

ABET COURSE SYLLABUS

ECSE 4670: Computer Communication Networks

Course Catalog Description:	Introduction to the basic concepts of computer and communication networks. In-depth presentation of the seven layers of the Open Systems Interconnection (OSI) reference model emphasizing network design. Network architectures and protocols such as the Internet, Ethernet, and Integrated Services Digital Networks are described in order to illustrate important networking concepts. Fall term annually. <i>3 credit hours</i>
Pre-Requisite Courses:	ECSE-2610 and combinatorial probability, such as in MATH-2800, ENGR-2600 or ECSE-4500.
Co-Requisite Courses:	None
Prerequisites by Topic:	<ol style="list-style-type: none">1. Basic understanding of computer components and operations.2. Basic understanding of combinatorial probability, including axioms of probability, conditional probability, random variables, probability density and distribution functions.
Textbook: (and/or other required material)	J.F. Kurose, K.W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet (3rd Ed.), 2004.
References:	<ul style="list-style-type: none">• S. Keshav, An Engineering Approach to Computer Networking, 1997.• B. Davie, L. Peterson, Computer Networks: A Systems Approach (3rd Ed.), 2003.• A. Tannenbaum, Computer Networks (4th Ed.), 2002.• D. Bertsekas, R. Gallager, Data Networks (2nd Ed.), 1991.
Course Coordinator:	Koushik Kar
Overall Educational Objective:	To gain an understanding of the basic concepts, architectures and protocols of computer networking, using Internet as an example.
Course Learning Outcomes:	<ol style="list-style-type: none">1. Understand the benefits of layering, and the functions of the different layers of the Internet.2. Understand how different application layer protocols like HTTP, FTP and SMTP work.3. Understand the principles of reliable transfer of data and congestion control and how these functions are implemented in transport layer protocols like TCP and UDP.4. Understand addressing conventions and routing algorithms used in the Internet.5. Understand basic multi-access communication protocols, and their implementations in link layer standards like Ethernet, PPP and 802.11.6. Understand fundamentals of queuing theory, and how they can be used in analyzing average delay and buffer requirements at routers.7. Understand how space-time diagrams can be used to calculate end-to-end packet delays in a communication network.
How Course Outcomes are Assessed:	Homeworks: 20% 2 Mid-term exams: 25% each Final exam: 30%

Relation to EE/CSE/EPE Outcomes

N = none
M = moderate
H = high

Outcome	Level	Demonstrate Proficiency
	N, M, H	e.g. Exams, projects, HW
Mathematics, science and engineering	M	Exams, HW
Basic disciplines in Electrical Engineering	N	
Depth in Electrical Engineering	M	Exams, HW
Basic disciplines in Computer & Sys. Eng.	M	Exams, HW
Depth in Computer and Systems Eng.	H	Exams, HW
Electromagnetics, electromechanics, power semiconductors	N	
Power system behavior	N	
Electrical energy conversion	N	
Conduct experiments and interpret data	N	
Identify, formulate and solve problems	H	Exams, HW
Design a system, component or process	N	
Communicate in written and oral form	N	
Function as part of a multi-disciplinary team	N	
Preparation for life-long learning	N	
Ethical issues; safety, health, public welfare	N	
Humanities and social sciences	N	
Laboratory equipment and software tools	N	
Variety of instruction formats	N	

Topics Covered:
(number of hours or classes for each)

1. Introduction to networking: 3 classes
2. Application Layer: 3 classes
3. Transport Layer: 4 classes
4. Network Layer: 4 classes
5. Network performance modeling and analysis: 4 classes
6. Link Layer: 4 classes
7. Wireless networks: 3 classes

Computer Usage: None, other than viewing lecture slides

Laboratory Experiences: None

Design Experiences: None

Independent Learning Experiences: None

Class/Lab Schedule: T, F : 12:30-1:50pm

Contribution to the Professional Component:

(a) College-level mathematics and basic sciences:	0 credit hours
(b) Engineering Topics (Science and/or Design):	3 credit hours
(c) General Education:	0 credit hours

Prepared by:	Koushik Kar
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