



## Course Specifications

<b>Course Title:</b>	Network Administration
<b>Course Code:</b>	443 CNET-3
<b>Program:</b>	Bachelor in Computer & Network Engineering
<b>Department:</b>	Computer and Network Engineering
<b>College:</b>	Computer Science and Information Technology
<b>Institution:</b>	Jazan University

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## A. Course Identification

<b>1. Credit hours:</b> 03 Hours	
<b>2. Course type</b>	
a.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> Level -13 / Year 05	
<b>4. Pre-requisites for this course (if any):</b> Computer Network (331 CNET-3)	
<b>5. Co-requisites for this course (if any):</b> None	

## 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	52	100
2	Blended	--	--
3	E-learning	--	--
4	Distance learning	--	--
5	Other	--	--

## 7. Contact Hours (based on academic semester)

No	Activity	Learning Hours
<b>Contact Hours</b>		
1	Lecture	22
2	Laboratory/Studio	22
3	Tutorial	
4	Others (specify)	8
	<b>Total</b>	<b>52</b>

## B. Course Objectives and Learning Outcomes

### 1. Course Description

The course begins with the Introduction to System Administration, Scope, goals, and meta principles of system administration. It describes the System components, operating systems with File systems types. This course teaches student how to administrate and manage a modern network by properly planning and implementing various functions of a Microsoft Windows server 2016 OS. Key components include how to plan server deployment, server and workstation monitoring and maintenance. The second part of the course describes designing, building, and launching services, converting users from one service to another, building resilient services, and planning for disaster recovery. It covers network architectures and operations, an overview of datacenter strategies, and datacenter operations. It includes such topics as ethics, organizational structures, perception, visibility, time management, communication.

### 2. Course Main Objectives:

This course will equip students with the knowledge and skills to,

1. Demonstrate the knowledge of configuration and management of network administration.
2. Install, configure and manage network application services such as Windows server 2016 OS, DNS, DHCP and SNMP.
3. Analyzing network performance and find ways to improve efficiency.
4. Configure and manage users/groups in a single domain network.
5. Implement secure network environment and Access Policies.

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
<b>1</b>	<b>Knowledge:</b>	
1.2	<b>Explain</b> roles and responsibilities of a network administrator, Structure of workstation and Network configuration.	K2
1.3	<b>Identify</b> and understanding of latest version of various Server operating and system installation.	K3
<b>2</b>	<b>Skills :</b>	
2.1	<b>Analyze</b> the features of Workstation, Server models and network interfaces.	S1
2.2	<b>Differentiate</b> wired and wireless networks, IPv4 and IPv6 network addressing.	S1
2.3	<b>Apply</b> designing of logical network and acquire knowledge of installation and configuration of DNS, DHCP.	S3
2.4	<b>Communicate</b> effectively to present their assignments and mini projects	S4
2.5	<b>Analyze and apply</b> the Software designed network models with OSI reference model.	S5
<b>3</b>	<b>Values:</b>	
3.1	<b>Functions</b> and task of Network team to be upgrade and maintenance procedures of server and scheduling of Windows server OS.	V1
3.2	<b>Perform</b> Self-learning which improves assessing the Server performance, Monitoring, SNMP tool and User authentication.	V2

### C. Course Content

No	List of Topics	Contact Hours
1	<b>Chapter – 1: Introduction and System Components</b> <ul style="list-style-type: none"> <li>▪ What is Network and System administration?</li> <li>▪ Applying technology in an environment</li> <li>▪ The human role in systems</li> <li>▪ Ethical Issues</li> <li>▪ The challenges of system administration</li> <li>▪ Common practice and Good practice</li> <li>▪ Bugs and emergent phenomena</li> <li>▪ The meta principles of system administration</li> </ul>	2T+2P

