King Saud University
College of Computer and Information Sciences
Department of Computer Science
CSC 329 – Computer Networks 3 (3-0-1)

Catalog Description:

Definition of computer networks, objectives and applications. Computer network topologies and types (LANs, MANs and WANs). Computer network architecture: layering protocols & standard models. The OSI & TCP/IP reference models. Compare the use of various connecting devices (such as Hub, Switch, Router and gateways). Physical layer of computer network: signal types, signal characteristics and impairments. Transmission modes (simplex, half -duplex, full-duplex) Digital transmission: line and block coding techniques. Analog transmission: modulation techniques and modems. The transmission media, Data link layer functions & protocols. Media access control methods. LAN protocols, the IEEE 802.3 standard Ethernet and backbone networks. Network layer of the internet model: concept and services of the network layer, Internet Protocol (IP) addresses, network layer protocols such as IP, ARP, ICMP. Routers and Routing protocols: RIP and OSPF.

Prerequisites: CSC 227
Co-requisite: None
Course Type: Required

Textbook(s):
Primary:

Title: Data Communications and Networking, 5th Edition
Author: Behrouz A. Forouzan
Edition: 5
Publisher: McGraw-Hill
Publication Date: 2012

Also recommended
Computer Networks by Andrew S. Tanenbaum (5th edition)

Recommended:

Computer networking: a top-down approach / James F. Kurose, Keith W. Ross.— international edition available online.

Secondary:

Computer Networks and Internets by Douglas E. Comer (5th edition)

Course Objective:

The objective of this course is to equip students with theoretical as well as hands-on knowledge of Computer Networks covering all the fundamental aspects of networking such as OSI, TCP/IP, LANs, WAN, Routing Protocols, Switching etc. At the end of the course, students should be able to understand how two computers communicate through network at the local level and also at the wide range level.

Course Learning Outcomes

After completing successfully, student should have the following capabilities:

1. **The ability to describe major networking terms, topologies, types, protocols, devices, and components.**
2. **The ability to explain the main services, type of addressing, and protocols associated with each layer of the OSI model.**
3. **The ability to recognize signal types, characteristics, impairments, encoding methods, transmission media.**
4. **The ability to recognize the functions and protocols of the data link layer (**framing, error control, flow control, medium access control.)
5. **The ability to explain the functions and protocols of the network layer and to describe the different routing approaches:** (datagram , VC , addressing, Routing).
6. **The ability to compare the features of network components and to measure and analyze the time performances of a network.**

Major Topics:

1. **Overview: Fundamental concepts of computer networks.**
   Computer networks uses, types, and topologies.
   Network hardware
   Layered architecture of network software: Reference models: OSI, TCP/IP
   Services / protocols / interfaces
2. **The Physical Layer:**
   Physical basis for data communication
   Limitations: Nyquist and Shannon theorems
   Transmission media: wired and wireless
3. **The Data Link Layer:**
   Data Link functions
   Framing methods
   Error control methods
   Flow control protocols
4. **The MAC sublayer:**
   The channel allocation problem

Multiple access protocols: contention protocols, collision-free protocols, limited-contention protocols
Ethernet (and Fast Ethernet): cabling, encoding, operation
Wireless LANs: The 802.11Standard

5. **The Network Layer:**
   Networking layer functions and service: Datagram and VC
   Subnetting
   Routing algorithms: Distance vector, Link state,
   Internetworking
   The Internet: IP, ICP, OSPF, BGP, Multicasting, Mobile IP, IPv6
   The Internet: addressing and address resolution protocols

Schedule:

15 weeks of three 50-minute lectures/week and one 50-minute tutorial per week.

Evaluation

	Assignment	Grade	Due
1			
2			
4			
5			

Prepared by: *Prof. Mznah Alrodhan, Dr. Adel Soudani and Dr. Najla Al-Nabhan, 5/01/2019*

Reviewed by:

Approved by: