T-L 1

BAPATLA ENGINEERING COLLEGE

COURSE PLAN

1. Department	**Information Technology**
2. Program	**B.Tech**
3. Semester/Year	**V SEM**
4. Course title /code	**COMPUTER NETWROKS/20IT502**
5. Prerequisite – Code and Title	**NONE**
6. Number of hours tuition	**03 hours/04 Periods**
7. Date of Preparation	**25-07-2023**

8. Syllabus

Lectures	:	4Periods/Week	Continuous Assessment	:	30
Final Exam	:	3hours	Final Exam Marks	:	70

UNIT-1 (14 Periods)

Data Communications & Networking Overview: A Communications Model, Data Communications, Data Communication Networking.

Protocol Architecture: The Need for Protocol Architecture, A Simple Protocol Architecture, OSI, The TCP/IP Protocol Architecture.

Digital Data Communication Techniques: Asynchronous & Synchronous Transmission, Types of Errors, Error Detection, Error Correction.

Data Link Control: Flow Control, Error Control.

UNIT-2 (16 Periods)

Network Layer:

Network Layer Design Issues: Store-and-Forward Packet Switching, Services Provided to the Transport Layer, Implementation of Connectionless Service, Implementation of Connection-Oriented Service, Comparison of Virtual-Circuit & Datagram Subnets.

Routing Algorithms: The Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing.

Congestion Control Algorithms: General Principles of Congestion Control, Congestion Prevention Policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram Subnets, Load Shedding, Jitter Control.

UNIT-3 (15 Periods)

Quality of Service: Requirements, Techniques for Achieving Good Quality of Service The Network Layer in the Internet: The IP Protocol, IP Addresses, Internet Control Protocols. The **Transport Layer:**

The Transport Service: Services Provided to the Upper Layers, Transport Service Primitives, Berkeley sockets

Elements of Transport Protocols: Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery.

UNIT-4 (14 Periods)

The Internet Transport Protocol (UDP): Introduction to UDP, Remote Procedure Call, The Real-Time Transport Protocol.

The Internet Transport Protocols (TCP): Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Transmission Policy, TCP Congestion Control, TCP Timer Management.

Application Layer:

The Domain Name System (DNS): The DNS Name Space, Resource Records, Name Servers.

9. Course Objectives

The student will be able to :

1. Able to learn types of communications, topologies, OSI, TCP/IP protocol architectures along with error detection and correction mechanisms and also the working of data link layer.
2. Able to know the working of network layer issues along with the identification of shortest path among different nodes using various algorithms.
3. Able to know the transport layer issues, establishment of remote procedure calls and TCP segment header.
4. Able to learn the working of TCP and UDP and different application layer issues.

10. Learning Outcomes

After studying this course , the student will able to:

1. Define a Communication model
2. List different types of Topologies
3. Name different types of Data Communications
4. Discuss the need for a protocol Architecture
5. Explain the working of each OSI layer
6. Explain the TCP/IP Protocol suit
7. Differentiate between OSI and TCP/IP
8. Compare the Asynchronous and Synchronous transmission
9. Illustrate with an example about the working of CRC for error detection
10. Illustrate Error correction with an example
11. Describe the Flow control mechanisms
12. Explain the Error control mechanisms
13. With a neat diagram, Explain the working of High-Level Data link control
14. Explain the network layer design model issues
15. Describe the store and forward packet switching
16. Name the services provided to the Transport layer
17. Differentiate the connection less and connection oriented services

18. Able to compare the Virtual circuits and datagram subnets
19. Define the optimality principle
20. They will be able to detect the shortest path among the nodes in a network
21. Will be able to describe different routing algorithms
22. Able to list the general principles of Congestion control
23. Explain the Congestion prevention policies
24. Illustrate the Congestion control in data grams subnets
25. Define Jitter
26. Identify the requirements for Quality of service
27. Determine the techniques for achieving good quality of service
28. Able to demonstrate the Network layer in the internet
29. List the Transport layer services
30. They will be able to generalize the connection establishment and connection release services
31. They can be illustrate the Remote procedure calls
32. Describe the real time transport protocol working
33. Explain the services of TCP model
34. With a neat diagram explain the TCP segment header
35. Able to identify the naming in the name space

11. Teaching – Learning Methods

1. Lectures using blackboard/Online mode
2. LCD presentation

12. Assessment Methods

AAT 1 : After 4 Weeks
6 1-Mark questions, One Essay question from Unit - I
Term Examination 1 : After 8 Weeks
7 1-mark questions, One question from Unit-1 (14 M) with internal choice and One question from Unit-2 with internal choice (14 M).
AAT 3: After 12 Weeks
6 1-Mark questions, One Essay question from Unit - III
Term Examination 2 : After the last working day
6 1-mark questions, One question from Unit-3(14 M) with internal choice and One question from Unit-4(14 M) with internal choice.

