Article A : Pre-requisites A-1 to A-10

Syllabus : Signals, Fourier series and Fourier transform, Power and Energy theorems, Spectral Density Functions, Correlation of energy signals.

A.1 Signals A-2
A.1.1 Average Normalized Power A-2
A.1.2 Energy A-3
A.1.3 Energy and Power Signals A-3
A.2 Fourier Series and Fourier Transform A-3
A.2.1 Fourier Series A-3
A.2.2 Exponential Fourier Series A-3
A.2.3 Fourier Transform A-4
A.2.4 Inverse Fourier Transform A-4
A.2.5 Properties of Fourier Transform A-4
A.2.6 F. T. of Periodic Signals A-6
A.2.7 F. T. of Standard Signals A-6
A.3 Power and Energy Theorems A-6
A.3.1 Parseval's Power Theorem A-6
A.3.2 Rayleigh's Energy Theorem A-7
A.4 Spectral Density Functions A-7
A.4.1 Energy Spectral Density (ESD) A-7
A.4.2 Power Spectral Density (PSD) A-7
A.5 Correlation of Energy Signals A-7
A.5.1 Auto-Correlation Function for the Energy Signals A-7
A.5.2 Cross-Correlation of Energy Signals A-8
A.5.3 Auto-Correlation Function of Power Signals A-8
A.5.4 Cross-Correlation of Power Signals A-8
A.6 Sampling Process A-9
A.6.1 Sampling Theorem A-9

Module 1

Chapter 1 : Introduction to Digital Communication System 1-1 to 1-10

Syllabus : Introduction to digital communication system, Significance of AWGN channel, Pulse dispersion in the channel.

1.1 Introduction 1-2
1.2 Sources and Signals 1-2
1.2.1 Analog to Digital Conversion 1-2
1.2.2 Graphical Representation of A/D Conversion Process 1-2
1.3 Digital Communication System (DCS) 1-3
1.4 Significance of Digitization 1-5
1.4.1 Advantages of Digital Communication 1-7
1.4.2 Disadvantages 1-7
1.4.3 Comparison of Analog and Digital Modulation 1-7
1.5 Channels for Digital Communications 1-8
1.6 AWGN Channel 1-8
1.7 Pulse Dispersion in Channel 1-9
- **Review Questions 1-10**

Module 1

Chapter 2 : Concept of Probability Theory 2-1 to 2-42

Syllabus : Concept of Probability Theory in Communication Systems : Introduction to probability and sample space, Baye's rule, Conditional probability and statistical independence, Relation between probability and probability density, PDF,CDF. Random variables, Mean and Variance of Random variables and sum of random variables, Definition with examples.

Gaussian, Rayleigh PDF and Rician Distribution, Binomial Distribution, Poisson Distribution, Central-Limit Theorem.

2.1 Introduction 2-2
2.2 Important Definitions 2-2
2.2.1 A Random Experiment 2-2
2.2.2 Sample Space 2-2
2.2.3 Event 2-2
2.2.4 Complement of an Event 2-2
2.2.5 Union of Events 2-3
2.2.6 Intersection of Events 2-3
2.2.7 Disjoint or Mutually Exclusive Events 2-3
2.2.8 Mutually Independent Events 2-3
2.3 Definition of Probability 2-3
2.3.1 Properties of Probability 2-4
2.3.2 Conditional Probability 2-4
2.3.3 Bayes' Rule 2-5
2.3.4 Statistically Independent Events and their Probability 2-5
2.3.5 Bernoulli Trials 2-6
2.3.6 Definitions, Types and rules of probability 2-6
2.4 Random Variables 2-11
2.4.1 Types of Random Variables 2-11
2.4.2 Discrete Random Variables 2-11
2.4.3 Continuous Random Variable 2-12

