

NETWORKING II: INFRASTRUCTURE

Networking II: Infrastructure focuses on learning the fundamentals of networking, routing, switching and related protocols. In this course, students learn both the practical and conceptual skills that build the foundation for understanding basic networking, routing and switching. Students are introduced to the two major models used to plan and implement networks: OSI and TCP/IP. The OSI and TCP/IP functions and services are examined in detail. Students will learn how a router addresses remote networks and determines the best path to those networks, employing static and dynamic routing techniques.

- DOE Code: 4588
- Recommended Grade Level: Grade 11-12
- Required Prerequisites: Networking I (2 semesters) or CCENT Certification
- Credits: 1-3 credits per semester, maximum of 2 semesters, maximum of 6 credits
- Counts as a Directed Elective or Elective for all diplomas

Dual Credit

This course provides the opportunity for dual credit for students who meet postsecondary requirements for earning dual credit and successfully complete the dual credit requirements of this course.

Application of Content and Multiple Hour Offerings

Intensive laboratory applications are a component of this course and may be either school based or work based or a combination of the two. Work-based learning experiences should be in a closely related industry setting. Instructors shall have a standards-based training plan for students participating in work-based learning experiences. When a course is offered for multiple hours per semester, the amount of laboratory application or work-based learning needs to be increased proportionally.

Career and Technical Student Organizations (CTSOs)

Career and Technical Student Organizations are considered a powerful instructional tool when integrated into Career and Technical Education programs. They enhance the knowledge and skills students learn in a course by allowing a student to participate in a unique program of career and leadership development. Students should be encouraged to participate in Business Professional of America or Future Business Leaders of America, the CTSOs for this area.

Content Standards

Domain – Local Area Network Design

Core Standard 1 Students develop skills in designing wired and wireless LANs.

Standards

- BTI-1.1 Explain why it is important to design a scalable hierarchical network.
- BTI-1.2 Select network devices based on feature compatibility and network requirement.

Domain – Scaling Virtual Local Area Networks

Core Standard 2 Students configure and troubleshoot VLANs.

Standards

- BTI-2.1 Configure enhanced inter-switch connectivity technologies.
- BTI-2.2 Troubleshoot issues in an inter-VLAN routing environment.
- BTI-2.3 Implement inter-VLAN routing using Layer three of the OSI Model.

Domain – Spanning Tree Protocol

Core Standard 3 Students will understand and demonstrate the proper use of STP.

Standards

- BTI-3.1 Build a switched network with redundant links.
- BTI-3.2 Explain how different varieties of STP operate.
- BTI-3.3 Implement PVST+ and Rapid PVST+ in a switched LAN environment.

Domain – Link Aggregation and Hot Standby Router Protocol

Core Standard 4 Students will understand and demonstrate link aggregation and HSRP.

Standards

- BTI-4.1 Explain link aggregation operation in a switched LAN environment.
- BTI-4.2 Implement link aggregation to improve performance on high-traffic switch links.
- BTI-4.3 Implement HSRP.

Domain – Dynamic Routing

Core Standard 5 Students will understand and demonstrate the proper use of dynamic routing protocols.

Standards

- BTI-5.1 Explain the features and characteristics of dynamic routing protocols.
- BTI-5.2 Configure a distance vector routing protocol.
- BTI-5.3 Configure a link-state protocol.

Domain - Enhanced Interior Gateway Routing Protocol

Core Standard 6 Students will understand and demonstrate the proper use of EIGRP.

Standards

N2I-6.1 Explain the features and characteristics of EIGRP.

N2I-6.2 Implement EIGRP for IPv4.

N2I-6.3 Implement EIGRP for IPv6.

N2I-6.4 Troubleshoot common EIGRP configuration issues.

Domain - Open Shortest Path First

Core Standard 7 Students will understand and demonstrate the proper use of OSPF.

Standards

N2I-7.1 Explain how single-area OSPF and a Multiarea OSPF operate.

N2I-7.2 Implement single-area OSPF.

N2I-7.3 Implement multiarea OSPF.

N2I-7.4 Troubleshoot OSPF configuration issues.

Domain - Wide Area Network

Core Standard 8 Students will be able to identify and understand WAN technologies.

Standards

N2I-8.1 Explain WAN access technologies.

N2I-8.2 Select WAN access technologies to satisfy network requirements.

Domain - Point-to-Point Connections

Core Standard 9 Students will understand and demonstrate the proper use of a point-to-point connections.

Standards

N2I-9.1 Configure High-Level Data Link Control encapsulation.

N2I-9.2 Explain how PPP operates across a serial link.

N2I-9.3 Configure PPP encapsulation.

N2I-9.4 Troubleshoot PPP issues.

Domain - Access Control Lists

Core Standard 10 Students will understand and demonstrate the proper use of access control lists.

Standards

N2I-10.1 Configure standard IPv4 ACLs

N2I-10.2 Configure extended IPv4 ACLs

N2I-10.3 Configure IPv6 ACLs

N2I-10.4 Troubleshoot ACL issues

Domain - Network Security and Monitoring

Core Standard 11 Students will understand and demonstrate how to monitor network security and quality of service.

Standards

N2I-11.1 Explain how to mitigate common LAN security attacks.

N2I-11.2 Configure Simple Network Management Protocol to monitor network operations.

N2I-11.3 Troubleshoot network problems using Catalyst Switched Port Analyzer.

N2I-11.4 Explain the purpose and characteristics of Quality of Service.

N2I-11.5 Explore avenues to secure remote and local networks, including Virtual Private Networks.

Domain - Network Evolution

Core Standard 12 Students will understand current and future trends for technology.

Standards

N2I-12.1 Explain and identify Internet of Things.

N2I-12.2 Explain why cloud computing and virtualization are necessary for evolving networks.

N2I-12.3 Explain why network programmability is necessary for evolving networks.