

17.4.25 COURSE 25: SYSTEMS AND NETWORK ADMINISTRATION

Course Name: Systems and Network Administration

Course Code: BUC73105

Course Level: Year 3, Semester 1

Notional Hours: 140

Credits: 14

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Course Description

This Competence-based, hands-on course introduces learners to the principles and practices of systems and network administration, focusing on the operational management of human-computer systems. The course covers essential topics including introduction to network and system administration, system components, networked communities, host management, user management, configuration and management, diagnostics, fault and change management, and security. The course is delivered using a practical, case-based approach combining interactive lectures, laboratory sessions, group discussions, and practical exercises, enabling learners to design logical networks, deploy and manage machines, administer users, and develop ways of fixing errors and problems. Through structured exercises, scenario analyses, and practical assignments, learners develop system administration skills, analytical thinking, and the ability to manage and troubleshoot computer systems and networks. The course culminates in a systems and network administration project that demonstrates applied competence in designing, configuring, and managing a computer system and network infrastructure.

Course Competences

Competence Domain	Specific Competences
Foundational Knowledge	Explain the concepts, scope, and goals of network and system administration

Foundational Knowledge	Describe the components of a system including hardware, operating systems, and software
Technical Skills	Design logical networks and carry out audit services or trails of a computer network
Technical Skills	Create and administer users on IT systems
Technical Skills	Configure and manage hosts on a computer network
Cognitive Skills	Perform diagnostics and manage faults on a system
Professional Skills	Apply security principles and practices in system and network administration

Course Learning Outcomes

Upon successful completion of this course, learners will be able to:

- i. Explain the concepts, scope, and goals of network and system administration.
- ii. Describe the components of a system including hardware, operating systems, and software.
- iii. Design logical networks and carry out audit services or trails of a computer network.
- iv. Create and administer users on IT systems.
- v. Configure and manage hosts on a computer network.
- vi. Perform diagnostics and manage faults on a system, and apply security principles.

Course Learning Matrix

Topic	Competencies	Learning Outcomes	Learning Activities	Methodology	Assessment Strategy
Topic 1: Introduction	Explain network and system administration	Define network and system administration	Group discussion on network	Interactive lecture;	Observation: Observe learners participating

	concepts and scope	on; explain the scope of network administration; describe the goals of network administration	and system administration; scope identification exercises	group discussion	in discussions and identifying administration concepts. Conversation: Question learners on network and system administration definitions, scope, and goals. Product: Assess completed discussion summaries and quiz responses.
Topic 2: System Components	Identify and describe system components	Explain what 'The System' is; describe handling hardware; describe operating systems	System component identification exercises; hardware and OS description tasks	Guided practice	Observation: Observe learners identifying and describing system components. Conversation: Question learners on system components, hardware handling, and operating

					systems. Product: Assess completed component identification exercises and descriptions.
Topic 3: Networked Communities	Explain communities and enterprises in network administration	Describe communities and enterprises; explain policy blueprints; explain user behavior and socio-anthropology	Community and enterprise analysis; policy blueprint exercises; user behavior analysis	Case study; group discussion	Observation: Observe learners analysing communities and enterprises. Conversation: Question learners on networked communities, policy blueprints, and user behavior. Product: Assess completed community analyses and policy blueprints.
Topic 4: Host Management	Manage hosts on a computer network	Apply global view and local action; describe physical	Server room design exercises; start-up and	Practical laboratory work	Observation: Observe learners managing hosts and configuring

		considerations of server room; manage computer start-up and shutdown; configure and personalize workstations	shutdown procedures; workstation configuration tasks		workstations. Conversation: Question learners on host management, server room considerations, and workstation configuration. Product: Assess completed workstation configurations and server room designs.
Topic 5: User Management	Create and administer users on IT systems	Explain user management issues; apply user registration; apply account policy	User registration exercises; account policy development tasks	Guided practice	Observation: Observe learners creating and administering users. Conversation: Question learners on user management issues, registration, and account policies. Product: Assess completed user

					registrations and account policy documents.
Topic 6: Configuration and Management	Apply configuration and management practices	Explain system configuration policy; apply methods: controlling causes and symptoms; apply change management	Configuration policy development; cause and symptom control exercises; change management tasks	Practical laboratory work	Observation: Observe learners applying configuration and management practices. Conversation: Question learners on configuration policy, controlling causes and symptoms, and change management Product: Assess completed configuration policies and change management documents.
Topic 7: Diagnostics, Fault and Change Management	Perform diagnostics and manage faults and changes	Explain fault tolerance and propagation; explain networks and small	Fault tolerance exercises; causality and dependence	Case study; guided practice	Observation: Observe learners performing diagnostics and fault management

		worlds; explain causality and dependen cy	ncy analysis tasks		. Conversation: Question learners on fault tolerance, propagation, causality, and dependency. Product: Assess completed fault management reports and diagnostic analyses.
Topic Security	8: Apply security principles in system and network administration	Explain principles of security; implement security	Security principle exercises; security impleme ntation tasks	Practical laboratory work	Observation: Observe learners implementing security measures. Conversation: Question learners on security principles and implementati on. Product: Assess completed security implementati ons and

					security policy documents.
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Notional Hours Distribution by Topic as per Learning Outcomes