2.5 Cumulative Distribution Function (CDF). 2-12
2.5.1 Important Properties of CDF 2-12
2.5.2 CDF for Discrete Random Variables 2-13
2.5.3 Definitions and Properties of CDF 2-13
2.5.4 Solved Examples on CDF 2-14
2.6 Probability Density Function (PDF) 2-18
2.6.1 Properties of PDF 2-18
2.6.2 Relation between Probability and PDF 2-19
2.6.3 Definition and Properties of PDF 2-19
2.6.4 Solved Examples on PDF 2-20
2.7 Transformation of a Random Variables 2-24
2.8 Statistical Averages 2-24
2.8.1 Mean Value / Average Value / Expected Value 2-25
2.8.2 Mean Value of a Continuous Random Variable 2-25
2.8.3 n^{th} Moment of Random Variable X 2-26
2.8.4 The Central Moment 2-26
2.8.5 Variance of a Random Variable (σ_x^2) 2-26
2.8.6 Mean and Variance of the Sum of RVs 2-29
2.8.7 Mean of the Product of Independent RVs 2-30
2.9 Probability Models (Useful PDF and CDFs) 2-30
2.9.1 Need to use Standard Models 2-30
2.9.2 Binomial Distribution 2-31
2.9.3 Poisson Distribution 2-33
2.9.4 Gaussian Distribution (or Normal Distribution) 2-33
2.9.5 Uniform Distribution 2-35
2.9.6 Error Function 2-37
2.9.7 Complementary Error Function 2-37
2.9.8 The Q Function 2-37
2.9.9 Rayleigh's Distribution 2-38
2.10 Central Limit Theorem 2-39
- **Review Questions 2-41**

Module 2

Chapter 3 : Information Theory and Source Coding **3-1 to 3-38**

Syllabus : Measure of information, Entropy, Information rate, Channel capacity, Shannon Hartley Capacity theorem and its implications, Shannon fano encoding, Huffman encoding, Code efficiency and redundancy examples and applications of source coding.

3.1 Introduction to Information Theory 3-2
3.1.1 Uncertainty and Information 3-2
3.2 Information (Measure of Information) 3-3
3.2.1 Properties of Information 3-3
3.3 Types of Sources and their Models 3-5
3.3.1 Analog Information Sources 3-5
3.3.2 Discrete Information Sources 3-5
3.4 Average Information or Entropy 3-5
3.4.1 Expression for Entropy 3-5
3.4.2 Properties of Entropy 3-6
3.4.3 Entropy of a Binary Memoryless Source 3-7
3.5 Information Rate (R) 3-8
3.6 Shannon's First Theorem (Source Coding Theorem) 3-12
3.6.1 Shannon-Fano Code 3-13
3.6.2 Shannon - Fano Algorithm 3-13
3.6.3 Huffman Coding 3-17
3.6.4 Comparison of Shannon Fano and Huffman Coding 3-26
3.7 Applications of Source Coding 3-27
3.8 Channel Capacity 3-27
3.9 Shannon's Theorem on the Channel Capacity (Channel Coding Theorem) 3-27
3.10 Shannon Hartley Channel Capacity Theorem 3-30
3.10.1 Trade-off between B.W. and SNR 3-31
3.11 Implications of Information Capacity Theorem 3-35
- **Review Questions 3-37**

Module 3

Chapter 4 : Pulse Shaping for Optimum Transmission **4-1 to 4-30**

Syllabus : Line codes and their desirable properties, PSD of digital data, Baseband PAM transmission : Concept of Inter symbol interference (ISI), Raised Cosine filter, Nyquist Bandwidth. Concept of equalizer to overcome ISI.

4.1 Introduction 4-2
4.2 Baseband System 4-2
4.3 Line Coding 4-2
4.3.1 Classification of Line Codes 4-3
4.3.2 Properties of Line Codes 4-4
4.3.3 Unipolar RZ Line Code 4-5
4.3.4 Unipolar NRZ Format 4-5
4.3.5 Polar RZ Line Code 4-6
4.3.6 Polar NRZ Line Code 4-6

