CENTRAL TEXAS COLLEGE
ITNW 1325
FUNDAMENTALS OF NETWORKING TECHNOLOGIES

Semester Hours Credit: 3

INSTRUCTOR: _____

OFFICE HOURS: _____

I. INTRODUCTION

A. Instruction in networking technologies and their implementation. Topics include the OSI reference model, network protocols, transmission media, and networking hardware and software.

B. This course serves as a required or elective course on various degree plans. Curriculum plans for degrees and certificates are listed in the current Central Texas College catalog.

C. The delivery method of this course may be traditional lecture/lab, blended lecture/lab, or online.

D. Prerequisites: None

II. LEARNING OUTCOMES

Upon successful completion of this course, Fundamentals of Networking Technologies, the student will be able to:

A. Identify and use network transmission media (C3, C5, C15, C16, C18)

B. Explain the OSI model (C5, C15, C18, F1)

C. Identify the characteristics of network topologies and protocols (C3, C5, C15, C18)

D. Identify the functions of a network operating system and distinguish between centralized, client/server, and peer-to-peer systems (C1, C3, C5, C6, C8, C11, C13, C17, C18, C20)

E. Distinguish between Local Area Networks (LANs) and Wide Area Networks (WANs) and identify the components used to expand a LAN into a WAN (C5, C6, C8, C11, C15, C18, C19, F1, F8, F9)

III. INSTRUCTIONAL MATERIALS

A. The instructional materials identified for this course are viewable through www.ctcd.edu/books

B. Lecture Classes also require at least one USB storage device. Online students may use cloud based storage.

IV. COURSE REQUIREMENTS

A. Attend both lecture and lab or in the case of online delivery, be actively engaged in Blackboard and maintain constant progress.

B. Be prepared to participate in discussion, team projects/assignments and take unannounced assessments relating to the lecture materials.

C. Complete all exams/assessments.

D. Submit all assignments on time.

V. ASSESSMENTS

A. Student content mastery will be evaluated in the following areas:

- **Assessments (midterm exam, quizzes, projects, discussion etc.)**
- **Final Assessment (final exam and/or semester project, participation)**

B. Scheduled and unscheduled assessments will be given at the discretion of the instructor.

C. Exams/assessments may be composed of both subjective and objective questions plus computer output.

D. A student must take all exams/assessments. Both online and on campus students who know in advance that they will be absent due to school sponsored trips, military duty or orders, or any other valid reason, must arrange to take an early exam/assessment. Unexpected absences due to illness or other extenuating circumstances will require the student to contact the instructor about make-up work in lieu of the missed exam/assessment.

E. Students with unexcused absences will be given a zero for each missed assignment.

VI. SEMESTER GRADE COMPUTATION

Course Requirements	Points
Assignments	300
Assessments	300
Final Assessment	400
TOTAL	1000

Points	Grade	Quality Points
900-1000	A-Superior	4
800-899	B-Above Average	3
700-799	C-Average	2
600 - 699	D – Passing but Unsatisfactory	1
0 -599	F-Failure	0

VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM THE INSTRUCTOR

A. Information on the following Academic Policies, as described in the CTC Course Catalog will be followed:

1. **Withdrawals**
2. **Grading**
3. **Class Attendance and Course Progress**
4. **Scholastic Honesty**

B. Cell Phones and Pagers: Students will silence cell phones and mobile devices while in the classroom or lab.

C. Americans with Disabilities Act (ADA): Disability Support Services provide services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Explore the website at www.ctcd.edu/disability-support for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

D. Instructor Discretion: The instructor reserves the right of final decision in course requirements and may make changes to the course outline and/or assignments as needed.

E. Civility: Individuals are expected to be aware of what a constructive educational experience is and be respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.

VIII. COURSE OUTLINE

A. Lesson One:

1. **Learning Outcomes: Upon successful completion of this lesson the student will be able to:**
   a. **Distinguish between the client-server and peer-to-peer models used to control access to a network**
   b. **Identify types of applications and protocols used on a network**
   c. **Describe various networking hardware devices and the most common physical topologies**
   d. **Describe the seven layers of the OSI model**
   e. **Explain best practices for safety when working with networks and computers**
   f. **Describe the seven-step troubleshooting model for solving a networking problem**

2. **Learning Activities:**
   a. **Participate in collaborative discussions based on the assigned reading materials. (C9,C12,C14,F1, F2, F5, F6)**
   b. **Complete assigned PC labs/simulations (C18, C19, C20, F8, F9, F11)**
   c. **Submit assigned papers and/or projects (C5, C6, C8, F1, F2, F7, F9, F11)**

3. **Unit Outline:**
   Introduction to Networking

B. Lesson Two:

1. **Learning Outcomes: Upon successful completion of this lesson the student will be able to:**
   a. **Identify and describe network and cabling equipment in commercial buildings and work areas**
   b. **Create and analyze network diagrams**
   c. **Explain operating procedures, inventory management, labeling conventions**
   d. **Find the MAC address of a computer and explain its function in network communications**
   e. **Configure TCP/IP settings on a computer, including IP address, subnet mask, default gateway, and DNS servers**
   f. **Explain the purpose of ports and sockets, and identify the ports of several common, network protocols**
   g. **Describe domain names and the name resolution process**
   h. **Use command-line tools to troubleshoot common network problems**

2. **Learning Activities:**
   a. **Participate in collaborative discussions based on the assigned reading materials. (C9,C12,C14,F1, F2, F5, F6)**
   b. **Complete assigned PC labs/simulations (C18, C19, C20, F8, F9, F11)**
   c. **Submit assigned papers and/or projects (C5, C6, C8, F1, F2, F7, F9, F11)**