	<ul style="list-style-type: none"> <li>▪ Maintaining local documentation</li> <li>▪ What is ‘the system’</li> <li>▪ Network Infrastructure</li> <li>▪ Operating systems</li> <li>▪ Shells or command interpreters</li> <li>▪ Logs and audits</li> <li>▪ File systems</li> <li>▪ Unix file model</li> <li>▪ Windows File Model</li> </ul>	
2	<p><b>Chapter -2 Workstation Architecture</b></p> <ul style="list-style-type: none"> <li>▪ Operating System</li> <li>▪ Network Configuration</li> <li>▪ Accounts and Authorization</li> <li>▪ Data Storage</li> <li>▪ OS Installation</li> <li>▪ OS Configuration</li> <li>▪ Updating the System Software and Applications</li> <li>▪ Automation</li> <li>▪ Cloning</li> </ul>	4T+4P
3	<p><b>Chapter-3 Server Hardware Features &amp; Specifications</b></p> <ul style="list-style-type: none"> <li>▪ Workstations Versus Servers</li> <li>▪ Server Reliability</li> <li>▪ Levels of Redundancy</li> <li>▪ Data Integrity</li> <li>▪ Hot-Swap Components</li> <li>▪ Servers Should Be in Computer Rooms</li> <li>▪ Separate Administrative Networks</li> <li>▪ Server Hardware Details</li> <li>▪ Network Interfaces</li> <li>▪ Disks: Hardware Versus Software RAID</li> <li>▪ Power Supplies</li> </ul>	4T+4P
4	<p><b>Chapter 4 Network Architecture &amp; Operations</b></p> <ul style="list-style-type: none"> <li>▪ Physical Versus Logical</li> <li>▪ Wired Office Networks</li> <li>▪ Wireless Office Networks</li> <li>▪ Datacenter Networks</li> <li>▪ WAN Strategies</li> <li>▪ Corporate Standards</li> <li>▪ Software-Defined Networks</li> <li>▪ Monitoring</li> <li>▪ Management</li> <li>▪ Documentation</li> <li>▪ Network Design and Implementation</li> <li>▪ DNS</li> <li>▪ CMDB</li> <li>▪ Labeling</li> </ul>	4T+4P
5	<p><b>Chapter -5 Maintenance Windows</b></p> <ul style="list-style-type: none"> <li>▪ Scheduling Maintenance Windows, Planning Maintenance Tasks</li> <li>▪ Developing the Master Plan</li> <li>▪ Disabling Access</li> </ul>	4T+4P

	<ul style="list-style-type: none"> <li>▪ Ensuring Mechanics and Coordination</li> <li>▪ Shutdown/Boot Sequence</li> <li>▪ KVM, Console Service, and LOM</li> <li>▪ Communications</li> <li>▪ Change Completion Deadlines</li> <li>▪ Comprehensive System Testing</li> <li>▪ Post-maintenance Communication</li> <li>▪ Reenabling Remote Access</li> </ul>	
6	<b>Chapter -6 Monitoring Service &amp; Name services</b> <ul style="list-style-type: none"> <li>▪ Types of Monitoring</li> <li>▪ Building a Monitoring System</li> <li>▪ Historical Monitoring</li> <li>▪ Real-Time Monitoring</li> <li>▪ SNMP</li> <li>▪ Log Processing</li> <li>▪ Alerting Mechanism</li> <li>▪ Escalation</li> <li>▪ Active Monitoring Systems</li> <li>▪ Scaling</li> <li>▪ Centralization and Accessibility</li> <li>▪ Pervasive Monitoring</li> <li>▪ End-to-End Tests</li> <li>▪ Application Response Time Monitoring</li> <li>▪ Compliance Monitoring</li> <li>▪ Meta-monitoring</li> <li>▪ Nameservice Data- Consistency, Authority, Capacity and Scaling</li> <li>▪ Reliability-DNS, DHCP, LDAP, Authentication, Databases</li> </ul>	4T+4P
7	<b>Final Exam</b>	4T+4P
<b>Total</b>		52

Online Study Topics
<ul style="list-style-type: none"> <li>• Network Administrator Duties and Responsibilities</li> <li>• Workstation and designing concept</li> <li>• Key functions of Server</li> <li>• Network Architecture</li> <li>• Monitoring system</li> </ul>

## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	<b>Knowledge</b>		
1.2	<b>Explain</b> roles and responsibilities of a network administrator, Structure of	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Classroom discussions</li> </ul>	<ul style="list-style-type: none"> <li>• Exam 1</li> <li>• Final Exam</li> <li>• Assignment 1</li> </ul>

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	workstation and Network configuration.	<ul style="list-style-type: none"> <li>• Lab exercises</li> </ul>	
1.3	<b>Identify</b> and understanding of latest version of various Server operating and system installation.	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Classroom discussions</li> <li>• Lab exercises</li> </ul>	<ul style="list-style-type: none"> <li>• Exam 2</li> <li>• Final Exam</li> <li>• Lab Assignment</li> <li>• Lab Exam</li> </ul>
<b>2.0</b>	<b>Skills</b>		
2.1	<b>Analyze</b> the features of Workstation, Server models and network interfaces.	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Classroom discussions</li> <li>• Lab exercises</li> </ul>	<ul style="list-style-type: none"> <li>• Exams 2</li> <li>• Lab Assignment</li> <li>• Final Exam</li> </ul>
2.2	<b>Differentiate</b> wired and wireless networks, IPv4 and IPv6 network addressing.	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Classroom discussions</li> </ul>	<ul style="list-style-type: none"> <li>• Exam 2</li> <li>• Final Exam</li> <li>• Lab Assignment</li> <li>• Lab Exam</li> </ul>
2.3	<b>Apply</b> designing of logical network and acquire knowledge of installation and configuration of DNS, DHCP.	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Classroom discussions</li> <li>• Lab exercises</li> </ul>	<ul style="list-style-type: none"> <li>• Assignment 2</li> <li>• Lab Assignment</li> <li>• Lab Exam</li> </ul>
2.4	<b>Communicate</b> effectively to present their assignments and mini projects	<ul style="list-style-type: none"> <li>• Classroom discussions</li> <li>• Lab exercises</li> </ul>	<ul style="list-style-type: none"> <li>• Assignments</li> <li>• Mini project</li> </ul>
2.5	<b>Analyze and apply</b> the Software designed network models with OSI reference model.	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Classroom discussions</li> <li>• Lab exercises</li> </ul>	<ul style="list-style-type: none"> <li>• Exam 1/Exam2</li> <li>• Lab Assignments</li> <li>• Lab Exam</li> </ul>
<b>3.0</b>	<b>Values</b>		
3.1	<b>Functions</b> and task of Network team to be upgrade and maintenance procedures of server and scheduling of Windows server OS.	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Classroom discussions</li> </ul>	<ul style="list-style-type: none"> <li>• Assignment 2</li> <li>• Exam 2</li> <li>• Lab Assignment</li> <li>• Final Exam</li> </ul>
3.2	<b>Perform</b> Self-learning which improves assessing the Server performance, Monitoring, SNMP tool and User authentication.	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Classroom discussions</li> </ul>	<ul style="list-style-type: none"> <li>• Assignment 2</li> <li>• Lab Assignment</li> </ul>

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments / Mini Project	4 <sup>th</sup> Week	20%
2	Midterm Exam	6 <sup>th</sup> Week	20%
3	Lab Exam	11 <sup>th</sup> Week	20%
4	Final Theory Exam	12 <sup>th</sup> Week	40%

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)



## E. Student Academic Counseling and Support

### Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

Department have an arrangement for “Academic Counseling and Support”, for each student by the department. The Department Coordinator nominates faculty members for “**Student Academic Advisory Committee**” every semester. These “**Academic Advisors**” are responsible for student counseling and advising to a group of fix number of students (around 10-15 students) and maintaining students’ files. At the beginning of semester and at time of course registration all students take counseling from Academic Advisor according to his previous grades and coverage of pre-requisite course and follow-up.

