

The University of Alabama in Huntsville
Electrical and Computer Engineering
Course Syllabus
CPE 633 01
Spring 2008

Textbook: Fault-Tolerant Systems, Israel Koren and C. Mani Krishna, Morgan Kaufmann Publishers, 2007

Web Page: <http://www.ece.uah.edu/courses/cpe633>

Instructor: Dr. Rhonda Kay Gaede, Office: EB 211, Phone: 824-6573,
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Office Hours: W 10 AM – 12 PM, R 2 PM – 3 PM, or by appointment

<u>Grading:</u>	Homework	25 %
	Tests(2)	40 %
	Final Exam	35 %

Homework: NO late homework will be accepted without extenuating circumstances.
Contact me as soon as a problem occurs.

Important Dates: January 11 – Last day to add a class and file course repeat
January 18 – Last day to withdraw with refund
January 21 - Holiday
January 28 – Last day to apply for Pass/Fail
February 4 – Last day to change from credit to audit
February 18 - Midterm
March 17 – Last day to withdraw
March 17-22 – Spring Break
April 7 - Advising and registration for Summer and Fall 2008 begins
April 8 – Honors Day
April 22 – Last TR class

Final Exam: Thursday, April 24, 11:30 AM – 2:00 PM

Miscellaneous: Mute your cell phones before you bring them to class.

Course Outline:

Chapter Topics

1 Preliminaries

Fault Classification, Types of Redundancy, Basic Measures of Fault Tolerance:
Traditional and Network

- 2 Hardware Fault Tolerance**
Failure Rate, Reliability, and Mean Time to Failure, Canonical and Resilient Structures, Reliability Evaluation Techniques, Fault-Tolerance Processor-Level Techniques, Byzantine Failures
- 3 Information Redundancy**
Coding, Resilient Disk Systems, Data Replication, Algorithm-Based Fault Tolerance
- 4 Fault-Tolerant Networks**
Measures of Resilience, Common Network Topologies and their Resilience, Fault-Tolerant Routing
- 5 Software Fault Tolerance**
Acceptance Tests, Single-Version Fault Tolerance, N-Version Programming, Recovery Block Approach, Preconditions, Postconditions, and Assertions, Exception-Handling, Software Reliability Models, Fault-Tolerance Remote Procedure Calls
- 6 Checkpointing**
What is Checkpointing?, 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, Other Uses of Checkpointing
- 7 Case Studies**
NonStop Systems, Stratus Systems, Cassini Command And Data Subsystem, IBM G5, IBM Sysplex, Itanium
- 8 Defect Tolerance in VLSI Circuits**
Manufacturing Defects and Circuit Faults, Probability of Failure and Critical Area, Basic Yield Models, Yield Enhancement Through Redundancy
- 9 Fault Detection in Cryptographic Systems**
Overview of Ciphers, Security Attacks Through Fault Injection, Countermeasures

Possible Coverage

- 10 Simulation Techniques**
Writing a Simulation Program, Parameter Estimation, Variance Reduction Methods, Random Number Generation, Fault Injection,

I promise or affirm that I will not at any time be involved in cheating, plagiarism, fabrication, misrepresentation, or any other form of academic misconduct as outlined in the UAH Student Handbook while I am enrolled as a student at UAH. I understand that violating this promise will result in penalties as severe as indefinite suspension from the University of Alabama in Huntsville.

Name (Printed)

Signature

Date