

Course Outline of Record

1. Course Code: CIS-353B
2.
  - a. Long Course Title: Computer Network Fundamentals II
  - b. Short Course Title: IT NETWORKS II
3.
  - a. Catalog Course Description:
 

CompTIA certifications help students build a solid foundation of essential knowledge and skills that will help students earn employment in technology-related careers. The CompTIA Network+ certification assures employers that their applicant is prepared to enter the workforce as a network support technician. Computer network technicians analyze, test, troubleshoot, and evaluate existing network systems, such as local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Perform network maintenance to ensure networks operate correctly with minimal interruption.

Completion of this course, together with CIS 353A, prepares students for the CompTIA Network+ N10-006 industry certification exam.

This course may be taken as credit or non-credit.
  - b. Class Schedule Course Description:
 

CompTIA certifications help students build a solid foundation of essential knowledge and skills that will help students earn employment in technology-related careers. The CompTIA Network+ certification assures employers that their applicant is prepared to enter the workforce as a network support technician. Computer network technicians analyze, test, troubleshoot, and evaluate existing network systems, such as local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Perform network maintenance to ensure networks operate correctly with minimal interruption.

Completion of this course, together with CIS 353A, prepares students for the CompTIA Network+ N10-006 industry certification exam.
  - c. Semester Cycle (*if applicable*): N/A
  - d. Name of Approved Program(s):
    - NETWORK+ PREPARATORY Certificate of Completion
4. Total Units: 0      Total Semester Hrs: 27.00  
 Lecture Units: 0      Semester Lecture Hrs: 27.00  
 Lab Units: 0      Semester Lab Hrs: 0  
 Class Size Maximum: 32      Allow Audit: No  
 Repeatability Noncredit - Unlimited  
 Justification 0
5. Prerequisite or Corequisite Courses or Advisories:
 

*Course with requisite(s) and/or advisory is required to complete Content Review Matrix (CCForm1-A)*

 Prerequisite: CIS 353A
6. Textbooks, Required Reading or Software: (*List in APA or MLA format.*)
  - a. Dye, M., Reid, A. (2013). Cisco Networking Academy Program: Introduction to Networks (1st/e). Cisco Press. ISBN: 9781587133169  
 College Level: Yes  
 Flesch-Kincaid reading level: 12
  - b. Meyers, Mike (2015). CompTIA Network+ All-In-One Exam Guide (6th/e). McGraw Hill. ISBN: 9780071848220  
 College Level: Yes  
 Flesch-Kincaid reading level: 12
7. Entrance Skills: *Before entering the course students must be able:*

a.

Describe and differentiate the devices and services used to support communications in data networks and the Internet.

- CIS 353A - Describe and differentiate the devices and services used to support communications in data networks and the Internet.

b.

Describe the role of protocol layers in data networks.

- CIS 353A - Describe the role of protocol layers in data networks.

c.

Evaluate the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments.

- CIS 353A - Evaluate the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments.

d.

Design, calculate, and apply subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 networks.

- CIS 353A - Design, calculate, and apply subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 networks.

## 8. Course Content and Scope:

### Lecture:

1. Standard media types (for example: Fiber, Copper), associated properties, standard connector types.
2. Wireless standards.
  1. WPA personal.
  2. WPA enterprise.
  3. Disable SSID Broadcast.
3. WAN (Wide Area Networks) technology types and properties.
  1. ISDN.
  2. DSL.
  3. Frame Relay.
4. Network topologies.
  1. Define star topologies.
  2. Client server.
  3. Ring topologies.
5. LAN (Local Area Networks) technology types and properties.
  1. Logical map of the network.
  2. Physical map of the network.
  3. Vlan,s mapped to IP addresses.
6. Hardware and software tools to troubleshoot connectivity issues.
  1. Extended ping.
  2. Network baseline testing.
  3. Protocol analyzer.
7. Network monitoring resources to analyze traffic.
  1. Using WireShark to watch network performance.
  2. Using Protocol Analyzer.
8. Network performance optimization.
  1. Using Vlan's.
  2. Providing file-sharing services.
  3. Interpreting ping results.
9. Wireless Security Measures.
  1. AES encryption.
  2. WPA personal.
  3. Disable SSID broadcast.
10. Network Access Security Methods.