Topic	DH	SH	AH	OH	NH
Topic 1: Introduction	5	13	3	2	23
Topic 2: System Components	5	10	4	2	21
Topic 3: Networked Communities	4	8	2	2	16
Topic 4: Host Management	6	12	4	2	24
Topic 5: User Management	4	10	3	2	19
Topic 6: Configuration and Management	5	9	2	2	18
Topic 7: Diagnostics, Fault and Change Management	3	11	3	2	19
Topic 8: Security	4	12	3	2	21
Total	32	73	21	14	140

Capstone Project: Systems and Network Administration Project

Learners complete a comprehensive systems and network administration project:

- Design a logical network
- Administer users on an IT system
- Configure and manage hosts on a computer network
- Perform diagnostics and manage faults
- Implement security measures
- Document the system and network administration plan

Assessment is based on:

- Product (system and network administration plan and documentation)
- Observation (administration process)
- Conversation (defense/Q&A)

Modes/Strategies of Delivery

Delivery Strategy	CBE Description
Interactive Lectures	Instructor-led explanation of system and network administration concepts with real-world examples to develop foundational knowledge through active engagement
Laboratory Learning	Hands-on configuration and administration tasks to build technical and digital skills through practical application
Case Study Analysis	Analysis of real system and network administration scenarios to build analytical and problem-solving competences
Group Discussions	Collaborative exploration of administration issues and challenges to build cognitive and generic skills through peer learning
Practical Exercises	Hands-on application of administration techniques to develop technical competence

Competence-Based Assessment

Competence Domain	Novice (Level 1)	Developing (Level 2)	Competent (Level 3)	Proficient (Level 4)	Expert (Level 5)
Administration Concepts	Cannot explain administration concepts	Basic understanding with gaps	Clearly explains system and network administration	Explains complex administration systems	Teaches administration concepts effectively

System Components	Cannot identify system components	Identifies some components with errors	Identifies and describes system components	Analyses system components effectively	Designs system architectures
User Management	Cannot administer users	Basic administration with errors	Administers users correctly	Manages complex user environments	Designs user management frameworks
Host Management	Cannot manage hosts	Basic management with errors	Manages hosts correctly	Optimizes host management	Designs host management frameworks
Diagnostics and Fault Management	Cannot diagnose faults	Basic diagnosis with guidance	Diagnoses and resolves faults	Effectively manages complex faults	Develops fault management frameworks
Security	Cannot implement security	Basic security with errors	Implements security correctly	Designs comprehensive security framework	Develops enterprise security strategies

Modes/Strategies of Assessment

Formative Assessments (50%)

- Lab Participation & Administration Journal – 5%

- Quizzes – 10%
- Practical Exercises – 20%
- Case Study Analyses – 15%

Summative Assessments (50%)

- Systems and Network Administration Project – 20%
- End of Semester Examination – 30%

Software Requirements

Requirement	Details
Operating Systems	Windows Server, Linux (Ubuntu/CentOS)
Virtualization	VirtualBox / VMware
Networking Tools	Cisco Packet Tracer
Command-Line Tools	Command Prompt, PowerShell, Linux Terminal
Lab Environment	Computer laboratory with internet access
Storage	Cloud / USB storage

Reading List / References

A. Core Texts

1. Burgess, M. (2020). *Principles of Network and System Administration* (3rd ed.). Wiley.
2. Limoncelli, T. A., Hogan, C. J., & Chalup, S. R. (2020). *The Practice of System and Network Administration* (3rd ed.). Addison-Wesley.
3. Nemeth, E., Snyder, G., Hein, T. R., & Whaley, B. (2020). *UNIX and Linux System Administration Handbook* (5th ed.). Addison-Wesley.
4. Frisch, A. (2019). *Essential System Administration* (3rd ed.). O'Reilly Media.

5. Hunt, C. (2020). *TCP/IP Network Administration* (3rd ed.). O'Reilly Media.
6. Davies, J. (2021). *Windows Server 2019 Administration Fundamentals* (3rd ed.). Packt.

B. Online Resources

- Microsoft Learn – Windows Server Administration
- Linux Documentation Project
- Cisco Networking Academy