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

MASTER SYLLABUS

ELEC 380 – LAN/WAN Technology

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SCHOOL OF ENGINEERING TECHNOLOGY
ELECTRICAL ENGINEERING TECHNOLOGY & ENGINEERING
SCIENCE DEPARTMENT
FALL 2023

A. TITLE: LAN/WAN Technology

B. COURSE NUMBER: ELEC 380

C. CREDIT HOURS (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity):

 # Credit Hours: 3
 # Lecture: 2 hours of lecture per week
 # Lab Hours: (1) two-hour lab per week

Course Length 15 of Weeks

D. WRITING INTENSIVE COURSE: NO

E. GER CATEGORY: NONE

F. SEMESTER(S) OFFERED: Fall/Spring

G. COURSE 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.

H. PRE-REQUISITES: ELEC 225 [Telecommunications], or permission of the instructor.

I. STUDENT LEARNING OUTCOMES:

Course Objectives (SLO)	ABET-Student Outcomes (1-5)	Institutional SLO's
a. Understand the fundamental terminology used in data communications and computer networking. Understand the basic standards and protocols of computer networking.	(1) an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve well-defined engineering problems appropriate to the discipline	(5) Industry, Professional, Discipline-Specific Knowledge and Skills.
b. Explain the basic architecture and implementations of Local Area Networks(LANs) and Wide Area Networks (WAN's).	4) an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results	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.	4) an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results	2. Critical Thinking (5) Industry, Professional, Discipline-Specific Knowledge and Skills.

KEY	**Institutional Student Learning Outcomes [ISLO 1 – 5]**
ISLO #	**ISLO & Subsets**
1	**Communication Skills** Oral [O], Written [W]
2	**Critical Thinking** *Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]*
3	**Foundational Skills** *Information Management [IM], Quantitative Lit,/Reasoning [QTR]*
4	**Social Responsibility** *Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]*
5	**Industry, Professional, Discipline Specific Knowledge and Skills**

J. APPLIED LEARNING COMPONENT: **Yes____X__ No_____**

If Yes, select one or more of the following categories:

Classroom/Lab_X__
Internship___
Clinical Practicum___
Practicum___
Service Learning___
Community Service___
Civic Engagement___
Creative Works/Senior Project___
Research___
Entrepreneurship___
(program, class, project)

K. TEXTS: Networking Essentials: A CompTIA Network+ N10-006 Textbook, 4th edition by Jeffrey S Bealsey & Piyasat Nilkaew; ISBN: 0-7897-5819-9 OR as determined by instructor

L. REFERENCES: None

M. EQUIPMENT: Network equipment in the Laboratory

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS: Tests, Laboratory Projects, Class Participation and Assignments

P. DETAILED COURSE OUTLINE:

I. Introduction to Computer Networks
   A. Network Topologies
   B. The OSI Model
   C. The Ethernet LAN
   D. Home Networking

II. Physical Layer Cabling: Twisted Pair
   A. Structured Cabling
   B. Unshielded Twisted Pair Cabling
   C. Terminating UTP Cables
   D. Cable Testing and Certifications

III. Physical Layer Cabling: Fiber Optics
   A. The Nature of Light
   B. Fiber Attenuation and Dispersion
   C. Optical Components
   D. Optical Networking
   E. Safety

IV. Interconnecting LANs
   A. The Network Bridge
   B. The Network Switch
   C. The Router
   D. Interconnecting LANs with the Router

V. Wireless Networking
   A. IEEE 802.11 Wireless LAN Standard
   B. 802.11 Wireless Networking
   C. Securing Wireless Networks

VI. TCP/IP
   A. The TCP/IP Layers
   B. IPv4 Addressing
   C. Subnet Masks
   D. CIDR Blocks
   E. IPv6 Addressing

VII. Routing Protocols
   A. Static Routing
   B. Dynamic Routing Protocols
   C. Distance Vector Protocols
   D. Configuring RIP
   E. Link State Protocols
   F. Configuring OSPF

VIII. Wide Area Networks/Out to the Internet
   A. Network Services DHCP and DNS
   B. Internet Routing

IX. Network Security
   A. Intrusion
   B. Denial of Service
   C. Security Software and Hardware
   D. Introduction to Virtual Private Networks

Q. LABORATORY OUTLINE:

1. Construct Network Patch Cable
2. Introduction to the Cisco Ethernet Switch
3. Introduction to VLANs
4. Routing between VLANs using Cisco Router
5. Static and Dynamic Routing
6. Introduction to Network Troubleshooting