



Faculty: Information Technology	
Department: Computer Science	Program: Master
Academic year:	Semester:

Course Plan

First: Course Information

Course No.: 1501721	Course Title: <i>Advanced Computer Networks</i>	Credit Hours: 3	Theoretical: 3	Practical: 0
Prerequisite No. and Title:	Section No.:	Lecture Time:		
Level in JNQF	9			
Type Of Course:	<input type="checkbox"/> <i>Obligatory University Requirement</i> <input type="checkbox"/> <i>Elective University Requirement</i> <input type="checkbox"/> <i>Obligatory Faculty Requirement</i> <input type="checkbox"/> <i>Elective Faculty Requirement</i> <input checked="" type="checkbox"/> <i>Obligatory Specialization Requirement</i> <input type="checkbox"/> <i>Elective Specialization Requirement</i> <input type="checkbox"/> <i>Ancillary course</i>			
Type of Learning:	<input checked="" type="checkbox"/> <i>Face-to-Face Learning</i> <input type="checkbox"/> <i>Blended Learning (2 Face-to-Face + 1 Asynchronous)</i> <input type="checkbox"/> <i>Online Learning (2 Synchronous+ 1 Asynchronous)</i>			

Second: Instructor's Information

Course Coordinator:				
Name:		Academic Rank:		
Office Number:		Extension Number:1025	Email:	
Course Instructor:				
Name:		Academic Rank: Assistant Professor		
Office Number:		Extension Number:	Email:	
Office Hours:	Sunday	Monday	Tuesday	Wednesday Thursday

Third: Course Description

This course gives a broad perspective of computer networks and Internet protocols. The course covers the principles and practices of computer communication networks including the design and implementation of the Internet, its protocols, and applications. Topics to be covered include Circuit-switched and packet-switched networks, protocols, protocol layering; layered network architectures, application layer, network programming interfaces (e.g., sockets), transport layer, multiplexing and demultiplexing, UDP, TCP, reliability, flow control, congestion control, network layer, routing protocols, switching technologies, multicast, mobility; link layer, local area networks, error detection, and correction; mobile and wireless networks(e.g., Wi-Fi, GSM); network security and management.

Fourth: Course Objectives

1. Provide students with the principles of how to manage network systems, including concepts, transactions, and exchange data between systems.
2. Teach students the different types of computer reference models, so they are able to identify and differentiate the architecture of computer networks.
3. Familiarize students with the basic tools, techniques and algorithms for error detection and correction, and the multiple access protocols.
4. Guide the students to analyze some issues that may appear on multiaccess channels, and how can handle these issues.
5. Develop students' understanding of how to deal with the latest challenges that may appear in shared channels during the transmission process.

Fifth: Learning Outcomes

<i>Level descriptor according to (JNQF)</i>	<i>CILOs Code</i>	<i>CILOs</i> If any CLO will not be assessed in the course, mark NA.	<i>Associated PILOs Code</i> Choose one PILO for each CILO*	<i>Assessment method</i> Choose at least two methods
Knowledge	K1	Overview the basic definitions of computer networks including the computer network reference models, i.e., OSI, TCP/IP and hybrid models, and understanding the similarities and differences between the roles of these layers in each reference model.	PK1	<ul style="list-style-type: none"> • Mid-term Exam • Final Exam
	K2	Understand the most recent and advanced concepts of computer network applications and design, and network routing techniques.	PK3	<ul style="list-style-type: none"> • Mid-term Exam • Final Exam
	K3	Describe the physical layer concepts: Data Rate, Communication medium, encoding, modulation, multiplexing, and switching.	PK1	<ul style="list-style-type: none"> • Final Exam
	K4	Discuss the data link and transport layer concepts, and the design of protocols, interfaces, and services; including connection-oriented and connection-less models, techniques to provide reliable data delivery, and algorithms for congestion control, flow control, error detection and correction, and the collision challenges.	PK1	<ul style="list-style-type: none"> • Final Exam
Skills	S1	Analyze the performance of routing protocol, algorithms, and discuss the differences between routing and forwarding.	PS1	<ul style="list-style-type: none"> • Mid-term Exam • Final Exam

	S2	Evaluate research papers, technical documentation, and assess the ethical and social implications of emerging technologies and networking.	PS2	<ul style="list-style-type: none"> • Assignments • Group presentation
	S3	Adapting to the development of the state-of-the-art technologies and methodologies in computer networks design and demonstrate flexibility in addressing challenges and changes in problem-solving within dynamic and changing environments.	PS5	<ul style="list-style-type: none"> • Assignment • Group presentation
Competencies	C1	Design new approaches and models to manage problems that may appear in multi-access channels (Thesis based)	PC1	<ul style="list-style-type: none"> • Assignment • Group presentation
	C2	Develop a high-level of communication skills required that positively impact collaboration on group projects.	PC4	<ul style="list-style-type: none"> • Group presentation

*CILOs: Course Intended Learning Outcomes; PILOs: Program Intended Learning Outcomes; For each CILO, the PILO could be the same or different.

