

Course Title:	Preparing For The CCNA2 Certification
Course Code:	CSE341
Program:	Master Degree In Computer Engineering
Department:	Computer Engineering
Course coordinator:	Dr. Amina GHARSALLAH
Institution:	Private Higher School of Engineers of Gafsa (ESIP)

A. Course identification

1. Credit hours: 3 (1-0-2)
2. Course type
a. College Department Others
b. Fundamental Transversal Optional
3. Level/year at which this course is offered: 2.1/3
4. Pre-requisites for this course (if any): CCNA1(CSE232), Graph theory and optimization
(CSE212)

1. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Self- study	Total workload
1	Traditional classroom			
2	Blended	45		
3	E-learning		35	80
4	Distance learning			
5	Other ()			

2. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	22.5
2	Laboratory/Studio	22.5
3	Tutorial	
4	Others (specify)	-
	Total	45



B. Course Objectives and Learning Outcomes

Course Description

The CCNA2 (Cisco Certified Network Associate - Part 2) course builds upon foundational networking concepts, focusing on advanced switching, routing, and network security techniques. It provides students with the knowledge and hands-on experience required to configure, manage, and troubleshoot dynamic routing protocols (RIP, EIGRP, OSPF), VLANs, WAN technologies, network security mechanisms, and IP services. This course emphasizes real-world applications, integrating firewall configurations, Quality of Service (QoS), SNMP-based network management, and advanced troubleshooting techniques. By the end of this course, students will be well-prepared for mid-level networking roles and the CCNA certification exam.

Course Main Objectives

- ✓ Understand and configure dynamic routing protocols (RIP, EIGRP, OSPF) and troubleshoot routing issues.
- ✓ Gain knowledge of WAN technologies and their applications in enterprise networks.
- ✓ Configure and manage Cisco switches, including VLANs, Inter-VLAN Routing, STP, and EtherChannel.
- ✓ Implement and secure IP services such as DHCP, DNS, NAT, and QoS.
- ✓ Enhance network security by configuring firewalls, ACLs, and HTTPS encryption.
- ✓ Utilize SNMP and Syslog for network monitoring and management.
- ✓ Develop troubleshooting skills to diagnose and resolve network issues efficiently.

CLOs		Aligned PLOs
1	Knowledge and understanding	
1.1	Explain and configure dynamic routing protocols (RIP, EIGRP, OSPF) and understand WAN technologies and their deployment.	PLO.K1
1.2	Configure and manage Cisco switches, including VLANs, Inter-VLAN Routing (ROAS), STP, and EtherChannel. Troubleshoot dynamic routing issues and optimize network performance. Monitor and manage network devices and services.	PLO.K3
2	Skills	
2.1	Implement IP services such as DHCP, DNS, NAT, and QoS. Integrate these services into a network architecture to enhance performance and scalability	PLO.S2
2.2	Strengthen network security by configuring firewalls, HTTPS encryption, ACLs, and VLAN security. Utilize SNMP-based network management and monitoring tools. Diagnose and resolve network issues using systematic troubleshooting methods.	PLO.S6

1. Course Learning Outcomes



C. Course Content

No	List of Topics	Contact Hours
1	 Chapter 1: Introduction to Dynamic Routing Protocols 1. Overview of Routing Protocols (RIP, EIGRP, OSPF) 2. Differences Between Static and Dynamic Routing 3. Advantages and Disadvantages of Different Protocols 	3
2	 Chapter 2: Configuring and Troubleshooting Dynamic Routing 1. Configuring RIP, EIGRP, and OSPF 2. Troubleshooting Routing Protocols 3. Route Summarization and Redistribution 	3
3	 Chapter 3: VLANs and Layer 2 Switching Technologies 1. VLAN Concepts, Benefits, and Configuration 2. Inter-VLAN Routing (Router-on-a-Stick - ROAS) 3. VLAN Trunking (802.1Q) 4. Spanning Tree Protocol (STP, RSTP, PVST+) 5. EtherChannel (LACP & PAgP) 	4.5
4	 Chapter 4: IP Services and Network Security 1. Introduction to IP Services: DHCP, DNS 2. Implementing and Securing DHCP and DNS 3. Access Control Lists (ACLs): Standard & Extended 4. Wireless LAN (WLAN) Configuration & Security (WPA2, WPA3) 	3
5	 Chapter 5: Quality of Service (QoS) and IP Address Management 1. QoS Concepts and Implementation 2. Managing IP Addresses: IPv4 and IPv6 3. IPv6 Static Routing and OSPFv3 Configuration 	3
6	 Chapter 6: Network Monitoring and Management 1. Network Monitoring Tools and Techniques 2. SNMP Configuration and Management 3. Syslog and Network Event Management 4. Best Practices for Network Management 	3
7	Chapter 7AdvancedNetworkTroubleshooting& WANTechnologies1.1.Understanding WAN Technologies (PPP, GRE, VPN)2.Systematic Troubleshooting Approaches3.Common Network Issues and Solutions	4.5