13. LESSON PLAN

Week	No. of Periods	Learning Outcomes	Unit/module/ Topic(s)	Teaching Methods	Assessment Methods
1	4	1,2,3	Data Communications & Networking Overview: A	11.2	AAT1, TE1

			Communications Model, Data Communications, Data Communication Networking		
2	4	4	Protocol Architecture: The Need for a Protocol Architecture, A Simple Protocol Architecture.	11.2	AAT1, TE1
3	4	5,6,7	OSI, The TCP/IP Protocol Architecture.	11.2	AAT1, TE1
4	4		Digital Data Communication Techniques: Asynchronous & Synchronous Transmission, Types of Errors, Error Detection, Error Correction.	11.2	AAT1, TE1
5	4	8,9,10,11,12	Data Link Control: Flow Control, Error Control	11.2	TE1
6	4	13,14,15	Network Layer Design Issues: Store-and-Forward Packet Switching, Services Provided to the Transport Layer.	11.1, 11.2	TE1
7	4	16,17	Implementation of Connectionless Service Implementation of Connection Oriented Service, Comparison of Virtual Circuits & Datagram Subnets.	11.1, 11.2,	TE1
8	4	18,19	Routing algorithms: The Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, and Hierarchical Routing.	11.1, 11.2	TE1
9	4	20,21,222,23	Congestion Control Algorithms: General Principles of Congestion Control, Congestion Prevention Policies, Congestion	11.1, 11.2	TE1

			Control in Virtual Circuit Subnets, Congestion Control in Datagram Subnets, Load Shedding and Jitter Control		
10	4	24,25,26	Quality of Service: Requirements, Techniques for Achieving Good Quality of Service The Network Layer in the Internet: The IP Protocol, IP Addresses, Internet Control Protocols.	11.2	AAT2, TE2
11	4	27,28	The Transport Service: Services Provided to the Upper Layers, Transport Service Primitives, Berkeley Sockets.	11.1, 11.2	AAT2, TE2
12	4	28,29	Elements of Transport Protocols: Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery.	11.1, 11.2	AAT2, TE2
13	4	30,31	The Internet Transport Protocol (UDP): Introduction to UDP, Remote Procedure Call, The Real Time Transport Protocol. The Internet Transport Protocol (TCP): Introduction to TCP, The TCP Service Model, The TCP Protocol	11.1, 11.2	TE2
14	4	32,33	The TCP Segment Header, TCP Connection Establishment, TCP Connection Release,	11.2	TE2

15	4	34	Modeling of TCP Connection Management, TCP Transmission Policy, TCP Congestion Control, TCP Timer Management	11.2	TE2
16	4	35	The Domain Name System (DNS): The DNS Name Space, Resource Records, Name Servers.	11.2	TE2
					Semester End Exam

14. **Resources**

Text Book	1. William Stallings, "Data and Computer Communications", 7th Edition, Pearson Education, 2004. 2. Tanenbaum, "Computer Networks", 4th Edition, Pearson Education, 2003.
Reference Books	1. Wayne Tomasi, "Introduction to Data Communications and Networking", 1st Edition, Pearson Education, 2007. 2. Achyut S Godbole, "Data Communications and Networking", 1st Edition, TMH, 2002. 3. Nader F. Mir, "Computer and Communication Networks", 1st Edition, PHI, 2006.

Assessment Scheme:

Assessment method	Type of questions	ILOs to be tested	Marks allocated	Percent weight
AAT –I	**6 1-Mark questions, One Essay question from Unit - I**	**1 – 7**	**10**	**10%**
AAT – II	**6 1-Mark questions, One Essay question from Unit - III**	**27-29**	**10**	
Written examination (TE 1)	**7 1-Mark questions, Descriptive and Essay Questions.**	**1 – 23**	**30**	**20%**
Written examination (TE 2)	**7 1-Mark questions, Descriptive and Essay Questions.**	**24-35**	**30**	
Semester End	**14 1- Mark Questions**	**1-35**	**50**	**70%**

Exam	**and Essay Question**			