

**Execution Time Prediction** : Measurement of Software by software, Program Analysis with Timing Schema, Schema Concepts, Basic Blocks, Statements and Control, Schema Practice, Prediction by optimisation, System Interference and Architectural Complexities, Timer Application, Properties of Real and ideal clocks, Clock Servers – Lamport's Logical clocks, Monotonic Clock service, A software Clock server, Clock Synchronization- Centralized

### **UNIT - V**

**Synchronization, Distributed Synchronization, Programming Languages** : Real Time Language Features, Ada-Core Language, Annex Mechanism for Real Time Programming, Ada and Software Fault Tolerance, Java and Real-time Extensions, CSP and Occam

### **TEXT BOOK :**

1. Alan C. Shaw, "Real – Time Systems and software", 2<sup>nd</sup> ed., John Wiley & Sons Inc, 2001.

### **REFERENCE BOOK :**

1. Jane W.S. LIU "Real - Time Systems", 1<sup>st</sup> ed., Pearson Edition, 2000.