DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING

III YEAR

M SCHEME

V SEMESTER

2015-2016 onwards

DIGITAL COMMUNICATION

CURRICULAM DEVELOPMENT CENTRE

Course Name   : **Electronics and Communication Engineering**
Subject Code   : **34071**
Semester   : **V Semester**
Subject Title   : **DIGITAL COMMUNICATION**

TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester   : 15 weeks

Subject	Instruction		Examination			
	Hrs./ Week	Hrs./ Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
Digital Communication	5	75	25	75	100	3 Hrs

TOPICS AND ALLOCATION:

UNIT	TOPIC	TIME (HRS)
I	Basics of digital communication	13
II	Formatting and Base Band Modulation	13
III	Baseband Coding Techniques	13
IV	Digital Modulation Techniques	12
V	Spread Spectrum Techniques	12
	Revision Test	12
	Total	**75**

RATIONALE:

Today, the growth of any industry depends upon electronics and communication. There is the need for digital techniques in each and every field. The reason behind the introduction of this subject is to impart technical excel hence in the field of digital communication by analyzing the various digital transmission methods, error control methods and understanding about the multiple access communication.

OBJECTIVES :

- ➢ To know the Basics of Digital Communication
- ➢ To study about the various types of signals
- ➢ To study about the data transmission
- ➢ To understand the Baseband system and sampling
- ➢ To learn about PCM waveform types
- ➢ To study about M-ary pulse modulation
- ➢ To learn about rationale for coding
- ➢ To learn about types of coding methods
- ➢ To study about various error control codes
- ➢ To know the Digital modulation techniques
- ➢ To learn about TDM frame structure
- ➢ To study about coherent detection of PSK, FSK
- ➢ To understand the Spread spectrum communication
- ➢ To study the Jamming consideration
- ➢ To study about CDMA Digital cellular system

34071 DIGITAL COMMUNICATION

DETAILED SYLLABUS

UNIT	NAME OF THE TOPIC	HOURS
1	**BASICS OF DIGITAL COMMUNICATION** Digital communication signal processing – Typical Block diagram and transformations - Advantages over analog communication – Channels for Digital communication- Telephone, Optical fiber, Satellite. Classification of signals- deterministic and random signals - periodic and non-periodic signals – analog and discrete signals - energy and power signals - unit impulse function. Information capacity (Definition only) – Shannon's limit for information capacity (Definition only) - Data transmission - Serial and parallel transmission -Synchronous and asynchronous transmission.	13
2	**FORMATTING AND BASE BAND MODULATION** Base band system - The Sampling Theorem –impulse sampling- natural sampling- sample and hold operation - Spectra- Nyquist Theorem - Aliasing – signal interface for a digital system – sampling and quantizing effects- Quantization noise – channel effects – channel noise – PCM - Uniform and Non-uniform Quantization, **Baseband transmission** PCM waveform types- non return-to-zero(NRZ)- return-to-zero (RZ)- phase encoded – multilevel binary – spectral attributes of PCM waveforms – Bits per PCM word and Bits per symbol- PCM word size - M-ary pulse modulation waveforms.	13
3	**BASEBAND CODING TECHNIQUES** Rationale for coding – Types of codes – Discrete memoryless channel – Error control coding methods – forward error correction – error detection with retransmission – types of errors – random error and burst error – Principles of linear block codes – Hamming code – Binary cyclic codes – Cyclic redundancy check code (CRC) – Convolution code.	13

4	**DIGITAL MODULATION TECHNIQUES** Digital modulation techniques – Listing of various types – Coherent binary modulation techniques – Coherent quadrature modulation techniques – Non Coherent binary modulation techniques - Minimum shift keying (MSK) - Block diagram of MSK transmitter and receiver - TDM-Frame structure, ASCII framing- E1 Framing, T1 Framing for telephone. Detection of signals – coherent detection of PSK – sampled matched filter – coherent detection of FSK – Non-coherent detection - Binary differential PSK.	12
5	**SPREAD SPECTRUM TECHNIQUES** Spread spectrum communication - Beneficial attributes of spread spectrum systems – Pseudo noise sequences – Randomness properties – Balance property, Run property and Correlation property - Direct sequence spread spectrum systems – Processing gain and performance – Frequency hopping systems – Frequency hopping with diversity – fast hopping versus slow hopping – Synchronization – Jamming consideration – Commercial application – CDMA Digital cellular system.	12
	Revision & Test	12

REFERENCE BOOKS:

SL.No	Title	Author	Publisher with Edition
1	Digital communications Fundamentals & Applications	Bernard Sklar & Pabitra Kumar Ray	Pearson -Second edition - 2009
2	Digital Communications	Simon Haykin	John Wiley India edition - 2006
3	Digital communication	Dr. J.S.Chitode	Technical Publications -Pune Second edition,2011
4	Digital and analog communication system	B.P.Lathi .Zhi Ding	International 4th Edition - OXFORD university press.
5	Digital Communication	P.Ramakrishna Rao	TMH 2011