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**King Saud University**

**College of Computer and Information Sciences**

**Department of Computer Engineering**

1. Course number and name: **CEN444, Computer Networks**

2. Credits and contact hours: **3 (3, 0, 1)**

3. Instructor’s or course coordinator’s name: Ridha Ouni

4. Text book, title, author, and year:

**Computer Networks, A. Tanenbaum, Pearson.**

a. other supplemental materials:

**Computer Networking: A Top-Down Approach, J. Kurose and K. Ross, Pearson.**

5. Specific course information

a. Course description (catalog)

Data Link Control: framing, flow control, ARQ Stop/wait, Sliding window protocols, DLC standards; Medium Access control Protocols: ALOHA, CSMA, CSMA/CD, CSMA/CA, Collision-free protocols; LAN standards: Ethernet, IEEE 802.11; LAN switching: Spanning trees, HUBs, Switches. Network layer services: Packet-switching, VC & datagram; Routing Algorithms: Shortest path algorithms, Distance Vector, Link State, Multicast vs. Broadcast; Internetworking: encapsulation, fragmentation, IP protocol, IP addressing & subnetting, ICMP, ARP, DHCP; Internet routing: OSPF, BGP.

b. prerequisites or co-requisites: CEN342 (prerequisite).

c. Required, elective, or selected elective course: Required.

6. Specific goals for the course

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

1. Recognize the concepts of framing and reliable data transfer.
2. Recognize Medium Access Control protocols and evaluate their performance.
3. Describe LAN standards, devices and link layer switching.
4. Compare different packet-switching networks: virtual circuits and datagram networks.
5. Apply and evaluate routing algorithms.
6. Describe Internetworking protocols of the Internet.
7. Recognize and apply IP addressing, forwarding and routing.

b. Relationship of Course to Student Outcomes:

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| --- | --- | --- |
| **Outcome** | **Student Outcome Description** | **Contribution** |
| (a) | an ability to apply knowledge of mathematics, science, and engineering | √ |
| (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 | √ |
| (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 |  |
| (j) | a knowledge of contemporary issues |  |
| (k) | an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. | √ |

7. Brief list of topics to be covered and schedule in weeks

|  |  |
| --- | --- |
| **Topic** | **Weeks** |
| Introduction to LANs, WANs and network topologies | 2 |
| Data link layer: framing, flow control and ARQ | 2 |
| Medium Access Control, LAN standards: Ethernet and WLAN | 3 |
| LAN switching: Spanning-trees, Hubs & switches, VLANs | 1 |
| Network layer: packet-switching, services: datagrams & VC, Routing algorithms | 2 |
| Internetworking: encapsulation & fragmentation, IP protocol | 1 |
| IP addressing, CIDR, subnetting & aggregation, NAT, IP forwarding, IPv6 | 1 |
| IP control protocols: ICMP, DHCP, ARP | 1 |
| Internet routing: OSPF, BGP | 1 |
| Review and evaluation | 1 |

8. Assessment Plan for the Course

Homework/ Project 10%

Quizzes 10%

Midterm 1 20% 7th week (Sunday March 19, 2017)

Midterm 2 20% 12th week (Sunday April 30, 2017)

Final exam 40%

9. Tentative out of class assignments and dates

Homework 1: Framing and flow control.

Homework 2: MAC techniques.

Homework 3: Ethernet, Wireless LANs and Switching.

Homework 4: Routing algorithms.

Homework 5: IP fragmentation.

Homework 6: IP subnetting.

* Lecture notes will be posted in LMS page.
* Homework assignments must be done individually and submitted no later than the specified date.
* A set of 3 quizzes have to be achieved within the semester.

10. Current Instructor, Department, office hours and date:

**Dr. Ridha Ouni**

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