

Networking Fundamentals, Semester B

Course Overview

Networking Fundamentals, Semester B is the second part of a two-semester course. This course focuses on network planning, administration, troubleshooting, and maintenance. You'll learn about the different phases of project management and identify important skills needed to manage a project. You'll also plan, design, and document a network. You'll learn about wireless networking standards and access methods. You'll learn to set up and secure a wireless network. You'll learn about virtual private networks and cloud computing. You'll also learn to troubleshoot issues related to wired and wireless networks. Finally, you'll identify disaster recovery methods and describe how to maintain a network.

Course Goals

This course will help you meet the following goals:

- Explain the importance of project management and related skills.
- Plan and design a network for a given scenario.
- Use appropriate documentation to manage a network.
- Describe how to create domain user accounts, groups, and domain trusts.
- Describe how to design a wide area network (WAN).
- Describe IEEE 802.11 (Wi-Fi) wireless networking standards and access methods.
- Describe other wireless networking standards, technologies, and related characteristics.
- Describe the procedure to set up and secure a wireless network.
- Explain fundamental concepts of virtual private networks.
- Explain the concepts of cloud computing and cloud deployment models.
- Use the appropriate troubleshooting tools.
- Identify and troubleshoot issues related to wired and wireless networks.
- Identify disaster recovery methods and develop a disaster recovery plan.
- Describe maintenance operations of a network.

General Skills

To participate in this course, you should be able to do the following:

- complete basic operations with word-processing software, such as Microsoft Word or Google Docs
- complete basic operations with presentation software, such as a Microsoft PowerPoint or Google Docs presentation
- perform online research using various search engines and library databases
- communicate through email and participate in discussion boards

For a complete list of general skills that are required for participation in online courses, refer to the Prerequisites section of the Student Orientation document, found at the beginning of this course.

Credit Value

Networking Fundamentals, Semester B is a 0.5-credit course.

Course Materials

- notebook
- computer
- printer

Minimum Hardware and Software Requirements

- A computer running one of the following supported operating systems:
 - Windows 8 or later
 - macOS 10.12 or later
- Internet connectivity for online course access
- 4 GB memory (8 GB recommended)
- 40 GB disk space
- One of the following supported browsers:
 - Edge, Chrome, Safari, Firefox, Opera
- Word processing software:
 - Microsoft Word, Apple Pages, or a free open-source alternative (e.g., OpenOffice, LibreOffice, SoftMaker FreeOffice, etc.)
- Presentation software:
 - Microsoft PowerPoint, Apple Keynote, or a free open-source alternative (e.g., OpenOffice, LibreOffice, SoftMaker FreeOffice, etc.)

Additional Recommendations

- Microsoft Visio (diagramming, vector graphics, and visualization software; optional for use in creating network diagrams)
- VirtualBox & Extension Pack (free virtualization software for practice, available [here](#))
 - For virtualization practice, at least 8 GB memory and 80 GB disk space is recommended for adequate performance.
 - VirtualBox is available for Windows, macOS, or Linux.
 - Reference material:
 - [VirtualBox Overview and Quick Start Guide](#)
 - [Official VirtualBox 6.x User Guide](#)
- Windows 10 ISO file (disk image for virtualization practice; free evaluation version available [here](#))
 - *Note:* If you access this link via a browser on a PC running Windows 10, Microsoft will not allow you to directly download the Windows 10 .iso file. Instead, you will see a link to download the Windows 10 Media Creation Tool, which you can use to download the ISO file. The following steps apply to Microsoft Edge on a Windows 10 PC:
 - You must have administrator privileges on your PC to use this tool.
 - Select “Download tool now,” and click “Run.”
 - Click “Yes” when asked if you wish to allow this program to make changes to your PC.
 - Click “Accept” when you see the license terms.
 - On the next screen, select “Create installation media for another PC,” and then select “Next.”
 - On the next screen, the language, architecture, and edition of Windows 10 will be pre-filled based upon the recommended options for your PC. If you wish to keep these settings, choose “Next.” If not, uncheck the “recommended options” box and select your preferred options before clicking “Next.”
 - On the next screen, click “ISO file,” and then choose “Next.”
 - Choose your download location and click “Save.”
- Windows 2016 Server ISO file (disk image for virtualization practice; free evaluation version available [here](#))
- Ubuntu Desktop ISO file (disk image for Linux virtualization practice; this is a free, open-source operating system, available [here](#))
- PFSense ISO file (disk image; free customizable virtualized router/firewall appliance OS; can be deployed in VirtualBox or any VM hypervisor; download available [here](#))
 - Reference material:
 - [Comprehensive PFSense Video Tutorial](#)
 - [Official Netgate PFSense User Guide](#)

Attribution Information

Windows screenshots courtesy Microsoft Windows

Course Pacing Guide

This course description and pacing guide is intended to help you keep on schedule with your work. Note that your course instructor may modify the schedule to meet the specific needs of your class.