Sixth: Learning Resources

Main Reference:	<i>Computer Networks</i>			
Author: Andrew S., Tanenbaum and David J. Wetherall	Issue No.: 5th Edition	Print:	Publication Year: 2011	
Additional Sources and Websites:	<ul style="list-style-type: none"> • <i>Data and Computer Communications, William Stallings, 7 Pearson Education, Inc. Pearson Prentice Hall Pearson Education, Inc. Upper Saddle River, NJ 07458, Eighth Edition 2007.</i> 			
Teaching Type:	<input checked="" type="checkbox"/> Classroom <input type="checkbox"/> Laboratory <input type="checkbox"/> Workshop <input checked="" type="checkbox"/> MS Teams <input checked="" type="checkbox"/> Moodle			

Seventh: Course Structure

Week	Course Intended Teaching Outcomes (CILOs)	Topics	Teaching Procedures*	Teaching Methods**	References***
1	K1	Syllabus overview + Overview and definition of a computer network	Face-to-Face	Lecture, In-class Questions	Chapter 1
2	K1, K2, S1, C1, C2	Overview and definition of a computer network	Face-to-Face	Lecture, In-class Questions	Chapter 1
3	K1, K2, S1, C1, C2	Network uses and classifications + Layered architecture and the reference models	Face-to-Face	Lecture, In-class Questions	Chapter 1
4	K1, K2, S1, C1, C2	Layered architecture and the reference models	Face-to-Face	Lecture, In-class Questions	Chapter 1
5	K1, K2, S1, C1, C2	Layered architecture and the reference models	Face-to-Face	Lecture, In-class Questions	Chapter 1
6	K3, S1, C1, C2	Physical Layer Concepts: Data Rate, Communication Medium, Encoding, Modulation,	Face-to-Face	Lecture, In-class Questions	Chapter 2

		Multiplexing, Switching			
7	K3, S1, C1, C2	Physical Layer Concepts: Data Rate, Communication Medium, Encoding, Modulation, Multiplexing, Switching	Face-to-Face	Lecture, In-class Questions	Chapter 2
8	Midterm Exams				
9	K3, S1, C1, C2	Physical Layer Concepts: Data Rate, Communication Medium, Encoding, Modulation, Multiplexing, Switching	Face-to-Face	Lecture, In-class Questions	Chapter 2
10	K4, S1, C1, C2	The data link layer: Protocols; stop-and- wait, sliding window, protocols over noisy channels, Connection Establishment and Release PPP	Face-to-Face	Lecture, In-class Questions	Chapter 3
11	K4, S1, C1, C2	The data link layer: Protocols; stop-and- wait, sliding window, protocols over noisy channels, Connection Establishment and Release PPP	Face-to-Face	Lecture, In-class Questions	Chapter 3
12	K4, S1, C1, C2	The data link layer: Protocols; stop-and- wait, sliding window, protocols over noisy channels, Connection Establishment and Release PPP	Face-to-Face	Lecture, In-class Questions	Chapter 3
13	K4, S1, C1, C2	The data link layer: Protocols; stop-and- wait, sliding	Face-to-Face	Lecture, In-class Questions	Chapter 3

		window, protocols over noisy channels, Connection Establishment and Release PPP			
14	K4, S2, C1, C2	Multiple Access Control: Channel allocation problem, ALOHA, Slotted ALOHA, CSMA, CSMA/CD, SCMA/CA, Ethernet	Face-to-Face	Lecture, In-class Questions	Chapter 4
15	K4, S2, C1, C2	Multiple Access Control: Channel allocation problem, ALOHA, Slotted ALOHA, CSMA, CSMA/CD, SCMA/CA, Ethernet	Face-to-Face	Lecture, In-class Questions	Chapter 4
Final Exams					

*Teaching procedures: (Face-to-Face, synchronous, asynchronous).

** Teaching methods: (Lecture, video....).

*** Reference: (Pages of the book, recorded lecture, video....)

Eighth: Assessment Methods

Methods	Online Learning	Blended Learning	Face-To-Face Learning	Specific Course Output to be assessed							
				**If any CILO will not be assessed in the course, mark NA.							
				K1	K2	K3	S1	S2	S3	C1	C2
First Exam											
Second Exam											
Mid-term Exam			30	✓	✓		✓				
Asynchronous Activities											
Quizzes											
Assignments			25					✓	✓	✓	
Group presentation			5					✓	✓	✓	✓
Final Exam			40	✓	✓	✓	✓				
Total out of 100			100								

Ninth: Course Policies

- All course policies are applied to all teaching patterns (online, blended, and face-to-face Learning) as follows:
 - a. Punctuality.
 - b. Participation and interaction.
 - c. Attendance and exams.
- Academic integrity: (cheating and plagiarism are prohibited).

Approval	Name	Date	Signature
Head of Department			
Faculty Dean			