پوهنتون کاردان
KARDAN UNIVERSITY

Faculty of Computer Science
Department of Information Technology

Course Title:	Data Communication and Networking
Code:	CS-108
Coordinating Faculty/ Department:	Computer Science
Credits:	04
Pre-requisites :	N/A
Lecturer Name and Contact:	**Mirwais Shirzad** **m.sharzad@kardan.edu.af** **0786294569**

GENERAL COURSE INFORMATION

The Data Communication and Networking Course includes all the fundamental and vital concepts of Electronic Data communication and Computer Networking. The course will provide the conceptual foundation to students regarding Electronic Data Communication systems, Processes, models, mechanisms, standards, Internet, Internet Administration, Standardization organization and Computer Networks.

COURSE OBJECTIVES

This course aims to introduce students to Data Communication Systems, their Units, Characteristics, Data Communication Standards, role, responsibilities, Hierarchy of standardization organization in data communication and Networking. Data Communication Models will be completely discussed including TCP/IP and OSI, processes, protocols, data formats of each and every layer and interlayer relations of the mention Models will be discussing. Switching Process, switching types including Circuit Switching, Packet Switching, Messaging Switching and Packet Switching Sub types including Datagram Packet Switching and Virtual Circuit Switching will be discussing. Multiplexing, Multiplexing Process, Multiplexing Techniques including FDM, WDM and TDM and their subtypes including Synchronous and Statistical TDM will be discussing, this course will also cover in the data communication portion, Signal and types of signals, Periodic, Aperiodic, sine waves, composite waves, and their characteristics.

In the Computer Networking Portion of this course, the students will be educated and introduced to Computer Network, Criteria, Computer Network Classification base on multiple perspectives, Internet, Internet History, Internet Administration. Computer Network devices, their role, characteristics will be discussing. Computer Network Media will be discussed including Guided and Un-Guided media and their all possible types with a scientific approach. This portion of the course will also cover Domain Concepts including, Domain, Domain Hierarchy, Root Domain, Child Domain, Tree Domain, Forest, Domain Controller, Additional Domain Controller, Child Domain Controller, Read-Only Domain Controller,

Replication, Active Directory Database, Logical and Physical Objects of Active Directory Database. ADDS Service, DNS Service.

In the computer Networking Portion, we will have some lab activities for Designing, Implementing, and Configuring of Domain base network, Workgroup base network and Homegroup base networks.

COURSE LEARNING OUTCOME

Upon successful completion of this course, students will be able to understand and involved in the following Concepts and Processes.

- Students will understand all the important and fundamental concepts of Electronic Data communication, Systems, Procedures, Protocols, and Standards. The criteria for evaluating effective and efficient data communication systems and processes.
- Students will understand all the important and fundamental concepts of Computer Networks and Networking.
- Students will understand will be able to design, implement and configure Domain base network, workgroup and homegroup base networks from System Level.
- Students will understand the Internet, Internet or ISP Hierarchy, Internet History, Internet Administration Organizations, specifically ISOC, ISOC Hierarchy and their sub-organizations like Including ICANN, IANA, IAB, IESG, IRSG, and their regional Working Groups. The role of IEEE, IEEE 802 Project and their sub-working groups in the Electronic Data Communication.

LEARNING REFERENCES

Students will download the following learning References from the Kardan University LMS (Learning Management System)

- Books:
    - Data Communication and Networking Fifth Edition by Behrouz A. Forouzan
- Reference books
    - Data Communications and Computer Networks 7th Edition by Curt M. White

TEACHING METHODS

- Lecture
- Discussion
- Real life Scenarios
- Experiential Techniques
- Computer-Based practices

CLASSROOM ETIQUETTE:

- Classroom courtesy is expected of all students all the time. Following is the general guideline for the classroom conduct:
- Refrain from chatting with fellow students.
- Arrive on time. If you come late please be courteous to other students
- Do not get up and walk out halfway through class.
- Do not cut the instructor off at the end of class.
- All cell phones and pagers must be turned off during class and examination.
- Eating is not permitted.
- Above all please be cognizant of the learning process and purpose of you being in the classroom and extend the same respect to other students.

POLICIES & GUIDELINES

Guidelines for Format of Assignments: (General Recommendations)

1. Attendance & Absences – Students are expected to attend and sit through the entire class meetings. In case of an absence, the student is responsible to arrange for notes and missed announcements.
2. Assignment Completion & Late Work – Late assignment submission is not allowed unless permission is granted by the instructor prior to the deadline. Students should upload their assignment through the Learning Management system before the deadline. The assignments will be not acceptable in hardcopy directly or in soft copy through email. The Assignments will be only accepted through the LMS (Learning Management System).
3. Academic Conduct Code – Cheating and plagiarism will not be tolerated in any of the Program courses. They will result in no credit for the assignment or examination and may lead to disciplinary actions.