4.3.7 Bipolar NRZ Format (AMI) 4-7
4.3.8 Split Phase Manchester Format 4-8
4.3.9 Polar Quaternary NRZ Format 4-8
4.4 Power Spectra of Line Codes 4-9
4.4.1 Data signalling rate 4-9
4.4.2 Modulation Rate 4-9
4.4.3 Power Spectra 4-9
4.4.4 PSD of NRZ Unipolar Format 4-9
4.4.5 PSD of NRZ Polar Format 4-10
4.4.6 PSD of NRZ Bipolar Format 4-11
4.4.7 PSD of the Manchester Format 4-11
4.5 Comparison of Line Codes Base on Power Spectra 4-13
4.5.1 Comparison of Line Codes 4-13
4.5.2 Difference between Channel Coding and Line Coding 4-17
4.5.3 Synchronization 4-17
4.6 Pulse Transmission through a Band limited Channel 4-18
4.7 Inter-symbol Interference (ISI) 4-18
4.7.1 Causes of Inter symbol Interference 4-19
4.7.2 Effect of ISI 4-20
4.7.3 Remedy to Reduce the ISI 4-21
4.8 Nyquist Criterion for Distortionless Baseband Binary Transmission 4-21
4.8.1 Ideal Solution 4-23
4.8.2 Raised Cosine Filter 4-23
4.9 Eye Diagram 4-24
4.10 Equalization 4-26
4.10.1 Tapped Delay Line Filter 4-27
4.10.2 Decision Feedback Equalizer 4-27
4.11 Inter-Channel interference (ICI) 4-28
4.11.1 Comparison of ISI and interchannel interference 4-28
- **Review Questions 4-29**

Module 4

Chapter 5 : Digital Modulation Techniques 5-1 to 5-74

Syllabus : Concept of Binary and M-ary transmission, Coherent and Non- Coherent reception, Power spectral density of Pass-band signal, Signal space Representation and Euclidian distance.

Pass Band Amplitude modulation and Demodulation: BASK, M-ary PAM, Digital Phase Modulation and Demodulation: BPSK, OQPSK, QPSK, M-ary PSK, QAM, Digital Frequency Modulation and Demodulation: BFSK, MSK, M-ary FSK, Introduction to spread spectrum modulation, OFDM

Comparison of all techniques based on Spectral efficiency, Power efficiency, Probability of error in detection.

5.1 Introduction 5-2
5.1.1 Hierarchy of Digital Modulation Techniques 5-2
5.1.2 Probability of Error (P_e) 5-2
5.1.3 Power Spectra 5-2
5.1.4 Bandwidth Efficiency 5-2
5.2 Pass-band Transmission Model 5-2
5.3 Digital to Analog Conversion 5-3
5.3.1 Need of Digital Modulation 5-3
5.3.2 Types of Digital Carrier Modulation 5-4
5.3.3 Analogy with Analog Schemes 5-4
5.4 Classification of Digital Modulation 5-4
5.5 Binary and M-ary Transmission 5-5
5.5.1 Binary transmission 5-5
5.5.2 M-ary Transmission 5-5
5.6 Binary Amplitude Shift Keying (BASK) 5-5
5.6.1 Frequency Spectrum of BASK 5-6
5.6.2 Bandwidth of BASK Signal 5-6
5.6.3 Coherent Detection of BASK 5-6
5.6.4 Noncoherent Detection of ASK 5-7
5.6.5 Error Probability of ASK 5-7
5.6.6 Constellation Diagram 5-8
5.6.7 Constellation Diagram of ASK 5-9
5.6.8 Merits and Demerits of ASK 5-9
5.7 M-ary Pulse Modulation 5-9
5.7.1 Types 5-9
5.7.2 Transmission Bandwidth 5-10
5.7.3 Price Paid for Reducing the Channel Bandwidth 5-11
5.8 Phase Shift Keying (PSK) 5-11
5.8.1 Binary Phase Shift Keying (BPSK) 5-11
5.8.2 BPSK Generation 5-11
5.8.3 Mathematical Representation of BPSK 5-12
5.8.4 BPSK Coherent Receiver 5-12
5.8.5 Spectrum of BPSK 5-13
5.8.6 Bandwidth of BPSK 5-14
5.8.7 Geometrical Representation of BPSK 5-14

