QF01/0408-4.0E	Course Plan for Bachelor program - Study Plan Development and Updating Procedures/ Cyber Security Department

Study plan No.	**2024/2025**		**University Specialization**		**Cybersecurity**	
Course No.	**0133111**		**Course name**		**Computer Networks**	
Credit Hours	**3**		**Prerequisite Co-requisite**		-	
Course type	☐ MANDATORY UNIVERSITY REQUIREMENT	☐ UNIVERSITY ELECTIVE REQUIREMENTS	☐ FACULTY MANDATORY REQUIREMENT	☐ ✓ Support course family requirements	☐ Mandatory requirements	☐ Elective requirements
Teaching style	☐ Full online learning		☐ Blended learning		☐ ✓ Traditional learning	
Teaching model	☐ 2Synchronous: 1asynchronous		☐ 2 face to face: 1synchronous		☐ ✓3 Traditional	

Faculty member and study divisions information (to be filled in each semester by the subject instructor)

Name	Academic rank	Office No.	Phone No.	E-mail	
Division number	**Time**	**Place**	**Number of students**	**Teaching style**	**Approved model**

Brief description

This course explores key concepts and essential technologies of computer networks and broad range of topics in networking, including: General overview: Networks applications, Network classifications and topologies, Network layers, transmission media, Communication Network Protocols and architecture; Data link layer: framing, error detection and correction, CSMA/CD, LAN IEEE standards; Network layer: IP service model, IP Addressing, subnetting, Host configuration DHCP, ARP Protocol, ICMP protocol; Transport layer: UDP protocol, TCP protocol, TCP reliable transfer and sliding window, TCP flow and congestion control; Application layer: DNS protocol, NAT protocol, HTTP protocol, persistent and non-persistent HTTP connection

Learning resources

Course book information (Title, author, date of issue, publisher ... etc.)	• Data Communications and Networking with TCPIP Protocol Suite, 6/e. Behrous A. Forouzan, McGraw-Hill India, (2022), ISBN-10: 9355320949
Supportive learning resources (Books, databases, periodicals, software, applications, others)	• Tanenbaum, Andrew S. Computer Networks (5th Edition). Pearson, 2012. ISBN: 978-0132126953. • Forouzan, Behrouz A. TCP/IP Protocol Suite (3rd Edition). McGraw Hill, 2006. ISBN: 978-0073222001. • Stallings, William. Data and Computer Communications (7th Edition). Prentice Hall, 2004. ISBN: 978-0133506488. • Kurose, James F., and Ross, Keith W. Computer Networking: A Top-Down Approach Featuring the Internet (3rd Edition). Addison-Wesley, 2005. ISBN: 978-0321262929.
Supporting websites	

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The physical environment for teaching	☐ ✓**Class room**	☐ ✓labs	☐ **Virtual educational platform**	☐ Others
Necessary equipment and software	**Packet-Trace Application from Cisco Academy**			
Supporting people with special needs				
For technical support	**E-learning and Open Educational Center. Computer Center**			

Course learning outcomes (S= *Skills, C= Competences K= Knowledge,)*

No.	Course learning outcomes	The associated program learning output code
	Knowledge	
K1	Understand data communication and networking concepts	**MK1**
K2	Understand computer networks' standards, protocols (OSI and Internet reference models).	**MK2**
	Skills	
S1	Distinguish between different types of layers protocols.	**MS1**
S2	Analyze and compare the different LAN topologies and protocols.	**MS2**
	Competences	
C1	Design and implement LANs, and its relationship to WANs	**MC1**
C2	Implement the IP addresses strategies to network topologies	**MC2**

Mechanisms for direct evaluation of learning outcomes

Type of assessment / learning style	Fully electronic learning	Blended learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
First exam	0	**0**	0	0
Second / midterm exam	%30	**%30**	%30	%30
Participation / practical applications	0	**0**	0	0
Asynchronous interactive activities	%30	**%30**	%30	%30
final exam	%40	**%40**	%40	%40

Note: Asynchronous interactive activities include tasks such as projects, assignments, research, and group work performed through the virtual platform without direct teacher interaction.

