Course Specifications

Course Title:	**Advanced Computer Networks**
Course Code:	**ICS 435**
Program:	**Computer Science and Information Program**
Department:	**Department of 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. Pre-requisites for this course (if any)**:** Computer Networks
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**		
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

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

***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 covers a set of advanced topics in computer networks. The focus of the course is on principles, architectures, and protocols used in modern networked systems. Topics include:

- Wireless networks and mobility issues at the network and transport layer (Mobile IP and micromobility protocols, TCP in wireless environments).
- Data center and high-performance networking.
- Network virtualization

2. Course Main Objective

- This module covers wireless technologies and emerging networking technologies and a range of network architectures and protocols.
- Be able to understand operation of wireless networks
- Be familiar with one or more tools for implementing computer network projects
- Be able to design, develop and to build a wireless networking demonstrator for an embedded system.
- Be able to design and critically analyze networking protocols for a range of technologies and scenarios
- Have the ability to design and implement effective and usable graphical user interfaces
- Be able to start research in the area of networking and to read, write, and present work on networking

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	The basic concepts associated with network security	
2	**Skills :**	
2.1	Analyze and implement some of the most advanced routing and congestion control algorithms	
2.2	Evaluate the performances of computer networks (through mathematical modeling and simulation)	
3	**Competence:**	
3.1	Understand basics and principles of new generation of computer networks (VPN, wireless networks, mobile networks…)	
3.2	Work in a group to practice managing wireless networks	

C. Course Content

No	List of Topics	Contact Hours
1	Layered communication architecture: layers, services, protocols, layer entities, service access points, protocol functions…	3
2	Advanced Routing algorithms	3
3	Advanced Network Congestion Control algorithms	3
4	Quality of service	3

5	Network Virtualization	3
6	Performance Issues	6
7	Overview on VPN networks	3
8	Overview on Wireless Networks and Mobile Networks: LAN, PAN, Sensor Networks, Adhoc Networks	6
9	Data Center	6
10	SDN Network Management	3
11	IP Security	3
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	The basic concepts associated with network security	Lectures Lab demonstrations Case studies Individual presentations	Written Exam Homework assignments Class Activities Quizzes
2.0	**Skills**		
2.1	Analyze and implement some of the most advanced routing and congestion control algorithms	Small group discussions. Whole group discussions. Brainstorming. Presentations.	Written Exam Homework assignments Class Activities Quizzes
2.2	Evaluate the performances of computer networks (through mathematical modeling and simulation)		
3	**Competence:**		
3.1	Understand basics and principles of new generation of computer networks (VPN, wireless networks, mobile networks…)	Small group discussions. Whole group discussions. Brainstorming. Presentations.	Written Exam Homework assignments Class Activities Quizzes
3.2	Work in a group to practice managing wireless networks		

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 Networking: The Complete Guide to Understanding Wireless Technology, Network Security, Computer Architecture and Communications Systems (Including Cisco, CCNA and CCENT), Michael B. White, 2018
Essential References Materials	Wireless Communications & Networks, 2nd edition, William Stallings, Prentice-Hall Pearson
Electronic Materials	http://nptel.ac.in/courses.php?branch=Comp http://cs.mcgill.ca/~jpineau/comp424/schedule.html
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	