

**THIRD YEAR DIPLOMA COURSE IN
INFORMATION TECHNOLOGY AND
MEDICAL ELECTRONICS GROUP**

'G'
Scheme
Semester
V
MSBTE

COMMUNICATION TECHNOLOGY

Mrs. P. D. KULKARNI



NIRALI
PRAKASHAN
ADVANCEMENT OF KNOWLEDGE

Text Book Of

COMMUNICATION TECHNOLOGY (17519)

For

Semester - V

**Third Year Diploma Course in Information Technology and
Medical Electronics**

As Per MSBTE's 'G' Scheme Syllabus

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Dedicated to

My beloved father Shri. Krishnaji A. Deshpande (Principal)

Mother Late Sau. Sunita K. Deshpande

- Mrs. Pratibha D. Kulkarni

Preface ...

It gives me great pleasure and feeling of satisfaction in presenting this text book of '**Communication Technology**' for students of fifth semester Diploma courses in Information Technology and Medical Electronics. This text has been written as per MSBTE's new 'G' Scheme syllabus.

MSBTE questions are given for same topics from 'E' scheme on new topics practice questions are given.

This subject is presented in simple language into consideration of requirements of all the students regarding the latest and changing trends of examination. Every care has been taken to check the mistakes and misprints, yet it is very difficult to claim perfection.

I take this opportunity to thank **Hon. Secretary Shri. V. S. Kalbhor, Hon. A. O. Shri. Vispute, Hon. Principal Mrs. V. S. Byakod and Hon. Vice-Principal Shri. B. V. Mane** for their moral support and encouragement.

I also thanks to **Shri. M. P. Munde** whose inspiration and constant promoting are responsible for producing this book in short period. I am also thankful to publisher **Shri. Dineshbhai Furia and Shri. Jignesh Furia**. I am also thankful to Mr. Malik Shaikh, Mrs. Anagha Medhekar (Co-ordination and Proof Reading), Mrs. Anjali Muley and Mrs. Prachi Sawant (Figure Drawing) and staff of Nirali Prakashan for bringing out this book.

Very special thanks for co-operation in writing to my husband **Shri. Dipak Kulkarni**, daughter **Chi. Sharvari** and **Son Chi. Shriprasad**.

Any undetected and unintentional error, omissions, suggestions etc. from students and teachers for improvement brought to our notice in good spirit are most welcome.

Syllabus ...

Chapter 1 : Analog Communication (10 Hours, 20 Marks)

- Introduction to Electronic Communication - (Block Diagram, Classification, Electromagnetic Spectrum, Concept of Noise)
- Analog Modulation Techniques - Need for Modulation, Classification AM, FM, PM - Definition, Wave Forms, (Time Domain and Frequency Domain) Bandwidth Requirement, Modulation Index.
- AM, FM - Transmitter and Receiver, block diagram, Explanation and Simple Numerical Problems.
- Advantages, Disadvantages and Applications of Analog Communication.
- Wave Propagation - Ground, Ionosphere, Sky, Space

Chapter 2 : Pulse Modulation Techniques (10 Hours, 20 Marks)

- Advantages of Pulse Modulation over Amplitude Modulation.
- Basics of Pulse Modulation-Sampling Theorem, Nyquist Rate, Types of Sampling. (Natural and Flat Top)
- Classification of Pulse Analog Modulation Techniques - PAM, PWM, PPM - Working Principle, Block Diagram for Generation, Waveforms, Advantages, Disadvantages and Applications of PAM, PWM and PPM.
- Classification of Pulse Digital Modulation Techniques - PCM, DM, ADM - Working Principle, Block diagram for Generation, Waveforms - Advantages, Disadvantages and Applications of PCM, DM, ADM.

