Course Specifications

Course Title:	**Computer Networks**
Course Code:	**ICS 312**
Program:	**Information and Computer Science**
Department:	**Computer Science and Information**
College:	**College of Science at Azzulfi**
Institution:	**Majmaah University**

Table of Contents

A. Course Identification

1. Credit hours: 3
2. Course type **a.** University [ ] College [ ] Department [×] Others [ ] **b.** Required [×] Elective [ ]
3. Level/year at which this course is offered: 4
4. Pre-requisites for this course (if any)**:** ICS 222
5. Co-requisites for this course (if any)**:**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	48	80 %
2	**Blended**	6	10 %
3	**E-learning**	6	10 %
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	30
2	**Laboratory/Studio**	20
3	**Tutorial**	10
4	**Others** (specify)	
	Total	60
Other Learning Hours*		
1	**Study**	20
2	**Assignments**	15
3	**Library**	10
4	**Projects/Research Essays/Theses**	5
5	**Others**(specify)	
	Total	50

***The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course explores the principles underlying the design of computer networks. It examines techniques for transmitting information efficiently and reliably over a variety of communication media. It looks at the addressing and routing problems that must be solved to ensure that transmitted data gets to the desired destination. Students come to understand the impact that the distributed nature of all network problems has on their difficulty. The course examines the ways in which these issues are addressed by current networking protocols such as TCP/IP and Ethernet.

2. Course Main Objective

- Describe major computer networks components.
- Be familiar with various types of computer networks
- Describe how Internet works.
- Understand the OSI and Internet layers.
- Understand protocols and routing algorithms.
- Knowing the various aspects about computer networks security

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	Describe the layered structure of a typical networked architecture.	K1
1.2	Describe how resources can be allocated in a network.	K1
1.3	Describe how packets are forwarded in an IP network	K1
1.4	Describe how frames are forwarded in an Ethernet network	K1
1.5	List the scalability benefits of hierarchical addressing	K1
1.6		
2	**Skills :**	
	Compare and contrast current approaches to congestion	S2
2.1	Articulate the organization of the Internet.	S2
2.2	List and define the appropriate network terminology.	S2
3	**Competence:**	
3.1		
3.2		

C. Course Content

No	List of Topics	Contact Hours
1	**Introduction to Computer Networks** - Organization of the Internet (Internet Service Providers, Content Providers, etc.) - Switching techniques (e.g., circuit, packet) - Physical pieces of a network, including hosts, routers, switches, ISPs, wireless, LAN, access point, and firewalls	8
2	**Networked Applications** - Naming and address schemes	8

	- Distributed applications - HTTP as an application layer protocol - Multiplexing with TCP and UDP - Socket APIs	
3	**Reliable Data Delivery** - Error control (retransmission techniques, timers) - Flow control (acknowledgements, sliding window) - Performance issues (pipelining) - TCP	12
4	**Routing and Forwarding** - Routing versus forwarding - Static routing - Internet Protocol (IP) - Scalability issues (hierarchical addressing)	12
5	**Local Area Networks** - Multiple Access Problem - Local Area Networks - Ethernet - Switching	8
6	**Resource Allocation** - Need for resource allocation - Fixed allocation (TDM, FDM, WDM) versus dynamic allocation - End-to-end versus network assisted approaches - Fairness - Principles of congestion control - Approaches to Congestion (e.g., Content Distribution Networks)	12
Total		

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**		
1.1	Understand basic computer network technology protocols.	Lectures Lab demonstrations Case studies Individual presentations	Written Exam Homework assignments Class Activities Quizzes
1.2	Understand and explain Data Communications System and its components.		
1.3	Identify the different types of network topologies and protocols.		
1.4	Identify the layered structure of a typical networked architecture.		
1.5	Understand the organization of the network layers.		
1.6	Understand how resources can be allocated in a network.		
1.7	Understand how packets are forwarded in an IP network.		
1.8	Understand how frames are forwarded in an Ethernet network		
1.9	Understand the key security issues of computer communication		
2.0	**Skills**		
2.1	Be able to explain the most important standards in the field of computer communication	Small group discussions. Whole group discussions. Brainstorming. Presentations.	Written Exam Homework assignments Class Activities Quizzes
2.2	Assess different solutions for computer networks		
3.0	**Competence**		
3.1	Give an oral presentation of problems and technical solutions in the field of computer networks	Small group discussions. Whole group discussions. Brainstorming. Presentations.	Written Exam Homework assignments Class Activities Quizzes
3.2	Explain the historical development of the field of computer communication		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	First written mid-term exam	6	20%
2	Second written mid-term exam	12	20%
3	Presentation, class activities, lab activity, and group discussion	Every week	10%
4	Homework assignments	After every chapter	10%
5	Final written exam	15	40%
TOTAL			100%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

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

1. A total of 6 office hours per week in the lecturer schedule in order to facilitate the student.
2. Contacting students using e-mail , mobile, office telephone and website.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Computer Networks and Internets, Global Edition, 6/E, Douglas Comer, Pearson, 2016. Computer Networking Problems and Solutions: An innovative approach to building resilient, modern networks, Russ White and Ethan Banks, Addison-Wesley, 2018
Essential References Materials	Data and Computer Communication 9th Ed., William Stallings. Pearson Prentice Hall, 2011
Electronic Materials	https://www.coursera.org
Other Learning Materials	Video and presentations that are available with the instructor

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and, Library, as those are available at the college of science at Azzulfi
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching	Students	• Analysis of students' results. Observation during class work. • Students' evaluations. • Colleagues' evaluations. • Evaluation questionnaire filled by the students. • Interview a sample of students enrolled in the course to take their opinions
Evaluation of Teaching	Program leaders	• Self-assessment. • External evaluation. • Periodic review of course (the Commission of study plans)

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes,Quality oflearning resources, etc.)
Evaluators (Students,Faculty, Program Leaders,Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	