



## Course Specifications

<b>Course Title:</b>	Elective-2 (Introduction to CCNA)
<b>Course Code:</b>	435 CNET-3
<b>Program:</b>	Bachelor in Computer and Network Engineering
<b>Department:</b>	Computer and Network Engineering
<b>College:</b>	Computer Science and Information Technology
<b>Institution:</b>	Jazan University, Jazan

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## A. Course Identification

<b>1. Credit hours:</b> 3
<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 type="checkbox"/> Elective <input checked="" type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> Level 14/Year 05
<b>4. Pre-requisites for this course (if any):</b> None
<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	Contact Hours
1	Lecture	22
2	Laboratory/Studio	22
3	Tutorial	
4	Others (specify)	8
	<b>Total</b>	52

## B. Course Objectives and Learning Outcomes

### 1. Course Description

The topics of this course include Ethernet Networking standards. TCP/IP Model and each layer protocols are described in detail. Study of IP Addressing with IPv4 and Subnetting with VLSM. CISCO IOS and the concepts of layer 2 Switching will be introduced. Fundamentals of LAN | WAN and techniques of Virtual LAN configuration and inter-VLAN routing are explored. The procedures used for configuration and verification of device management are discussed.

## 2. Course Main Objective

Students who successfully complete this course should be able to:

1. Describe fundamentals of LAN, WAN, and IP routing.
2. Identify and contrast the different types of cables with connection setting.
3. Evaluate the IP Addressing Scheme of IPV4 to the Network Models.
4. Describe and verify switching concepts and processes.
5. Design and implement model for Inter-VLAN routing for medium size networks.

## 3. Course Learning Outcomes

CLOs		Aligned PLOs
1	<b>Knowledge and Understanding:</b>	
1.1	<b>Explain</b> TCP/IP networking model, classful network and protocols.	K1
1.2	<b>Identify</b> the different network technologies, switching services and functionalities.	K2
2	<b>Skills:</b>	
2.1	<b>Apply</b> IP addressing schemes and Calculate Subnets.	S1
2.2	<b>Design</b> a network of an organization using simulation.	S2
2.3	<b>Configure</b> various networking components to run a network.	S5
2.4	<b>Implement</b> VLANs and Inter-VLAN routing technology in network.	S3
3	<b>Values:</b>	
3.1	<b>Perform</b> self-study to improve their performance on network design and configuration	V2

## C. Course Content

No	List of Topics	Contact Hours
1	<ul style="list-style-type: none"> <li>• <b>Chapter 1 Introduction to TCP/IP Networking</b></li> <li>Perspectives on Networking</li> <li>TCP/IP Networking Model</li> <li>History Leading to TCP/IP</li> <li>Overview of the TCP/IP Networking Model</li> <li>TCP/IP Application Layer</li> <li>HTTP Overview</li> <li>HTTP Protocol Mechanisms</li> <li>TCP/IP Transport Layer</li> <li>TCP Error Recovery Basics</li> <li>Same-Layer and Adjacent-Layer Interactions</li> <li>TCP/IP Network Layer</li> <li>Internet Protocol and the Postal Service</li> <li>Internet Protocol Addressing Basics</li> <li>IP Routing Basics</li> <li>TCP/IP Data-Link and Physical Layers</li> <li>Data Encapsulation Terminology</li> <li>Names of TCP/IP Messages</li> <li>OSI Networking Model and Terminology</li> </ul>	4T + 4P

