

CS 4411: Computer Networks (4)

Catalog Description:

In-depth experience with telecommunications fundamentals, including voice-video-data transmission in LAN and Internet. Network protocol analysis and implementation. Network layered architecture and abstractions. Installation, configuration, systems integration, and management of the technologies.

Textbook: James Kurose and Keith Ross, *Computer Networking: A Top-Down Approach Featuring the Internet*, 2nd Ed. Addison-Wesley, 2002.

References:

Course Goals:

This course provides a top-down approach to the study of computer networking that begins with application-layer protocols and then works down the problem stack. It puts an emphasis on application-layer paradigms and application layer interfaces.

Prerequisites by Course & Topic

CS 3011: Information Technology Hardware and Software – principles of computer systems hardware and software.

Major Topics Covered in the Course

- Networking Foundation
- Application Layer
- Transport Layer
- Network Layer and Routing
- Link Layer and Local Area Networks
- Multimedia Networking
- Security in Computer Networks
- Network Management

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

Laboratory Projects

- Multithreaded Web server (6)
- Distributed asynchronous vector routing (6)

Course Contribution to Program Objectives and Outcomes:

1. Students understand and can implement code related to many Internet applications. (*b, c*)
2. Students comprehend the foundations of Internet architecture. (*c*)
3. Students realize the trade-off in benefits of the different routing protocols. (*d*)
4. Students are familiar with the concept of quality of service. (*a, d*)
5. Students have the ability to work independently and in group on hard problems and complex algorithms. (*b, e, f*)

Estimate CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures		1	Computer Organization and Architecture		1
Algorithms		1	Concept of Programming Languages		
Software Design		1			

Oral and Written Communications

Every student is required to submit at least 0 written reports (not including exams, tests, quizzes, or commented programs) of typically 0 pages and to make 1 oral presentations of typically 25 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

- Layer services definition (4 hours)
- Client/Server paradigm (2 hours)
- Standard protocols (10 hours)
- Communication services (8 hours)

Problem Analysis

Students perform analysis related to a number of lab problems including transmission delay, addressing spaces, routing, and security levels.

Solution Design

Students design solutions during their lab projects.

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