هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	Network Fundamentals
Course Code:	Net 103
Program:	Computer Science (Networking)
Department:	Applied Sciences
College:	Applied College
Institution:	Al Imam Muhammad bin Saud Islamic University

Table of Contents

A. Course Identification

1. Credit hours: 3 **(2 hours Lecture, 2 hours Lab)**
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: First year/ Second Semester
4. Pre-requisites for this course (if any)**:** None
5. Co-requisites for this course (if any)**:** None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**		
2	**Blended**	44	100%
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	22
2	**Laboratory/Studio**	22
3	**Tutorial**	
4	**Others** (specify)	
	Total	44

B. Course Objectives and Learning Outcomes

1. Course Description

This course introduces the basic concepts of computer networks, protocols, topologies, hardware and their main components to make students equipped with the theoretical basis and practical experiences necessary to design, implement, manage, and upgrade networks. This course will prepare students for the following certificates:

- CompTIA Network +.
- CompTIA A+.

2. Course Main Objective

This course aims to provide students with the necessary knowledge and skills related to the computer networks and the techniques used into it.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Understanding the concept of computer networks, their classifications, layers, and its software and hardware components.	ع1، ع5
1.2	Analysis of fundamentals and components of network security.	ع1، ع5
1.3	Knowledge of network addressing and segmentation techniques.	ع1، ع5
1.4	Knowledge of other networking techniques.	ع1، ع5
2	**Skills :**	
2.1	Determining the methods of installing and operating computer network devices.	م1، م2، م7
2.2	Technical skills in managing, establishing, operating, maintaining, and solving network infrastructure problems.	م1، م2، م7
2.3	The use of information and communication technology in communication, exchanging ideas, scientific research, and tasks accomplishments.	م1، م2، م7
2.4	Practicing critical thinking and solving problems that the learner faces in the course in creative ways.	م1، م2، م7
3	**Values:**	
3.1	Cooperation, teamwork, and professional ethics.	ق 1
3.2	Take responsibility for continuous learning and continuing personal development.	ق 2
3.3	Efficient and effective time management when applying acquired knowledge and skills.	ق 3

C. Course Content

No	List of Topics	Contact Hours

1	**Networking Basics:**
	• Defining a network.
	• Benefits of a network.
	• What is the internet?
	• Internet services.
	• History of computer networking and the internet.
	• Network components:
	  ○ Hardware
	  ▪ Computers.
	  ▪ Connectivity devices:
	  • Firewall.
	  • Hub.
	  • Switch.
	  • Repeater.
	  • Bridge.
	  • Router.
	  • Gateway.
	  • Modems.
	  • Wireless Access Point.
	  ▪ Network Interface Cards (NIC).
		8 Hours

	▪ Cables: • Twisted -Pair cabling. • Coaxial cables. • Fiber-Optic cables. ○ Software ▪ Network OS • Protocols ○ Internet Protocol. ○ Transmission Control Protocol. ○ User Datagram Protocol. ○ File Transfer Protocol. ○ Simple Mail Transfer Protocol. ○ Hypertext Transfer Protocol. ○ Hypertext Transfer Protocol Secure. ○ Post Office Protocol V 3/ Internet Access Protocol V4. ○ Secure Shell. ○ Telnet. ○ Internet Control Message Protocol. ○ Dynamic Host Configuration Protocol.	
2	**Network Classification:** • Types of network topologies: ○ Bus topology. ▪ Definition. ▪ Advantages and disadvantages. ○ Ring topology. ▪ Definition. ▪ Advantages and disadvantages. ○ Star topology. ▪ Definition. ▪ Advantages and disadvantages. ○ Mesh topology. ▪ Definition. ▪ Advantages and disadvantages. • Types of network architectures: ○ Client/Server model. ○ Peer-to-Peer Model. • Types of networks based on the communication media: ○ Wired. ○ Wireless. • Types of networks based on the geographical areas: ○ LAN. ○ WAN. ○ MAN. ○ CAN. ○ PAN. ○ SAN.	4 Hours
3	**Networking Models:** • What is the OSI networking model? • Following a packet through the layers. • The OSI Seven - Model Layers:	8 Hours

	○ The Physical Layer. ○ The Data Link Layer. ○ The Network Layer. ○ The Transport Layer. ○ The Session Layer. ○ The Presentation Layer. ○ The application Layer. • The TCP/IP Model: ○ The Application Layer. ○ The Transport Layer. ○ The Internet Layer. ○ The Network Interface Layer. • Comparing the OSI model to the four-layer TCP/IP Model.	
4	**Network Addressing, Routing, and Switching:** • The Internet Protocol (IP) address: ○ IPv4 address. ○ Classifying IP addresses: ▪ Class A addresses. ▪ Class B addresses. ▪ Class C addresses. ○ IPv4 Public and Private Networks. ○ IPv4 addresses types: ▪ Unicast Address. ▪ Broadcast Address. ▪ Multicast. • Subnetting Networking: ○ Subnets. ○ Purpose of Subnetting. ○ Subnet Masks. • IPv6 Address: ○ Understanding of IPv6 address. ○ IPv6 addresses types: ▪ Unicast IPv6 addresses. ▪ Global Unicast addresses. ▪ Link-Local addresses. ▪ Site-Local addresses. ▪ Multicast addresses. ▪ Anycast addresses. • Assigning IP Addresses: ○ Static addressing. ○ Dynamic addressing. • Media Access Control (MAC) address. • Domain Name Service (DNS).	8 Hours
5	**Data Link Layer and Network Traffic:** • Network access methods definition. • Purpose of network access methods. • What is carrier sensing? • What is a collision detection? • Types of network access methods: ○ CSMA/CD.	4 Hours

