



## Course Specifications

<b>Course Title:</b>	Cisco Networking
<b>Course Code:</b>	448 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

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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 checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> Level-15/Year 05
<b>4. Pre-requisites for this course (if any):</b> 331 CNET – 3 Computer Networks
<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

This course provides fundamental knowledge of network infrastructure design. Topics included in this course are strategies for planning, implementing and maintaining different technologies. The students will get familiar with optical networking which is latest technology used for providing network services. WAN protocols, ACL and QoS are introduced to design the network. This course also gives idea of network traffic analysis, modeling and traffic engineering.

## 2. Course Main Objective

*This course will develop the students' ability to learn:*

- Identify network design strategies and planning considerations.
- Design a network infrastructure according to the user requirements.
- Compare protocols analysis considering deterministic and non-deterministic approaches.
- Describe the components of a network implementation plan.
- Fundamentals of Wireless Networks.
- Design the Wireless Network Architecture using different technologies.
- Secure Wireless Network Architecture

## 3. Course Learning Outcomes

CLOs		Aligned PLOs
1	<b>Knowledge and Understanding</b>	
1.1	<b>Describe</b> the switching technologies with appropriate layer 2,3 protocols for open shortest path first.	K2
1.2	<b>Explain</b> the characteristics of different routing protocols for LAN's, WANs and architecture of Wireless networks.	K1
2	<b>Skills :</b>	
2.1	<b>Design</b> a WLAN and WAN network utilizing the appropriate switching protocols according to given network requirements.	S2
2.2	<b>Evaluate</b> the solutions for securing Wired and Wireless networks	S3
2.3	<b>Apply</b> the network troubleshooting strategies for solving network problems.	S2
3	<b>Values:</b>	
3.1	<b>Show</b> the abilities to justify and illustrate appropriate networking technical solutions to different audience.	V3
3.2	<b>Evaluate</b> the knowledge and ability to perform the wired and wireless network based design and its implementation.	V2

## C. Course Content

No	List of Topics	Contact Hours
1	<b>Chapter -1: Introduction to TCP/IP Transport and Applications</b> <ul style="list-style-type: none"> <li>• TCP IP layer 4 Protocols: TCP and UDP</li> <li>• Multiplexing using TCP port numbers</li> <li>• Popular TCP/IP Applications</li> <li>• Connection Establishment and Termination</li> <li>• Error Recovery and Reliability</li> <li>• Flow Control Using Windowing</li> <li>• User Datagram Protocol</li> <li>• Finding the Web server using DNS</li> <li>• Transferring file using HTTP</li> </ul>	4T + 4P

	<ul style="list-style-type: none"> <li>• Chapter Review Questions</li> </ul>	
2	<p><b>Chapter -2: Basic and Advance IPv4 Access Control Lists</b></p> <ul style="list-style-type: none"> <li>• IPv4 Access Control List Basics</li> <li>• ACL Location and Direction</li> <li>• Types of IP ACLs</li> <li>• Standard Numbered IPv4 ACL</li> <li>• Implementing Standard IP ACLs</li> <li>• Standard IP ACL Configuration</li> <li>• Practice Applying Standard IP ACLs</li> <li>• Reverse Engineering from ACL to Address Range</li> <li>• Extended numbered IP Access Lists</li> <li>• Matching the Protocol, Source IP, and Destination IP</li> <li>• Extended IP ACL Configuration</li> <li>• Named ACLs and ACL Editing</li> <li>• Editing ACLs Using Sequence Numbers</li> <li>• ACL Implementation Considerations</li> <li>• Chapter Review Questions</li> </ul>	4T + 4P
3	<p><b>Chapter – 3: Enhanced Switched Technologies</b></p> <ul style="list-style-type: none"> <li>• VLAN Review</li> <li>• Access and Trunk Ports</li> <li>• VLAN Trunking Protocol (VTP)</li> <li>• Spanning Tree Protocol(STP)</li> <li>• Types of STP</li> <li>• Modifying and Verifying RSTP</li> <li>• Spanning-Tree failure Consequences</li> <li>• PortFast</li> <li>• BPDU Guard</li> <li>• EtherChannel</li> <li>• Configuring and Verifying port channel</li> <li>• Chapter Review Questions</li> </ul>	4T+4P
4	<p><b>Chapter 4: Fundamentals of Wireless Network and Architectures</b></p> <ul style="list-style-type: none"> <li>• Network Fundamentals</li> <li>• Explain the role and function of network components</li> <li>• Access Points</li> <li>• Describe wireless principles</li> <li>• Non overlapping Wi-Fi channels</li> <li>• SSID</li> <li>• RF</li> <li>• Autonomous AP Architecture</li> <li>• Compare Cisco Wireless Architectures and AP modes</li> <li>• Describe wireless principles</li> <li>• Describe wireless security protocols (WPA, WPA2, and WPA3)</li> <li>• Chapter Review Questions</li> </ul>	4T + 4P
5	<p><b>Chapter 5: Implementing DHCP Snooping and ARP Inspection</b></p> <ul style="list-style-type: none"> <li>• DHCP Concepts</li> <li>• Supporting DHCP for Remote Subnets with DHCP Relay</li> <li>• Configuring DHCP Features on Routers and Switches</li> </ul>	4T + 4P

