



Course Description

CTS4955 | Networking Capstone | 4.00 credits

This upper division course, for students majoring in the BS-IST Networking concentration, requires students to demonstrate their competence to analyze, design, develop, and test an information system in a team environment. Each team will create and present an information technology (IT) solution proposal that includes design documentation, implementation plan, and project test plan to create an operational information system. Students will also implement a proof-of-concept in a real or simulated/virtualized environment. Prerequisite(s): Student must be classified as a senior and have completed at least 3 of the 5 concentration courses to obtain departmental approval.

Course Competencies:

Competency 1: The student will successfully formulate project requirements and a statement of work by:

1. Defining the project purpose and the scope of work to be conducted
2. Describing the client's business context
3. Determining the client's needs, requirements and compliance issues
4. Determining the client's business goals in terms of performance, scalability, availability, security and manageability
5. Using diagrams to describe the existing facilities and the existing network
6. Reviewing bandwidth requirements based on current and projected server processor volume

Competency 2: The student will be able to design a solution to satisfy project requirements by:

1. Assessing current network models and strategies to determine the optimal network design
2. Developing the network design using available network planning diagram tools, such as Cisco's Network Planning Solution (NPS)
3. Designing a switching infrastructure that adheres to the established requirements, including segmentation requirements
4. Designing the Internet Protocol (IP) addressing and routing schemes that adhere to the established requirements
5. Examining the types of remote connectivity options commonly used to access WAN technologies.
6. Examining the design and use of converged networks carrying data, VoIP (Voice over IP), and video traffic
7. Examining methods of enabling and supporting wireless portable and mobile devices in the enterprise
8. Examining virtualized resources and network storage capacity in the enterprise network
9. Designing security solutions for servers, computers, users and other accounts, routers, switches, and other network devices in an enterprise network using best practice

Competency 3: The student will be able to specify a solution to satisfy project requirements by:

1. Listing the physical hardware needed for the network, including servers, workstations, racks, printers, routers, switches, wireless access devices and other network infrastructure equipment
2. Setting up a scalable network cabling plan
3. Selecting the network services and protocols to be used
4. Describing the WAN technologies, including Virtual Private Network (VPN) solutions
5. Selecting space requirements, power, HVAC and cabling needs for the network

Competency 4: The student will be able to implement a proof-of-concept in a virtualized/ simulated environment by:

1. Using a network simulation tool (GNS3, Packet Tracer, etc.) and/or actual networking devices
2. Configuring IP addresses and network protocols for computers, servers, switches, routers, default gateways, and other network devices

3. Troubleshooting connectivity errors
4. Configuring, establishing, documenting, and managing enterprise network connections to WANs
5. Implementing security controls such as Firewalls, Access Control Lists (ACL), Mandatory Access Control (MAC) or Discretionary Access Control (DAC) to ensure user policies are enabled
6. Determining volume, bandwidth and placement requirements necessary for a functional wireless network
7. Testing the network using tools such as ping and traceroute

Competency 5: The student will demonstrate the ability to effectively communicate and present the results of the project by:

1. Developing presentations that are polished, informative and engaging
2. Demonstrating that all work products provided the right level and type of detail
3. Satisfactorily answering questions ranging from implementation detail to test methodology to future evolution of project

Learning Outcomes:

- Communicate effectively using listening, speaking, reading, and writing skills
- Formulate strategies to locate, evaluate, and apply information
- Use computer and emerging technologies effectively