

I. COURSE DESCRIPTION:

This course introduces students to network terminology, technologies and protocols, such as the TCP/IP suite of protocols used on the Internet. The course also includes the study of network media, Ethernet technologies, routing and bridging techniques and network devices. Practical exercises in network cable installation planning, terminating and testing is also an important component of this course. In general, it provides an introduction to the fundamentals of networks including LANs and WANs.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the CICE student along with the assistance of a Learning Specialist, will demonstrate the basic ability to:

1. Explain the importance of data networks and the Internet in supporting business communications and every day activities.Potential Elements of the Performance:

- Basically describe how networks impact our daily lives.
- Basically describe the role of data networking in the human network.
- Basically identify the key components of any data network.
- Basically identify the opportunities and challenges posed by converged networks.
- Basically describe the characteristics of network architectures: fault tolerance, scalability, quality of service and security.
- Basically install and use IRC clients and a Wikiserver.

Reference: Network Fundamentals CCNA Exploration, Chapter-1

2. Explain how communication works in data networks and the InternetPotential Elements of the Performance:

- Basically describe the structure of a network, including the devices and media that are necessary for successful communications.
- Basically explain the function of protocols in network communications.
- Basically explain the advantages of using a layered model to describe network functionality.

- Basically describe the role of each layer in two recognized network models: The TCP/IP model and the OSI model.
- Basically describe the importance of addressing and naming schemes in network communications.

Reference: Network Fundamentals CCNA Exploration, Chapter-2

3. **Describe & utilize the Application Layer & its protocols.**

Potential Elements of the Performance:

- Basically describe how the functions of the three upper OSI model layers provide network services to end user applications.
- Basically describe how the TCP/IP Application Layer protocols provide the services specified by the upper layers of the OSI model.
- Basically define how people use the Application Layer to communicate across the information network.
- Basically describe the function of well-known TCP/IP applications, such as the World Wide Web and email, and their related services (HTTP, DNS, SMB, DHCP, STMP/POP, and Telnet).
- Basically describe file-sharing processes that use peer-to-peer applications and the Gnutella protocol.
- Basically explain how protocols ensure services running on one kind of device can send to and receive data from many different network devices.
- Basically use network analysis tools to examine and explain how common user applications work.

Reference: Network Fundamentals CCNA Exploration, Chapter-3

4. **Analyze the operations and features of the Transport layer protocols and services**

Potential Elements of the Performance:

- Basically explain the need for the Transport layer.
- Basically identify the role of the Transport layer as it provides the end-to-end transfer of data between applications.
- Basically describe the role of two TCP/IP Transport layer protocols: TCP and UDP.
- Basically explain the key functions of the Transport layer,

including reliability, port addressing, and segmentation.

- Basically explain how TCP and UDP each handle key functions.
- Basically identify when it is appropriate to use TCP or UDP and provide examples of applications that use each protocol.

Reference: Network Fundamentals CCNA Exploration, Chapter-4

5. **Analyze the operations and feature of the Network layer protocols and services and explain the fundamental concepts of routing**

Potential Elements of the Performance:

- Basically identify the role of the Network layer as it describes communication from one end device to another end device.
- Basically examine the most common Network layer protocol, Internet Protocol (IP), and its features for providing connectionless and best-effort service.
- Basically understand the principles used to guide the division, or grouping, of devices into networks.
- Basically understand the hierarchical addressing of devices and how this allows communication between networks.
- Basically understand the fundamentals of routes, next-hop addresses, and packet forwarding to a destination network.

Reference: Network Fundamentals CCNA Exploration, Chapter-5

6. **Design, calculate, and apply subnet masks and IP addresses to fulfill given requirements**

Potential Elements of the Performance:

- Basically explain the structure IP addressing and demonstrate the ability to convert between 8-bit binary and decimal numbers.
- Given an IPv4 address, classify by type and basically describe how it is used in the network.
- Basically explain how addresses are assigned to networks by ISPs and within networks by administrators.
- Determine the basic network portion of the host address and explain the role of the subnet mask in dividing networks.
- Given IPv4 addressing information and design criteria, basically calculate the appropriate addressing components.
- Use common basically testing utilities to verify and test network connectivity and operational status of the IP protocol stack on a host.

