

STATE UNIVERSITY OF NEW YORK  
COLLEGE OF TECHNOLOGY  
CANTON, NEW YORK

MASTER SYLLABUS

ELEC 380 – LAN/WAN Technology

Prepared By: Stephen Frempong

SCHOOL OF ENGINEERING TECHNOLOGY  
ELECTRICAL ENGINEERING TECHNOLOGY & ENGINEERING  
SCIENCE DEPARTMENT  
FALL 2018

- A. TITLE : LAN/WAN Technology
- B. COURSE NUMBER: ELEC 380
- C. CREDIT HOURS: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)
- # Credit Hours: 3  
 # Lecture Hours: 3 one hour lecturers per week  
 # Lab Hours:           per week  
 Other:               per week
- Course Length: 15 Weeks
- D. WRITING INTENSIVE COURSE: NO
- E. GER CATEGORY: NONE
- F. SEMESTER OFFERED: SPRING
- G. CATALOG DESCRIPTION: This course will cover topics include: Network topologies and connectivity devices, TCP/IP protocol suite and internet protocol addressing, networks and sub-networks, network-layer protocols, internet control message protocol, transport layer protocol, internet protocol version 6, configuration and domain name protocols, and Integrated Services Data Networks (ISDN).
- H. PRE-REQUISITES: ELEC 225 [Telecommunications], or permission of program director.
- I. GOALS (STUDENT LEARNING OUTCOMES)

**Institutional Student Learning Outcome (ISLO's)**

- (1) Communication Skills (2) Critical Thinking (3) Foundational Skills  
 (4) Social Responsibility (5) Industry, Professional, Discipline-Specific Knowledge and Skills.

**Accreditation Board for Engineering and Technology ABET- Student Outcomes (a-k)**

Course Objectives	ABET-Student Outcomes (a-k)	Institutional SLO's
a. Understand the fundamental terminology used in data communications and computer networking. Understand the basic	(a) An ability to select and apply the knowledge, techniques, skills, and modern tools of the	(5) Industry, Professional, Discipline-Specific Knowledge and Skills.

standards and protocols of computer networking.	discipline to broadly-defined engineering technology activities.	
b. Explain the basic architecture and implementations of Local Area Networks(LANs) and Wide Area Networks (WAN's).	(c) An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.	2. Critical Thinking  (5) Industry, Professional, Discipline-Specific Knowledge and Skills.
c. Apply the knowledge to properly manage the basic functions of Cisco Ethernet switches and routers.	(c) An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.	2. Critical Thinking  (5) Industry, Professional, Discipline-Specific Knowledge and Skills.

J. APPLIED LEARNING COMPONENT: CLASSROOM/LAB

K. TEXTS:

Patrice Regan, Wide Area Networks, 1<sup>st</sup> Edition, Upper Saddle River, New Jersey: Prentice Hall, 2004. OR, as determined by instructor.

L. REFERENCE:

Patrick Regan, Local Area Networks, 1<sup>st</sup> Edition, Upper Saddle River, New Jersey: Prentice Hall, 2004.

M. EQUIPMENT: Will use Network Laboratory Equipment

N. GRADING METHOD: A-F

O. MEASUREMENT CRITERIA/METHODS: Tests, Laboratory project, Participation, and Assignment.

P. DETAILED COURSE OUTLINE:

1. Introduction to the OSI Model
  - a. The need for standardization
  - b. The OSI reference model
2. Connectivity Devices
  - a. Repeaters
  - b. Hubs
  - c. Bridges and Switching Hubs
  - d. Routers and Brouters
  - e. Gateways
3. Network Technology and Protocol
  - a. TCP/IP
  - b. IPX and SPX
  - c. SAP and NCP Protocols
4. IP Addressing
  - a. IPV4/IPV6 Addressing
  - b. Subnetting the Network
  - c. Variable Length Subnet Masks
  - d. Classless Interdomain Routing
  - e. Networking Address Translation and Proxy Servers
5. Ethernet, Token Ring, and FDDI
  - a. Ethernet Encoding Method
  - b. Ethernet Frame Types
  - c. 10Base5, 10Base2, 10BaseT, and 100 Mbps Ethernet
  - d. Gigabit Ethernet
  - e. Token Ring
  - f. FDDI
  - g. Testing Cable Systems
6. Using Bridges and Switches
  - a. Segmentation
  - b. Basic and Transparent Bridges
  - c. The Spanning Tree Algorithm
  - d. Switches (Layer 3, and Layer 4)
  - e. Virtual LANs (Trunking and Configuration)
  - f. Indirect FM Generation
  - g. Designing LANs

7. WAN Technology
  - a. WAN Devices
  - b. PSTNs
  - c. Leased Digital Lines
  - d. Digital Subscriber Lines
  - e. Circuit Switched Lines
  - f. Cable Modems
  - g. Synchronous Digital Hierarchy and Synchronous Optical Networks
  - h. Networking with WAN Links
  
8. Introduction to Routers and Routing
  - a. Characteristics of Router Protocols
  - b. The IP Routing Protocol
  - c. Gateway Protocols
  - d. IP Multicast
  - e. IPX Routing Protocols
  
9. Introduction to Cisco Routers
  - a. Cisco Router Basics
  - b. Router Memory
  - c. Configuring Files  
    Range of Cisco Routers
  - d. Router Ports

Q. LABORATORY OUTLINE:

1. Construct CAT5 Crossover Cable
2. Construct CAT5 Patch Cable
3. Building a Basic Network with Hubs and Computers
4. Building a Network with Cisco Switch
5. Building a Network with Cisco Router
6. Router Configuration
7. Network Troubleshooting