Program : **Diploma in Computer Hardware Engineering**	
Course Code : **3152**	Course Title: **Computer networks-I**
Semester :**3**	Credits: **4**
Course Category: **Core**	
Periods per week: **4 (L:4 T:0 P:0)**	Periods per semester: **60**

Course Objectives:

- To impart concepts of data communication and computer networks.
- To impart concepts on transmission media, methods, ISO-OSI, TCP/IP Layered architectures and protocols are to be extended.

Course Prerequisites:

Topic	Course code	Course name	Semester
Fundamentals of Electrical and Electronics Engineering		Fundamentals of Electrical and Electronics Engineering	2
Introduction to IT Systems		Introduction to IT Systems	1

Course Outcomes

On completion of the course student will be able to:

COn	Description	Duration (Hours)	Cognitive Level
CO1	Describe the basic concepts of data communication and computer networks.	12	Understanding
CO2	Explain signal properties, techniques for conversion between them and different types of transmission, multiplexing.	14	Understanding
CO3	Classify transmission media-Guided and unguided-based on their characteristics and explain categories of switched networks and their features.	16	Understanding
CO4	Outline ISO-OSI and TCP/IP Protocol architecture, IPV4 and Application layer protocols.	16	Understanding

	Series Tests	2	

CO – PO Mapping:

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO1	2						
CO2	2						
CO3	2						
CO4	2						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline

	Description	Duration (Hours)	Cognitive Level
CO1	Describe the basic concepts of data communication and computer networks.		
M1.01	Illustrate the concept of Data Communication.	1	Understanding
M1.02	Explain different data representation forms.	2	Understanding
M1.03	Illustrate different data flow methods.	2	Understanding
M1.04	Explain different physical structures of the network.	2	Understanding
M1.05	Define different network attributes.	1	Understanding
M1.06	Define different network categories.	2	Understanding
M 1.07	Explain the concept of network model.	2	Understanding
Contents: Concepts – components of communication - representation- text, numbers, images, audio, video – Data flow – simplex, half duplex, full duplex, serial & parallel communications, Network attributes – performance, reliability, security –Physical structure – type of connections, topology-star, ring, bus, mesh – Categories – LAN, WAN, MAN – –Internet – Intranet – Extranet , Client-Server, Peer to Peer.			
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CO2	Explain signal properties, techniques for conversion between them and different types of transmission, multiplexing.		
M2.01	Differentiate Analog and Digital Data and signals.	1	Understanding
M2.02	Define the terms sine wave, Phase, Wave length, time and frequency domains, and bandwidth.	2	Understanding
M2.03	Explain digital signals transmission, bit rate, bit length, transmission impairments.	2	Understanding
M2.04	Explain Transmission modes	2	Understanding
M 2.05	Explain signal encoding methods-A to D , D to A and A to A.	4	Understanding
M2.06	Illustrate Bandwidth Utilization - Multiplexing	3	Understanding
	Series Test-1	1	
Contents: Analog and digital – data, signals – Periodic analog signals – sine wave, phase, wave length, time and frequency domains, bandwidth – digital signals – bit rate, bit length – digital transmission – baseband, broadband – impairments – attenuation, distortion, noise – Transmission modes – parallel, serial , asynchronous, synchronous- Signal Encoding- analog to digital – PCM– digital to analog – ASK, FSK, PSK – analog to analog – AM, FM, PM – Multiplexing – FDM, WDM, TDM			
CO3	Classify transmission media-Guided and unguided- based on their characteristics and explain categories of switched networks and their features		
M3.01	Illustrate Guided transmission media- Twisted pair, Coaxial cable, Optical fiber cables.	3	Understanding
M3.02	Explain Unguided media-Radio, Infrared and microwaves.	3	Understanding
M3.03	Describe Circuit switched networks.	2	Understanding
M3.04	Explain Packet switching – datagram, virtual circuit.	3	Understanding
M3.05	Explain the structure of a switch.	1	Understanding
M3.06	Contrast structure of circuit switches- time division and space division structure.	2	Understanding

M3.07	Illustrate structure of packet switches.	2	Understanding
Contents: Guided – twisted pair, co-axial, fiber optic – unguided – wireless – radio, microwave, infrared – switched networks – circuit switched – packet switched – datagram, virtual circuit – structure of switch – circuit switch structure – space division – time division – structure of packet switches..			
CO4	Outline ISO-OSI and TCP/IP Protocol architecture, IPV4 and Application layer protocols.		
M4.01	Outline ISO-OSI and TCP/IP layers, protocols standards	3	Understanding
M4.02	Summarize Transport layer protocols	2	Understanding
M4.03	Outline Connection oriented and connectionless services.	1	Understanding
M4.04	Explain Network layer protocols	4	Understanding
M4.05	Explain Application Layer protocols	3	Understanding
M4.06	Explain IPv4	3	Understanding
	Series Test-II	1	
Contents: Protocols – standards – layered approach – ISO OSI model – functions of layers. Overview of TCP / IP- ISO OSI & TCP/IP comparison. Transport Layer Protocol:–connection Oriented and connectionless Services – Sockets - TCP & UDP. Network Layers Protocol:- IP – Interior Gateway Protocols (IGMP, ICMP, ARP, RARP). Application Layer Protocols:-FTP-TFTP– Telnet – SMTP– HTTP. IP v4:-classes of IP address, IP Addressing -Dotted Decimal Notation –Sub netting & Super netting – VLSM Technique.			

Text / Reference:

T/R	BookTitle/Author
T1	Computer Networks by Andrew S. Tanenbaum -Pearson
R2	Data Communication & Networks - William Stalling- Prentice Hall-Tenth Edition
R3	Data Communications And Networking by Behrouz Forouzan -Mc Graw Hill

Online resources

Sl.No	Website Link
1	http://www.uoitc.edu.iq/images/documents/informatics-institute/exam_materials/Computer%20Networks%20-%20A%20Tanenbaum%20-%205th%20edition.pdf
2	https://www.tutorialspoint.com/ipv4/ipv4_quick_guide.htm
3	https://www.cisco.com/c/en/us/support/docs/ip/routing-information-protocol-rip/13788-3.html