5.8.8 Euclidian Distance (D) 5-14
5.8.9 Error Probability of BPSK (with Coherent Detection) 5-15
5.8.10 Constellation Diagram of BPSK 5-16
5.8.11 Advantages of BPSK 5-16
5.8.12 Disadvantage of BPSK 5-16
5.8.13 Applications 5-16
5.9 Binary Frequency Shift Keying (FSK) 5-17
5.9.1 Mathematical Representation of BFSK 5-17
5.9.2 Generation of BFSK 5-17
5.9.3 Spectrum of BFSK 5-18
5.9.4 Bandwidth of BFSK 5-19
5.9.5 BFSK Receiver (Coherent Receiver) 5-19
5.9.6 Noncoherent BFSK Receiver 5-19
5.9.7 Geometric Representation of Orthogonal BFSK 5-20
5.9.8 Advantages of BFSK 5-21
5.9.9 Disadvantages of BFSK 5-21
5.9.10 Applications of BFSK 5-21
5.9.11 Difference between Orthogonal and Non-orthogonal BFSK 5-21
5.10 Comparison of BASK, BFSK, BPSK 5-21
5.11 Quadrature PSK (QPSK) 5-22
5.11.1 Principle and Waveforms 5-22
5.11.2 Mathematical Representation of QPSK 5-23
5.11.3 Symbol Transmission Rate 5-23
5.11.4 Constellation Diagram of QPSK 5-23
5.11.5 Offset QPSK (OQPSK) Transmitter 5-24
5.11.6 Non-offset QPSK Transmitter 5-26
5.11.7 The QPSK Receiver 5-27
5.11.8 Signal Space Representation of QPSK 5-28
5.11.9 Conclusions (Euclidian Distance d) 5-30
5.11.10 Spectrum of QPSK 5-30
5.11.11 Bandwidth of QPSK 5-31
5.11.12 Error Probability for QPSK System 5-31
5.11.13 Advantages of QPSK 5-32
5.11.14 Disadvantage 5-33
5.11.15 Applications 5-33
5.11.16 QPSK is Better than PSK 5-33
5.11.17 Comparison of BPSK and QPSK 5-33
5.11.18 Comparison of OQPSK and QPSK 5-34
5.12 M-ary PSK 5-36
5.12.1 Euclidian Distance (d) 5-37
5.12.2 8- PSK System 5-37
5.12.3 PSD and Bandwidth of M-ary PSK 5-38
5.12.4 M-ary PSK Transmitter 5-38
5.12.5 M-ary PSK Receiver 5-39
5.12.6 Advantages of M-ary PSK 5-40
5.12.7 Disadvantages of M-ary PSK 5-40
5.12.8 Probability of Symbol Error for MPSK 5-42
5.13 Quadrature Amplitude Shift Keying (QASK) or QAM 5-42
5.13.1 Geometrical Representation of QASK 5-42
5.13.2 Types of QAM 5-44
5.13.3 4 QAM and 8 QAM Systems 5-44
5.13.4 QASK Transmitter 5-44
5.13.5 QASK Receiver 5-45
5.13.6 PSD and Bandwidth of QASK System 5-46
5.13.7 Error Probability of 16 QAM 5-46
5.13.8 Comparison of QASK and QPSK 5-47
5.13.9 Comparison of 16 PSK with 16 QASK 5-47
5.14 M-ary FSK System 5-48
5.14.1 Spectrum of M-ary FSK 5-49
5.14.2 Bandwidth of M-ary FSK 5-49
5.14.3 Advantage of M-ary FSK 5-49
5.14.4 Disadvantages 5-50
5.14.5 Geometric Representation of M-ary FSK 5-50
5.14.6 Probability of Symbol Error for MFSK (Coherent Detection) 5-50
5.14.7 Comparison of M-ary PSK and M-ary FSK 5-50
5.15 Minimum Shift Keying (MSK) 5-51
5.15.1 Waveforms of MSK 5-51
5.15.2 Expression for MSK Signal 5-52
5.15.3 MSK is called as Shaped QPSK 5-52
5.15.4 To Prove that MSK is FSK 5-53
5.15.5 Values of f_H and f_L 5-53
5.15.6 Signal Space Representation of MSK 5-54
5.15.7 Phase Continuity in MSK 5-55
5.15.8 MSK Transmitter 5-56
5.15.9 MSK Receiver 5-57
5.15.10 Advantages of MSK 5-58
5.15.11 Disadvantages of MSK System 5-58
5.15.12 PSD and Bandwidth of MSK 5-58
5.15.13 Comparison of QPSK and MSK Spectra . 5-59