No	List of Topics	Contact Hours
	 Advanced Diagnostic Tools and Techniques (Packet Capture, Debugging) 	
8	 Lab 1: Dynamic Routing Configuration 1. Configure RIP, EIGRP, and OSPF on Cisco routers 2. Verify and troubleshoot routing configurations 	3
9	 Lab 2: VLAN Configuration and Management 1. Create and manage VLANs on Cisco switches 2. Configure Inter-VLAN routing and troubleshoot VLAN issues 	3
10	Lab 3: IP Services Configuration1. Set up and secure DHCP and DNS services2. Integrate IP services into a network architecture	3
11	 Lab 4: Network Security and Firewalls 1. Configure HTTPS and implement firewall rules 2. Test and verify network security configurations 	3
12	 Lab 5: QoS and IP Address Management 1. Implement QoS on network devices 2. Plan and manage IPv4 and IPv6 addressing schemes 	3
13	 Lab 6: Integration of Network Services 1. Integrate DHCP, DNS, and NTP services in a network 2. Set up network monitoring using SNMP 	3
	Lab 7: Advanced Network Troubleshooting 1. Perform systematic troubleshooting on simulated network	
14	issues2. Use advanced diagnostic tools to resolve complex network problems	3
Total		45

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	Knowledge and understanding		
PLO.K1	Explain and configure dynamic routing protocols (RIP, EIGRP, OSPF) and	- Lecturing	- Assignments



Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	understand WAN technologies and their deployment.		- Quizzes - Exams
PLO.K3	Configure and manage Cisco switches, including VLANs, Inter-VLAN Routing (ROAS), STP, and EtherChannel. Troubleshoot dynamic routing issues and optimize network performance. Monitor and manage network devices and services.		
2.0			
PLO.S2	Implement IP services such as DHCP, DNS, NAT, and QoS. Integrate these services into a network architecture to enhance performance and scalability		- Assignments
PLO.S6	Strengthen network security by configuring firewalls, HTTPS encryption, ACLs, and VLAN security. Utilize SNMP-based network management and monitoring tools. Diagnose and resolve network issues using systematic troubleshooting methods.	 Lecturing Pravtice projects 	- Quizzes - Exams

2. Assessment Tasks for Students

	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Practical Work (written or oral)	Weekly	25%
2	Quizzes, Homework assignments	Random	%
3	First mid Term	8	25%
4	Final Exam	16	50%

E. Student Academic Counselling and Support

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

1- Office hours

2- Blackboard interface

F. Learning Resources and Facilities

1. Learning Resources

	1.	Odom, Wendell. CCNA 200-301 Official Cert Guide, Volume
Paguirad Taythooks	2.	1 & 2. Cisco Press, 2020.
Required Textbooks		Cisco Networking Academy. CCNA 2: Switching, Routing,
		and Wireless Essentials Companion Guide. Cisco Press, 2021.



	3. Lammle, Todd. CCNA Certification Study Guide: Exam 200- 301. Sybex, 2020.	
Essential References Materials	CCNA 200-301 Official Cert Guide Library	
	✓ Cisco Networking Academy (NetAcad): Official CCNA	
	2 Course (www.netacad.com)	
	✓ Cisco Learning Network: Official Exam Topics & Study	
	Materials (learningnetwork.cisco.com)	
Electronic Materials	✓ Udemy & Coursera: CCNA 200-301 Certification	
	Courses by David Bombal & Neil Anderson	
	(www.udemy.com, www.coursera.org)	
	✓ YouTube Channels: Jeremy Cioara	
	1. Cisco Press. 31 Days Before Your CCNA Exam. Cisco Press,	
	2021.	
Other Learning Materials	2. Tesch, Allan Johnson. CCNA 200-301 Portable Command	
	Guide. Cisco Press, 2020.	
	3. Stewart, Richard F. Routing TCP/IP, Volume 1 & 2. Cisco	
	Press, 2016.	

2. Facilities Required

Item	Resources
	Classroom board
Accommodation	Computer lab with the necessary software
	Internet access
Technology Resources	Data projector

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment.	Students, Faculty, Program Leaders, Peer Reviewer	Direct/Indirect
Extent of achievement of course learning outcomes.	Faculty, Program Leaders, Peer Reviewer	Direct
Quality of Learning resources	Faculty, Program Leaders, Peer Reviewer	Direct, Indirect
Teaching and learning quality and effectiveness.	Students, Faculty Program Leaders, Peer Reviewer	Direct, Indirect

H. Specification Approval Data

Council / Committee	Computer Engineering Council
Date	11/09/2023