Unit 1: Network Planning and Administration

Summary

This unit focuses on network planning and administration. You'll describe the phases of project management and identify project management skills and tools. You'll design a network. You'll also create a network diagram. In addition, you'll learn about domain controller and Active Directory. Finally, you'll describe how to design a wide area network (WAN).

Day	Activity/Objective	Type
1 day: 1	Syllabus and Student Orientation <i>Review the Student Orientation and Course Syllabus at the beginning of this course.</i>	Course Orientation
4 days: 2–5	Project Management <i>Explain the importance of project management and related skills.</i>	Lesson
4 days: 6–9	Network Plan and Design <i>Plan and design a network for a given scenario.</i>	Lesson
4 days: 10–13	Network Documentation <i>Use appropriate documentation to manage a network.</i>	Lesson
4 days: 14–17	Network Administration <i>Describe how to create domain user accounts, groups, and domain trusts.</i>	Lesson
4 days: 18–21	Wide Area Network <i>Describe how to design a wide area network (WAN).</i>	Lesson
5 days: 22–26	Unit Activity and Discussion—Unit 1	Unit Activity / Discussion
1 day: 27	Posttest—Unit 1	Assessment

Unit 2: Wireless Networking and Cloud Services

Summary

This unit focuses on wireless networking and cloud services. You'll first describe IEEE802.11 (Wi-Fi) wireless networking standards and access methods. Then, you'll describe wireless networking standards and technologies, such as radio frequency identification (RFID) and near-field communication (NFC). You'll learn to set up and secure a wireless network. You'll also learn about virtual private networks (VPN), cloud computing, and cloud deployment models.

Day	Activity/Objective	Type
5 days: 28–32	IEEE 802.11 (Wi-Fi) Networking <i>Describe IEEE 802.11 (Wi-Fi) wireless networking standards and access methods.</i>	Lesson
5 days: 33–37	Other Wireless Technologies <i>Describe wireless networking standards, technologies, and related characteristics.</i>	Lesson
5 days: 38–42	Setting Up a Wireless Network <i>Describe the procedure to set up a wireless network.</i>	Lesson
5 days: 43–47	Securing a Wireless Network <i>Secure a wireless network.</i>	Lesson
5 days: 48–52	Virtual Private Network <i>Explain fundamental concepts of virtual private networks.</i>	Lesson
5 days: 53–57	Cloud Services <i>Explain the concepts of cloud computing and cloud deployment models.</i>	Lesson
4 days: 58–61	Unit Activity and Discussion—Unit 2	Unit Activity / Discussion
1 day: 62	Posttest—Unit 2	Assessment

Unit 3: Network Troubleshooting and Maintenance

Summary

This unit focuses on network troubleshooting and maintenance. You'll use hardware and software tools for troubleshooting. You'll identify and troubleshoot issues related to wired and wireless networks. You'll also differentiate between disaster recovery and business continuity. You'll describe disaster recovery methods and develop a disaster recovery plan. In addition, you'll describe how to maintain a network.

Day	Activity/Objective	Type
5 days: 63–67	Troubleshooting Tools <i>Use the appropriate troubleshooting tools.</i>	Lesson
5 days: 68–72	Troubleshooting Networking Problems <i>Identify and troubleshoot issues related to wired and wireless networks.</i>	Lesson
5 days: 73–77	Disaster Recovery <i>Identify disaster recovery methods and develop a disaster recovery plan.</i>	Lesson
5 days: 78–82	Network Maintenance <i>Describe maintenance operations of a network.</i>	Lesson
5 days: 83–87	Unit Activity and Discussion—Unit 4	Unit Activity / Discussion
1 day: 88	Posttest—Unit 4	Assessment
1 day: 89	Semester Review	Review
1 day: 90	End-of-Semester Exam	Assessment