

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: 1

Computer Science & Engineering

Subject Name: Major Elective I-Real Time Computing

Sr.No	Course content
1	Basic real time concepts: Terminology, Real-time system design issues, Example Real-time system, Common misconceptions,
2	Hardware consideration: Basic architecture, Hardware interfacing, Central processing unit, Memory, Input output, Enhancing performance, Other special devices, Non-von-neumann architectures
3	Real-time operating system: Real-time kernels, Theoretical foundation of Real-time operating system, Intertask communication and synchronization, Memory management
4	Software Requirement Engineering: Requirement Engineering process, Types of Requirement, Requirement specification of Real-time system, Formal method in Software specification, Structured analysis and design, Object oriented analysis and the unified modeling language, Organizing the Requirement documents, Organizing and writing Requirements, Requirement validation and review,
5	Software system design: Properties of Software, Basic Software engineering principles, The design activity, Procedural-oriented design, Object-oriented design
6	Programming language and software production process: Introduction, Assembly language, Procedural language, Object-oriented language, Brief survey of languages, Coding standards
7	Performance analysis and optimization: Theoretical preliminaries, Performance analysis, Application of queuing theory, I/O Performance, Performance optimization, Result from compiler optimization, Analysis of Memory Requirements, Reducing Memory utilization
8	Engineering considerations: Metrics, Faults, Failures and Bugs, Fault-Tolerance, Systems integration, Refactoring Real-time code, Cost estimation using COCOMO

Reference Books:

1. Real Time System Design and Analysis by Phillip
2. Real-Time Systems (\$60 at amazon.com), by Jane Liu.
3. Linux Device Drivers (\$24 at amazon.com), by Alessandro Rubini.
4. The Ada Reference Manual.
5. The material covered in the first part of the course follows very closely the textbook *Real-Time Systems* by Jane W.S. Liu at Illinois