Reference: Network Fundamentals CCNA Exploration, Chapter-6

7. **Describe the operation of protocols at the OSI Data link layer and explain how they support communications**

Potential Elements of the Performance:

- Basically explain the role of Data Link layer protocols in data transmission.
- Basically describe how the Data Link layer prepares data for transmission on network media.
- Basically describe the different types of media access control methods.
- Basically identify several common logical network topologies and describe how the logical topology determines the media access control method for that network.
- Basically explain the purpose of encapsulating packets into frames to facilitate media access.
- Basically describe the Layer 2 frame structure and identify generic fields.
- Basically explain the role of key frame header and trailer fields, including addressing, QoS, type of protocol, and Frame Check Sequence.

Reference: Network Fundamentals CCNA Exploration, Chapter-7

8. **Explain the role of Physical layer protocols and services in supporting communications across data Networks**

Potential Elements of the Performance:

- Basically explain the role of Physical layer protocols and services in supporting communication across data networks.
- Basically describe the purpose of Physical layer signaling and encoding as they are used in networks.
- Basically describe the role of signals used to represent bits as a frame is transported across the local media.
- Basically identify the basic characteristics of copper, fiber, and wireless network media and describe common uses of copper, fiber, and wireless network media.

Reference: Network Fundamentals CCNA Exploration, Chapter-8

9. **Explain fundamental Ethernet concepts such as media, services, and operation**

Potential Elements of the Performance:

- Basically describe the evolution of Ethernet
- Basically explain the fields of the Ethernet Frame
- Basically describe the function and characteristics of the media access control method used by Ethernet protocol
- Basically describe the Physical and Data Link layer features of Ethernet
- Basically compare and contrast Ethernet hubs and switches
- Basically explain the Address Resolution Protocol (ARP)

Reference: Network Fundamentals CCNA Exploration, Chapter-9

10. **Employ basic cabling and network designs to connect devices in accordance with stated objectives**

Potential Elements of the Performance:

- Basically identify the basic network media required to make a LAN connection.
- Basically identify the types of connections for intermediate and end device connections in a LAN.
- Basically identify the pinout configurations for straight-through and crossover cables.
- Basically identify the different cabling types, standards, and ports used for WAN connections.
- Basically define the role of device management connections when using Cisco equipment.
- Basically design an addressing scheme for an internetwork and assign ranges for hosts, network devices, and the router interface.
- Basically compare and contrast the importance of network designs.

Reference: Network Fundamentals CCNA Exploration, Chapter-10

11. **Build a simple Ethernet network using routers and switches and use Cisco CLI IOS commands to perform basic router and switch configuration and verification**

Potential Elements of the Performance:

- Basically define the role of the Internetwork Operating System (IOS).
- Basically define the purpose of a configuration file.
- Basically identify several classes of devices that have the IOS embedded.
- Basically identify the factors contributing to the set of IOS commands available to a device.
- Basically identify the IOS modes of operation.
- Basically identify the basic IOS commands.
- Basically compare and contrast the basic show commands.

Reference: Network Fundamentals CCNA Exploration, Chapter-11

III. TOPICS:

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|-----|--------------|---|
| 1. | Chapters 1-2 | Introduction to Networking and Communications |
| 2. | Chapter 3 | Application Layer Functions & Protocols |
| 3. | Chapter 4 | OSI Transport Layer |
| 4. | Chapter 5 | OSI Network Layer |
| 5. | Chapter 6 | Addressing the Network – Ipv4 |
| 6. | Chapter 7 | Data Link Layer |
| 7. | Chapter 8 | OSI Physical Layer |
| 8. | Chapter 9 | Ethernet |
| 9. | Chapter 10 | Planning & Cabling Networks |
| 10. | Chapter 11 | Configuring & Testing Networks |

IV. REQUIRED RESOURCES / TEXTS / MATERIALS:

The curriculum is provided on-line but the following text and the lab manual are recommended:

Textbook:

“Network Fundamentals CCNA Exploration Companion Guide”, Cisco Press, 2008, ISBN-13:978-1-58713-208-7, ISBN-10:1-58713-208-7

Mandatory Lab manual:

“Network Fundamentals CCNA Exploration Labs and Study Guide”, Cisco Press, 2008, ISBN-13:978-1-58713-203-2, ISBN-10:1-58713-203-6

Both bundled:

NETWORK FUNDAMENTALS CCNA EXPLRTN VALUE PK (includes text book and the lab manual) © 2008 | ISBN-13: 9780131357709

V. EVALUATION PROCESS/GRADING SYSTEM:

Final grade will be awarded based on the composite score of assignments, quizzes, and tests as follows:

Theory:

Online Cisco Chapter exams (10x3)	30%
Cisco Final Exam	25%
Attendance	5%
Assignments	5%

Lab:

Lab Activities	25%
Skills-based Assessment	10%

(The percentages shown above may have to be adjusted to accurately evaluate student skills. Students will be notified of any changes made.)

