CSC 563 - COMPUTER NETWORKS AND DISTRIBUTED SYSTEMS

CREDIT HOURS: 3
PREREQUISITES: CSC 342 and 6 advanced hours of CSC (CSC 435 or 560 recommended)
GRADE REMINDER: Must have a grade of C or better in each prerequisite course.

CATALOG DESCRIPTION

Communication models and protocols. Distributed algorithms and analysis. Distributed systems architectures and communications. Latest developments in communication technology including hardware, software, and applications.

PURPOSE OF COURSE

To provide the student with a knowledge of state-of-the-art communications technology, functionality, and distributed systems applications.

EDUCATIONAL OBJECTIVES

The goal of this course is to have students develop the concepts and skills necessary for the design and implementation of distributed systems. Evaluation of student progress will be measured through the successful completion of progressively more advanced laboratory assignments, performance on homework problems, and analysis of exam responses.

Upon successful completion of the course, students should be able to:

1. Demonstrate knowledge of communication terms and concepts.

2. Demonstrate skills in problem analysis and solution design for network problems including, centralized control networks, routing, and distributed control networks.

3. Develop classification measures and categorize distributed systems.

4. Identify distributed algorithm design problems in mutual exclusion, election, deadlock, termination, consensus and their respective solutions.

5. Apply distributed algorithm techniques to the analysis of distributed systems.

6. Develop and implement simple distributed applications that illustrate conceptual issues.

7. Utilize advanced language and library support features.

CONTENT   Hours

Network Design 18
       Review analysis techniques - queuing systems, graph algorithms, optimization
       Network designs, standards, and interfaces
       Protocol design and performance analysis

Distributed Algorithms 12
    Processes, communication, classification
    Issues - mutual exclusion, election, deadlock, termination, data transfer, consistency, consensus

Distributed Systems 12
    Architectural models, design goals, services
    Protocols and technologies
    Characteristics, interface, software
    File and directory structures, sharing, recovery, concurrency
    Security (access, authentication, encryption)
    Representative systems

Exams (plus final) 3

TOTAL   45

REFERENCES

Barbosa, V., An Introduction to Distributed Algorithms, MIT Press, 1996.

Bertsekas, D., and Gallager R., Data Networks, 2nd Ed., Prentice Hall, 1992.

Coulouris, G. F., Dollimore, J., and Kindberg, T., Distributed Systems, 4th Ed., Addison-Wesley, 2005.

Kershenbaum, A., Telecommunication Network Design Algorithms, McGraw-Hill, 1993.

Kshemkalyani, A., Singhal, M., Distributed Computing: Principles, Algorithms, and Systems, Cambridge, 2008.

Lynch, N., Distributed Algorithms, Morgan Kaufmann, 1996.

Raynal, M., Distributed Algorithms and Protocols, John Wiley, 1988.

Schwartz, M., Telecommunication Networks Protocols, Modeling and Analysis, Addison-Wesley, 1987.

Tanenbaum, A.S., Computer Networks, 5th Ed., Prentice Hall, 2010.