Principles of Electronics Communication

(Code : 22334)

SECOND YEAR DIPLOMA

Maharashtra State Board of Technical Education (MSBTE)

Semester III – Electronics and Telecommunication Engineering, Electronics, Electronics and Communication Engineering, Electronics Engg. and Electronics and Communication Technology (EJ/ET/EN/EX/EQ)

Strictly as per new revised 'I' Scheme w.e.f. academic year 2018-2019

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We dedicate this Publication soulfully and wholeheartedly,

in loving memory of our beloved founder director,

Late Shri. Pradeepji Lalchandji Lunawat,

who will always be an inspiration, a positive force and strong support behind us.

"My work is my prayer to God"

– Lt. Shri. Pradeepji L. Lunawat

Soulful Tribute and Gratitude for all Your Sacrifices, Hardwork and 40 years of Strong Vision…

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Syllabus

Unit	Topics and Sub-topics
Unit - I : Basics of Electronic Communication **Refer chapter 1**	1.1 The elements of basic electronic communication system. 1.2 Electromagnetic spectrum. 1.3 Transmission modes : Simplex, Duplex-full/half, Synchronous and Asynchronous 1.4 Sources of noise (Internal and external), Signal to noise ratio.
Unit - II : AM and FM Modulation **Refer chapters 2 and 3**	2.1 Need for modulation. 2.2 Types of modulation techniques, Amplitude modulation : Mathematical representation of amplitude modulated wave, Modulation index, Bandwidth requirement, Representation of AM signal in time and frequency domain, Types of AM with respect to frequency spectrum (DSB, SSB and VSB), Power relations in AM wave. 2.3 Frequency modulation : Representation of FM signal in time domain and frequency domain, Frequency deviation ratio, Modulation index (β), Mathematical representation of FM, Bandwidth requirement, Types of frequency modulation (NB and WBFM). 2.4 Phase modulation.
Unit - III : Transmitters and Receivers **Refer chapters 4 and 5**	3.1 Generation of AM. 3.2 Block diagram of AM superheterodyne receiver, its working with waveforms. 3.3 Demodulation of AM signal : Diode detector and practical diode detector. 3.4 Automatic gain control and its types. 3.5 Concept of pre-emphasis and De-emphasis. 3.6 Generation of FM using direct (Varactor diode and reactance modulator) and indirect method (Armstrong method). 3.7 Block diagram of FM receiver and its working with waveforms. 3.8 FM detector circuits : Ratio detector and PLL as FM demodulator.
Unit - IV : Wave Propagation **Refer chapter 6**	4.1 Concept of propagation of radio waves. 4.2 Ground wave propagation. 4.3 Sky wave : Ionospheric layers, Concept of actual height and virtual height, Critical frequency, Skip distance, Skip zone, Concept of fading, Maximum usable frequency, Multiple hop sky wave propagation.

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Unit	Topics and Sub-topics
	4.4 Space wave propagation : Line of sight, Multipath space wave propagation, Optical and radio horizon, Shadow zones. 4.5 Duct propagation (microwave space-wave propagation). 4.6 Troposphere scatter propagation.
Unit - V : Antennas **Refer chapter 7**	5.1 Antenna fundamentals : Resonant antenna and non-resonant antennas. 5.2 Antenna parameters : Radiation pattern, Polarization, Bandwidth, Beamwidth, Antenna resistance, Directivity and power gain, Antenna gain. 5.3 Dipole antenna : Half wave dipole antenna (Resonant antenna) and its radiation pattern, Folded dipole antenna and its radiation pattern, Radiation pattern for dipole antenna of different length. 5.4 Loop antenna, Telescopic antenna, Yagi-Uda antenna, Micro-wave antenna – Dish antenna, Horn antenna and Microstrip patch antenna – Rectangular, Square and Circular. (Structure, radiation pattern and application of antennas).

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Unit - I

Chapter 1 : Basics of Electronic Communication **1-1 to 1-23**

Syllabus : The elements of basic electronic communication system. Electromagnetic spectrum, Transmission modes, Simplex, Duplex-full/half, Synchronous and Asynchronous, Sources of noise (Internal and external), Signal to noise ratio.

Unit - II

Syllabus : Need for modulation, Types of modulation techniques, Amplitude modulation : Mathematical representation of amplitude modulated wave, Modulation index, Bandwidth requirement, Representation of AM signal in time and frequency domain, Types of AM with respect to frequency spectrum (DSB, SSB and VSB), Power relations in AM wave.

Unit - II

Syllabus : Frequency modulation : Representation of FM signal in time domain and frequency domain, Frequency deviation ratio, Modulation index (β), Mathematical representation of FM, Bandwidth requirement, Types of frequency modulation (NB and WBFM), Phase modulation.

Syllabus : Generation of AM, Block diagram of AM superheterodyne receiver, its working with waveforms, Demodulation of AM signal : Diode detector and practical diode detector, Automatic gain control and its types.

Unit - III

Chapter 5 : FM Transmitters and Receivers **5-1 to 5-36**

Syllabus : Concept of pre-emphasis and de-emphasis. Generation of FM using direct (Varactor diode and reactance modulator) and indirect method (Armstrong method). Block diagram of FM receiver and its working with waveforms, FM detector circuits : Ratio detector and PLL as FM demodulator.

Unit - IV

Syllabus : Concept of propagation of radio waves, Ground wave propagation, Sky wave : Ionospheric layers, Concept of actual height and virtual height, Critical frequency, Skip distance, Skip zone, Concept of fading, Maximum usable frequency, Multiple hop sky wave propagation, Space wave propagation : Line of sight, Multipath space wave propagation, Optical and radio horizon, Shadow zones, Duct propagation (microwave space-wave propagation), Troposphere scatter propagation.

Unit - V

Chapter 7 : Antennas **7-1 to 7-31**

Syllabus : Antenna fundamentals : Resonant antenna and non-resonant antennas, Antenna parameters : Radiation pattern, Polarization, Bandwidth, Beamwidth, Antenna resistance, Directivity and power gain, Antenna gain, Dipole antenna : Half wave dipole antenna (Resonant antenna) and its radiation pattern, Folded dipole antenna and its radiation pattern, Radiation pattern for dipole antenna of different lengths, Loop antenna, Telescopic antenna, Yagi-Uda antenna, Micro-wave antenna – Dish antenna, Horn antenna and Microstrip patch antenna – Rectangular, Square and Circular. (Structure, radiation pattern and application of antennas).

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