COURSE SCHEDULE / CONTENTS

Week No.	Topics for Discussion	Book Chapter	Activities	Topic Outcomes
1	**Chapter 01:** • **Definition of Computer Networks** • **Benefits of Computer Networks** • **Computer Network types** • **Network Topologies** • **Mish, Star, Bus, Ring, Tree and Hybrid topologies**	Chapter 1	The lecture is conducted using slides. Students will be involved in a group discussion to get involved in studies. Discussion points are that Electronic Data Communication system	Students will gain the fundamental Concepts of Data Communication System and Computer Network
2	**Chapter 02:** • **Transmission mode** • **Simples Mode** • **Half duplex Mode** • **Full duplex mode** • **Categories of Network and its benefits** • **LAN, MAN and WAN and its advantages and** • **Disadvantages**	Chapter 1	The lecture will be conducted using the slides. Review of Computer Networks will take place, then Network Topologies and types of Network topologies will be explained. Group discussion will take place to understand Network Topologies, Internet standards, and Administrations.	Students will understand the logical and Physical Arrangement of Computer Network Components.
3	**Chapter 03:** • **Twisted Pair Cables** • **TP cable categories and benefits** • **TP cable configuration and usage** • **Coaxial and its benefits and usages** • **Fiber Optics Cables usage and advantages** • **Wireless technologies** • **Protocols**	Chapter 3	The lecture will be conducted using slides. A network Transmission medium with their hierarchy has been introduced to the students so they can understand the Network transmission medium and all the possible types	Media is the Unit of Data Communication systems and in this lecture, the students will become familiar with Networking Media and their all possible types.
4	**Chapter 04:** • **OSI model overview and introduction** • **OSI 7 Layers** • **OSI 7 Layers functions** • **TCP/IP overview and its compareson to OSI model** • **TCP/IP Layers and its Functions**	Chapter 3	The lecture will start with the question and answer session from the previous lecture to check the understanding of the students about the previous lecture. Slides will be used for the new lecture. Group discussion will take	In this lecture, students will understand Unguided or Wireless Media and their all possible types which we can use for electronic Data

5	**Chapter 05:** • **Connecting Devices of Computer Networking** • **Network Devices usage** • **IP addresses** • **Usage of IP addresses** • **IP classes and subnet Mask (default Subnet Mask)**	Chapter 2	The lecture will start with the question and answer session from the previous lecture to check the understanding of the students about the previous lecture. Slides will be used for the new lecture.	In this Lecture, students will understand how two End-Nodes of a Data Communication process
6	**Chapter 06:** • **Introduction to Hyper V** • **Hyper V structure in computer Networks** • **Hyper V storages** • **Virtual Switches and its Usages** • **Hyper V VMS creation and implementation** • **Lab Practice**	Chapter 2	The lecture will start with the question and answer session from the previous lecture to check the understanding of the students about the previous lecture. .	In this lecture, the students will become familiar with ISO and their created OSI Model for data Communication process
7	**Chapter 07:** • **Introduction to Active Directory Domain Services** • **Installation of AD - DS** • **DNS installation and configuration** • **Users and group accounts types** • **Users and group account creation** • **Types of Organizational unit and creation** • **Lab Practice**	Network Device Chapter 4	The class assignment will be given to the students to explain the role and Important of Networking Models in today complex data communication systems.	Network Devices are Units of Computer Networks. In this Lecture,
8	**Chapter 08:** • **Joining client to the domain Machine** • **Managing different AD objects** • **Managing GPOs** • **Creating GPOs points and its implemetation** • **Lab Practice**	Chapter 4	The class will split into three sessions. In the first session the remaining concepts of Wireless networking devices will be cover.	Students will be familiarized to Wireless LAN Networking Devices.
Mid Term Examination				
9	**Chapter 09:** • **Implementation of IP classes** • **Installation of DHCP Server** • **Creating Scopes in DHCP Server** • **Implementation of DHCP**	From the Microsoft System Administration Book	Lecture will be started using Slides Home-group and workgroup will be explained and comparison will take place. After explanation lab activity will be performed for Home-	Students will be able to Design, Implement and Configure Home-group and Workgroup base

	on different devices ○ **Lab Practice**		group and workgroup installation and configuration.	Networks.
10	**Chapter 10:** • **File Servers overview** • **Installations and configuration of File Server** • **Distributed Files system DFS** • **NTFS permissions and Implementation** **Lab practice**	From the Microsoft System Administration Book	Lectures will be started using Slides Doman, Domain hierarchy and all other fundamentals concepts will be explained.	Students will be able to define Domain, Domain Hierarchy..
11	**Chapter 11:** • **Data Communication Overview** • **Data Communication key terminologies** • **Signals and its types** **Analog and digital Signals and data**	Chapter 6	The lecture will start with the question and answer session from the previous lecture to check the understanding of the students about the previous lecture.	Students will understand Bandwidth and the bandwidth importance.
12	**Chapter 12:** • **Periodic and non-periodic signals** • **Sine Waves and its characteristics** • **Amplitude, phase and period/Frequency** • **Bit rate and bit interval** •	Chapter 6	The lecture will start with the question and answer session from the previous lecture to check the understanding of the students about the previous lecture. The class will be conducted using slides and main topics and concepts about Time	The students will be able to understand the mechanism for increasing the Digital link bandwidth efficiency with the help of TDM Multiplexing.