Schedule of simultaneous / face-to-face encounters and their topics

Week	Subject	Learning Style*	Reference **
1	**Overview:** Data Communication (Definition., Characteristics and Components), Data flow in communication, Network Definition, Personal, Local, Campus, Metropolitan and Wide Area Network Concepts, Circuit VS. Packet	**Lecture**	Ch. 1 & 2

	Switching, Protocol Layers and Structure OSI.		
2	**Physical Layer:** Analog & Digital Concepts, Transmission concepts and Technologies.	**Lecture**	Ch. 3,4,5
3	**Physical Layer:** Transmission modes, Encoding Protocols, Transmission Media, LAN Topologies	**Lecture**	Ch.6,7
4	**Data link Layer:** LAN Topologies, Ethernet	**Lecture**	Ch.10
	Lab.: Packet tracer installation, configuration and functions, Creating LAN with different subnets	**learning through projects**	Cisco Academy
5	**Network Layer:** Protocols, TCP/IP protocol suite	**Lecture**	Ch.4,5
6	**Network Layer:** IPv4, Addressing, Public and Private Addresses Static and Dynamic IP Addresses,	**Lecture**	Ch.4,5
7	**Network Layer:** Network topologies, Subnetting and Routing	**Lecture**	Ch.4,5
	Lab.: Create Simple WAN, Connecting LANs to the Internet	**learning through projects**	Cisco Academy
8	**Network Layer:** IP Address Resolution, Address Resolution Protocol (ARP)	**Lecture**	Ch.9
9	**Network Layer:** Routing techniques and protocols	**Lecture**	Ch.6
10	**Transport Layer Protocols:** Transport Layer Concepts & Structure, UDP, UDP Ports and processes.	**Lecture**	Ch.12
11	**Transport Layer Protocols:** TCP and communication processes, connection establishment, flow and error control	**Lecture**	Ch.12
	Lab.: Creating three WANs using RIP	**learning through projects**	Cisco Academy
12	**Application Layer:** Application Layer concept and Structure, Processes, DHCP, DNS	**Lecture**	Ch.20
13	**Internet Architecture Overview:** Overall network architecture and layout, DNS, DDNS	**Lecture**	Ch. 26
14	**Lab.:** Configure DHCP and DNS	**learning through projects**	Cisco Academy
15	Network General review.		
16	**Final Exam**		

*** Learning styles: Lecture, flipped learning, learning through projects, learning through problem solving, participatory learning ... etc.**

**** Reference: Pages in a book, database, recorded lecture, content on the e-learning platform, video, website ... etc.**

Schedule of asynchronous interactive activities (in the case of e-learning and blended learning)

This activities was designed using the **Project-Based Learning (PBL)**

Network Layer & WAN / Routing (PBL)

Task / Activity	Reference	Expected Results
Design a network topology connecting multiple LANs	Network Topologies, Internet Architecture Overview	Structured logical network design
Calculate subnetting and assign IP addressing	Subnetting, IP Addressing	Correct subnet tables with valid IP allocation
Configure routers and routing tables	Routing Techniques & Protocols (Static / RIP)	Successful routing between networks
Create a Simple WAN connecting different LANs	Lab: Create Simple WAN, Connecting LANs to Internet	LANs connected through WAN with communication enabled
Implement RIP routing between networks	Lab: Creating three WANs using RIP	Dynamic routing successfully operational
Perform ARP testing across network	Network Layer: ARP	Verified ARP resolution and address mapping
Verify end-to-end connectivity and troubleshoot	Routing Protocols, Packet Flow Concepts	Stable communication, zero packet loss
Prepare final project documentation	PBL Documentation Requirements	Clear professional technical report