



PROFESSIONAL CERTIFICATE IN **Network Administration**

Certificate Description

This certificate provides high school graduates, professionals with limited experience or out-of-field students and professionals the opportunity to understand the significance of network administration in today's business environment.

Introduction to Computer and Network Hardware—ITCO 103 (required)—This course provides the student with the knowledge about microcomputers and basic network hardware. Topics may include desktop and portable systems, printers, input devices, and fundamental networking components and concepts.

Outcomes:

- Describe various computing infrastructure components
- Configure computer and network resources
- Explain the operation of computers
- Discuss installation, maintenance, and configuration of computer and network hardware
- Explain the operation of key network hardware
- Explain the structure and function of the OSI model

Network Infrastructure Basics—ITCO 251 (required)—This course provides students with a conceptual overview of network infrastructure. Topics may include network configurations, network operations, segmentation through subnetting, and wireless developments.

Outcomes:

- Explain structure of the principal network architecture models and their corresponding communication protocols.
- Explain networking concepts and principles
- Describe the different IP addressing techniques
- Describe subnetting concepts and techniques
- Describe wireless developments in networking



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Information Technology Security—ITCO 361 (required)—This survey course covers information security concepts and mechanisms. Information security concepts reviewed may include data protection techniques, software security, information assurance process, enterprise network security, and attack types/countermeasures.

Outcomes:

- Explain the fundamental concepts of information assurance and security.
- Discuss how operational issues such as software security and access management are addressed.
- Describe mechanisms for enterprise and Internet security.
- Discuss security management processes.
- Explain selected common security threats, vulnerabilities, and their countermeasures.

Routing and Switching—ITNA 353—This course provides an overview of routing and switching in network operations. Topics to be covered may include the role of switches and routers in network topologies and architectures, collisions and network congestion, the role of routers and switches in minimizing collisions, switching protocols and interswitch communications, switching and routing processes, switch operating systems, and switch management issues.

Outcomes:

- Implement Layer 2 network segmentation using switch configurations
- Explain the purpose of Layer 2 segmentation
- Explain the functions of bridges and switches
- Explain the purpose and function of the Spanning Tree Protocol
- Implement trunking between switches

Network Hardware: Physical Layer—ITNA 354—This course covers network hardware at Layer 1 of the OSI model. Topics covered may include wire cabling and cabling standards, wired layer 1 transmission methods, optical fiber cable, structured cabling systems, terminators and jacks, wireless layer 1 transmission methods, network cards and network interfaces.

Outcomes:

- List and explain hardware channel capacity standards
- Describe the bandwidth characteristics of several types of physical communication media
- Explain the benefits of structured cabling
- Identify and explain the use of the major types of wired and wireless terminators



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Special Topics in Network Administration—ITNA 359—This course provides an advanced selection of contemporary topics which may include network management, operations and administration, developments in networking technologies, or developments in the business need for networking services.

Outcomes:

- Discuss how to identify and troubleshoot network problems
- Describe troubleshooting tools
- Monitor and optimize system performance and reliability
- Use implementation, management and maintenance skills in network configuration
- Differentiate between methods of connecting to a network
- Discuss emerging topics in network operation and administration

Wireless and Mobile Computing—ITNA 452—This course surveys topics in wireless and mobile communications, including system architectures, physical challenges unique to wireless, carrier signal encoding, power control, location management, address management, multiple access technologies and protocols, and cellular and ad-hoc network topologies.

Outcomes:

- Discuss the fundamental differences between networks using waveguides and those using free space signaling
- Differentiate between fixed wireless, cellular, and ad-hoc networks
- Discuss prominent physical issues (eg, resource management, power control, fading, interference) in wireless networks
- Explain various MAC-sublayer protocols in multiuser wireless networks and the cross-layer protocol issues which may arise

Specialized Network Administration—ITNA 457—This course covers the recent global Internet technology and paves the way for the new generation of networking. In this specialization course, students will explore architectural network designs in accordance with ISO standards, network topology requirements, configuration management, fault management, performance management, monitoring resources, Quality of Service (QoS), and security policies.

Outcomes:

- Explain network performance and resource management
- Describe network resource and control access
- Evaluate network and system configuration and troubleshoot problems
- Discuss access control for network resources, network throughput, utilization parameters and quality of service
- Evaluate a suitable security policy for implementation