

21CSE29	FAULT TOLERANT SYSTEM	L	T	P	C
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Course Objectives					
<ul style="list-style-type: none"> The main objective of this course is to learn a comprehensive view of fault tolerant systems and need for fault tolerance 					
UNIT I	INTRODUCTION	9 Hours			
Fault Classification, Types of Redundancy, Basic Measures of Fault Tolerance, Hardware Fault Tolerance, The Rate of Hardware Failures, Failure Rate, Reliability, and Mean Time to Failure, Canonical and Resilient Structures, Other Reliability Evaluation Techniques, Processor level Techniques.					
UNIT II	INFORMATION REDUNDANCY	9 Hours			
Information Redundancy, Coding, Resilient Disk Systems, Data Replication, Voting: Hierarchical Organization, Primary-Backup Approach, Algorithm based Fault Tolerance, Fault-Tolerant Networks: Measures of Resilience, Common Network Topologies and Their Resilience, Fault-Tolerant Routing.					
UNIT III	SOFTWARE FAULT TOLERANCE	9 Hours			
Acceptance Tests, Single-Version Fault Tolerance, N-Version Programming, Recovery Block Approach, Preconditions, Post conditions, and Assertions, Exception-Handling, Software Reliability Models, Fault-Tolerant Remote Procedure Calls.					
UNIT IV	CHECKPOINTING	9 Hours			
Introduction, Checkpoint Level, Optimal Checkpointing-An Analytical Model, Cache-Aided Rollback Error Recovery (CARER), Checkpointing in Distributed Systems, Checkpointing in Shared-Memory Systems, Checkpointing in Real-Time Systems, Case Studies: NonStop Systems, Stratus Systems, Cassini Command and Data Subsystem, IBM G5, IBM Sysplex, Itanium					
UNIT V	FAULT DETECTION IN CRYPTOGRAPHIC SYSTEMS	9 Hours			
Security Attacks Through Fault Injection – Fault Attacks on Symmetric Key Ciphers – Fault Attacks on Public (Asymmetric) Key Ciphers – Counter Measures – Spatial and Temporal Duplication – Error Detecting Codes.					
Course Outcomes:					
<ul style="list-style-type: none"> Define the traditional measures of fault tolerance Discuss the various hardware fault tolerance techniques used Point out the processor level fault tolerance techniques Discuss error detecting and correcting codes 					
Text books:					
<ol style="list-style-type: none"> Israel Koren, Mani Krishna, “Fault Tolerant Systems”, Elsevier Science & Technology, 2007. Martin L Shooman, Willey, “Reliability of Computer Systems and Networks: Fault Tolerance, Analysis and Design”, 2002. 					

Reference Books:

1. LL Pullam, "Software Fault Tolerance Techniques and Implementation", Artech House Computer Security Series, 2001.