Course Description Form

1. Course Name: Network Switching and Routing I

2. Course Code: CSCN3107

3. Semester / Year: first/2024-2025

4. Description Preparation Date: 1/9/2024

5. Available Attendance Forms: Classroom Lecture attendance/ Lab Attendance

6. Number of Credit Hours (Total) / Number of Units (Total)

   60/45

7. Course administrator's name (mention all, if more than one name)

   Name: Prof. Dr. Rana Fareed Ghani
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8. Course Objectives

Course Objectives	
	The aim of this course is to provide students with a comprehensive understanding of the fundamental principles, protocols, and technologies involved in routing and switching within computer networks. This module typically aims to:
	1. Understand Network Infrastructure: Teach students about the infrastructure of computer networks, including routers, switches, and their roles in data transmission.
	2. Routing Protocols: Introduce students to various routing protocols used in networking, such as RIP, OSPF, and BGP. Students learn how routers communicate and exchange routing information to efficiently forward data packets.
	3. Switching Concepts: Cover switching concepts like VLANs (Virtual Local Area Networks), STP (Spanning Tree Protocol), and switching algorithms. Students learn how switches forward traffic within local networks.
	4. Network Design and Optimization: Equip students with knowledge and skills to design and optimize network topologies for efficiency, scalability, and reliability.
	Overall, the aim is to empower students with theoretical understanding and practical skills necessary design, implement, manage, and troubleshoot routing switching solutions within computer networks.

9. Teaching and Learning Strategies

Strategy	1. Lectures: Traditional lectures delivered by instructors to introduce and explain theoretical concepts, principles, and technologies related to routing and switching. 2. Hands-on Labs: Practical lab sessions where students have the opportunity to configure routers, switches, and network devices in a simulated or real-world environment. This allows students to gain practical experience and reinforce theoretical concepts through hands-on experimentation. 3. Case Studies: Analysis of real-world case studies and scenarios involving routing and switching issues, allowing students to apply theoretical knowledge to practical problems and develop problem-solving skills. 4. Group Projects: Collaborative projects where students work in teams to design, implement, and troubleshoot network architectures and solutions. This encourages teamwork, communication, and critical thinking skills. 5. Simulations: Making use of network simulation software or virtualization platforms to simulate complex network environments, allowing students to experiment with different configurations, scenarios, and protocols in a safe and controlled setting. 6. Online Resources: Providing access to online resources such as video tutorials, interac simulations, documentation, and forums to supplement classroom instruction and facilitate s paced learning.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name		Learning method	Evaluation method
			Theoretical	**Practical**		
1.	4	1, 2, 4	Network Routing Protocols: Introduction to Routing Protocols	Introduction	1. Lectures 2.Hands-on Labs 3. Case Studies 4.Group Projects 5. Simulations	quizzes, lab reports, practical demonstrations
2.		1,2, 3,5	IP Routing Routing Basics	Packet Tracer Introduction	1. Lectures 2.Hands-on Labs 3. Case Studies 4.Group Projects 5. Simulations	quizzes, lab reports, practical demonstrations
3.		1,2,3,5,6,7	The IP Routing Process Configuring IP Routing	Packet Tracer Introduction	1. Lectures 2.Hands-on Labs 3. Case Studies 4.Group Projects 5. Simulations	quizzes, lab reports, practical demonstrations
4.		1,2,3,5,6,7	Static routing	Static Routing using Packet Tracer	1. Lectures 2. Hands-on Labs 3. Case Studies 4. Group Projects 5. Simulations	quizzes, lab reports, practical demonstrations
5.		1,2,3,5,6,7	Dynamic routing	Dynamic Routing using Packet Tracer	1. Lectures 2. Hands-on Labs 3. Case Studies 4. Group Projects 5. Simulations	quizzes, lab reports, practical demonstrations
6.		1,2,3,5,6,7	Host Routing and ARP	ARP using packet Tracer	1. Lectures 2. Hands-on Labs 3. Case Studies 4. Group Projects 5. Simulations	quizzes, lab reports, practical demonstrations

7.		1,2,3,5,6,7	Spanning Tree protocol (STP) Looping problems and the need for STP	Spanning Tree commands	1. Lectures 2. Hands-on Labs 3. Case Studies 4. Group Projects 5. Simulations	quizzes, lab reports, practical demonstrations
8.		1,2,3,5,6,7	How Spanning Tree Works The Rapid Spanning Tree Protocol (RSTP)	Spanning Tree and Network Topology	1. Lectures 2. Hands-on Labs 3. Case Studies 4. Group Projects 5. Simulations	quizzes, lab reports, practical demonstrations
9.			Mid-Exam	Mid Exam		
10		1,2,3,5,6,7	FROM IPv4 TO IPv6 Address Architecture	Ipv6 addressing	1. Lectures 2. Hands-on Labs 3. Case Studies 4. Group Projects 5. Simulations	quizzes, lab reports, practical demonstrations
11		1,2,3,5,6,7	The IPv6 Header Format. ICMP v6.	Ipv6 addressing	1. Lectures 2. Hands-on Labs 3. Case Studies 4. Group Projects 5. Simulations	quizzes, lab reports, practical demonstrations
12		1,2,3,4,5,6,7	Review	Review		
13		1,2,3,4,5,6,7	Review	Review		
14			Exam	Exam		
15			Exam			

16. Course Evaluation

Distributing the score out of 40 according to the tasks assigned to the student such as daily preparation, weekly topology achievement, written exams.
60 score for final exam.

17. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	1. Bruce Hartpence, "Packet Guide to Routing and Switching", O'Reilly Media, 2011. 2. Wendell Odom, CCNA 200-301 Official Cert Guide, Volume 1, Cisco Press, 2018. 3. Wendell Odom, CCNA 200-301 Official Cert Guide, Volume 2, Cisco Press, 2018.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	