13	**Chapter 12:** • **Analog to Digital Conversion** • **Digital to Digital Conversion** • **Digital to Analog Conversion** • **Analog and Analog Conversion** • **And conversion types** ◦	Chapter 7	The lecture will be conducted using slides. The lecture will start with the question and answer session from the previous lecture to check the understanding of the students about the previous lecture. In this lecture switching and types of switching will be explained. In this lecture, there will be no lab activity.	In the result of this lecture, the students will understand the switching process and their types.
14	**Chapter 12:** • **Unipolar Line Coding Scheme** • **Bi-Polar Line Coding Scheme** • **AMI, B8ZS etc.** **Examples**	Chapter 7	The lecture will be conducted using slides. The lecture will start with the question and answer session from the previous lecture to check the understanding of the students about the previous lecture.	Packet switching the important type of Switching for digital data communication. in this lecture, the students will.
15	**Chapter 12:** • **SyQuest and Shannon Formulas** • **Examples** • **What is line coding?** • **Characteristics of line coding.**	Chapter 8	The class assignment will be given to the students. The lecture will be conducted using slides. Signal and Main types of Signal will be discussed including their properties.	After this lecture, the students will understand and will be able to define Signal, types of signal and their related Concepts

16	**Chapter 12:** • **Conclusion** • **Discussion on applying Network projects on real envoronment.**	Chapter 8	The class will split into two sessions. In the first session, the student will conduct	Students will understand the concepts
Final Examination				

COURSE ASSESSMENT

TYPE	PERCENTAGE	RATIONALE
Internal Assessment - Assignments: 10% - Quizzes: 10% - Attendance: 5%	25 %	Equal weightage is assignments and quizzes and at the same time emphasizing on the importance of class participation.
External Assessment - Midterm: 25% - Terminal: 50%	75%	Students develop an examination sense through midterm examination hence 25% weightage is appropriate. Midterm duly followed by terminal examination providing 50% weightage which is an opportunity to improve scores appropriately.

GRADING

MARK RANGE	GRADE POINT	GRADE	EXPECTED RESULT
90 and above	4.0	A	At least 25% expected to secure A grade
80 – 89	3.0	B	At least 35% expected to secure B grade
70 – 79	2.0	C	At least 30% expected to secure C grade
60 – 69	1.0	D	At least 7% expected to secure D grade
59 and below	0.0	F	At least 3% expected to secure F grade

KARDAN UNIVERSITY POLICY ON PLAGIARISM

All examinations and quizzes will be "closed book" unless otherwise instructed. At the time of examination, all students are requested to clear their desks and are not allowed exchanging any notes or electronic (text) messages to other students. All cellular phones should be in silent mode and the student will not be allowed to use it during the examination other than medical/family/work emergency. All students are expected to adhere to these policies and procedures.

CONDUCT AND IMPORTANT POLICIES

Any student found guilty of a breach of ethics will be referred to the Disciplinary Committee of the University.

a) Breach of ethics includes, but is not limited to plagiarism (the copying of other's ideas and passing them off as one's own); copying or other forms of cheating on examinations, papers, and reports; the sale, purchase, or distribution of term papers It is within an instructor's discretion to impose a lesser penalty, e.g., "zero" grade on a given assignment.

b) Course registration is charged by the management. Please approach the management for any queries about course enrolment. In no circumstances should you approach the lecturers who have no control over this?

c) Make-up exam for midterm and terminal exam is available only for those individuals, who are not able to attend their regular exams. Provision of supporting documents is mandatory for grant of approval to participate in make-up exams. Those students who miss their regular exam without a genuine reason will be entitled to 80% of total makeup marks.

Usually, a make-up exam starts a week after the regular exam finishes.

d) There is no make-up session for oral presentations and quizzes. If you are absent from the oral presentation/ quiz without eligible reasons/documents, you will not earn any marks.

e) All examinations and quizzes will be "closed book" unless otherwise instructed. At the time of examination, all students are requested to clear their desks and are not allowed exchanging any notes or electronic (text) messages to other students. All cellular phones should be in silent mode and the student will not be allowed to use it during the examination other than medical/family/work emergency. All students are expected to adhere to these policies and procedures.

ATTENDANCE

Your regular and punctual attendance at lectures and seminars is expected in this course.

University regulations indicate that if students attend less than 65% of scheduled classes they may be refused final assessment.

This course policy has been approved in the Curriculum Development Committee meeting FCS/CDC-2025-04.

Head of Committee Signature.....

Dean, Faculty of Computer Science Signature .....