CSE 641: Reliability & Fault Tolerance of Computer Systems (3-0-3)

Syllabus

Catalog Description


Prerequisite: (COE 523 or equivalent) OR Conset of Instructor.

Text Book:


Course Objectives:
(1) To introduce students to the theory of reliable and fault-tolerant computer systems.
(2) To provide in-depth design and analysis issues in the design of general reliable computer systems.
(3) To provide in-depth design and analysis issues in the design of reliable and fault-tolerant multicomputer networks.
(4) To introduce students to the basic design aspects of reliable and fault-tolerance ATM/high speed networks.
(5) To provide in-depth design and analysis issues in the design of topological design and optimization of reliable and fault-tolerant Telecommunication networks.

Course Learning Outcomes:

After taking this course, students should be able to
(1) Grasp firmly the foundation of the theory of reliable and fault-tolerant computer systems.
(2) Master the issues involved in the design and analysis of reliable computer systems including multicomputer networks, ATM/high speed networks, and telecommunication networks.

Topics:

1. Module 1: Introduction to Design & Analysis of FT Systems
   (Chapter 1)
   Fundamental concepts. Redundancy techniques. Dependability evaluation techniques. Design Methodology.

2. Module 2: Reliability Estimation
   (Chapter 6)
   (Chapters 3 and 4)


4. **Module 4: FT and Reliability Design of ATM Switch Architectures**
   (Supplement)

   Design of reliable and fault-tolerant space-division ATM networks.

5. **Module 5: Reliability and FT Computer Networks Optimization**
   (Supplement)

   Topological optimization of computer communication networks subject to reliability and fault tolerance constraints.

6. **Module 6: Fault Tolerance Software**
   (Chapter 7)

Computer Usage:
Use of available network reliability evaluation tools.

Laboratory Experiments:
None.

Grading Policy (Tentative):
- 10% Quizzes
- 20% Major Exam (Tentatively offered at the end of week 8)
- 40% Course Projects (Two projects equally weighted)
- 30% Final Exam (Scheduled by the Registrar)

ABET Category content:
- Engineering Science: 60%
- Engineering Design: 40%