KADI SARVA VISHWAVIDYALAYA

B.E. Semester: VI
Electronics & Communication Engineering
Subject Name: Digital Communication
Subject Code : EC-601   W.E.F2014-2015

A. **Course Objective:**

The educational objectives of this course are

- To introductory knowledge of Probability & Information Theory & Random Processes.

- Fundamentals of Error Correction Codes & Digital Modulation Techniques.

B. **Teaching / Examination Scheme:**

SUBJECT		Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
CODE	NAME	Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
EC-601	**Digital Communication**	4	0	2	6	5	3	70	30	20	30	150

C. **Detailed Syllabus:**

1. **Probability Theory & Random Processes:** Introduction to digital communication, Probability, Conditional Probability Of Independent Events, Relation between probability and probability density ,CDF, PDF, Gaussian PDF, Threshold Detection, Random Variable, Variance of a random variable, co relation between random variables, Mean and variance of sum of random variables, Statistical Average, Chebyshev In Equality, Raleigh Probability Density, The Central Limit Theorem, correlation, PSD.

2. **Information Theory :** Concept & Measure Of Information, entropy, Error Free Communicat ion Over A Noisy Channel, The Channel Capacity Of A Discrete Memory Less Channel, Channel Capacity, Shannon's Equation.

3. **Formatting A Base Band Modulation:** Base Band System, the Sampling Theorem, Aliasing, Pulse Code Modulation, Delta Modulation, Adaptive Delta Modulation, Phase Modulation, QAM, SNR Calculation.

4. **Principle of digital data Transmission :** Line Coding, PSD Of On/Off Signal, Bipolar Signal, Duo Binary Signal, Pulse Shaping , Nyquist Criterion,regenerative repeaters, Scrambling, Digital Carrier System, Digital Multiplexing.

5. **Error Correction Codes:** Introduction, Linear block code, cyclic code, hamming code. BCH Code

6. **Digital Modulation Techniques :** Modulation schemes like ,DEPSK, DPSK, BPSK, QPSK, QASK, MSK, BFSK.

7. **Channel access schemes:** Introduction, TDM,FDM.

D. **Lesson Planning**

SR. No.	(Lectures) Hours	% Weight-age in Exam	Topics
1	12	20	**Probability Theory & Random Processes:** Introduction to digital communication, Probability, Conditional Probability Of Independent Events, Relation between probability and probability density ,CDF, PDF, Gaussian PDF, Threshold Detection, Random Variable, Variance of a random variable, co relation between random variables, Mean and variance of sum of random variables, Statistical Average, Chebyshev In Equality, Raleigh Probability Density, The Central Limit Theorem, correlation, PSD.
2	12	20	**Information Theory :** Concept & Measure Of Information, entropy, Error Free Communicat ion Over A Noisy Channel, The Channel Capacity Of A Discrete Memory Less Channel, Channel Capacity, Shannon's Equation.
3	07	15	**Formatting A Base Band Modulation:** Base Band System, the Sampling Theorem, Aliasing, Pulse Code Modulation, Delta Modulation, Adaptive Delta Modulation, Phase Modulation, QAM, SNR Calculation.
4	08	15	**Principle of digital data transmission:** Line Coding, PSD Of On/Off Signal, Bipolar Signal, Duo Binary Signal, Pulse Shaping , Nyquist Criterion,regenerative repeaters, Scrambling, Digital Carrier System, Digital Multiplexing.
6	08	08	**Error Correction Code :** Introduction, Linear block code, cyclic code, hamming code, BCH Code
7	08	12	**Digital Modulation Techniques :** Modulation schemes like ,DEPSK, DPSK, BPSK, QPSK, QASK, MSK, BFSK.
8	05	10	**Channel access schemes:** Introduction, TDM,FDM.
TOTAL	60	100	

E. Instructional Method And Pedagogy (ANNEXURE-I)

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F. Suggested List Of Experiments:

1. To perform study the sampling theory
2. To perform the Pulse code modulation.
3. To perform the adaptive delta modulation.
4. To perform pulse position, pulse width modulation and demodulation.
5. To perform the different data formatting scheme.
6. To perform ASK modulation and demodulation scheme.
7. To perform FSK modulation and demodulation scheme.
8. To perform PSK modulation and demodulation scheme.
9. To perform time division multiplexing scheme.
10. To perform BPSK modulation and demodulation scheme.
11. To perform QPSK modulation and demodulation scheme.
12. To perform different error improvement codes.

G. Students Learning Outcomes:

On successful completion of the course

- The student can identify different areas of digital communication. Can find the applications of all the areas in day to day life. Can identify the operations, working, construction, material etc. and Error Correction Codes & Digital Modulation Techniques.

- The study spectrum analyzer and vector analyzer.

H. Recommended Study Materials:

Text Books:

1. B.P.Lathi, Digital and Analog communication system, LCBS Publication

Reference Books:

1. Taub & Schilling, Principle of communication system, TMH Publication

2. B. Carlson ,Communication system , TMH Publication

3. John G. Proakis, Digital Communications , TMH Publication

4. Simon Haykin ,Digital and analog communication system , Willey Publication