10ABTEC22213: COMPUTER NETWORK AND TROUBLESHOOTING		
Course Framework		
Credits: L-T-P: 3 – 0 – 1		**Total Credits: 4**
Contact Hours/Week: 5	**Direct Teaching Hours: 45**	**Total Contact Hours: 7**

Course Learning Objectives: This course will enable the students to

- Understand the various types of data communication, familiarity with layered model. Knowled on multiple services
- Knowledge on Transport layer protocols Understand their purpose, behavior and structu Practical knowledge on implementation the protocols
- Knowledge on Network Security which is required in the data communication. Exposure secure algorithms
- Knowledge VPN and IPSEC. Implementation of various types of VPN

Course Outcomes: On completion of the course, student would be able to:

COs	Course outcomes	RBT
CO1	Describe the purpose, structure and behaviour of protocols	L2
CO2	Describe the implementation of Transport layer protocols	L2
CO3	Demonstrate network security and services	L2
CO4	Exposure on VPN and Implementation of IPSEC tunnel	L2
CO5	Understand and deploy multimedia streaming	L3

Syllabus	Hours
Module-1	**09**

Introduction to transport layer services, Fundamental concepts of TCP, including its role in the TCP model, reliable data transfer, flow control, congestion control, and error detection. TCP Handsha TCP Header, TCP Flow Control, TCP Retransmission, UDP, Features of UDP, UDP Header, TCP UDP.

Module – 2	**09**

Fundamental concepts of routing, Subnetting, Role of routers, Routing table, Routing protocols, Sta Routing, NAT, Routing metrics, Routing Algorithms, Link-State (LS) Routing Algorithm, Distance-Vec (DV) Routing Algorithm, Hierarchical Routing, Routing in the Internet, Intra-AS Routing in the Intern RIP, Intra-AS Routing in the Internet: OSPF, Inter/AS Routing: BGP, Broadcast Routing Algorithms a Multicast.

Module – 3	**09**

Overview of Network Security: Elements of Network Security, Classification of Network Attac Security Methods, Symmetric-Key Cryptography: Data Encryption Standard (DES), Advanc Encryption Standard (AES), Public-Key Cryptography: RSA Algorithm, Diffie-Hellman Key-Exchan Protocol, Authentication: Hash Function, Secure Hash Algorithm (SHA), Digital Signatures, Firewa and Packet Filtering

Module-4	**09**
Concept of Virtual Private Networks (VPNs), Benefits of Using a VPN, Types of VPN protocols, sett up a VPN, VPN for Streaming, Introduction to IPSEC, IPSEC Modes, IPSEC protocols, IPSEC polic IPSEC with IPV6 architecture	
Module-5	**09**
Properties of video, properties of Audio, Types of multimedia Network Applications, streaming sto video: UDP Streaming, HTTP Streaming, Adaptive streaming and DASH, content distribution Netwo Voice-over-IP: Limitations of the Best-Effort IP Service, Removing Jitter at the Receiver for Aud Recovering from Packet Loss Protocols for Real-Time Conversational Applications, RTP, SIP	

Scheme of Evaluation:

A. Continuous Internal Assessment (CIA) Scheme:

Components	Group Seminar	Lab	Activity Based Learning	IAT	Preparatory	Total
Max. Marks	10	10	10	10	10	50

LAB (P = 1 Credit)		
Record	**Execution**	**Lab total**
05	05	10

Note: A student has to obtain a minimum of 40% in theory of the subject to be eligible to appear ESE.

B. End Semester Exam (ESE) Scheme: 50 marks

Question paper pattern:

a) Question paper shall have 5 main questions corresponding to 5 modules.
b) Each main question will have two full questions carrying 10 marks each.
c) A full question may have a maximum of four sub questions, covering the topics under a module.
d) The students will have to answer all 5 main questions, selecting one full question from each modu

Textbooks:

1. James F Kurose and Keith W Ross, Computer Networking, A Top-Down Approach, Si edition, Pearson.
2. Nader F Mir, Computer and Communication Networks, 2nd Edition, Pearson

Reference Books:

1. Behrouz A Forouzan, Data and Communications and Networking, Fifth Edition, McGraw H Indian Edition
2. Larry L Peterson and Brusce S Davie, Computer Networks, fifth edition, ELSEVIER
3. Andrew S Tanenbaum, Computer Networks, fifth edition, Pearson
4. Mayank Dave, Computer Networks, Second edition, Cengage Learning

e-Material:

Web links and Video Lectures (e-Resources):
https://www.youtube.com/watch?v=iSS0uOSPv8Y&list=PL5B4IsKp6FVzTrpjBbKcv2AgOVzqtH p
https://nptel.ac.in/courses/106108098
Activity Based Learning/Practical Based Learning
http://nptel.ac.in
https://swayam.gov.in

Beyond Syllabus

Structure of IPV6
Application of 5G
Implementation of Edge Computing

LIST OF EXPERIMENTS

1. Configuring TCP/IP and static Routing
2. Configuring Routing Information Protocol (RIP)
3. Configuring Interior Gateway Routing Protocol (IGRP)
4. Configuring Open Shortest Path First (OSPF)
5. Configuring Network Address Translation (NAT)
6. Configuring Access Control List (ACL)
7. Configuring Secure Shell (SSH)
8. Configuring Privilege Levels
9. Configuring Zone Based Firewall (ZBF)
10. Configuring Layer 2 Security
11. Virtual Private Network (VPN)