**King Saud University**

**College of Computer and Information Sciences**

**Department of Computer Science**

**CSC 329 – Computer Networks 3 (3-0-1)**

**Current Instructor:** Dr. Ahmad AlMogren

**Course Coordinator:** Dr. Ahmad AlMogren

**Coordinator’s email:** ahalmogren@ksu.edu.sa

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

**Primary:**

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

**Secondory:**

1. Computer Networks and Internets by Douglas E. Comer (5th edition)
2. CCNA ICND1 and ICND2 official exam certification guides by Wendell Odom

**Course Description (catalog):**

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 handle small to medium size networks and have the ability to implement and troubleshoot different networking issues related to routing and switching.

**Prerequisites:** CSC 227

**Co-requisite:** None

**Course Type:** Required

**Course Learning Outcomes:**

1. The students will be able to describe the fundamental aspects of networking corresponding to OSI and TCP/IP models
2. The students will be able to design small to medium sized networks
3. The students will be able to troubleshoot the networks by using the theoretical and practical hands on knowledge gained in this course through lectures and hands on labs
4. The students will be able to handle small to medium sized networks practically covering all the fundamental concepts of ip addressing, VLSM, routing protocols, vlans, spanning tree protocols etc.

**Student Outcomes Covered by Course:**

a.An ability to apply knowledge of computing and mathematics appropriate to the discipline;

Students apply knowledge of computing and mathematics and design to a lab

b.An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;

Troubleshooting requires identifying and analyzing the problem carefully and applying the networking theoretical and practical knowledge to rectify the issues

c.An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs;

Students are required to design, implement, evaluate and troubleshoot networks with various complexity through labs

d.An ability to function effectively on teams to accomplish a common goal;

Labs are conducted in the form of groups thus effectively enhancing the ability to work in a team towards accomplishing a common goal

e.An understanding of professional, ethical, legal, security, and social issues and responsibilities;

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f.An ability to communicate effectively with a range of audiences;

Labs require pre-lab discussion, lab report and feedback

g.An ability to analyze the local and global impact of computing on individuals, organizations and society;

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h.Recognition of the need for, and an ability to engage in, continuing professional development;

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i.An ability to use current techniques, skills, and tools necessary for computing practices.

Labs required good knowledge in networking and students are required to use network simulator (packet tracer) for implementation and troubleshooting

j.An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;

Students gain experience through designing small to medium sized networks by applying mathematical and computing knowledge related to networking

k.An ability to apply design and development principles in the construction of software systems of varying complexity.

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**Major Topics covered and schedule in weeks:**

1. Introduction to Networking, OSI and TCP/IP models
2. Key principles in Data link layer, error control, flow control; Fundamentals of LAN and WAN, X.25, Frame Relay and ATM
3. Key Principles in Transport Layer (Fundamentals of TCP/IP, Transport Layer Protocols)
4. Fundamentals of Network Layer,(IP addressing and Subnetting)
5. Variable Length Subnet Mask (VLSM) Design
6. Network Address Translation and Port Address Translation, IPV6
7. DHCP, ARP
8. Key Principles in Network Layer (Routing Protocols, RIP, OSPF, EIGRP and algorithms)
9. Virtual LANs, Spanning Tree Protocol (STP)
10. Access Control List (ACL)
11. Quality of Service (QoS) models, IntServ, DiffServ and MPLS
12. Queueing and Scheduling in IP Networks