Chapter 3 : Digital Modulation Techniques (10 Hours, 22 Marks)

- Introduction to Digital Communication System - Baseband and Passband Transmission, Block diagram of Digital Modulation System.
- Classification of Digital Modulation - ASK, FSK, PSK, DPSK, QPSK - Working Principle - Block Diagram for Generation, Waveform - Advantages, Disadvantages and Applications of ASK, FSK, PSK, DPSK, QPSK - Channel capacity: - Shanon's Theorem - Channel Bandwidth.

Chapter 4 : Data Encoding and Transmission (06 Hours, 12 Marks)

- Introduction to Encoding Digital Data to Digital Signal.
- Definition - Data Rate, Baud Rate, Bit Rate
- Classification of Encoding Techniques - Unipolar, Polar, Bipolar and their Types - Advantages and Disadvantages of Encoding Techniques - Comparison of Various Techniques.

Chapter 5 : Wired and Wireless Communication Systems (12 Hours, 26 Marks)

- Telephone System - Introduction and Block diagram.
- Multiplexing - Need of Multiplexing - Multiplexing Techniques - FDM, TDM, WDM - Principles, Block Diagram, Applications, Advantages and Disadvantages - Multiple Access - TDMA, FDMA, CDMA-Principle, Block Diagram, Advantages, Disadvantages and Applications.
- Satellite Communication Systems - Frequency Band used, Block Diagram, Principle and Application.
- Mobile Communication Systems - Frequency Band, Block diagram, Principles - Concept of Frequency Reuse and Cell Splitting - Call Processing - Forward and Reverse Direction (Handset to Handset) and (Handset to Landline) - Concept of Hand-off.

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Chapter 1 ...

Analog Communication

About This Chapter ...

After reading this chapter students can understand –

- Introduction to Electronic Communication
- Block Diagram of Communication System
- Electromagnetic Spectrum
- EM Spectrum and Applications
 - Infrared Rays
 - Light
- Concept of Noise
- Classification of Electronic Communication
 - Communication based on Direction of Communication
 - Classification based on the Nature of Input Signal
 - Classification based on the Technique of Transmission
- Applications of Communication Systems
- Analog Modulation Techniques
 - Definition
 - Need for Modulation
 - Classification of Modulation
 - Comparison of Analog Communication and Digital Communication
 - Concept of Transmission Bandwidth
 - Comparison Analog Modulation and Digital Modulation
- Amplitude Modulation (AM): Definition and Waveforms
 - Modulation Index (M.I.)
 - Representation of AM Wave
 - AM in Time Domain
 - AM in Frequency Domain
 - Bandwidth Requirement of AM
 - Advantages of AM
 - Disadvantages of AM
- Angle Modulation
- Frequency Modulation (FM): Definition and Waveforms

- Modulation Index
 - Representation of FM
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 - FM in Frequency Domain
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 - Applications of FM
 - Phase Modulation (PM): Definition and Waveforms
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 - Low Level Modulated AM Transmitter
 - High Level Modulated AM Transmitter
 - Comparison between High Level and Low Level Modulation
 - AM Receiver
 - TRF Radio Receiver
 - Superhetrodyne AM Radio Receiver
 - FM Transmitter
 - Armstrong FM Transmitter
 - Reactance Modulator
 - Varactor Diode
 - FM Receiver
 - FM Radio Receiver
 - Frequencies used in Radio Receiver
 - Wave Propagation
 - Ground Wave Propagation
 - Attenuation of Ground Wave
 - VLF Propagation
 - Advantages
 - Disadvantages
 - Applications
 - Sky-wave Propagation
 - The Ionosphere
 - Types of Sky Wave Propagation
 - Space Wave Propagation
 - Multipath Space Wave Propagation
 - Applications
 - Comparison between Ground Wave, Sky Wave and Space Wave Propagation
-

1.1 INTRODUCTION TO ELECTRONIC COMMUNICATION

- Communication is the oldest branch of electronics.
- In broad sense, the term communication refers to the sending, receiving and processing of information by electronic means.

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