	Comparing OSI and TCP/IP Layer Names and Numbers OSI Data Encapsulation Terminology	
2	<p><b>Chapter 2: Analyzing Ethernet LAN Switching</b></p> <p>Foundation Topics</p> <p>LAN Switching Concepts</p> <p>Overview of Switching Logic</p> <p>Forwarding Known Unicast Frames</p> <p>Learning MAC Addresses</p> <p>Flooding Unknown Unicast and Broadcast Frames</p> <p>Avoiding Loops Using Spanning Tree Protocol</p> <p>LAN Switching Summary</p> <p>Verifying and Analyzing Ethernet Switching</p> <p>Demonstrating MAC Learning</p> <p>Switch Interfaces</p> <p>Finding Entries in the MAC Address Table</p> <p>Managing the MAC Address Table (Aging, Clearing)</p> <p>MAC Address Tables with Multiple Switches</p>	4T + 4P
3	<p><b>Chapter 3: IPv4 Addressing and Subnetting</b></p> <p><b>Analyzing Classful IPv4 Networks</b></p> <p>Classful Network Concepts</p> <p>IPv4 Network Classes and Related Facts</p> <p>The Number and Size of Class A, B, and C Networks</p> <p>Address Formats</p> <p>Unusual Network IDs and Network Broadcast Addresses</p> <p>Practice with Classful Networks</p> <p>Practice Deriving Key Facts Based on an IP Address</p> <p><b>Perspectives on IPv4 Subnetting</b></p> <p>Introduction to Subnetting</p> <p>Subnetting Defined Through a Simple Example</p> <p>Operational View Versus Design View of Subnetting</p> <p>Analyze Subnetting and Addressing Needs</p> <p>Assigning Subnets to Different Locations</p> <p>Choose Static and Dynamic Ranges per subnet</p> <p><b>Analyzing Subnet Masks</b></p> <p>Subnet Mask Conversion</p> <p>Three Mask Formats</p> <p>Converting Between Binary and Prefix Masks</p> <p>Converting Between Binary and DDN Masks</p> <p>Converting Between Prefix and DDN Masks</p> <p>Identifying Subnet Design Choices Using Masks</p> <p>Masks Divide the Subnet's Addresses into Two Parts</p> <p>Masks and Class Divide Addresses into Three Parts</p> <p>Classless and Classful Addressing</p> <p>Calculations Based on the IPv4 Address Format</p> <p><b>Analyzing Existing Subnets</b></p> <p>Defining a Subnet</p> <p>Subnet ID Concepts</p> <p>Subnet Broadcast Address</p> <p>Range of Usable Addresses</p> <p>Analyzing Existing Subnets: Decimal</p>	6T + 6P

	Finding the Subnet Broadcast Address: Difficult Masks Subnet Broadcast Address Practice Problems	
4	<b>Chapter 4: Device Management Protocols</b> Foundation Topics System Message Logging (Syslog) Sending Messages in Real Time to Current Users Storing Log Messages for Later Review Log Message Format Log Message Severity Levels Configuring and Verifying System Logging The debug Command and Log Messages Network Time Protocol (NTP) Setting the Time and Timezone Basic NTP Configuration NTP Reference Clock and Stratum Redundant NTP Configuration NTP Using a Loopback Interface for Better Availability Analyzing Topology Using CDP and LLDP Examining Information Learned by CDP Configuring and Verifying CDP Examining Information Learned by LLDP Configuring and Verifying LLDP	4T+4P
5	<b>Chapter 5: Implementing Ethernet Virtual LANs</b> Foundation Topics Virtual LAN Concepts Creating Multiswitch VLANs Using Trunking VLAN Tagging Concepts The 802.1Q and ISL VLAN Trunking Protocols Forwarding Data Between VLANs The Need for Routing Between VLANs Routing Packets Between VLANs with a Router VLAN and VLAN Trunking Configuration and Verification Creating VLANs and Assigning Access VLANs to an Interface VLAN Configuration Example: Full VLAN Configuration VLAN Trunking Protocol Implementing Interfaces Connected to Phones Data and Voice VLAN Concepts Data and Voice VLAN Configuration and Verification Troubleshooting VLANs and VLAN Trunks Access VLANs Undefined or Disabled Mismatched Trunking Operational States The Supported VLAN List on Trunks Mismatched Native VLAN on a Trunk	4T+4P
	<b>Final Exam</b>	4T+4P
<b>Total</b>		52

