اعتماد
NCAAA

T4

2020

Course Specifications

Course Title:	Computer Networks
Course Code:	331 CNET-3
Program:	Bachelor in Computer and Network Engineering
Department:	Computer and Network Engineering
College:	College Of Computer Science & Information Technology
Institution:	Jazan University

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KINGDOM OF SAUDI ARABIA

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Table of Contents

A. Course Identification

1. Credit hours: 03 Hours	
2. Course type	
a. University ☐ College ☑ Department ☐ Others ☐	
b. Required ☑ Elective ☐	
3. Level/year at which this course is offered: 10th Level / 4th Year	
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**	52	100%
2	**Blended**	--	--
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** (**Exams and Revision**)	8
	Total	52

B. Course Objectives and Learning Outcomes

1. Course Description

This Course introduces the fundamentals of Computer Network. It is based around the TCP/IP Reference Model that explains the working of all layers in general and deal with the major issues in the Data Link and Network layers of the model. Most of the protocols used in these layers are discussed. Students are also introduced to the areas of routing Protocols, OSI and Internet protocols. It also covers the Error detection, Multiple Access Protocols, Ethernet switch and VLANs.

2. Course Main Objective
- Explain basics of a network, its types and technologies, data communication and transmission media.
- Understand the TCP/IP Reference Model (Internet protocol stack) in context.
- Compare and classify different protocols for internetworks.
- Develop the ability to operate and troubleshoot an internetwork.
- Differentiate and comprehend different routing algorithms.
- Analyze the requirements for a given organizational structure by choosing the most appropriate networking architecture and technologies.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	**Describe** the basic elements and principles for a computer network.	K1
1.2	**Explain** the concepts of TCP/IP Layers, related protocols and algorithms.	K2
2	**Skills:**	
2.1	**Demonstrate** data link layer services by applying error handling techniques provided by data link layer	S1
2.2	**Apply** routing algorithms to find the shortest paths for network layer packet delivery.	S2
2.3	**Implement** a simulation of network scenarios in assignments using simulation tools.	S5
3	**Values:**	
3.1	**Participate** as a member or a team leader to solve network-based assignments.	V1

C. Course Content

No	List of Topics	Contact Hours
1	**CHAPTER 1: Introduction - Computer Networks** • The Internet • Protocols • Network Edge • Digital Subscriber Line • Wireless Access Networks • Network Core • Packet Switching • Circuit Switching • Performance: loss, delay and throughput • Reference Models (TCP/IP)	4T+4P
2	**CHAPTER 2: Application Layer** • Principles of Network Applications • Network Application Architectures • Application Layer Protocols Defines • Internet Transport Protocols Services	4T+4P

	• The Web and HTTP • Electronic Mail and SMTP • DNS	
3	**CHAPTER 3: Transport Layer** • Introduction and Transport Layer services • Relation between Transport layer and Network layer • Transport Layer in internet • Multiplexing and demultiplexing • UDP: User Datagram Protocol • Pipeline protocols – Go Back-N and Selective Repeat • Connection-Oriented Transport: TCP • TCP Fast Retransmit • Connection management	4T+4P
4	**CHAPTER 4: Network Layer: Data Plane** • Network-Layer Services and Protocols • Data Plane, Control Plane • Router Architecture Overview • IPv4 Datagram Format • IP Addressing: Introduction • DHCP: Dynamic Host Configuration Protocol • NAT: Network Address Translation • IPv6 Datagram Format • Tunneling and Encapsulation	3T+3P
5	**CHAPTER 5: Network Layer: Control Plane** • Introduction • Network Layer Functions • Routing Protocols • Link State • Intra-ISP Routing • OSPF • Routing Among ISPs: BGP • SDN Control Plane	3T+3P
6	**CHAPTER 6: The Link Layer and LANs** • Introduction • Error Detection and Correction (Parity checking, CRC) • Multiple Access Protocols • Channel Partitioning (TDMA and FDMA) • Random Access Protocols (CSMA) • Taking Turns (Polling, Token Passing) • MAC Addresses and ARP • Ethernet • VLANs	4T+4P
	Final Exam	4T+4P
Total		52

