Course Specification
(Bachelor)

Course Title: Computer Networks
Course Code: 313 CNET-3
Program: BS in Computer and Network Engineering
Department: Electrical and Electronics Engineering
College: College of Engineering & Computer Science
Institution: Jazan University
Version: 4
Last Revision Date: 24 May 2024

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A. General information about the course:

1. Course Identification

1. Credit hours: (3)

2. Course type

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

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

4. Course General 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.

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

None

6. Co-requisites for this course (if any):

None

7. Course Main Objective(s):

• 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.

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**	26
2.	**Laboratory/Studio**	26
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	8
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	**Describe** the basic elements and the different topologies for a network.	K1	➢Lectures ➢Classroom discussions ➢Lab exercises	➢Exam-1 ➢Assignment ➢Final Exam
1.2	**Explain** the concepts of TCP/IP Layers, related protocols and algorithms.	K2	➢Lectures ➢Classroom discussions ➢Lab exercises	➢Exam-1 ➢Assignment ➢Final Exam

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.0	Skills			
2.1	**Design** and simulate various network related scenarios using simulation tool like packet tracer.	S1	➢Lectures ➢Classroom discussions ➢Lab exercises	➢Lab Exam ➢Final Exam
2.2	**Apply** routing algorithms to find the shortest paths for network layer packet delivery.	S2	➢Lectures ➢Classroom discussions ➢Lab exercises	➢Assignment ➢Final Exam
2.3	**Explain** all the services provided by Data Link Layer and its error handling techniques.	S3	➢Lectures ➢Classroom discussions ➢Lab exercises	➢Assignment ➢Final Exam
3.0	Values, autonomy, and responsibility			
3.1	**Participate** as a member or a team leader to solve network-based assignments.	V1	➢Classroom discussions ➢Lab exercises	➢Assignment ➢Final Exam

C. Course Content

No	List of Topics	Contact Hours
1.	**CHAPTER 1: Introduction - Computer Networks** • **The Internet** • **Protocols** • **Network Edge** • **Type of networks** • **Digital Subscriber Line** • **Wireless Access Networks** • **Network Core** • **Packet Switching** • **Circuit Switching** • **Performance: loss, delay and throughput** • **Reference Models (TCP/IP)**	**3T**

2.	**CHAPTER 2: Application Layer** • **Principles of Network Applications** • **Network Application Architectures** • **Application Layer Protocols Defines** • **Internet Transport Protocols Services** • **The Web and HTTP** • **Electronic Mail and SMTP** • **DNS**	**4T+6P**
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** • **TCP 2-way and 3-way handshake.**	**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** • **Generalized forwarding**	**4T+5P**
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**	**5T+5P**
6.	**CHAPTER 6: The Link Layer and LANs** • **Introduction** • **Error Detection and Correction (Parity checking, CRC)**	**6T+6P**

	• **Multiple Access Protocols** • **Channel Partitioning (TDMA and FDMA)** • **Random Access Protocols (CSMA)** • **Taking Turns (Polling, Token Passing)** • **MAC Addresses and ARP** • **Ethernet** • **VLANs**	
7.	**Revision**	**2T + 2P**
8.	**Final Exam+ Lab Exam**	**2T + 2P**
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	ASSIGNMENT-1	6th week	10%
2.	MIDTERM	7-8th week	20%
3.	ASSIGNMENT-2	11th week	10%
4.	LAB EXAM	14th week	20%
5.	FINAL EXAM	15th week	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	Computer Networking James F. Kurose; Keith Ross 8th Pearson, 2021, ISBN: 9780136681557, 0136681557
Supportive References	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. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	A Lecture room appropriate for 30 students with a personal computer, a projector and whiteboard.
Technology equipment (projector, smart board, software)	A Computer Network Lab with Network Devices.

Items	Resources
Other equipment (depending on the nature of the specialty)	A projector and whiteboard.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Students**	**Course evaluation survey form**
Effectiveness of Students assessment	**HoD /committee nominated by HoD**	**Random re-checking of evaluated answer sheets**
Quality of learning resources	**Track leaders / CRC**	**Review meetings and star rating with suggestions for further modification and improvements**
The extent to which CLOs have been achieved	**Course Teachers / QAU**	**CLO assessment template that is further verified at course coordinator, Track leader and QAU level.**
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	DEPARTMENT COUNCIL
REFERENCE NO.	**ENGCSEEE2411**
DATE	**10/10/24**