King Saud University
College of Computer and Information Sciences
Department of Computer Engineering

CEN 445 - NETWORK PROTOCOLS & ALGORITHMS (3-0-1)
Summer Semester, Academic Year 2010-2011
Required Course, Time (Sun+Tue 8:00-12:00)

Course Description (catalog):
Network Layer; Routing Algorithms: Optimality principle, Flow based, Distance Vector, Shortest Path, Broadcast; Congestion control Algorithms: Leaky Bucket, Traffic Shaping; Internetworking Protocols: The Internet Network layer, IP Tunneling and Concatenated Virtual Circuits, IP datagram forwarding, encapsulation, fragmentation and reassembly; Transport Layer Protocols: TCP and UDP services, designs, and performance.

Prerequisites: - Course CEN 444

Textbook(s) and/or Other Required Materials:
Primary:
- A. Tanenbaum, *Computer Networks*, 4th Edition, Prentice Hall, 2003.

Supplementary:
- A. Farouzan, *Data Communications and Networking*, 3nd Edition, McGraw Hill 2004.

Course Learning Outcomes: This course requires the student to demonstrate the following:

1. Describe end to end transmission.
2. Compare between virtual circuit and datagram networks.
3. Apply and evaluate routing algorithms.
4. Classify and evaluate congestion control algorithms.
5. Apply and evaluate Internetworking protocols.
6. Describe IP protocol specification and operation.
7. Recognize transport layer services, designs, protocols and performance.

Major Topics covered and schedule in weeks:

Network Layer Design Issues	1
Routing Algorithms	2
Congestion Control	2
Quality of Service and Internetworking	2
The Network Layer in The Internet	2
Elements of Transport Protocols and The Internet Transport Protocols: UDP	2
The Internet Transport Protocols: TCP and TCP Performance Issues	3
Review and Evaluation	2

Assessment Plan for the Course

Students' performance in homework, quizzes, exams, and class-projects.

Contribution of Course to Meeting Curriculum Disciplines:

Curriculum Discipline	Percentage
Mathematics and Basic Science	30
Engineering Science	60
Engineering Design	10
General Education	

Relationship of Course to Program Outcomes

Outcome	Program Outcome Description	Level of Contribution
(a)	an ability to apply knowledge of mathematics, science, and engineering	H
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(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	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	M
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	H
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	M

H=High, M= Medium, L=Low

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