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-11.3 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.