Kadi Sarva Vishwavidyalaya

Faculty of Engineering & Technology

Electronics and communication Engineering

(Academic Year 2019-20)

Subject Code:EC601-N	**Subject Title: DIGITAL COMMUNICATION**
Pre-requisite	

Course Objective:

The educational objectives of this course are

- The course provides the basic knowledge of various digital modulation and demodulation techniques used in digital communication system.
- Comparison of various techniques will enable the student to select most appropriate technique for the application.
- The course includes the Probability, statistical analysis like mean, variance etc.
- The Course includes Information measurements and error detection and error correction codes are also included.

Teaching Scheme (Credits and Hours)

Teaching scheme				**Total Credit**	**Evaluation Scheme**					**Total Marks**
L	**T**	**P**	**Total**		**Theory**		**IE Marks**	**CIA Marks**	**Pract. Marks**	
Hrs	**Hrs**	**Hrs**	**Hrs**		**Hrs**	**Marks**				
03	00	02	05	04	03	70	30	20	30	150

Outline Of the Course:

Sr. No	**Title of the Unit**	**Minimum Hours**
1.	Base Band Modulation	06
2.	Digital Data Transmission	06
3.	Digital Modulation and Demodulation Techniques	08
4.	Probability Theory and Random Variable:	08
5.	Information Theory	10
6.	Error Correcting Codes	10
	Total	**48**

Total hours (Theory): 48
Total hours (Lab): 16*2=32
Total hours: 80

Kadi Sarva Vishwavidyalaya

Faculty of Engineering & Technology

Electronics and communication Engineering

(Academic Year 2019-20)

Detailed Syllabus:

Unit No.	Topics	Lecture Hours	Weightage(%)
1.	**Base Band Modulation:** Base Band System, the Sampling Theorem and Reconstruction, Aliasing, Pulse Code Modulation, Companding, Differential PCM (DPCM), Delta Modulation, Adaptive Delta Modulation, T1 Carrier System.	06	12
2.	**Digital Data Transmission:** Components of digital communication system, line coding, Scrambling, Regenerative Repeater, Eye Diagram, Timing Extraction, Detection Error Probability, M-ary communication, Digital Carrier Systems	06	12
3.	**Digital Modulation and Demodulation Techniques:** Modulation and Demodulation techniques for ASK, FSK, PSK,BPSK, QPSK, DPSK, QAM, MSK, GMSK, Coherent and Non Coherent Detection.	08	18
4.	**Probability Theory and Random Variable:** Concept of Probability, Conditional Probability Of Independent Events, Types of Random Variable, CDF, PDF,Mean and variance, Chebyshev In Equality, The Central Limit Theorem, Correlation.	08	18
5.	**Information Theory :** Measure Of Information, Entropy, Source encoding, Error Free Communication Over A Noisy Channel, The Channel Capacity Of A Discrete Memory Less Channel, Channel Capacity, Shannon's Equation.	10	20
6.	**Error Correcting Codes:** Introduction, Linear block code, cyclic code, Burst error detecting and correcting codes, Convolution Code, Code Tree, State Diagram, Trellis Diagram , Viterbi's Decoding algorithm Comparison of coded and un coded system.	10	20
	Total	48	100

Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lecture and laboratory which carries 10 marks in overall evaluation.
- One internal exam will be conducted as a part of internal theory evaluation.
- Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.

- Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.

Learning Outcomes:
On successful completion of the course

- The student can identify different areas of Digital Communication system and find the applications of all the areas in day to day life usage. Also, Students can identify the operations, working, and design of various TELCO Networks.
- The Student can practically work on Digital Communication system considering various parameters of modern communication Switching by use of simulation software like Omnet, Opnet & MATLAB.

TEXT BOOKS:
1. B.P.Lathi, Modern Digital and Analog communication System, Oxford Publication.
2. JE Flood, "Telecommunications Switching, Traffic and Networks", Pearson.
3. J. Bellamy, "Digital Telephony", John Wiley, 2003, 3rd Edition.

REFERENCES BOOKS:
1. Taub & Schilling, Principle of communication system, TMH Publication.
2. John G. Proakis, Digital Communications, TMH Publication.
3. Simon Haykin , Digital and analog communication system , Willey Publication

List of Experiments (Not limited to following. Subject teacher may modify the same)**:**

Sr. No.	Experiment Title
1.	To study and perform sampling and Reconstruction.
2.	To understand and the concept of Pulse Code Modulation and To observe the Performance of PCM system.
3.	To understand the concept of Delta Modulation and to achieve the Delta Modulation /De-Modulation.
4.	To study the performance of An-adaptive Delta modulator/De-modulator circuits.
5.	To Study and observe the performance of Digital carrier system (Amplitude Shift Keying) ASK.
6.	To Study and observe the performance of Digital carrier system (Frequency Shift Keying) FSK.
7.	To Study and observe the performance of Digital carrier system (Phase Shift Keying) PSK.
8.	To study and perform Pulse Amplitude Modulation (PAM).
9.	To study and perform Pulse Position Modulation (PPM).
10.	To study and perform Pulse Width Modulation (PWM).
11.	To perform BPSK modulation and demodulation scheme.
12.	To perform QPSK modulation and demodulation scheme.