### Online Study Topics:

- OSI Reference Model
- OSI Layers protocols
- Number system conversion

Binary to Decimal Binary to Hexadecimal Decimal to Binary Decimal to hexadecimal Hexadecimal to Binary Hexadecimal to Decimal
<ul style="list-style-type: none"> <li>• Communication Media</li> <li>• Types of Communication</li> <li>• Subnetting examples</li> <li>• Summarization with examples</li> <li>• Basics of Switching</li> <li>• Basics of routing</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
<b>1.0</b>	<b>Knowledge and Understanding:</b>		
1.1	<b>Explain</b> TCP/IP networking model, classful network and protocols.	<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>➤ Mid-Term Exam</li> <li>➤ Assignments</li> <li>➤ Final Exam</li> </ul>
1.2	<b>Identify</b> the different network technologies, switching services and functionalities.	<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>➤ Assignments</li> <li>➤ Lab Exam</li> <li>➤ Final Exam</li> </ul>
<b>2.0</b>	<b>Skills</b>		
2.1	<b>Apply</b> IP addressing schemes and Calculate Subnets.	<ul style="list-style-type: none"> <li>➤ Lectures</li> <li>➤ Classroom discussion</li> <li>➤ Lab Exercises</li> </ul>	<ul style="list-style-type: none"> <li>➤ Final Exam</li> <li>➤ Mini Project</li> <li>➤ Assignments</li> </ul>
2.2	<b>Design</b> a network of an organization using simulation.	<ul style="list-style-type: none"> <li>➤ Lectures</li> <li>➤ Classroom discussion</li> <li>➤ Lab Exercises</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assignments</li> <li>➤ Mini Project</li> <li>➤ LAB Exam</li> </ul>
2.3	<b>Configure</b> various networking components to run a network.	<ul style="list-style-type: none"> <li>➤ Lectures</li> <li>➤ Classroom discussion</li> <li>➤ Lab Exercises</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assignments</li> <li>➤ Mini Project</li> <li>➤ LAB Exam</li> </ul>
2.4	<b>Implement</b> VLANs and Inter-VLAN routing technology in network.	<ul style="list-style-type: none"> <li>➤ Lectures</li> <li>➤ Classroom discussion</li> <li>➤ Lab Exercises</li> </ul>	<ul style="list-style-type: none"> <li>➤ Final Exam</li> <li>➤ Mini Project</li> <li>➤ Assignments</li> <li>➤ LAB Exam</li> </ul>
<b>3.0</b>	<b>Values</b>		



Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.1	<b>Perform</b> self-study to improve their performance on network design and configuration.	<ul style="list-style-type: none"> <li>➤ Lectures</li> <li>➤ Classroom discussion</li> </ul>	<ul style="list-style-type: none"> <li>➤ Mini Project</li> <li>➤ LAB Assessment</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 has an arrangement for “Academic Counseling and Support” for each student in the department. The Department Coordinator nominates faculty members for the “**Student Academic Advisory Committee**” every semester. These “**Academic Advisors**” are responsible for student counseling and advising a group of a fixed number of students (around 10-15 students) and maintaining students’ files. At the beginning of the semester and at the time of course registration all students take counseling from the Academic Advisor according to their previous grades and coverage of pre-requisite course and follow-up.

Also, students with GPAs below 2.00 remain 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 to provide proper guidance for students who are looking to focus on their future careers 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>	CCNA 200-301 Official Cert Guide Library, ISBN: 978-1-58714-714-2, By Cisco Networking Academy, Published Jul 14, 2020, by Cisco Press 2
<b>Essential References Materials</b>	<ol style="list-style-type: none"> <li>1. Introduction to Networks Companion Guide (CCNAv7), ISBN: 978-0-13-663366-2, By Cisco Networking Academy, Published Jul 14, 2020, by Cisco Press.</li> <li>2. Introduction to Networks Labs and Study Guide (CCNAv7) ISBN: 978-0-13-663445-4, By Allan Johnson, Cisco</li> </ol>



	Networking Academy, Published Jun 17, 2020, by Cisco Press.
<b>Electronic Materials</b>	<a href="https://www.cisco.com">https://www.cisco.com</a> <a href="https://www.netacad.com/">https://www.netacad.com/</a> <a href="https://www.networklearning.org/">https://www.networklearning.org/</a>
<b>Other Learning Materials</b>	

## 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom equipped with projector and whiteboard and sufficient seating arrangements. Lab with software installed and an individual computer terminal for each student.
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Whiteboards and projectors for classroom and lab Following software for lab work: <ul style="list-style-type: none"> <li>• Cisco Packet Tracer 8.1</li> <li>• Wireshark</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, Track leader, 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>	