CS577

RELIABILITY AND FAULT TOLERANCE

UNIT-I

Introduction to Reliability Engineering:
Reliability, Repairable and Non-repairable Systems, Maintainability and Availability, Designing, Reliability, Repairable and Non-repairable Systems, MTBF MTBF, MTTF MDT, k out of in systems.

UNIT-II

Software Reliability:
Software Reliability, Software Reliability Vs Hardware Reliability, Failures and Faults, Classification of Failures, Counting, System configuration, Components and Operational Models, Concurrent Systems, Sequential Systems, Standby Redundant Systems.

Software Reliability Approaches:
Fault Avoidance, Passive Fault Detection, Active Fault Detection, Fault Tolerance, Fault Recovery, Fault Treatment.

UNIT-III

Software Reliability Modeling:
Introduction to Software Reliability Modeling, Parameter Determination and Estimation, Model Selection, Markovian Models, Finite and Infinite failure category Models, Comparison of Models, Calendar Time Modeling.

UNIT-IV

Fault Tolerant Computers: General Purpose Commercial Systems, Fault Tolerant Multiprocessor and VLSI based Communication Architecture.
Design – N – Version programming Recovery Block, Acceptance Tests, Fault Trees, Validation of Fault Tolerant Systems.

UNIT-V

Fault Types: Fault Detection and Containment, Redundancy, Data Diversity, Reversal, Reversal Checks,Obtaining Parameter Values, Reliability Models for Hardware Redundancy, Software Error Models,Checks, Fault /Tolerant Synchronization, Synchronization in Software.

Suggested Reading:

1. John D. Musa, " Software Reliability", McGraw Hill, 1995.

2. Patric D. T. O. Concor, Practical Reliability Engineering", 4th Edition, John Wesley & Sons, 2003.
3. C.M. Krishna, Kang G. Shin, " Real Time Systems", McGraw Hill, 1997.