CS 5651: COMPUTER NETWORKS (4)

Catalog Description:
Introduction to computer networking and associated software protocols. Network reference models and layered architecture. Network services and applications. Design of computer networking software. Quality of service concepts.

Textbook: Larry Peterson and Bruce Davie, *Computer Networks, 2nd Ed*., Morgan Kaufmann, 2000.

References:

Course Goals:
The goals of this course are: (1) to provide students with a solid understanding of computer network hardware and software; and (2) to provide students with a practical and theoretical knowledge of network architecture and network performance analysis.

Prerequisites by Course & Topic
CS 2511: Software Analysis and Design – data abstraction, algorithm analysis, group implementation
CS 2521: Computer Organization and Architecture – computer organization and introduction to computer architecture, hardware performance analysis and measurements.

Major Topics Covered in the Course
- Layering and OSI architecture
- Requirements for building computer networks
- Network performance characteristics and analysis
- Unix socket programming
- The Data Link Layer
- Packet switching
- The Network Layer - Internetworking
- The Transport Layer - End-to-end protocols, reliable transmission
- Congestion avoidance and resource allocation
- Application layer, security in networks

Class/Laboratory Schedule: Lecture: 3 hours per week, Laboratory: 1

Laboratory Projects
- Network performance and analysis (?)
- Unix socket programming (?)
- Term project development (?)

Course Contribution to Program Objectives and Outcomes:
1. Students will demonstrate proficiency in basic principles of network design. (*b*,*d*).
2. Students will demonstrate an understanding of the taxonomy of network hardware with respect to scale and transmission technology. (*c*,*d*)
3. Students will demonstrate an understanding of a layered design of a computer network. (*c*,*d*)
4. Students will demonstrate proficiency in network programming. (*c*,*d*)
5. Students will demonstrate proficiency in analyzing and verifying communication protocols. (*d*)
6. Students will demonstrate proficiency in analyzing local area network performance. (*d*)
7. Students will undertake team and individual projects. (*e*)

Estimate CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures			Computer Organization and Architecture		2
Algorithms			Concept of Programming Languages		
Software Design		2			

Oral and Written Communications
Every student is required to submit at least __1___ written reports (not including exams, tests, quizzes, or commented programs) of typically ___5__ pages and to make ___1__ oral presentations of typically ___10__ minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Theoretical Content
The course involves significant discussion of the theory and rationale of various network protocols (approximately 65% of the course).

Problem Analysis
Students are expected to perform Cluster and LAN performance analyses using performance metrics such as latency bandwidth.

Solution Design
Students must create TCP/IP solutions for problems in distributed applications such as FTP, Dining Philosophers, and TELNET.

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