5.15.14 Gaussian MSK 5-59
5.15.15 Comparison of OQPSK and MSK 5-59
5.16 Comparison of Digital CW Systems 5-61
5.17 Spread-Spectrum 5-62
5.17.1 Model of Spread Spectrum Modulation System 5-63
5.18 Direct Sequence Spread Spectrum (DSSS) 5-64
5.18.1 Performance Parameters of a DS-SS System 5-65
5.18.2 Advantages of DS-SS System 5-67
5.18.3 Disadvantages of DS-SS System 5-67
5.18.4 Applications of DS-SS System 5-67
5.19 Frequency Hop Spread Spectrum (FH-SS) 5-67
5.19.1 Operation of FHSS 5-68
5.19.2 Types of FHSS 5-69
5.19.3 Processing Gain PG 5-69
5.19.4 Bandwidth of Spread Signal 5-69
5.19.5 BW of Unspread Signal 5-69
5.19.6 Advantages of FH-SS System 5-69
5.19.7 Disadvantages of FH-SS System 5-69
5.19.8 Applications of FHSS 5-70
5.19.9 Comparison of Slow and Fast Frequency Hopping 5-70
5.19.10 Comparison of DS-SS and FHSS 5-70
5.20 Orthogonal Frequency Division Multiplexing (OFDM) 5-71
5.20.1 Orthogonality 5-71
5.20.2 Assigning the Subcarriers 5-71
5.20.3 Generation of OFDM Signals 5-72
5.20.4 OFDM-PAPR (OFDM-Peak-to-peak Average Power Ratio) 5-73
- **Review Questions..... 5-73**

Module 5

Chapter 6 : Error Control Codes 6-1 to 6-44

Syllabus : Need of channel encoding, Concept of error detection and correction, Forward error correction, Linear block codes: Hamming distance, Hamming weight, Systematic codes, Syndrome testing.

6.1 Introduction 6-2
6.1.1 Need of Channel Encoding 6-2
6.1.2 Error Control Coding 6-3
6.1.3 Error Control Techniques 6-3
6.1.4 Types of Errors 6-4
6.1.5 Encoding and Decoding 6-4
6.1.6 Advantages of coding 6-4
6.1.7 Disadvantages of coding 6-5
6.2 Definitions Related to Codes 6-5
6.2.1 Code Word 6-5
6.2.2 Code Rate 6-5
6.2.3 Hamming Weight w(x) 6-5
6.2.4 Code Efficiency 6-5
6.2.5 Hamming Distance 6-5
6.2.6 Minimum Distance d_{min} 6-6
6.3 Error Detection Techniques 6-6
6.3.1 Parity Checking 6-6
6.3.2 Two Dimensional Parity Check (Block Parity) 6-7
6.3.3 Checksum Error Detection 6-9
6.4 Error Correction Techniques 6-10
6.5 FEC (Forward Error Correction) 6-10
6.6 ARQ Techniques 6-11
6.6.1 Basic ARQ system 6-11
6.6.2 Advantages of ARQ 6-12
6.6.3 Disadvantages of ARQ 6-12
6.6.4 Applications 6-12
6.6.5 Types of ARQ system 6-12
6.6.6 Comparison of FEC and ARQ 6-12
6.7 Classification of Error-correcting Codes 6-12
6.7.1 Linear Codes 6-12
6.7.2 Non-Linear Codes 6-13
6.7.3 Classification Based on the Functioning 6-13
6.8 Linear Block Codes 6-14
6.8.1 Generation of block code (LBC) 6-14
6.8.2 Code Word Structure of LBC 6-14
6.8.3 Matrix Representation of LBC 6-14
6.8.4 Generator Matrix of LBC 6-14
6.8.5 Generation of Code Words Using Generator Matrix 6-15
6.8.6 Systematic Form of Generator Matrix 6-16
6.8.7 Systematic Code Word 6-17
6.9 Decoding of a Linear Block Code 6-17
6.9.1 Error Detection Capability 6-17
6.9.2 Error Correcting Capability 6-18
6.10 Encoder Implementation 6-18

