I. INTRODUCTION

A. This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. By the end of the course, students will be able to build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes.

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, CCNA 1: Introduction to Networks, the student will be able to:

A. Build simple LANs. (C1, C5, C6, C7, C8, C12, C15, C17, C18, C20, F1, F7, F8, F9, F12)

B. Perform basic configurations for routers and switches. (C1, C5, C6, C7, C8, C12, C15, C17, C18, C20, F1, F7, F8, F9, F12, F16)

C. Implement IP addressing schemes. (C5, C6, C9, F1, F2, F9, F12)
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, 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. No make-up exams/assessments will be given. 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 see 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 COMPUTATIONS
<table>
<thead>
<tr>
<th>Course Requirements</th>
<th>Points</th>
<th>Points</th>
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<td>Assignments</td>
<td>300</td>
<td>900-1000</td>
<td>A-Superior</td>
<td>4</td>
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<tr>
<td>Assessments</td>
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<td>800-899</td>
<td>B-Above Average</td>
<td>3</td>
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<td>700-799</td>
<td>C-Average</td>
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<td></td>
<td></td>
<td>600-699</td>
<td>D-Passing but Unsatisfactory</td>
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<td>0-599</td>
<td>F-Failure</td>
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VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM THE INSTRUCTOR

A. Course Withdrawal: It is the student’s responsibility to officially withdraw from a course if circumstances prevent attendance. Any student who desires to, or must, officially withdraw from a course after the first scheduled class meeting must file a Central Texas College Application for Withdrawal (CTC Form 59). The student must sign the withdrawal form.

CTC Form 59 will be accepted at any time prior to Friday of the 12th week of classes during the 16-week fall and spring semesters. The deadline for sessions of other lengths is:
- 10-week session       Friday of the 8th week
- 8-week session        Friday of the 6th week
- 5-week session        Friday of the 4th week

The equivalent date (75% of the semester) will be used for sessions of other lengths. The specific last day to withdraw is published each semester in the Schedule Bulletin.

For non-GoArmyEd active military students, the effective date of withdrawal is the filing date with the Education Center. For all other students, the effective date of withdrawal is the date that the withdrawal application is received by the Central Texas College representative.

Students who used financial aid, military tuition assistance, VA benefits, or other non-personal funds may be required to repay tuition and fees to the funding agency. For specific repayment requirements, contact the Office of Student Financial Aid or Veterans Services Office before withdrawing. Military tuition assistance students should visit their military Education Center or Navy College Office.

A student who officially withdraws will be awarded the grade of “W” provided the student’s attendance and academic performance are satisfactory at the time of official withdrawal. Students must file a withdrawal application with the College before they may be considered for withdrawal.
A student may not withdraw from a class for which the instructor has previously issued a grade of “F,” “FI,” “FN,” “IP,” or “XN.”

B. **Instructor Initiated Withdrawals:** Faculty are authorized to withdraw students who are not making satisfactory course progress to include failure to meet College attendance requirements as outlined in the section of the Catalog entitled “Satisfactory Progress Standards.” The instructor will assign the appropriate grade on CTC Form 59 for submission to the registrar.

Students enrolled in distance learning courses are expected to maintain constant progress throughout the course. Failure to do so may result in the student being administratively withdrawn by the instructor.

Students who have not attended class by the 12th class day of a 16-week course or the 6th class day of an 8-week term may be administratively withdrawn by the instructor with a grade of "W." Students may be administratively withdrawn from any class when their absences reach a total equal to 12.5% of the class hours for the course; and in the opinion of the instructor, the student cannot satisfactorily complete the course. An example: Students attending a 48-hour class during an 8-week period normally meet 180 minutes each session for 16 sessions. Those students accumulating two (2) unexcused absences are subject to Administrative Withdrawal since the total unexcused absences equal 12.5% of class hours for the course. Those students attending a 48 hour class during a 16-week period normally meet 90 minutes each session for 32 sessions. Those students accumulating four (4) unexcused absences are subject to Administrative Withdrawal since the total unexcused absences equals 12.5% of class hours for the course. In a distance learning course the last date of attendance is the last activity by the student in the course.

C. **Administrative Withdrawal:** A student may be administratively withdrawn by a designated member of the administrative staff of the College when the student has been placed on Academic Suspension or Disciplinary Suspension; the student has an outstanding financial obligation owed to the college; or the student registered for a course without the required prerequisite or departmental permission.

The College is under no obligation to refund tuition and fees, or other costs associated with an administrative or instructor initiated withdrawal.

D. **Incomplete Grade:** The College catalog states, “An incomplete grade may be given in those cases where the student has completed the majority of the coursework but, because of personal illness, death in the immediate family, or military orders, the student is unable to complete the requirements for a course...” Prior approval from the instructor is required before the grade of “IP” for Incomplete is recorded.