3. **Unit Outline:**
   a. **Network Infrastructure and Documentation**
   b. **Addressing on Networks**

C. **Lesson Three:**

1. **Learning Outcomes: Upon successful completion of this lesson the student will be able to:**
   a. **Describe the functions of core TCP/IP protocols**
   b. **Identify how each protocol's information is formatted in a TCP/IP message**
   c. **Explain how routers manage internetwork communications**
   d. **Employ various TCP/IP utilities for network discovery and troubleshooting**
   e. **Explain basic data transmission concepts, including throughput, bandwidth, multiplexing, and common transmission flaws**
   f. **Identify and describe the physical characteristics and official standards of coaxial cable, twisted-pair cable, and fiber-optic cable, and their related connectors**
   g. **Compare the benefits and limitations of various networking media**
   h. **Select and use the appropriate tool to troubleshoot common cable problems**

2. **Learning Activities:**
   a. **Participate in collaborative discussions based on the assigned reading materials. (C9,C12,C14,F1, F2, F5, F6)**
   b. **Complete assigned PC labs/simulations (C18, C19, C20, F8, F9, F11)**
   c. **Submit assigned papers and/or projects (C5, C6, C8, F1, F2, F7, F9, F11)**

3. **Unit Outline:**
   a. **Network Protocols and Routing**
   b. **Network Cabling**

D. **Lesson Four:**

1. **Learning Outcomes: Upon successful completion of this lesson the student will be able to:**
   a. **Identify and describe various types of wireless networking characteristics**
   b. **Explain the various wireless standards that support the Internet of Things**
   c. **Explain 802.11 standards and innovations**
   d. **Implement a Wi-Fi network**

e. **Secure a Wi-Fi network**
f. **Troubleshoot a Wi-Fi network**

2. **<u>Learning Activities:</u>**
   a. **Participate in collaborative discussions based on the assigned reading materials. (C9,C12,C14,F1, F2, F5, F6)**
   b. **Complete assigned PC labs/simulations (C18, C19, C20, F8, F9, F11)**
   c. **Submit assigned papers and/or projects (C5, C6, C8, F1, F2, F7, F9, F11)**

3. **<u>Unit Outline:</u>**
   Wireless Networking

E. <u>Lesson Five</u>:

1. **<u>Learning Outcomes</u>: Upon successful completion of this lesson the student will be able to:**
   a. **Describe and explain virtualization technologies, including how virtual machines connect with a network and how networking infrastructure devices can be virtualized**
   b. **Describe cloud computing categories and models, and discuss concerns regarding cloud connectivity and security**
   c. **Secure network connections using encryption protocols**
   d. **Configure remote access connections between devices**

2. **<u>Learning Activities:</u>**
   a. **Participate in collaborative discussions based on the assigned reading materials. (C9,C12,C14,F1, F2, F5, F6)**
   b. **Complete assigned PC labs/simulations (C18, C19, C20, F8, F9, F11)**
   c. **Submit assigned papers and/or projects (C5, C6, C8, F1, F2, F7, F9, F11)**

3. **<u>Unit Outline:</u>**
   Virtualization and Cloud Computing

F. <u>Lesson Six</u>:

1. **<u>Learning Outcomes</u>: Upon successful completion of this lesson the student will be able to:**
   a. **Explain the purposes of network segmentation**
   b. **Calculate and implement subnets**
   c. **Explain how VLANs work and how they're used**

2. **<u>Learning Activities:</u>**
   a. **Participate in collaborative discussions based on the assigned reading materials. (C9,C12,C14,F1, F2, F5, F6)**

b. Complete assigned PC labs/simulations (C18, C19, C20, F8, F9, F11)
c. Submit assigned papers and/or projects (C5, C6, C8, F1, F2, F7, F9, F11)

3. Unit Outline:

Subnets and VLANs

G. Lesson Seven:

1. Learning Outcomes: Upon successful completion of this lesson the student will be able to:
a. Identify people, technology, and malware security risks to a network
b. Describe tools used to evaluate the security of a network
c. Discuss physical security methods that prevent and detect intrusions
d. Configure devices on a network for increased security
e. Describe various security policies and explain how they can guide users' activities on a network
f. Describe the functions and features of various network security devices
g. Implement security precautions on a switch
h. Track the processes of authentication, authorization, and auditing on a network
i. Explain the available options in network access control methods
j. Configure various security measures on a wireless network
k. Use appropriate tools to monitor device and network events
l. Adjust device configurations to optimize network performance
m. Identify methods to increase network availability
n. Identify best practices for incident response and disaster recovery

2. Learning Activities:
a. Participate in collaborative discussions based on the assigned reading materials. (C9,C12,C14,F1, F2, F5, F6)
b. Complete assigned PC labs/simulations (C18, C19, C20, F8, F9, F11)
c. Submit assigned papers and/or projects (C5, C6, C8, F1, F2, F7, F9, F11)

3. Unit Outline:
a. Network Risk Management
b. Security in Network Design
c. Network Performance and Recovery

H. Lesson Eight:

1. Learning Outcomes: Upon successful completion of this lesson the student will be able to:
a. Identify the fundamental elements of WAN service options
b. Compare and contrast Layer 1 WAN technologies

c. **Compare and contrast Layer 2 WAN technologies**
d. **Explain the most common wireless WAN technologies**

2. **<u>Learning Activities:</u>**
   a. **Participate in collaborative discussions based on the assigned reading materials. (C9,C12,C14,F1, F2, F5, F6)**
   b. **Complete assigned PC labs/simulations (C18, C19, C20, F8, F9, F11)**
   c. **Submit assigned papers and/or projects (C5, C6, C8, F1, F2, F7, F9, F11)**

3. **<u>Unit Outline:</u>**

Wide Area Networks