CSE 214	**DATA COMMUNICATION**	**CREDITS: 3**

L T P E O
3 0 0 1 0
END   EXAM: 3Hrs

SESSIONAL MARKS: 40

FINAL EXAM MARKS: 60

Pre -requisites:
Basic knowledge of Computer fundamentals, Digital Logic Design, Computer Hardware.

Course Objectives:

1 To educate concepts, vocabulary and techniques currently used in the area of Data Communication, Networking and Internet.
2 To interpret the Digital encoding Techniques in Data Communication.
3 Familiarize the student with the basic taxonomy and terminology of the Data and signals, Signal Transmission, and Transmission Impairments.
4 To accumulate existing state-of-the-art in Data Link Layer concepts and sliding window protocols and its applications.
5 To analyze the functions of physical layer and gain knowledge in different mediums used for data transfer.
6 Introduce the student to illustrate the point in Data Communication & networking concepts, preparing the student for those entry level courses.

Course Outcomes:

By the end of the semester, the student will be able to:
CO-1: Acquire the Basics of data communications model, differentiate OSI with TCP/IP models .
CO-2: Analyse and explain the features of Transmission media with various encoding techniques and examine the transmission impairments.
CO-3: Apply the error correction and detection techniques.
CO-4: Analyse the performance issues of different types of LANs
CO-5: Analyse the characteristics of multiplexing and spread spectrum.

CO – PO Mapping:

	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-K	PO-L	PSO-1	PSO-2
CO-1	2	2	3	2	3				2	1		2	1	1
CO-2	2	2	2	1	1				2	2		1	1	1
CO-3	1	2	3	2	1				3	2		2	1	1
CO-4	3	2	2	1	1				2	1		1	1	1
CO-5	2	1	2	2	1				3	2		2	1	1

UNIT-I   **12-hours**

Introduction to Data Communications:
History of Data communication, Data Communication System: An Example Configuration, Protocol Architectures: Reference Models, ISO-OSI model, The TCP/IP. Traditional Internet-Based Applications, Analog and Digital Data Transmission.

Learning Objectives: At the end of this unit student will be
- Emphasis on what Representations being used for defining data communication system with model.
- Analyze the performance comparison between ISO-OSI model and TCP/IP models.

UNIT-II   **12 -hours**
Transmission Media:
Guided Media, Un- Guided Media: Antenna, characterstics, Wireless propagation Techniques.
Representation of Signals: Analog Signal-Digital Signal, Amplitude, Frequency, Phase, Data/Signal Encoding Techniques, Modulation and Demodulation techniques, Data-Analog data, Digital Data, Transmission Impairments.

Learning Objectives: At the end of this unit student will be
- describe the characteristics of guided and unguided media with internal representation.
- Analyze the signals with encoding techniques to present the target data.

UNIT –III   **15 -hours**
The Digital Data Communication Techniques:
Data Link Control, Asynchronous and Synchronous Transmission, Line Configurations, interface standards- DCE, DTE, Modems.
Flow Control-Error Control:Stop and Wait, Go Back -N, selective repeat protocols,ARQ protocols.
Error- Error Detection, and correction- Parity Check, VRC, CRC, Hamming code, Bit oriented protocol- HDLC,LAP,ATM-cell relay.

Learning Objectives: At the end of this unit student will be
- Understanding the state and types of digital transmissions.
- Analyze the flow and error control methods .

UNIT-IV   **16 -hours**
Local Area Network and IoT:
LAN addressing, LAN Topologies, LAN Technologies, LAN Protocol Architecture, Bridges, Layer 2 and Layer 3 Switches.
High-Speed LANs: Ethernet (IEEE 802.3, IEEE 802.5)-Frame format, Delays, Specifications, Wireless LANs: IEEE 802.11- Architecture and Services.
Short Range networks: Bluetooth- Architecture and Services.
Introduction to IoT : Design principles, Architecture, Protocols, Applications.

Learning Objectives: At the end of this unit student will be
- Define and interpret the LAN architecture and its variants.
- Understanding the view of High speed LAN and its applications.
- Illustrate the technologies Ethernet,IEEE802.11, IoT.

UNIT-V   **12 -hours**
Multiplexing: Caterories, Demultiplexing: Categories Frequency-Division Multiplexing: characteristics.
Time Division Multiplexing-Characteristics: Types, Statistical TDM, Synchronous TDM: Characteristics, TDM Link Control, The Concept of Spread Spectrum, Frequency Hopping Spread Spectrum, Direct Sequence Spread Spectrum, Code-Division Multiple Access.
Case Study: Analog services and Digital services

Learning Objectives: At the end of this unit student will be

- Compare the multiplexing techniques with respect to Frequency and time.
- Discuss the various spread spectrum techniques.

TEXT BOOKS

1. Behrouz A. Forouzan, "Data Communications and Networking", TMH, 2004, 4th Edition.
2. Raj kamal," Internet of Things – Architecture and Design principles" , Publisher: Tata McGraw-Hill Education India.

REFERENCE BOOKS
1. William Stallings, "Data and Computer Communications" , Pearson Education Inc., 2010, 8th Edition.

Online Web Resources:
1. https://nptel.ac.in/courses/106108098/#
2. https://www.globalitschools.com/programming-quiz/desktop-programming-quiz/data-communication/

Prepared By: Mr. G.Jagadish**,** Dr. V.Usha Bala