E. **Cell Phones and Pagers:** Students will silence cell phones and mobile devices while in the classroom or lab.
F. **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. Review the website at [www.ctcd.edu/disability-support](http://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.

G. **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.

H. **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.

I. **Degree Progression:** Students who receive a grade of “D” are advised not to enroll in the next course for which this course was a prerequisite.

J. **Failing Grade:** The grade of “F” or “FN” will be given for academic failure, non-attendance or scholastic dishonesty.

K. **Scholastic Honesty:** All students are expected to maintain the highest standards of scholastic honesty in the preparation of all course work and during examinations. The college policy on scholastic honesty, including definitions on plagiarism, collusion, and cheating can be found at the following URL: [http://online.ctcd.edu/plagiarism.cfm](http://online.ctcd.edu/plagiarism.cfm)
VIII. COURSE OUTLINE

A. Lesson One: Explore the Network

1. Learning Outcomes: Upon successful completion of this lesson the student will be able to:
   a. Explain how multiple networks are used in everyday life.
   b. Describe how topologies and devices are connected in a small to medium-sized business
   c. Explain the basic characteristics of a network that supports communication in a small to medium-sized business.
   d. Explain trends in networking that will affect the use of networks in small to medium-sized businesses

2. Learning Activities:
   a. Research and discuss the topics of the Lesson in class and in an online collaborative discussion forum (C7, C8, C9, C15, C18, F1, F9, F10, F13)
   b. Perform skills and functions in the section (C1, C5, C7, C8, C9, C16, C18, F1, F9, F10, F13)

3. Unit Outline:
   a. Globally Connected Networks
   b. LANs, WANs and the Internet
   c. The Network as a Platform
   d. The Changing Work Environment

B. Lesson Two: Configure a Network Operating System

1. Learning Outcomes: Upon successful completion of this lesson the student will be able to:
   a. Explain the features and functions of the Cisco IOS Software.
   b. Configure initial settings on a network device using the Cisco IOS Software.
   c. Given an IP addressing scheme, configure IP address parameters on devices to provide end-to-end connectivity in a small to medium-sized business network.

2. Learning Activities:
   a. Research and discuss the topics of the Lesson in class and in an online collaborative discussion forum (C7, C8, C9, C15, C18, F1, F9, F10, F13)
   b. Perform skills and functions in the section (C1, C5, C7, C8, C9, C16, C18, F1, F9, F10, F13)

3. Unit Outline:
   a. IOS Bootcamp
b. Basic Device Configuration

C. Lesson Three: Network Protocols and Communications

1. Learning Outcomes: Upon successful completion of this lesson, the student will be able to:
   a. Identify common traits of rules which facilitate communication.
   b. Explain the role of protocols and standards organizations in facilitating interoperability in network communications.
   c. Locate placement and behavior of devices on a LAN in a small to medium-sized business network.

2. Learning Activities:
   a. Research and discuss the topics of the Lesson in class and in an online collaborative discussion forum (C7, C8, C9, C15, C18, F1, F9, F10, F13)
   b. Perform skills and functions in the section (C1, C5, C7, C8, C9, C16, C18, F1, F9, F10, F13)

3. Unit Outline:
   a. Rules of Communication
   b. Network Protocols and Standards
   c. Data Transfer in the Network

D. Lesson Four: Network Access

1. Learning Outcomes: Upon successful completion of this lesson, the student will be able to:
   a. Explain how physical layer protocols and services support communications across data networks.
   b. Build a simple network using the appropriate media.
   c. Explain the role of the data link layer in supporting communications across data networks.
   d. Compare media access control techniques and logical topologies used in networks.

2. Learning Activities:
   a. Research and discuss the topics of the Lesson in class and in an online collaborative discussion forum (C7, C8, C9, C15, C18, F1, F9, F10, F13)
   b. Perform skills and functions in the section (C1, C5, C7, C8, C9, C16, C18, F1, F9, F10, F13)

3. Unit Outline:
   a. Physical Layer Protocols
b. Network Media

c. Data Link Layer Protocols

d. Media Access Control

E. Lesson Five: Ethernet Protocols

1. Learning Outcomes: Upon successful completion of this lesson, the student will be able to:
   a. Explain the operation of Ethernet.
   b. Diagram the operation of the components of a switch.
   c. Demonstrate how the address resolution protocol enables communication on a network.