Online Study Topics:
• History of Computer Networks • Sockets • Flow control • Congestion • ICMP: Internet Control Message Protocol • Ethernet switch

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	**Describe** the basic elements and the different topologies for a network.	➢ Lectures ➢ Classroom discussions ➢ Lab exercises	➢ Exam-1 ➢ Assignment ➢ Final Exam
1.2	**Identify,** and define various protocols of associated with TCP/IP Layers.	➢ Lectures ➢ Classroom discussions ➢ Lab exercises	➢ Exam-2 ➢ Assignment ➢ Final Exam
2.0	**Skills**		
2.1	**Design** and simulate various network related scenarios using simulation tool like packet tracer.	➢ Lectures ➢ Classroom discussions ➢ Lab exercises	➢ Lab Exam ➢ Final Exam
2.2	**Apply** routing algorithms to find the shortest paths for network layer packet delivery.	➢ Lectures ➢ Classroom discussions ➢ Lab exercises	➢ Exam-2 ➢ Assignment ➢ Final Exam
2.3	**Explain** all the services provided by Data Link Layer and its error handling techniques.	➢ Lectures ➢ Classroom discussions ➢ Lab exercises	➢ Assignment ➢ Final Exam
3.0	**Values**		
3.1	**Participate** as a member or a team leader to solve network-based assignments.	➢ Classroom discussions ➢ Lab exercises	➢ Assignment ➢ Mini Project

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments / Mini Project	4th Week	20%
2	Midterm Exam	6th Week	20%
3	Lab Exam	11th Week	20%
4	Final Theory Exam	12th Week	40%

*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:

Department have an arrangement for "Academic Counseling and Support" for each student. The Academic Advising Committee nominates faculty members for "Student Academic Advisor" every semester. These "Academic Advisors" are responsible for student counseling and advising to a group of fix number of students (around 10-15 students) and maintaining students' files. At the beginning of every semester and at time of course registration all students take counseling from Academic Advisor according to his previous grades and coverage of pre-requisite course and follow-up.

Also, students with GPA below 2.00 are remained under deep observation and continuous meetings with respective course teachers about their performance are arranged to help and support the students. The course teacher is to be associated with this course provide a proper guidance for students who are looking to focus on their future career based on their intellectual interests, identify better opportunities related to this course and connections in their academic fields.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	(i) Computer Networking James F. Kurose; Keith Ross 8th Pearson, 2021, ISBN: 9780136681557, 0136681557
Essential References Materials	1. Computer Networking: A Top-Down Approach, 8th edition Jim Kurose, Keith Ross Pearson, 2020, ISBN-13: 978-1292405469
Electronic Materials	https://lms.jazanu.edu.sa/webapps/login/ (Blackboard)
Other Learning Materials	Network Simulator – Cisco Packet Tracer

2. Facilities Required

Item	Resources
Accommodation	A Lecture room appropriate for 30 students with a personal computer, a projector and whiteboard.

Item	Resources
(Classrooms, laboratories, demonstration rooms/labs, etc.)	
Technology Resources (AV, data show, Smart Board, software, etc.)	• A Computer Network Lab with Network Devices. A projector and whiteboard.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	All equipment is available for this course.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Sufficiency of resources and facilities for students	Students	Course evaluation survey form
Effectiveness of teaching / learning process	Students	Course evaluation survey form
Effectiveness of teaching / learning process	CRC / QAU / HoD	Course reports / result analysis
Quality of learning Resources	Track leaders / CRC	Review meetings and star rating with suggestions for further modification and improvements
Verifying standards of student achievement / evaluation	HoD /committee nominated by HoD	Random re-checking of evaluated answer sheets
Achievement of course learning outcomes	Course Teachers / QAU	CLO assessment template that is further verified at course coordinator, Track leader and QAU level.

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	Department Council
Reference No.	
Date	