	<ul style="list-style-type: none"> <li>• Configuring a Switch as DHCP Client</li> <li>• Configuring a Router as DHCP Client</li> <li>• DHCP Snooping Concepts</li> <li>• DHCP Snooping Configurations</li> <li>• Dynamic ARP inspection logic</li> <li>• Dynamic ARP inspection configurations</li> <li>• IP ARP Inspection Configuration Summary</li> <li>• Chapter Review Questions</li> </ul>	
6	<b>Chapter 5: Quality of Services (QoS)</b> <ul style="list-style-type: none"> <li>• Introduction to QoS</li> <li>• QoS: Managing Bandwidth, Delay, Jitter, and Loss</li> <li>• Types of Traffic</li> <li>• QoS on Switches and Routers</li> <li>• Classification and Marking</li> <li>• Classification on Routers with ACLs and NBAR</li> <li>• DiffServ Suggested Marking Values</li> <li>• Round-Robin Scheduling (Prioritization)</li> <li>• Shaping and Policing</li> <li>• Chapter Review Questions</li> </ul>	2T + 2P
7	Final Exam	4T+4P
<b>Total</b>		<b>52</b>

Online Study Topics:	
	<ul style="list-style-type: none"> <li>• Implementing DHCP</li> <li>• Host Setting for DHCP IPV4</li> <li>• Matching TCP UDP Port numbers</li> <li>• Building Access list point</li> <li>• Binary Wildcard Mask</li> <li>• IP telephony port on Switch</li> <li>• VLAN tagging concept</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>Describe</b> the switching technologies with appropriate layer 2,3 protocols for open shortest path first.	<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>Explain</b> the characteristics of different routing protocols for LAN's, WANs and architecture of Wireless networks.	<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>➤ Mid-Term Exam</li> <li>➤ Lab Exam</li> <li>➤ Final Exam</li> </ul>

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>2.0</b>	<b>Skills</b>		
2.1	<b>Design</b> a WLAN and WAN network utilizing the appropriate switching protocols according to given network requirements.	<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>➤ Mid-Term Exam</li> <li>➤ Mini Project</li> <li>➤ Assignments</li> </ul>
2.2	<b>Evaluate</b> the solutions for securing Wireless and Cloud architecture and networks	<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>Apply</b> the network troubleshooting strategies for solving network problems.	<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>
<b>3.0</b>	<b>Values</b>		
3.1	<b>Show</b> the abilities to justify and illustrate appropriate networking technical solutions to different audience.	<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>➤ Assignments</li> </ul>
3.2	<b>Evaluate</b> the knowledge and ability to perform the wired and wireless network based design and its implementation.	<ul style="list-style-type: none"> <li>➤ Lecture</li> <li>➤ Classroom Discussion</li> </ul>	<ul style="list-style-type: none"> <li>➤ Mini Project</li> <li>➤ Assignments</li> <li>➤ Lab Assignments</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 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>	CCNA 200-301 Official Cert Guide volume 1 and 2 by Wendell Odom, Copyright © 2020 Pearson Education, Inc. Published by: Cisco Press, Library of Congress Control Number: 2019949625, ISBN-13: 978-1-58714-713-5, ISBN-10: 1-58714-713-0
<b>Essential References Materials</b>	<ul style="list-style-type: none"> <li>• CCNA ICND2 Guide, Wendell Odom, 3<sup>rd</sup> edition, July 2016, ISBN: 978-1-58720-425-8</li> <li>• CCNA Routing and Switching Practice and Study Guide, Allan Johnson.</li> <li>• Cisco CCNA Study Guide, Aaron Balchums</li> </ul>
<b>Electronic Materials</b>	<ul style="list-style-type: none"> <li>• <a href="https://learningnetwork.cisco.com/community/certifications/ccna">https://learningnetwork.cisco.com/community/certifications/ccna</a></li> <li>• <a href="http://www.freeccnastudyguide.com/">http://www.freeccnastudyguide.com/</a></li> <li>• <a href="http://www.routeralley.com/completed/ccna_studyguide.pdf">http://www.routeralley.com/completed/ccna_studyguide.pdf</a> <ul style="list-style-type: none"> <li>• <a href="#">Jazanu/blackboard</a></li> </ul> </li> </ul>
<b>Other Learning Materials</b>	None

### 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> <li>• One lecture room for each section (maximum 30 students).</li> <li>• One Computer lab for each section, Lab section should not exceed 20 students.</li> <li>• Each Lab should be equipped with routers, switches properly mounted on special networking racks. Classroom equipped with projector, 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 for lab work: <ul style="list-style-type: none"> <li>• Cisco Packet Tracer 7.2</li> <li>• GNS3</li> <li>• UNL Network simulator</li> </ul>



Item	Resources
<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>	Council meeting
<b>Reference No.</b>	
<b>Date</b>	