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| Course syllabus | CSC 329 |
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**King Saud University**

**College of Computer and Information Sciences**

**Department of Computer Science**

**Semester: Spring 24**

**Course number and name: CSC 329**

**Credits and contact hours: (3) Required course**

**Instructor’s name: Dr. Adel Soudani**

**Textbook(s) and/or Other Required Materials: Primary:**

Data Communications & Networking , Behrous Forouzan , McGraw Hill.

**Supplementary:**

Computer Networks – 5th edition by A.S. Tanenbaum

. Data and Computer Communications, William Stallings, Prentice Hall.

**Course Description (catalog):**

Definition of computer networks, objectives and applications. Computer network types (LANs, MANs and WANs). Computer network architecture: layering protocols & standard models. The OSI & TCP/IP reference models. Physical layer of computer network: signal types, signal characteristics and impairments. Data Transmission Basics: Synchronous and asynchronous transmission, synchronization levels; bit, character and frame. Transmission modes (simplex, half -duplex, full-duplex) and (parallel & serial transmission), Digital transmission: line and block coding techniques. Analog transmission: modulation techniques and modems. The transmission media, Data link layer functions & protocols. Local Area Networks: Topology and media access methods. LAN protocols, the IEEE 802.3 standard Ethernet and backbone networks. Compare the use of various connecting devices (such as Hub, Switch, Router and gateways). 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.

**Course Learning Outcomes**

After completing successfully, student should have the following capabilities:

1. **The ability to list and names the different layers of the OSI model and recall the basic concepts of network (**connection oriented, connectionless, reliable, unreliable, broadcast,circuit/packet switched, …).

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1. **The ability Recognize the functions of the data link layer (**framing, error control, flowcontrol, medium access control.)
2. **The ability to state the function of the routing layer and to describe the different routing approaches:** ( datagram , VC , addressing, Routing).
3. **The ability to compare the features of network components and to measure and analyze the time performances of a network.**

**Major Topics:**

**Overview: Fundamental concepts of computer networks.**

Computer networks uses.

Network hardware

Layered architecture of network software

Services / protocols / interfaces

Reference models: OSI, TCP/IP

**The Physical Layer:**

Physical basis for data communication

Limitations: Nyquist and Shannon theorems

Transmission media: wired and wireless

**The Data Link Layer:**

Data Link functions

Framing.

Flow control

Error control

ARQ strategies.

Sliding Window Protocols

**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

**The Network Layer:**

Networking layer functions

Routing algorithms: Distance vector, Link state, Broadcast, Multicast,

Mobile hosts, Ad Hoc networks, p2p networks

Internetworking

The Internet: IP, ICP, OSPF, BGP, Multicasting, Mobile IP, IPv6

The Internet: addressing and address resolution protocols

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Schedule:

11 weeks of three 75-minute lectures/week and one 75-minute tutorial per week.

Evaluation

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|  | Task | Grade | Due |
| 1 | Mid-term 1 exam | 20 % | Announced during the semester |
| 2 | Mid-term 2 exam | 20 % | Announced during the semester |
| 2 | Homework 1 and mini-project | 10 % | During semester |
| 3 | Quizzes 1 & 2 | 10 % | During the semester |
| 4 | Final exam | 40 % | As the College announcements |
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Notes for email communication:

Your email header must start with \*CSC329\*

Email address: asoudani@ksu.edu.sa

Please write your name and your ID at the end of the email

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