

COURSE MODULE FOR THE SESSION 2024-25(ODD SEMESTER)

Course Syllabi with CO's

Academic Year: 2024 - 2025							
Department: Computer Science & Engineering - Data Science							
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
BCS502	Computer Networks	Core	Fundamentals of computers, Operating systems, Basic Mathematics	3	-	2	40T + 20P

Objectives:

- Study the TCP/IP protocol suite, switching criteria and Medium Access Control protocols for reliable and noisy channels.
- Learn network layer services and IP versions.
- Discuss transport layer services and understand UDP and TCP protocols.
- Demonstrate the working of different concepts of networking layers and protocols.

Topics Covered as per Syllabus

Module -1

Introduction: Data Communications, Networks, Network Types, Networks Models: Protocol Layering, TCP/IP Protocol suite, The OSI model, Introduction to Physical Layer: Transmission media, Guided Media, Unguided Media: Wireless. Switching: Packet Switching and its types.

Module -2

Data Link Layer: Error Detection and Correction: Introduction, Block Coding, Cyclic Codes. Data link control: DLC Services: Framing, Flow Control, Error Control, Connectionless and Connection Oriented, Data link layer protocols, High Level Data Link Control. Media Access Control: Random Access, Controlled Access. Check Sum and Point to Point Protocol

Module -3

Network Layer: Network layer Services, Packet Switching, IPv4 Address, IPv4 Datagram, IPv6 Datagram, Introduction to Routing Algorithms, Unicast Routing Protocols: DVR, LSR, PVR, Unicast Routing protocols: RIP, OSPF, BGP, Multicasting Routing-MOSPF

Module -4

Introduction to Transport Layer: Introduction, Transport-Layer Protocols: Introduction, User Datagram Protocol, Transmission Control Protocol: services, features, segments, TCP connections, flow control, Error control, Congestion control.

Module - 5

Introduction to Application Layer: Introduction, Client-Server Programming, Standard Client-Server Protocols: World Wide Web and HTTP, FTP, Electronic Mail, Domain Name System (DNS), TELNET, Secure Shell (SSH)

TextBooks:		
1. Behrouz A. Forouzan, Data Communications and Networking, 5th Edition, Tata McGraw-Hill,2013.		
Reference Books		
1. Larry L. Peterson and Bruce S. Davie: Computer Networks - A Systems Approach, 4th Edition, Elsevier, 2019. 2. Nader F. Mir: Computer and Communication Networks, 2nd Edition, Pearson Education, 2015. 3. William Stallings, Data and Computer Communication 10th Edition, Pearson Education, Inc.,2014.		
List of URL's		
1. https://www.digimat.in/nptel/courses/video/106105183/L01.html 2. http://www.digimat.in/nptel/courses/video/106105081/L25.html 3. https://nptel.ac.in/courses/10610		
Course outcomes: The students should be able to:		
At the end of the course, the student will be able to: <ul style="list-style-type: none">▪ Explain the fundamentals of computer networks.▪ Apply the concepts of computer networks to demonstrate the working of various layers and protocols in communication network.▪ Analyze the principles of protocol layering in modern communication systems.▪ Demonstrate various Routing protocols and their services using tools such as Cisco packet tracer.		
Internal Assessment Marks: 40 (3 Session Tests are conducted during the semester and Marks allotted based on average of all performances).		

PRACTICAL COMPONENT OF IPCC

1. Implement three nodes point - to - point network with duplex links between them. Set the queue size, vary the bandwidth, and find the number of packets dropped.
2. Implement transmission of ping messages/trace route over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion.
3. Implement an Ethernet LAN using n nodes and set multiple traffic nodes and plot congestion window for different source / destination.
4. Develop a program for error detecting code using CRC-CCITT (16- bits).
5. Develop a program to implement a sliding window protocol in the data link layer.
6. Develop a program to find the shortest path between vertices using the Bellman-Ford and path vector routing algorithm.
7. Using TCP/IP sockets, write a client - server program to make the client send the file name and to make the server send back the contents of the requested file if present.
8. Develop a program on a datagram socket for client/server to display the messages on client side, typed at the server side.
9. Develop a program for a simple RSA algorithm to encrypt and decrypt the data.
10. Develop a program for congestion control using a leaky bucket algorithm.

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code	BCD502			Title: Computer Networks									
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	Total
CO-1	2	1		-	-	-	-	-	-	-	-	-	3
CO-2	2	2		-	-	-	-	-	-	-	-	-	4
CO-3	2	1		-	-	-	-	-	-	-	-	-	3
CO-4	2	1		-	-	-	-	-	-	-	-	-	3
Total													13

The Correlation of Program Specific Outcome's (PSO's) and Course Outcome (CO's)

Subject Code	BCD502	Title: Computer Networks	
List of Course Outcome's	PSO1	PSO2	Total
CO-1	-	1	1
CO-2	-	1	1
CO-3	-	1	1
CO-4	-	1	1
Total	-	-	4

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution