**CS 82.21A Course Outline as of Fall 2015**

# CATALOG INFORMATION

Dept and Nbr: CS 82.21A Title: NETWORK FUNDAMENTALS
Full Title: Network Fundamentals (Cisco Networking 1)
Last Reviewed: 5/11/2015

| Units | | Course Hours per Week | | Nbr of Weeks | Course Hours Total | |
|---|---|---|---|---|---|---|
| Maximum | 4.00 | Lecture Scheduled | 4.00 | 17.5 | Lecture Scheduled | 70.00 |
| Minimum | 4.00 | Lab Scheduled | 0 | 8 | Lab Scheduled | 0 |
| | | Contact DHR | 0 | | Contact DHR | 0 |
| | | Contact Total | 4.00 | | Contact Total | 70.00 |
| | | Non-contact DHR | 0 | | Non-contact DHR | 0 |

Total Out of Class Hours: 140.00 Total Student Learning Hours: 210.00

| | |
|---|---|
| Title 5 Category: | AA Degree Applicable |
| Grading: | Grade or P/NP |
| Repeatability: | 00 - Two Repeats if Grade was D, F, NC, or NP |
| Also Listed As: | |
| Formerly: | CIS 55.11A |

**Catalog Description:**
This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. It uses the OSI (open systems interconnection) and TCP (transmission control protocol) layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. The principles and structure of IP (internet protocol) addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. Network simulator activities help students analyze protocol and network operation and build small networks in a virtual environment. Students build simple LAN (Local Area Network) topologies by applying basic principles of cabling, performing basic configurations of network devices, including routers and switches, and implementing IP addressing schemes.Network Fundamentals is the first of the four courses leading to the Cisco Certified Network Associate (CCNA) designation. CCNA 1 introduces Cisco Networking Academy Program students to the networking field.

**Prerequisites/Corequisites:**

**Recommended Preparation:**
Completion of CS 80.15 AND CS 81.21 AND Eligibility for ENGL 100 or ESL 100

**Limits on Enrollment:**

**Schedule of Classes Information:**
Description: This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. It uses the OSI (open systems interconnection) and TCP (transmission control protocol) layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. The principles and structure of IP (internet protocol) addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. Network simulator activities help students analyze protocol and network operation and build small networks in a virtual environment. Students build simple LAN (Local Area Network) topologies by applying basic principles of cabling, performing basic configurations of network devices, including routers and switches, and implementing IP addressing schemes.Network Fundamentals is the first of the four courses leading to the Cisco Certified Network Associate (CCNA) designation. CCNA 1 introduces Cisco Networking Academy Program students to the networking field. (Grade or P/NP)
Prerequisites/Corequisites:
Recommended: Completion of CS 80.15 AND CS 81.21 AND Eligibility for ENGL 100 or ESL 100
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

| | | | | | |
|---|---|---|---|---|---|
| **AS Degree:** | **Area** | | | Effective: | Inactive: |
| **CSU GE:** | **Transfer Area** | | | Effective: | Inactive: |
| **IGETC:** | **Transfer Area** | | | Effective: | Inactive: |
| **CSU Transfer:** | Transferable | Effective: | Spring 2009 | Inactive: | Spring 2022 |
| **UC Transfer:** | | Effective: | | Inactive: | |

**CID:**

**Certificate/Major Applicable:**
Certificate Applicable Course

### Approval and Dates

| | | | |
|---|---|---|---|
| Version: | 03 | Course Created/Approved: | 9/29/2008 |
| Version Created: | 3/12/2015 | Course Last Modified: | 1/2/2021 |
| Submitter: | Michael McKeever | Course last full review: | 5/11/2015 |
| Version Status: | Approved (Changed Course) | Prereq Created/Approved: | 5/11/2015 |
| Version Status Date: | 5/11/2015 | Semester Last Taught: | Fall 2020 |
| Version Term Effective: | Fall 2015 | Term Inactive: | Fall 2021 |

## COURSE CONTENT

**Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:
1. Analyze data networks supporting business communications and apply network protocol models to facilitate improved transfer of information across and Internetwork.
2. Demonstrate the importance of addressing and naming schemes at the various layers of data networks.
3. Compare and contrast fundamental Ethernet concepts and topological designs used in data networks.

**Objectives:**
Upon completion of this course, students will be able to:
1. Examine the importance of data networks and the Internet in supporting business communications and everyday activities
2. Summarize how communication is accomplished in data networks and across the Internet
3. Differentiate the devices and services that are used to support communications across an Internetwork
4. Deduce the layers of communications in data networks through analysis of network protocol models
5. Examine the role of protocols in data networks
6. Evaluate the importance of addressing and naming schemes at various layers of data networks
7. Compare and contrast the protocols and services operating at the application layer in the Open Systems Interconnection (OSI) model and examine how this layer operates in sample networks
8. Analyze the operations and features of the transport layer protocols and services
9. Analyze the operations and feature of the network layer protocols and services and explain the fundamental concepts of routing
10. Design, calculate, and apply subnet masks and addresses to fulfill given requirements
11. Interpret the operation of protocols at the OSI data link layer and examine how they support communications
12. Inspect the physical layer protocols and services supporting communications across data networks
13. Distinguish fundamental Ethernet concepts such as media, services, and operation
14. Choose basic cabling and network designs to connect devices in accordance with stated objectives
15. Experiment with Cisco Command Line Interface (CLI) to perform basic router and switch configuration