6.11 Parity Check Matrix of Block Codes 6-19
6.11.1 Error Detection using Parity Check Matrix 6-20
6.11.2 Relation between H and d_{min} 6-20
6.12 Decoding LBC using Parity Check Matrix 6-24
6.12.1 Shannon's Limit 6-25
6.13 Syndrome Decoding 6-25
6.13.1 Error Vector (E) 6-25
6.13.2 Syndrome Vector (S) 6-25
6.13.3 Procedure for Syndrome Decoding 6-26
6.13.4 Hamming Bound 6-39
6.14 Syndrome Generator 6-39
6.15 Generalised Decoder of LBC 6-39
6.16 Hamming Codes 6-40
6.16.1 Error Detection and Correction Capabilities of Hamming Code 6-40
• **Review Questions..... 6-43**

Module 5

Chapter 7 : Cyclic Codes 7-1 to 7-34

Syllabus : Cyclic codes : Generator polynomial for Cyclic codes, Systematic cyclic codes, Feedback shift register for Polynomial division.

7.1 Introduction to Cyclic Codes : 7-2
7.1.1 Definition of Cyclic Code 7-2
7.2 Polynomial Representation of Cyclic Codes 7-3
7.3 Generating the Cyclic Codes 7-3
7.3.1 Generator Polynomial 7-3
7.3.2 Generation of Non-systematic Code Words 7-4
7.4 Systematic Cyclic Codes 7-6
7.4.1 Generation of Systematic Code words 7-6
7.5 Matrix Description of Cyclic Codes 7-8
7.5.1 Generator Matrices of the Cyclic Codes ... 7-8
7.5.2 Use of Generator Matrix to Obtain the Code words 7-8
7.5.3 Systematic Form of Generator Matrix 7-9
7.6 Parity Check Matrix 7-9
7.6.1 Comparison of Systematic and Non-systematic Cyclic Codes 7-10
7.7 Cyclic Redundancy Check (CRC) 7-11
7.7.1 CRC Encoder and Decoder 7-11
7.7.2 Procedure to obtain CRC 7-12
7.7.3 Requirements of CRC 7-12
7.7.4 CRC Generator 7-12
7.7.5 CRC Checker 7-13
7.8 Syndrome Decoding of Cyclic Codes 7-13
7.8.1 Syndrome Polynomial 7-13
7.8.2 Syndrome Decoding 7-14
7.9 Advantages and Disadvantages of Cyclic Codes .. 7-18
7.9.1 Advantages of Cyclic Codes 7-18
7.9.2 Disadvantages of Cyclic Codes 7-18
7.10 Circuit Implementation of Cyclic Codes 7-18
7.10.1 The Circuit Elements used in Encoder or Decoder 7-18
7.10.2 Encoder for the Cyclic Codes 7-19
7.10.3 Drawing the Encoder Circuit 7-20
7.11 Non-algebraic Decoding of Cyclic Codes 7-28
7.11.1 Syndrome Calculator for the Systematic Cyclic Codes 7-28
• **Review Questions 7-34**

Module 5

Chapter 8 : Convolution Codes 8-1 to 8-32

Syllabus : Convolution code : Convolution encoder, Impulse response of encoder, State diagram, Tree diagram, Trellis diagram representations.

8.1 Introduction to Convolution Codes 8-2
8.1.1 Tree Codes and Convolution Codes 8-2
8.1.2 Convolution Encoder 8-2
8.1.3 Word length (k) 8-3
8.1.4 Block length (n) 8-3
8.1.5 Simplified Convolution Encoder 8-3
8.2 Graphical Representation for Convolution Encoding 8-5
8.2.1 State Diagram 8-5
8.2.2 Trellis Diagram 8-5
8.2.3 Encoding using the Trellis Diagram 8-6
8.3 Mathematical Representation of Encoding 8-7
8.3.1 Practical Convolution Encoder 8-7
8.3.2 Definitions For Convolution Codes 8-7
8.3.3 Time Domain Approach (Impulse Response of Encoder) 8-8
8.3.4 Transform - Domain Approach (Polynomial Description of Convolution Codes) 8-10
8.3.5 Graphical Representation 8-11
8.3.6 The Code Tree 8-11
8.3.7 Code Trellis 8-13