	○ CSMA/AD. ○ Token passing.	
6	**Cloud Computing:** • What is cloud computing? • Types of cloud services: ○ SaaS ○ PaaS ○ IaaS • Cloud delivery models: ○ Private ○ Public ○ Hybrid	4 Hours
7	**Network Security and Network Troubleshooting:** • What is network security? • Network security model. • How to secure your network? ○ Physical security and device hardening. ▪ Lock and Key. ▪ Swipe card and pin access. ▪ Biometrics. ○ Two factor and multifactor authentication. ○ Secure versus unsecured protocols. ○ Additional device hardening. ○ Access control. ○ Securing wireless networks. • Malicious software. • Common network attacks. • Vulnerability prevention. • Troubleshooting steps and procedures.	8 Hours
Total		44

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 and Understanding**		
1.1	Understanding the concept of computer networks, their classifications, layers, and its software and hardware components.	- Lectures. - Discussions. - Surveys. - Experimental learning. - Self- Learning. - Development lectures. - Brainstorming. - Web Survey. - KWL - Learning Schedule.	- Traditional and online achievement tests. - Questions. - Assignments. - Participations. - Presentations. - Discussions - Debates. - Cognitive Tests.
1.2	Analysis of fundamentals and components of network security.		
1.3	Knowledge of network addressing and segmentation techniques.		
1.4	Knowledge of other networking techniques.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		- Mind maps. - Concept maps.	- Student Activity File.
2.0	**Skills**		
2.1	Determining the methods of installing and operating computer network devices.	- Demonstrations. - Development Lectures. - Experimental learning. - Peers Learning. - Self- Learning. - Discussions. - Web Survey. - Brainstorming. - Teamwork. - Problem Solving. - Projects. - Online Discussions.	- Presentations. - Rubrics. - Auditions. - Production metrics. - Observations. - Labs. - Student Activity File. - Peer Assessments. - Self-Assessment.
2.2	Technical skills in managing, establishing, operating, maintaining, and solving network infrastructure problems.		
2.3	The use of information and communication technology in communication, exchange of ideas, scientific research, and performance tasks and costs.		
2.4	Practicing critical thinking and solving problems that the learner faces in the course in creative ways.		
3.0	**Values**		
3.1	Cooperation, teamwork, and professional ethics.	- Demonstrations. - Development Lectures. - Experimental learning. - Peers Learning. - Self- Learning. - Discussions. - Web Survey. - Brainstorming. - Teamwork. - Problem Solving. - Projects. - Online Discussions.	- Presentations. - Rubrics. - Auditions. - Production metrics. - Observations. - Labs. - Student Activity File. - Peer Assessments. - Self-Assessment.
3.2	Take responsibility for continuous learning and continuing personal development.		
3.3	Efficient and effective time management when applying acquired knowledge and skills.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	One Midterm Exam	Week 6	20
2	Quizzes	The whole semester	10
3	Passing CISCO Networking Academy Course	The whole semester	10
4	Labs	The whole semester	15
5	Group Project	Week 10	10
5	Participation	The whole semester	5
6	Final Exam	Week 12	30
7	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: 4 office hours per week. 4 hours of weekly meetings Contact through the LMS Communication/interact via e-mails with students

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	CompTIA Network+ Certification All-in-One Exam Guide, by Scott Jernigan, 6th Edition.
Essential References Materials	Computer Networking: A Top-Down Approach, by James F. Kurose, 6th Edition. Networking All-in-One For Dummies, by Doug Lowe, 8th Edition. Networking Fundamentals by Crystal Panek.
Electronic Materials	Course Lectures on the blackboard.
Other Learning Materials	N/A

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Lecture room with Smart board Lab with 25 Pc
Technology Resources (AV, data show, Smart Board, software, etc.)	PC and WIFI Internet access within the classroom .Projector, and Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	N/A

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessments.	Students – Peers Review	1. Questionnaires and surveys approved by the department. 2. Faculty peer evaluations. 3. Reviewing the results of the students' evaluation.
Effectiveness of student assessment methods.	Peers Reviews, Program Leaders, Faculty, Students.	1. Questionnaires and surveys approved by the department.

Evaluation Areas/Issues	Evaluators	Evaluation Methods
		2. Review course specifications and course reports periodically. 3. Peer evaluation. 4. Review samples of student work.
Learning resources	Program Leaders, Faculty, Students.	1. Approved questionnaires and surveys from the department. 2. Students grade records.
Quality of learning resources	Program Leaders, Faculty.	1. Review course report. 2. Analyze exam models and student grade records.

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

H. Specification Approval Data

Council / Committee	Computer Programs Development Committee
Reference No.	The Third Semester of the year 1445
Date	08 / 03 / 2024 G, 27/ 08 /1445 H