Note: It is necessary to attain a grade of 60% on the final Cisco Exam in order to proceed to the next Cisco CCNA Course level.

Online Cisco exams must be written in class during class time. Special procedures for on-line testing will be a requirement of this course.

The professor reserves the right to adjust the mark up or down based on attendance, participation, leadership, creativity and whether there is an improving trend.

- Students must complete and pass both the test and lab portion of the course in order to pass the entire course.
- All Assignments must be completed satisfactorily to complete the course.
- Makeup Tests are at the discretion of the instructor and will be assigned a maximum grade of 50%.
- The professor reserves the right to adjust the number of tests, practical tests and quizzes based on unforeseen circumstances. The students will be given sufficient notice to any changes and the reasons thereof.
- A student who is absent for 3 or more times without any valid reason or effort to resolve the problem will result in action taken.

NOTE: If action is to be taken, it will range from marks being deducted to a maximum of removal from the course.

Attendance:

Absenteeism will affect a student's ability to succeed in this course. Absences due to medical or other unavoidable circumstances should be discussed with the professor. Students are required to be in class on time and attendance will be taken within the first five minutes of class. A missed class will result in a penalty in your marks unless you have discussed your absence with the professor as described above. The penalty depends on course hours and will be applied as follows:

Course Hours	Deduction
5 hrs/week (75 hrs)	1% per hour
4 hrs/week (60 hrs)	1.5% per hour
3 hrs/week (45 hrs)	2% per hour
2 hrs/week (30 hrs)	3% per hour

Absentee reports will be discussed with each student during regular meetings with Faculty Mentors. Final penalties will be reviewed by the professor and will be at the discretion of the professor.

The following semester grades will be assigned to students:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

VI. SPECIAL NOTES:Upgrading of Incompletes:

When a student's course work is incomplete or final grade is below 50%, there is the possibility of upgrading to a pass when a student meets all of the following criteria:

1. The student's attendance has been good.
2. An overall average of at least 45% has been achieved by semester's end.
3. The student has made reasonable efforts to participate in class and maintain the recommended schedule for assigned activities.

The nature of the upgrading requirements will be determined by the instructor and may involve re-testing and/or additional lab assignments

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.

CICE Modifications:**Preparation and Participation**

1. A Learning Specialist will attend class with the student(s) to assist with inclusion in the class and to take notes.
2. Students will receive support in and outside of the classroom (i.e. tutoring, assistance with homework and assignments, preparation for exams, tests and quizzes.)
3. Study notes will be geared to test content and style which will match with modified learning outcomes.
4. Although the Learning Specialist may not attend all classes with the student(s), support will always be available. When the Learning Specialist does attend classes he/she will remain as inconspicuous as possible.

A. Tests may be modified in the following ways:

1. Tests, which require essay answers, may be modified to short answers.
2. Short answer questions may be changed to multiple choice or the question may be simplified so the answer will reflect a basic understanding.
3. Tests, which use fill in the blank format, may be modified to include a few choices for each question, or a list of choices for all questions. This will allow the student to match or use visual clues.
4. Tests in the T/F or multiple choice format may be modified by rewording or clarifying statements into layman's or simplified terms. Multiple choice questions may have a reduced number of choices.

B. Tests will be written in CICE office with assistance from a Learning Specialist.***The Learning Specialist may:***

1. Read the test question to the student.
2. Paraphrase the test question without revealing any key words or definitions.
3. Transcribe the student's verbal answer.
4. Test length may be reduced and time allowed to complete test may be increased.

C. Assignments may be modified in the following ways:

1. Assignments may be modified by reducing the amount of information required while maintaining general concepts.
2. Some assignments may be eliminated depending on the number of assignments required in the particular course.

The Learning Specialist may:

1. Use a question/answer format instead of essay/research format
2. Propose a reduction in the number of references required for an assignment
3. Assist with groups to ensure that student comprehends his/her role within the group
4. Require an extension on due dates due to the fact that some students may require additional time to process information
5. Formally summarize articles and assigned readings to isolate main points for the student
6. Use questioning techniques and paraphrasing to assist in student comprehension of an assignment

D. Evaluation:

Is reflective of modified learning outcomes.