2. Learning Activities:
   a. Research and discuss the topics of the Lesson in class and in an online collaborative discussion forum (C7, C8, C9, C15, C18, F1, F9, F10, F13)
   b. Perform skills and functions in the section (C1, C5, C7, C8, C9, C16, C18, F1, F9, F10, F13)

3. Unit Outline:
   a. Ethernet Protocol
   b. LAN Switches
   c. Address resolution Protocol

F. Lesson Six: Network Layer

1. Learning Outcomes: Upon successful completion of this lesson, the student will be able to:
   a. Describe how network layer protocols and services support communications across data networks.
   b. Explain how routers enable end-to-end connectivity in a small to medium-sized business network.
   c. Explain how devices route traffic in a small to medium-sized business network.
   d. Configure a router with basic configurations.

2. Learning Activities:
   a. Research and discuss the topics of the Lesson in class and in an online collaborative discussion forum (C7, C8, C9, C15, C18, F1, F9, F10, F13)
   b. Perform skills and functions in the section (C1, C5, C7, C8, C9, C16, C18, F1, F9, F10, F13)

3. Unit Outline:
   a. Network Layer Protocols
b. Routing

c. Routers

d. Configuring a Cisco Router

G. Lesson Seven: IP Addressing

1. Learning Outcomes: Upon successful completion of this lesson, the student will be able to:
   a. Explain the use of IPv4 addresses to provide connectivity in small to medium-sized business networks.
   b. Configure IPv6 addresses to provide connectivity in small to medium-sized business networks.
   c. Use common testing utilities to verify and test network connectivity.

2. Learning Activities:
   a. Research and discuss the topics of the Lesson in class and in an online collaborative discussion forum (C7, C8, C9, C15, C18, F1, F9, F10, F13)
   b. Perform skills and functions in the section (C1, C5, C7, C8, C9, C16, C18, F1, F9, F10, F13)

3. Unit Outline:
   a. IPv4 Network Addresses
   b. IPv6 Network Addresses
   c. Connectivity Verification

H. Lesson Eight: Subnetting IP Networks

1. Learning Outcomes: Upon successful completion of this lesson, the student will be able to:
   a. Implement an IPv4 addressing scheme to enable end-to-end connectivity in a small to medium-sized business network.
   b. Given a set of requirements, implement a VLSM addressing scheme to provide connectivity to end users in a small to medium-sized network.
   c. Explain design considerations for implementing IPv6 in a business network.

2. Learning Activities:
   a. Research and discuss the topics of the Lesson in class and in an online collaborative discussion forum (C7, C8, C9, C15, C18, F1, F9, F10, F13)
   b. Perform skills and functions in the section (C1, C5, C7, C8, C9, C16, C18, F1, F9, F10, F13)

3. Unit Outline:
   a. Subnetting an IPv4 Network
b. Addressing Schemes  
c. Design Considerations for IPv6  

I. Lesson Nine: Transport Layer  

1. Learning Outcomes: Upon successful completion of this lesson, the student will be able to:  
a. Explain how transport layer protocols and services support communications across data networks.  
b. Compare the operations of transport layer protocols in supporting end-to-end communication.  

2. Learning Activities:  
a. Research and discuss the topics of the Lesson in class and in an online collaborative discussion forum (C7, C8, C9, C15, C18, F1, F9, F10, F13)  
b. Perform skills and functions in the section (C1, C5, C7, C8, C9, C16, C18, F1, F9, F10, F13)  

3. Unit Outline:  
a. Transport Layer Protocols  
b. Transmission Control Protocol (TCP)  
c. User Datagram Protocol (UDP)  

J. Lesson Ten: Application Layer  

1. Learning Outcomes: Upon successful completion of this lesson, the student will be able to:  
a. Explain the operation of the application layer in providing support to end-user applications.  
b. Explain how well-known TCP/IP application layer protocols operate.  

2. Learning Activities:  
a. Research and discuss the topics of the Lesson in class and in an online collaborative discussion forum (C7, C8, C9, C15, C18, F1, F9, F10, F13)  
b. Perform skills and functions in the section (C1, C5, C7, C8, C9, C16, C18, F1, F9, F10, F13)  

3. Unit Outline:  
a. Application Layer Protocols  
b. Well-Known Application Layer Protocols and Services  

K. Lesson Eleven: Build a Small Network
1. **Learning Outcomes:** Upon successful completion of this lesson, the student will be able to:
   a. Explain how a small network of directly connected segments is created, configured and verified.
   b. Configure switches and routers with device hardening features to enhance security.
   c. Use common show commands and utilities to establish a relative performance baseline for the network.
   d. Troubleshoot a network.

2. **Learning Activities:**
   a. Research and discuss the topics of the Lesson in class and in an online collaborative discussion forum (C7, C8, C9, C15, C18, F1, F9, F10, F13)
   b. Perform skills and functions in the section (C1, C5, C7, C8, C9, C16, C18, F1, F9, F10, F13)

3. **Unit Outline:**
   a. Network Design
   b. Network Security
   c. Basic Network Performance
   d. Network Troubleshooting