8.3.8 State Diagram 8-13
8.3.9 Parity Check Matrix 8-15
8.3.10 Syndrome Polynomial Vector 8-15
8.3.11 Systematic Encoder 8-15
8.4 Decoding Methods of Convolution Codes 8-25
8.4.1 Viterbi Decoding 8-25
8.4.2 Hard-Decision Viterbi Decoding 8-26
8.4.3 Metric Diversion Effect 8-28
8.4.4 Decoding Window 8-28
8.4.5 Soft Decision Viterbi Decoding 8-29
8.4.6 Comparison of Convolution Codes and Block Codes 8-32
- **Review Questions.... 8-32**

Module 6

Chapter 9 : Optimum Reception of Digital Signals 9-1 to 9-36

Syllabus : A baseband signal receiver and its probability of error. The optimum receiver and filter. Matched filter and its probability of error.

9.1 Introduction 9-2
9.1.1 White Gaussian Noise 9-2
9.2 Probability of Error (P_e) 9-2
9.2.1 Detection and Estimation 9-3
9.2.2 Digital Communication System 9-3
9.3 Vector Space Representation of Signals 9-4
9.3.1 Unit Vectors 9-4
9.3.2 Representation of a Vector 9-4
9.3.3 Scalar Product of Vectors 9-4
9.3.4 Independent Vectors 9-4
9.3.5 Basis Vectors 9-5
9.4 Signal as a Vector 9-5
9.4.1 Concept of Signal Space 9-5
9.4.2 Vectors of Orthogonal Signals 9-5
9.5 Geometric Representation of Signals 9-6
9.5.1 Signal Space Representation 9-7
9.5.2 N-dimensional Signal Space 9-7
9.5.3 Detection of Known Signals in Noise 9-8
9.6 Coherent Detection of Binary Signals in Presence of Noise 9-8
9.6.1 Gaussian Noise and its PDF 9-9
9.6.2 Variance and Standard Deviation 9-9
9.6.3 Mathematical Representation of a Gaussian PDF 9-9
9.6.4 How to use the PDF Curves ?....9-9
9.6.5 Effect of Gaussian Noise on Bipolar Signals 9-9
9.6.6 To Determine the Error Rate of Pulse System 9-10
9.6.7 Error Probability 9-10
9.6.8 Maximum Likelihood Detector 9-10
9.7 Effect of Noise on Signal 9-11
9.7.1 Requirements of a Detection Technique 9-12
9.7.2 Detection Theory 9-12
9.7.3 Detection Techniques 9-13
9.8 Integrate and Dump Receiver (Filter) 9-13
9.8.1 Signal to Noise Ratio of Integrate and Dump Receiver (Filter) 9-14
9.8.2 Probability of Error for Integrate and Dump Receiver 9-16
9.9 The Optimum Receiver 9-20
9.9.1 Probability of Error for an Optimum Filter 9-21
9.9.2 Optimum Filter Transfer Function H (f) 9-22
9.10 Matched Filter 9-24
9.10.1 Impulse Response of a Matched Filter ... 9-25
9.10.2 Probability of Error the Matched Filter ...9-26
9.10.3 Signal to Noise Ratio of a Matched Filter 9-27
9.10.4 Properties of Matched Filter 9-27
9.11 Coherent Reception (Correlation) 9-31
9.11.1 Correlator Realization of a Matched Filter 9-32
9.11.2 Comparison of Matched Filter and Correlator 9-33
9.12 Maximum-Likelihood Receiver 9-33
9.13 Correlator Receiver 9-34
9.14 Gram-Schmidt Procedure 9-35
- **Review Questions 9-36**
- **Appendix-A .... A-1 to A-2**
- **Appendix-B ....B-1 to B-1**
- **Appendix-C ....C-1 to C-1**
- **Appendix-D .... D-1 to D-2**
- **Appendix-E ....E-1 to E-1**
- **Appendix-F ....F-1 to F-1**

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