Course Code	Course Title	L	T	P	S	J	C
CSEN1071	Data Communications	2	0	0	0	0	2
Course Owner	Department of CSE	Syllabus version				1.0	
Course Pre-requisite(s)	Nil	Contact hours				30	
Course Co-requisite(s)		Approved on: April 1, 2022					
Alternate Exposure							

A large majority of computer applications require communication of data from one device to another. As such, this course deals with data communications, including conversion of data into a signal, propagation of the signal through a medium and conversion of the signal back into data. Proper communication also requires the two communicating devices to follow a common protocol. This course covers the concepts of layered network architecture, properties of different transmission media and data communication principles. Various signal encoding techniques and their merits and demerits are taught, together with basic error and flow control techniques and multiplexing. The course acts as a foundation for later courses.

Course Objectives

1. Introduce the concepts of Data Communications and different models
2. Impart the characteristics of various transmission media.
3. Familiarize different analog and digital transmission techniques.
4. Expose the basic error control and flow control techniques.
5. Acquaint with static channel allocation using TDMA and FDMA.

UNIT - I Data communication, Data networking and the Internet LTP 600

A communication model, data communications, networks, the Internet.

Protocol Architecture: Need for protocol architecture, TCP/IP protocol architecture, OSI model, TCP/IP Vs OSI model.

Learning Outcomes:

After completion of this unit, the student will be able to

- explain basic working of the computer network L2
- infer the necessity of layered protocol architecture L2
- compare the OSI and TCP/IP architectures L2

Pedagogy tools: Blended learning, video lectures, self-reading

UNIT - II Data transmission LTP 600

Concepts and terminology, analog and digital data transmission, transmission impairments, channel capacity. Transmission Media: Guided and unguided

Learning Outcomes:

After completion of this unit, the student will be able to

- summarize various transmission impairments L2
- describe analog transmission, digital transmission and channel capacity L2
- compare guided and unguided media L2

Pedagogy tools: Blended learning, video lectures, self-reading

UNIT - III Signal encoding techniques LTP 600

Digital data to digital signals, digital data to analog signals, analog data to digital signals, analog data to analog signals.

Learning Outcomes:

After completion of this unit, the student will be able to

- illustrate various signal encoding techniques L2
- analyze signal encoding techniques L4
- select an encoding technique for a given network scenario L3

Pedagogy tools: Blended learning, video lectures, self-reading

UNIT - IV Digital Data Communication Techniques LTP 600

Asynchronous and synchronous transmission, types of errors, error detection techniques, error correction techniques (single bit)

Data link control protocols: Flow control, error control.

Learning Outcomes:

After completion of this unit, the student will be able to

- compare synchronous and asynchronous transmission L2
- test for errors in a given data stream L4
- analyze various flow control techniques L4

Pedagogy tools: Blended learning, video lectures, self-reading

UNIT - V Multiplexing LTP 600

Frequency division multiplexing, characteristics, synchronous time division multiplexing, characteristics, statistical time division multiplexing, characteristics.

Learning Outcomes:

After completion of this unit, the student will be able to

- explain the need for multiplexing L2
- summarize the characteristics of multiplexing techniques L2
- compare the performance of multiplexing techniques under different conditions L2

Pedagogy tools: Blended learning, video lectures, self-reading

Textbook(s):

1. William Stallings, Data and Computer Communications, 8/e, Pearson Education., 2013.

Reference Book(s):

1. Fred Harshall, Data Communications, Computer Networks and Open systems,4/e, Pearson Education, 2005.

2. Behrouz A Forouzan, Data Communications and Networking, 4/e, McGraw Hill, 2012.

Course Outcomes: After successful completion of the course the student will be able to:

1. illustrate and summarize the OSI and TCP/IP network architectures
2. compare the properties of various transmission media
3. utilize error correction and detection techniques to detect or correct errors
4. analyze flow control schemes for data transmission
5. explain basic signal encoding and multiplexing techniques

	Programme Outcomes (POs)												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1									1			1		
CO2	1	1								1			1		
CO3	1		2							1				1	
CO4	2			3						1					2
CO5	1	2			2					1			1		2

1-Low, 2- Medium and 3- High Correlation