The University of Jordan School of Engineering Electrical Engineering Department

1st Semester – A.Y. 2025/2026



Course: Communication Networks – 0903426 (3 Cr. – Elective Course)

Instructor: Prof. Mohammed Hawa

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Office Hours: will be posted soon

Platform: http://www.hawa.work/426

Catalog description:

Introduction to communication networks and the OSI model. Circuit switching and packet switching. Physical layer and transmission media. Asynchronous and synchronous transmission. Local loop access technologies. Data Link Layer Principles. IEEE 802.x Medium Access Control (MAC) protocols: LANs, MANs, WANs and PANs. The concept of internetworking and the Internet Protocol (IP). IP Specifications and supporting protocols (ARP, DHCP, ICMP, etc). Routing and switching in IP networks. Repeaters, Switches, Hubs, Bridges, Routers and Gateways. UDP and TCP transport layers. Internet applications.

Prerequisites by course: Prerequisites by topic:

EE 0953421 - Communications I (pre-requisite)

Students are assumed to have a background in the following topics:

• Digital baseband coding and digital modulation.

Basics of computer hardware and software.

Textbook:

Computer Networks by Andrew S. Tanenbaum, Nick Feamster and David J. Wetherall, Pearson, 6th Edition, 2021.

References:

- Computer Networks: A Systems Approach by Larry L. Peterson and Bruce S. Davie, Morgan Kaufmann, 6th edition, 2021.
- Computer Networking: A Top-Down Approach by James F. Kurose and Keith W. Ross, Pearson, 8th edition, 2022.
- Computer Networks and Internets by Douglas E. Comer, Pearson, 6th edition, 2014.
- Internetworking with TCP/IP Vol.1: Principles, Protocols, and Architecture by Douglas E. Comer, Pearson, 6th Edition, 2013.
- Data and Computer Communications by William Stallings, Pearson, 10th edition, 2013.
- Computer Networks: Data Communications, Internet and Security by Ata Elahi and Alex Cushman, Springer, 1st edition, 2024.
- Hacking for Dummies by by Kevin Beaver, Wiley, 7th edition, 2022.

Schedule:

On Campus [16 Weeks, 42 lectures (50 minutes each) including exams]

Course goals:

The overall objective is to introduce the student to the basics of computer networks and the OSI model. This course emphasizes:

- The concepts and design guidelines of computer networks.
- The framework for implementing network protocols (Layering & OSI model).
- Modern trends and latest implementations of networks and internetwork protocols.

	successful com Become familia	utcomes (CLO) and relation to ABET student outcomes (SO): apletion of this course, a student will: ar with the basic principles of computer networking and be able to bork performance metrics such as throughput, delay, and loss.			[SO]	
2.	Be able to describe network architectures, the OSI reference model, framing, MAC protocols, internetworking and encapsulation.					[1]
3.	Understand the design philosophies for various popular networking protocols, such as CSMA/CD, CSMA/CA, FTTH, IPv4, IPv6, ICMP, DHCP, UDP and TCP.				s, such as	[1, 7]
4.	Be able to use	IP addressing and a	pply sub-netting	techniques.		[1]
5.	Recognize the network securit		with changing	network technology and	d emerging	[7]
Course topics: 1. Introduction to Communication Networks. Circuit vs. Message vs. Packet vs. Virtual-Circuit						Hrs
1.	Switching. Gro	wth of the Internet.		•		3
2.	Network Protocols and Layering: OSI Model, Protocols, Encapsulation, TCP/IP Protocol Stack.					3
3.	The Physical Layer and Transmission Media. FLAG Network. Asynchronous and Synchronous Transmission.					2
4.	Local Loop, Internet Access and Leased Lines: xDSL, Cable Modems, Fiber. Broadband Wireless Access (BWA), Power Line Communications, PDH, SDH/SONET.					5
5.	Data Link Layer Basics: Framing and Error Detection.					2
6.	Local Area Networks (LANs): Ethernet and Ethernet MAC Protocol (CSMA/CD). Wi-Fi MAC protocol (CSMA/CA).					2
7.	Ethernet Addressing and Frame Formats.					2
8.	First Exam					1
9.	Switched Ethernet and Collision Domains.					2
10.	Self-Learning Bridges and the Spanning Tree Protocol (STP). VLANs.					2
11.	Ethernet Wiring and Ethernet Standards (Fast Ethernet, 1 GbE and 10 GbE).					3
12.	Concept of Internetworking and the Internet Protocol (IP).					1
13.	IP Packet Format and IP Packet Fragmentation. IP Addressing (Classful and Classless), and Subnetting. IPv6 Addresses and Packet Format.					4
14.	IP Datagram Forwarding and ICMP Protocol.					2
15.	Midterm Exam.					1
16.	Address Resolution and ARP. DHCP, Private IP Addresses and NAT.					3
17.	Introduction to Internet Routing: OSPF, RIP, EIGRP and BGP.					1
18.	UDP and TCP Transport Layers: Automatic Repeat Request (ARQ) and the TCP Sliding Window Algorithm. Introduction to Congestion Control in TCP.					2
19.	· · · · · · · · · · · · · · · · · · ·					
Ground rules:		Attendance is required and highly encouraged. To that end, attendance will be taken every lecture. Eating and drinking are not allowed during class, and cell phones must be set to silent mode. All exams (including the final exam) should be considered cumulative . Exams are closed book. No scratch paper is allowed. You will be held responsible for all reading material assigned, even if it is not explicitly covered in lecture notes. Academic integrity must be maintained.				
Assessment &		First Exam	20 %	Assignments	0 %	
grading policy:		Midterm Exam	30 %	Projects	0 %	
J	51 - 75 -	Final Exam	50 %	Lab Reports	0 %	
		Quizzes	0 %	Presentation	0 %	
Last Undated:		Octobor 2025		Total	100 %	

Last Updated: October 2025