Also students with GPA below than 2.00 are remained under deep observation and continuous meetings with respective course teachers about their performance are arranged to help and support the students. The course teacher is to be associated with this course provide a proper guidance for students who are looking to focus on their future career based on their intellectual interests, identify better opportunities related to this course and connections in their academic fields.

The course teacher will commit to a minimum scheduled time for student consultation equivalent to **3 HOURS PER WEEK** and will have prescribed times set aside for individual appointments with students. The students will be informed at the commencement of every semester for teacher consultation hours for seeking advice and support.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	<ul style="list-style-type: none"> <li>▪ The Practice of System and Network Administration: Vol 1, Thomas A. Limoncelli, Christina J. Hogan, 3<sup>rd</sup> Edition, 2017.</li> <li>▪ Principles of Network and System Administration, Second Edition, Mark Burgess, 2<sup>nd</sup> Edition, 2007</li> </ul>
<b>Essential References Materials</b>	<ul style="list-style-type: none"> <li>▪ Computer network Administration A clear and concise Reference, by Gerardus Blokdyk (Author), 2019. ISBN 978-0655534105</li> <li>▪ Windows Server 2016 Administration Unleashed 1 Edition, Author: Rand Morimoto, Sams Publishing 2017. ISBN 13978-0134583754.</li> <li>▪ Network Governance: concepts, Theories, and Applications, Naim Kupucu, Qiyan Hy 1st Edition, ISBN 13:978-1138482852 , 2020</li> </ul>
<b>Electronic Materials</b>	<ul style="list-style-type: none"> <li>▪ <a href="https://ittutorials.net/microsoft/windows-server-2016/">https://ittutorials.net/microsoft/windows-server-2016/</a></li> <li>▪ <a href="https://www.comparitech.com/net-admin/active-directory-step-by-step-tutorial/">https://www.comparitech.com/net-admin/active-directory-step-by-step-tutorial/</a></li> </ul>
<b>Other Learning Materials</b>	<ul style="list-style-type: none"> <li>▪ Window Server 2016</li> <li>▪ VM Ware Workstation/Player</li> <li>▪ Linux/Unix server</li> <li>▪ <a href="https://www.microsoft.com/en-sa/learning/windows-server-training.aspx">https://www.microsoft.com/en-sa/learning/windows-server-training.aspx</a></li> <li>▪ <a href="https://www.lynda.com/Windows-Server-training-tutorials/2802-0.html">https://www.lynda.com/Windows-Server-training-tutorials/2802-0.html</a></li> <li>▪ <a href="https://altair.pw/pub/doc/windows/Microsoft%20Windows%20Server%20Administration%20Essentials.pdf">https://altair.pw/pub/doc/windows/Microsoft%20Windows%20Server%20Administration%20Essentials.pdf</a></li> </ul>



- <https://www.youtube.com/watch?v=MQIct3hx1y8&list=PLcRhfKiWZmM9F71Y6DRXVwiYpNB2RO6F9>

## 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> <li>• Class room equipped with projector and whiteboard and sufficient seating arrangements</li> <li>• Lab with software installed and individual computer terminal for each student</li> </ul>
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Whiteboards and projectors for classroom and Lab. Following software required for lab work: <ul style="list-style-type: none"> <li>• Window Server 2016</li> <li>• VMWare Workstation</li> </ul>
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Sufficiency of resources and facilities for students	Students	Course evaluation survey form
Effectiveness of teaching / learning process	Students	Course evaluation survey form
Effectiveness of teaching / learning process	CRC / QAU / HoD	Course reports / result analysis
Quality of learning Resources	Track leaders / CRC	Review meetings and star rating with suggestions for further modification and improvements
Verifying standards of student achievement / evaluation	HoD / committee nominated by HoD	Random re-checking of evaluated answer sheets
Achievement of course learning outcomes	Course Teachers / QAU	CLO assessment template that is further verified at course coordinator and QAU level.

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

<b>Council / Committee</b>	
<b>Reference No.</b>	
<b>Date</b>	