1. Control VTY lines.
2. Control Telnet.
11. User authentication Methods.
  1. Security on VTY lines.
  2. Authentication using SSH.
  3. Encryption of passwords.
12. Common threats, vulnerabilities, and mitigation techniques.
  1. Firewalls.
  2. Endpoint security.
  3. Authentication, authorization, and accounting.

Lab: (if the "Lab Hours" is greater than zero this is required)

9. Course Student Learning Outcomes:

1.  
Evaluate network bandwidth consumption by services offered through a network.
2.  
Understand the importance of data traffic and its security.
3.  
Employ best practices to ensure server reliability.

10. Course Objectives: *Upon completion of this course, students will be able to:*

- a. Explain fundamental Ethernet concepts such as media, services, and operations.
- b. Build a simple Ethernet network using routers and switches.
- c. Compose Cisco command-line interface (CLI) commands to perform basic router and switch configurations.
- d. Experiment with common network utilities to verify small network operations and analyze data traffic.

11. Methods of Instruction: (*Integration: Elements should validate parallel course outline elements*)

- a. Activity
- b. Collaborative/Team
- c. Demonstration, Repetition/Practice
- d. Discussion
- e. Distance Education
- f. Lecture
- g. Technology-based instruction

Other Methods:

Projects in order to facilitate and demonstrate the acquisition of skills required to relate the OSI model to router and switch commutations.

12. Assignments: (*List samples of specific activities/assignments students are expected to complete both in and outside of class.*)

In Class Hours: 27.00

Outside Class Hours: 54.00

a. In-class Assignments

- Initializing and Reloading a Router and Switch
- Installing the IPv6 Protocol with Windows XP
- Building a Simple Network
- Configuring a Switch Management Address
- Using Wireshark to View Network Traffic
- Exploring Router Physical Characteristics
- Building a Switch and Router Network

- Identifying IPv6 Addresses
- Configuring IPv6 Addresses on Network Devices
- Testing Network Connectivity with Ping and Traceroute
- Designing and Implementing a Subnetted IPv4 Addressing Scheme
- Designing and Implementing a VLSM Addressing Scheme
- Viewing Network Device MAC Addresses
- Using Wireshark to Examine Ethernet Frames
- Observing ARP with the Windows CLI, IOS CLI, and Wireshark
- Using IOS CLI with Switch MAC Address Tables
- Accessing Network Devices with SSH
- Securing Network Devices
- Using the CLI to Gather Network Device Information
- Managing Router Configuration Files with Terminal Emulation Software
- Managing Device Configuration Files Using TFTP, Flash, and USB

b. Out-of-class Assignments

- Students are required to read the Cisco Netacad Web site and the CCNA Routing and Switching Introduction to Networks Companion Guide booklet.
- Utilizing the concepts learned, students will write a paper clarifying the (OSI) Open System Interconnect model on how each layer is used and aligning protocols to each layer. Students will also write a list IP addresses used to subnet a class A, B, and C network.
- Students will be completing assignments outside of class utilizing Packet Tracer, NetAcad, and Netlab. These assignments will consist of preset configuration requirements covering different router and switch networking scenarios.

13. Methods of Evaluating Student Progress: *The student will demonstrate proficiency by:*

- Written homework  
Written on-line assignments; these topics are called out in the CISCO curriculum.
- Laboratory projects  
Laboratory projects/performance within Netlab, a locally hosted network simulator.
- Computational/problem solving evaluations
- Presentations/student demonstration observations  
Hands-on-projects and a combination of examinations, presentations, discussions, or problem-solving assignments.  
Presentations of projects within specific modules.
- Group activity participation/observation  
Class and individual projects such as an addressing scheme for a proposed local network.
- True/false/multiple choice examinations  
Testing of each module on the CISCO site.
- Mid-term and final evaluations  
Final examination/skills assessment administered on the CISCO site.
- Student participation/contribution

14. Methods of Evaluating: Additional Assessment Information:

15. Need/Purpose/Rationale -- *All courses must meet one or more CCC missions.*

PO - Career and Technical Education

Fulfill the requirements for an entry- level position in their field.

