10ABTEC22113: DATA COMMUNICATIONS		
Course Frame Work		
Credits: L-T-P: 3 – 0 – 1		**Total Credits: 4**
Contact Hours/Week: 5	**Direct Teaching Hours: 45**	**Total Contact Hours: 75**

Course Learning Objectives: This course will enable the students to

- Understand the various types of data communication, familiarity with layered model. Knowledge on multiple services
- Knowledge on Application layer protocols. Understand their purpose, behavior and structure. Practical knowledge on implementation the protocols
- Knowledge on Basic electronics which is required in the data communication. Exposure on electronic devices
- Implementation of Ethernet, VLAN, WAN Protocols. Knowledge on Digital communication.
- Introduction to Wireless Networks. Knowledge on wireless protocols and Mobile Communication

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

COs	Course outcomes	Levels
CO1	Describe the purpose, structure and behaviour of protocols	L2
CO2	Describe the implementation of application of layer protocols	L2
CO3	Demonstrate the data link layer protocols and services	L2
CO4	Explain the protocols for wireless networks	L2
CO5	Compute the knowledge of routing protocol for WAN communications	L2

Syllabus	Hours
Module-1	**09**
Introduction to Data Communications, Layered protocol Model, Network Edge, Network core, Delay loss and Throughput in Networks, Protocol layers and Service models, Network attack and security.	
Module – 2	**09**
Content Distribution Networks, Application layer principles, Web and HTTP, FTP, Electronic Mail -SMTP, POP3, IMAP. DNS, P2P, Video streaming and Content Distribution Networks.	
Module – 3	**09**
Introduction, Forwarding and Routing, Network Service Models, Virtual Circuit and Datagram Networks-Virtual-Circuit Networks, Datagram Networks, Origins of VC and Datagram Networks, inside a Router-Input Processing, Switching, Output Processing, Queuing, The Routing Control Plane, The Internet Protocol (IP): Forwarding and Addressing in the Internet- Datagram format, Ipv4 Addressing, Internet Control Message Protocol (ICMP), IPv6	
Module-4	**09**

Data Encoding and Transmission - Introduction, Digital data transmission over digital Signal and Analog signal, Analog data transmission over digital and Analog signal,
Data link Control – Error detection and Correction, Multiple access protocols, Addressing and ARP, Ethernet, switches and VLANS, PPP, MPLS.

Module-5	**09**

Wireless and Mobile Networks – Wireless links and characteristics, IEEE 802.11 wireless LAN, Cellular internet access, Mobility.

Scheme of Evaluation:

A. Continuous Internal Assessment (CIA) Scheme:

THEORY (L= 3 Credits)						
Components	**IAT**	**Worksheet**	**Assignments**	**Group Seminar**	**Preparatory**	**Theory Total**
Max. Marks	10	10	10	10	10	50

LAB (P = 1 Credit)						
Components	**Simulation**	**Quiz**	**Report**	**Field Trip**	**Lab internal**	**Lab Total**
Max. Marks	05	05	06	04	05	25

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

Text Books:

1. Data Communications and Networking, 4th Edition Behrouz A. Forouzan
2. Data Communications and Computer Networks by Brijendra Singh

Reference Books:

1. Data & Computer Communications by William Stallings
2. A Textbook of Computer Network by Dr. Sanjay Sharma
3. Computer Networks by Andrew S tanenbaum and Nick Feamster
4. Fundamentals of wireless communication by David Tse

e-Material:

Web links and Video Lectures (e-Resources):

https://www.youtube.com/watch?v=iSS0uOSPv8Y&list=PL5B4lsKp6FVzTrpjBbKcv2AgOVzqtHJnp

https://nptel.ac.in/courses/106108098

Activity Based Learning/Practical Based Learning

http://nptel.ac.in

https://swayam.gov.in

Beyond Syllabus:

Explaining the MAC and IP address for a system and Cisco Packet Tracer Software usage to identify the address. Establishing the network connection and analysing the behaviour of network inn software.

List of Lab experiments:

1. Implementation of Peer-to-Peer
2. Implementation of different topologies
3. Implementation of LAN
4. Implementation of HTTP
5. Implementation of FTP
6. Implementation of DNS
7. Implementation of ARP/RARP
8. Study of collision behavior for various networks
9. Implementation of VLAN
10. Configuration of Wireless Networks
11. Configuration of Wireless Router
12. Configuration of Mobile Networks