

Course Title:	<i>Data Communication & Networking</i>
Course Code:	CEN-222
Credit Hours Theory:	3
Credit Hours Lab (If Applicable):	1
Pre-requisite course	CEN-120 Digital Logic Design
Instructor Name with Qualification:	Shaftab Ahmed
Course Objectives:	This is an introductory course in Data Communications and networking. It familiarizes the students with the basics of data communications, OSI model and techniques, applications and control of modern data communications networks. Topics included are network models, digital and analog transmission, multiplexing, circuit and packet switching. This course will mainly focus to develop engineering skills in troubleshooting and designing data networks.
Contents (Catalog Description):	<p>Introduction to computer networks</p> <ul style="list-style-type: none"> • Structure and components Cables, Modems, Routers, Hubs, Switches, Access Points etc. • Topology Mesh, Star, Bus, Ring <p>Data Communication and Protocol Architecture</p> <ul style="list-style-type: none"> • Half / Full Duplex, Bluetooth, WiFi, WiMax • OSI Model • TCP/IP Protocol Architecture • Synchronous and Asynchronous Transmission <p>Data Transmission</p> <ul style="list-style-type: none"> • Frequency Domain • Time Domain • Frequency, Spectrum and Bandwidth • Transmission Impairments • Nyquist Theorem • Shannon Theorem • Signal to Noise Ratio <p>Data Encoding Techniques</p> <ul style="list-style-type: none"> • Unipolar • Polar • Bipolar • PAM • PCM • Performance Issues

	<p>Error Detection and Correction Techniques</p> <ul style="list-style-type: none"> • Parity Check • CRC • Hamming Code <p>Multiplexing FDM, TDM, DWDM etc</p> <ul style="list-style-type: none"> • Frequency Division Multiplexing • Synchronous Time Division Multiplexing • Digital Carrier Systems <p>Circuit Switching and Packet Switching</p> <ul style="list-style-type: none"> • Circuit Switching Concepts • Packet Switching Concepts <p>LAN, WAN, MAN Architecture</p> <ul style="list-style-type: none"> • LAN Architectures • Ethernet (Wired and Wireless) • Collision Domains • Token Ring • Token Ring Physical & logical Architecture <p>IP Addressing</p> <ul style="list-style-type: none"> • OSI vs TCP/IP • TCP/IP vs UDP • Classes In IP • Network Classes in IP V4 • Masking Concept • Subnetting Methods • Designing Subnets • Introduction to IPv6 • Supernetting • Classless Addressing CIDR <p>Data Link Control Protocols</p> <ul style="list-style-type: none"> • Stop and Wait Flow Control • Sliding Window Flow Control • Stop and Wait ARQ • Go Back N ARQ • Selective Reject ARQ • HDLC <p>Network Security</p> <p>Network Management</p>
<p>Recommended Text Books:</p>	<ol style="list-style-type: none"> 1. William Stallings, “ Data & Computer Communications” , Prentice Hall 2. Behrouz forouzan, “Introduction to Data Communications & Networking
<p>Reference Books:</p>	<ol style="list-style-type: none"> 1. James F. Kurose, Computer Networking: A Top-Down Approach Featuring the Internet, Addison Wesley Publishing Comp 2. Larry L. Peterson and Bruce S. Davie, Computer Networks A systems approach 3rd edition, Morgan Kaufmann Publishers

Helping Web Sites:	http://www.williamstallings.com
General Instructions for students:	<p>The Yahoo group NW-Fall-2014 will be used for course resources and announcements.</p> <p>The Quiz test will be mostly un announced and will cover the recent lectures delivered.</p> <p>The assignments are to be submitted on the dates announced.</p>
Sixteen Week Lesson Plan	<p>Week # 1 Introduction to computer networks I</p> <p>Week # 2 Introduction to computer networks II</p> <p>Week # 3 Data Communication and Protocol Architecture I</p> <p>Week # 4 Data Communication and Protocol Architecture II</p> <p>Week # 5 Network media of transmission and connectivity</p> <p>Week # 6 Network components</p> <p>Week # 7 Switched communication networks</p> <p>Week # 8 Routers – I (Functionality and HW description)</p> <p>Week # 9 Mid Term Exam</p> <p>Week # 10 Routers – II (Routing algorithms)</p> <p>Week # 11 Data encoding and communication techniques</p> <p>Week # 12 Data Multiplexing TDM, FDM, DWDM and transmission.</p> <p>Week # 13 Error Detection and Correction Techniques</p> <p>Week #14 Flow control</p> <p>Week #15 IP addressing scheme IP V4 verses IP V6</p> <p>Week #16 Network management</p> <p>Week #17 Network Security</p> <p>Week #18 Special topics and Presentations</p> <p>Week #19 FINAL EXAM</p>

Course Learning Outcomes mapping to Program Learning Objectives

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME LEARNING OUTCOMES													
SOFTWARE ENGINEERING		SOFTWARE PROJECT MANAGEMENT											
No.	Program Outcomes	Course Learning Outcomes											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Engineering Knowledge								√				
2	Problem analysis							√					
3	Design/Development of solutions							√					
4	Investigation								√				
5	Modern tool usage									√			
6	Engineer and society								√				
7	Environment and sustainability								√				
8	Ethics							√					
9	Individual and Team work									√			
10	Communication									√			
11	Project Management								√				
12	Lifelong learning									√			