Apply critical thinking skills to execute daily duties in their area of employment.

Apply critical thinking skills to research, evaluate, analyze, and synthesize information.

Display the skills and aptitude necessary to pass certification exams in their field.

Exhibit effective written, oral communication and interpersonal skills.

IO - Personal and Professional Development

Demonstrate an understanding of ethical issues to make sound judgments and decisions.

IO - Scientific Inquiry

Collect and analyze data. Skills of data collection include an understanding of the notion of hypothesis testing and specific methods of inquiry such as experimentation and systematic observation.

IO - Critical Thinking and Communication

Apply principles of logic to problem solve and reason with a fair and open mind.

IO - Global Citizenship - Scientific & Technological Literacy

Synthesize, interpret, and infer, utilizing information, data, and experience to solve problems, innovate, and explore solutions.

IO - Global Citizenship - Ethical Behavior

Apply ethical reasoning to contemporary issues and moral dilemmas.

16. Comparable Transfer Course

University System	Campus	Course Number	Course Title	Catalog Year
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17. Special Materials and/or Equipment Required of Students:

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18. Materials Fees:  Required Material?

Material or Item	Cost Per Unit	Total Cost
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19. Provide Reasons for the Substantial Modifications or New Course:

This course, together with CIS 353A, prepares students for the CompTIA Network+ certification exam. This certification will help them obtain employment in an IT-related field. The course is also oriented and the nontraditional student who does not desire to continue to a 4 year college but rather benefit from gainful IT-related employment.

20. a. Cross-Listed Course (*Enter Course Code*): *N/A*  
 b. Replacement Course (*Enter original Course Code*): *N/A*

21. Grading Method (*choose one*): Pass/No Pass Only

22. MIS Course Data Elements

- a. Course Control Number [CB00]: CCC000580645
- b. T.O.P. Code [CB03]: 70100.00 - Information Technology, G
- c. Credit Status [CB04]: N - Noncredit
- d. Course Transfer Status [CB05]: C = Non-Transferable
- e. Basic Skills Status [CB08]: 2N = Not basic skills course
- f. Vocational Status [CB09]: Clearly Occupational
- g. Course Classification [CB11]: J - Workforce Preparation Enhanced Funding
- h. Special Class Status [CB13]: N - Not Special
- i. Course CAN Code [CB14]: *N/A*
- j. Course Prior to College Level [CB21]: Y = Not Applicable
- k. Course Noncredit Category [CB22]: J - Workforce Preparation
- l. Funding Agency Category [CB23]: Y = Not Applicable
- m. Program Status [CB24]: 1 = Program Applicable

Name of Approved Program (*if program-applicable*): NETWORK+ PREPARATORY

*Attach listings of Degree and/or Certificate Programs showing this course as a required or a restricted elective.)*

23. Enrollment - Estimate Enrollment

First Year: 12  
 Third Year: 32

24. Resources - Faculty - Discipline and Other Qualifications:

a. Sufficient Faculty Resources: Yes

b. If No, list number of FTE needed to offer this course: N/A

25. Additional Equipment and/or Supplies Needed and Source of Funding.

N/A

26. Additional Construction or Modification of Existing Classroom Space Needed. (*Explain:*)

N/A

27. FOR NEW OR SUBSTANTIALLY MODIFIED COURSES

Library and/or Learning Resources Present in the Collection are Sufficient to Meet the Need of the Students Enrolled in the Course: Yes

28. Originator Felix Marhuenda-Donate Origination Date 09/13/16