**Topics and Scope:**

Topics will include but not be limited to:
1. Exploring the Network
   a. Globally Connected
   b. Local Area Networks (LANs), Wide Area Networks(WANs), and the Internet
   c. The Network as a Platform
   d. The Changing Network Environment
2. Configuring a Network Operating System
   a. Internetworking Operating System (IOS) Bootcamp

b. Getting Basic
c. Address Schemes
3. Network Protocols and Communications
a. Rules of Communication
b. Network Protocols and Standards
c. Moving Data in the Network
4. Network Access
a. Physical Layer Protocols
b. Network Media
c. Data Link Layer Protocols
d. Media Access Control
5. Ethernet
a. Ethernet Protocol
b. Address Resolution Protocol
c. LAN Switches
6. Network Layer
a. Network Layer Protocols
b. Routing
c. Routers
d. Configuring a Cisco Router
7. Transport Layer
a. Transport Layer Protocols
b. Transmission Control Protocol (TCP) and User Datagram Protocol (UDP)
8. IP Addressing
a. Internet Protocol version 4 (IPv4) Network Addresses
b. IPv6 Network Addresses
c. Connectivity Verification
9. Subnetting IP Networks
a. Subnetting an IPv4 Network
b. Addressing Schemes
c. Design Considerations for IPv6
10. Application Layer
a. Application Laer Protocols
b. Well-Known Application Layer Protocols and Services
c. The Message Heard Around the World
11. It’s a Network
a. Create and Grow
b. Keeping the Network Safe
c. Basic Network Performance
d. Managing IOS Configuration Files
e. Integrated Routing Services

**Assignment:**

Reading assignments may include:
1. Online research of network devices and deployment practices
2. Approximately 50 pages weekly from the textbook

Homework problems may include
1. Hands-on exercises to demonstrate proficiency with each topic
2. Online quizzes
3. Creation of network design diagrams

4. Network device configuration

Other assignments may include:
1. 9-11 quizzes
2. Skill demonstration examinations
3. Classroom scenario based exercises

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

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|---|---|
| None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course. | Writing<br>0 - 0% |

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

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|---|---|
| Homework problems, Creation of network design diagrams and layouts | Problem solving<br>15 - 30% |

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

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| Class performances of Network device configuration | Skill Demonstrations<br>20 - 30% |

**Exams:** All forms of formal testing, other than skill performance exams.

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|---|---|
| 9-11 quizzes and simulated equipment configuration | Exams<br>20 - 30% |

**Other:** Includes any assessment tools that do not logically fit into the above categories.

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|---|---|
| Attendance and participation in scenario based exercises | Other Category<br>10 - 25% |

**Representative Textbooks and Materials:**
Introduction to Networks (1st). Cisco Networking Academy. Cisco Press: 2013

# OTHER REQUIRED ELEMENTS

## STUDENT PREPARATION

| | | |
|---|---|---|
| Matric Assessment Required: | E | Requires English Assessment |
| Prerequisites-generate description: | NP | No Prerequisite |
| Advisories-generate description: | U | User-Generated Text |
| Prereq-provisional: | N | NO |
| Prereq/coreq-registration check: | N | No Prerequisite Rules Exist |
| Requires instructor signature: | N | Instructor's Signature Not Required |

## BASIC INFORMATION, HOURS/UNITS & REPEATABILITY

| | | |
|---|---|---|
| Method of instruction: | 02 | Lecture |
| | 72 | Internet-Based, Delayed Interaction |
| | 99 | Credit by Exam |
| | 71 | Internet-Based, Simultaneous Interaction |
| Area department: | CS | Computer Studies |
| Division: | 72 | Arts & Humanities |
| Special topic course: | N | Not a Special Topic Course |
| Program status: | 1 | Certificate Applicable Course |
| Repeatability: | 00 | Two Repeats if Grade was D, F, NC, or NP |
| Repeat group id: | | |

## SCHEDULING

| | | |
|---|---|---|
| Audit allowed: | N | Not Auditable |
| Open entry/exit: | N | Not Open Entry/Open Exit |
| Credit by exam: | Y | Credit by examination allowed |
| Budget code: Program: | 0000 | Unrestricted |
| Budget code: Activity: | 0701 | Computer & Information Science |

## OTHER CODES

| | | |
|---|---|---|
| Discipline: | Computer Information Systems | |
| Basic skills: | N | Not a Basic Skills Course |
| Level below transfer: | Y | Not Applicable |
| CVU/CVC status: | Y | Distance Ed, Not CVU/CVC Developed |
| Distance Ed Approved: | Y | Exclusively online or other technology based instruction |
| Emergency Distance Ed Approved: | Y | Fully Online<br>Partially Online<br>Online with flexible in-person activities |
| Credit for Prior Learning: | N | Agency Exam |
| | N | CBE |
| | N | Industry Credentials |
| | N | Portfolio |
| Non-credit category: | Y | Not Applicable, Credit Course |
| Classification: | Y | Career-Technical Education |
| SAM classification: | C | Clearly Occupational |
| TOP code: | 0708.10 | Computer Networking |
| Work-based learning: | N | Does Not Include Work-Based Learning |

| | | |
|---|---|---|
| DSPS course: | N | Not a DSPS Course |
| In-service: | N | Not an in-Service Course |