Gyanmanjari Innovative University

Course Syllabus
Gyanmanjari Diploma Engineering College
Semester-4 (Diploma)

Subject: Computer Networks-DETCE14210

Type of course: Major (Core)

Prerequisite: Basic knowledge of computer and its components

Rationale:

Computers and computer networks are the backbone of computer-based information systems. In contemporary times, irrespective of the scale of the organization, they possess their proprietary computer networks to manage computer-based information systems. Consequently, within every institution, the establishment, activation, and upkeep of secure computer networks have emerged as vital responsibilities for diploma computer engineers as well. This curriculum is thus formulated to aid diploma computer engineering graduates in cultivating this proficiency.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks		Practical Marks		CA	
CI	T	P	C	ESE	MSE	V	P	ALA	
3	0	2	4	60	30	10	20	30	150

(Legends: CI-Classroom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.)

Course Content:

Sr. No	Course Content	Hrs.	% Weightage
1	**Basics of Computer Network** Definition & need of networks, Categories of Computer Networks based on scope and connection, Line Configuration, Network Topology, Standard Organizations and Protocols, Applications and features of different types of servers: File server, Print Server, Mail Server, Web Server, Proxy Server.	07	15%
2	**Reference Model** OSI model & function of each Layer, TCP/IP model, function each Layer, Comparison of OSI & TCP/IP Models.	08	20%
3	**Transmission Media** Types of Transmission Media, Guided Media: Twisted Pair Coaxial Cable, Fiber, Un Guided Media: Electromagnetic spectrum, Radio Transmission, Microwave Transmission, Infrared Transmission, Satellite Communication.	10	22%
4	**Network Protocols & Devices** Protocol hierarchy, Network protocols: SMTP, FTP, MIME, POP, Telnet, DNS, DHCP, ARP, RARP, HTTP, HTTPS, Network devices: Hub, Switch, Repeater, Router, Gateway, Bridge.	08	20%
5	**IP Protocols** IP Protocol–IPv4: Characteristics, Advantages and Disadvantages, Packet structure, Address classes, Subnet & masking, Reserved Address, IP Protocol – IP v6: Characteristics, Addressing modes, Address types, Special Address, Difference between IPv4 and IPv6	12	23%

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Interconnecting Network Devices:** Students have to make posters on how devices such as computers, routers, switches, and other network components are interconnected to enable communication and data exchange on theoretical concepts learned in class and after the completion of this students have to upload images of posters on GMIU web portal.	10
2	**Simulating Network Architectures:** Students have to create a network simulation in packet tracer tool on a given problem and upload an image of that network on GMIU Web Portal.	10
3	**Case Study:** Students have to analyze case studies on guided and unguided transmission media and after the completion of the case study students have to upload a pdf of the case study on GMIU web portal.	10
	Total	30

Suggested Specification table with Marks (Theory): 60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage %	30%	40%	20%	10%	-	-

Course Outcome:

After learning the course students should be able to:	
CO1	Explain the basics of computer networks, network topology and types of servers.
CO2	Discuss data communication techniques and reference models.
CO3	Demonstrate usage of transmission media.
CO4	Understand usage of network protocol, and network devices.
CO5	Illustrate IP Header format and Addressing scheme.

List of Practical:

Sr. No	Description	Unit No	Hrs.
1	Connect computer using given topology with wired media. Assume six devices are arranged, if in: (a) Bus topology (b) Ring topology (c) Star topology (d) Mesh topology Find out number of cables(links), ports needed in each device and total number of ports needed in entire network for each of above stated topology.	1	4
2	Implement different LAN topologies using Network Simulator.	1	4
3	Study about OSI model network Layers.	2	2
4	Prepare and Test Straight UTP Cable and Cross UTP Cable.	3	2
5	Study and Test various Network devices available at Department/Institute. (Repeater, Hub, Switch, Bridge, Router and Gateway).	4	4
6	Study of basic network command and network configuration commands.	4	4
7	Determine Class and Network Address for different IPv4 address and subnet mask using different examples.	5	4
8	Subnet the IP address 216.21.5.0 into 30 hosts in each subnet.	5	2
9	Identify valid IPv6 addresses and if invalid IPv6 address then write reason for the same using different examples.	5	2
10	Determine whether following IPv4 address are valid or invalid. If valid IPv4 address then find class, Network and Host ID of an IPv4 address. If invalid IPv4 address then write reason for the same. (i) 1.4.5.5 (ii) 75.45.301.14 (iii) 111.56.045.78 (iv) 192.226.12.11 (v) 130.45.151.154 (vi) 11100010.23.14.67	5	2
		Total	30

Instructional Method:

The course delivery method will depend upon the requirement of content and the needs of students. The teacher, in addition to conventional teaching methods by black board, may also use any tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory.

The internal evaluation will be done on the basis of Active Learning Assignment.
Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in the laboratory.

Reference Books:

[1] Data Communication & Networking, Forouzen, Tata McGraw Hill.
[2] Computer Networks, Andrew S. Tannebaum & David J Wetherall, Pearson, 2012.
[3] Computer Networking, James Kurose & Keith Ross, Pearson.
[4] Data & Computer Communication, Williams Stallings, Prentice Hall of India.
[5] Networks for Computer Scientists and Engineers, Youlu Zheng & Shakil Akhtar, Oxford University Press, 2012.