

Rutgers University, Department of Electrical and Computer Engineering
ABET COURSE SYLLABUS
COURSE: 14:332:423

Course Catalog Description: 14:332:423 Computer and Communication Networks (3)
 Network protocol design principles, reliable transport protocols, routing, quality of service, multimedia networking, Internet telephony, wireless networks.

Pre-Requisite Courses: 14:332:226

Co-Requisite Courses: 14:332:226

Pre-Requisite by Topic: Probability and Random Processes

Textbook & Materials: Kurose & Ross, *Computer Networking*, 4th Edition, Addison Wesley, 2007.

References: None

Overall Educational Objective: The course teaches the fundamental principles of computer and communication networking. After this course students should have general knowledge on how the Internet works and what issues are encountered in the integration of voice, video, and data services.

Course Learning Outcomes: A student who successfully fulfills the course requirements will have demonstrated:

1. An ability to define and analyze the problem of reliable communication over noisy channels.
2. An ability to develop a simple network simulator to analyze the TCP protocol performance under limited network resources.
3. An ability to understand and analyze the issues with host naming, addressing, and routing packets in networks-of-networks (internetworks).
4. An ability to understand and analyze the issues in providing quality-of-service for networked multimedia applications, such as internet telephony.

How Course Outcomes are Assessed:
 Term Project (30 %)
 Two Mid-Term Exams (30 %)
 Final Exam (40 %)

N = none S = Supportive H = highly related

Outcome	Level	Proficiency assessed by
(a) an ability to apply knowledge of Mathematics, science, and engineering	H	Exams
(b) an ability to design and conduct experiments and interpret data	H	Term project
(c) an ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	N	
(d) an ability to function as part of a multi-disciplinary team	S	Term project

(e) an ability to identify, formulate, and solve ECE problems	H	Term project, Exams
(f) an understanding of professional and ethical responsibility	N	
(g) an ability to communicate in written and oral form	S	Term project
(h) the broad education necessary to understand the impact of electrical and computer engineering solutions in a global, economic, environmental, and societal context	N	
(i) a recognition of the need for, and an ability to engage in life-long learning	S	Lectures, subsequent courses
(j) a knowledge of contemporary issues	N	
(k) an ability to use the techniques, skills, and modern engineering tools necessary for electrical and computer engineering practice	H	Term project (including network simulation and analysis of results)
Basic disciplines in Electrical Engineering	H	Exams
Depth in Electrical Engineering	S	Exams
Basic disciplines in Computer Engineering	H	Network programming and simulation
Depth in Computer Engineering	S	Term project
Laboratory equipment and software tools	S	Network programming
Variety of instruction formats	S	Lectures, Recitation sessions, Office hour discussions

Topics Covered week by week:

Week 1: Protocol Layering and Reliable Communication

Week 2: Stop-and-wait and Window-based ARQs

Week 3: Internetworking and Internet Protocol

Week 4: TCP Protocol

Week 5: TCP Congestion Control

Week 6: Examination 1

Week 7: Routing Protocols and Multicast

Week 8: Switching and Switch Fabrics

Week 9: Queuing Delays

Week 10: Scheduling and Policing

Week 11: Examination 2

Week 12: Multimedia Protocols

Week 13: Internet Telephony

Week 14: Wireless Networks

Weeks 15-16: Review and Final Examination

Computer Usage: Network programming.

Laboratory Experiences: Network programming in a semester-long programming project, working in teams 2-3 students.

Design Experiences: The term project is design-oriented in that students learn how to program a simple network simulator, simulate a simple network, and analyze and interpret the simulation results.

Independent Learning Experiences: 1. Term project in network programming, 2. Testing (Exams)

Contribution to the Professional Component:

(a) College-level mathematics and basic sciences: 0.25 credit hours

(b) Engineering Topics (Science and/or Design): 2.75 credit hours

(c) General Education: 0 credit hours

Total credits: 3

Prepared by: I. Marsic

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