Course Specification

— (Bachelor)

Course Title: Computer Networks Lab

Course Code: IT 416

Program: Information Technology

Department: Information Technology

College: College of Computer and Information Sciences

Institution: Majmaah University

Version: 2

Last Revision Date: 31 May 2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 2(0,4,0)

2. Course type

A.	☐ University	☒ College	☐ Department	☐Track	☐Others
B.	☒ Required			☐Elective	

3. Level/year at which this course is offered: (Level 7)

4. Course general Description:

This course provides students with hands on training regarding the design, configuration, troubleshooting, modelling and evaluation of computer networks. This course covers: Peer-to-Peer and Server-based networks, Transmission media, MAC & IP addressing, Address Resolution Protocol (ARP), basic troubleshooting tools, IP routing Protocols such as RIP, IGRP, and OSPF, Transport protocols: TCP and UDP, Virtual LANs, Wireless networks, and Network security.

5. Pre-requirements for this course (if any)**:**

IT 324

6. Pre-requirements for this course (if any)**:**

7. Course Main Objective(s):

1.   Provide hands on training regarding the design, troubleshooting, modelling and evaluation of computer networks.

2.   Configure the active network components such as: switches and routers.

3.   Evaluate different routing techniques.

4.   Construct and configure virtual networks.

5.   Construct and configure wireless networks.

6.   Construct access control lists for the routers and configure packet filtering firewalls.

7.   Evaluate and measure QoS performance.

8.   Introduce the network modelling and build some simple networking models using the simulation packages.

9.   Evaluate different design approaches and expected network performance

Students will also be introduced to the network modelling and they will have the opportunity to build some simple networking models and evaluate their design approaches and expected network performance.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	
2.	**Laboratory/Studio**	60
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1				
1.2				
…				
2.0	**Skills**			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	Understanding the Peer-to-Peer and Server-based networks	S3	**Laboratory** Teaching	Quiz, Mid Exam, Final Exam
2.2	Understand the MAC & IP, LAN components and their interconnection addressing and evaluate different routing techniques.	S3	**Laboratory** Teaching	Lab Based on Assignments, Lab Tests, Mid
2.3	Student able to construct access control lists for the routers and packet filtering firewalls.	S1	**Laboratory** Teaching	Quiz, Mid Exam, Final Exam, Assignment
2.4	Understanding the virtual network and ability to construct and configure virtual networks	S1	**Laboratory** Teaching	Quiz, Mid Exam, Final Exam
2.5	Ability to Construct and configure wireless networks.	S1	**Laboratory** Teaching	Quiz, Mid Exam, Final Exam
2.5	Understand the security standard and evaluate the Secure network by implementing of various security policies.	S2	**Laboratory**	Quiz, Mid Exam, Final Exam
3.0	**Values, autonomy, and responsibility**			
3.1				
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	To study computer network devices, transmission media and types of Network.	4
2.	Ethernet LAN, Token Ring, Switched LANs, Network Design	4

3.	Simulate simple transmitting nodes in wire-less LAN by simulation and determine the performance with respect to transmission of packets	4
4.	Simulate simple transmitting nodes in wire-less LAN by simulation and determine the performance with respect to transmission of packets	4
5.	"IP address, Address Resolution Protocol (ARP),Dynamic Routing Protocols,	4
6.	Characteristics of EIGRP, Configuring EIGRP for IPv4,Operation of EIGRP	4
7.	Transport Layer Protocols TCP and UPD Simulation	4
8.	"Characteristics of static routing, Static Routing Implementation	4
9.	Characteristics of OSPF, Configuring Single/multi-Area OSPFv2,Configuring Single/multi-Area OSPFv	4
10.	Characteristics of BGP, Configuring BGP, Configuring BGP for IPv4	4
11.	VLAN Segmentation, VLAN Implementations, VLAN Security and Design	4
12.	Wireless LAN Concepts, Wireless LAN Operation, Wireless LAN Security, Wireless LAN Configuration, Simulation of different wireless routing protocol to check their performance	4
13.	IP ACL Operation, Standard IPv4 ACLs, Extended IPv4 ACLs, Troubleshoot ACLs	4
14.	VPNs, Site-to-Site GRE Tunnels, Introducing IPsec Tunnels, Remote Access	4
15.	Revision	4

Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	Week 4, Week 8	10%
2.	Assignments	Week 5, Week 10	15%
3.	Mid Term Exam	Week 7-8	20%
4.	Lab Exam	Every Week	15%
5.	Final Exam	Week 16	40%
...			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Larry L. Peterson & Bruce S. Davie, Computer Networks - A Systems Approach, 5thEdition, the Morgan Kaufmann Series in Networking.
Supportive References	Cisco routing switch essential by Cisco academy
Electronic Materials	Cisco scaling network by Cisco academy
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	**Class Room, PC**
Technology equipment (projector, smart board, software)	**LCD Projector, Packet Tracer**
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Indirect (Students)	CLO Survey
Effectiveness of Students assessment	Direct (Instructor)	Quiz, Mid exam, Assignments, Exercises, Final Exam and Indirect Survey
Quality of learning resources	Convener, instructors, HOD	Regular follow ups
The extent to which CLOs have been achieved	Instructor, TA	Performance in the exam for a particular CLO(s)
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	INFORMATION TECHNOLOGY
REFERENCE NO.	
DATE	