Ambala College of Engineering and Applied Research

Department of Electronics and Communication Engineering

M.Tech (Semester-1st)

Course	Subject	Teaching Schedule	Examination Schedule	Duration

Sr. No.	No.		L	T	P	Tot. Hrs.	Theory/Pr.	I.A	Total	of Exam. (Hours)
1	M.TEC 1.1	Digital Communication Systems	3	1	-	4	60	40	100	3
2	M.TEC 1.2	Digital Signal Processing	3	1	-	4	60	40	100	3
3	M.TEC 1.3	Basics of State-Variable Techniques	3	1	-	4	60	40	100	3
4	M.TEC 1.4	Stochastic Methods	3	1	-	4	60	40	100	3
5	M.TEC 1.5	Communication Laboratory	-	-	2*3	6	60	40	100	4

Ambala College of Engineering and Applied Research

Department of Electronics and Communication Engineering

M.Tech (Semester-2nd)

Sr. No.	Course No.	Subject	Teaching Schedule				Examination Schedule			Duration of Exam. (Hours)
			L	T	P	Tot. Hrs.	Theory/Pr.	I.A	Total	
1	M.TEC 2.1	Information Theory and Coding	3	1	-	4	60	40	100	3
2	M.TEC 2.2	Optical Communication	3	1	-	4	60	40	100	3
3	M.TEC 2.3	Wireless and Mobile Communication	3	1	-	4	60	40	100	3
4	M.TEC 2.4	Elective	3	1	-	4	60	40	100	3
5	M.TEC 2.5	DSP Laboratory	-	-	2*3	6	60	40	100	4

Electives (one of the following):

M.Tec 2.4(i) Satellite Communication

M.Tec 2.4(ii) Neural Networks

M.Tech 2.4(iii) DSP Architecture and Applications

Ambala College of Engineering and Applied Research

Department of Electronics and Communication Engineering

M.Tech (Semester-3rd)

Sr. No.	Course No.	Subject	Teaching Schedule				Examination Schedule			Duration of Exam. (Hours)
			L	T	P	Tot. Hrs.	Theory/Pr.	I.A	Total	
1	M.TEC 3.1	Data Communication	3	1	-	4	60	40	100	3
2	M.TEC 3.2	Advanced Digital Communication Systems	3	1	-	4	60	40	100	3
3	M.TEC 3.3	Current Literature Report and Seminars	3	1	-	4	60	40	100	3
4	M.TEC 3.4	Advanced Communication Laboratory	-	-	2*3	6	60	40	100	4

Master of Technology (Electronics and Communication Engg.)

DIGITAL COMMUNICATION SYSTEMS

MTEC 1.1

L	T	P		
3	1	0	Exams :	60
			Sessionals:	40
			Time:	3 Hours

INSTRUCTIONS: There shall be eight questions in total, two from each unit. Students are required to attempt five questions selecting at least one from each unit. All questions will carry equal marks.

Unit1: REPRESENTATION OF BANDPASS SIGNAL AND SYSTEM

Response of a band pass system to band pass signal, Representation of a band pass stationary stochastic processes, Representation of digitally modulated signals.

Unit2: MODULATION AND DEMODULATION FOR THE ADDITIVE GAUSSIAN NOISE CHANNEL: Representation of signal waveforms and channel characteristics optimum demodulation for completely known signal in additive Gaussian Noise, Binary signaling in an AWGN Channel. Mary orthogonal Signaling in an AWGN Channel, Multiphase Signaling waveforms, combined multiple phase and multiple amplitude waveforms, Carrier recovery for coherent demodulation.

Unit3: DETECTION: Optimum demodulation for signals with random phase in additive Gaussian Noise, Non-coherent Detection of binary signal in an AWGN channel, Non Coherent detection of M-ary orthogonal signal in an AWGN channel.

Unit4: DIGITAL SIGNALLING OVER A CHANNEL WITH INTERSYMBOL, INTERFERENCE AND ADDITIVE GAUSSIAN NOISE: Signal design for band limited channels, optimum demodulation for ISI and additive white Gaussian noise linear equalization Feedback equalization.

Books:

1. Simon Haykin: Communication System, Wiley Eastern Ltd. Ed. 1998
2. J.Dassm SK Mullick & PK Chatterjee: Principal of Digital Communication, Wiley Eastern Ltd.
3. Martin S.Roden: Digital and Data Communications System P.H.I London, Ed, 1998.
4. Viterbi, A.I and J.K Qmura: Principles of Digital Communication, McGraw Hill Company, New York.

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DIGITAL SIGNAL PROCESSING

MTEC 1.2

L	T	P		
3	1	0	Exams :	60
			Sessionals:	40
			Time:	3 Hours

INSTRUCTIONS: There shall be eight questions in total, two from each unit. Students are required to attempt five questions selecting at least one from each unit. All questions will carry equal marks.

Unit1: DISCRETE – TIME DESCRIPTION OF SIGNALS & SYSTEMS.

Discrete-time sequences, response sequence, time invariant systems, stability and causality criterion for discrete-time system, linear constant coefficient difference equation, properties of real valued sequences, convolution, correlation.

Unit2: THE Z-TRANSFORM

Sampling, Definition of Z-transform, Properties of Z-transform, The complex Z-plane, Region of convergence in the Z-plane, Evaluation of Z-transform, Relation between FT & Z-Transform, The Z-transform of Symmetric sequences, The Inverse Z-transform. The systems function of a digital filter.

Unit3: THE DISCRETE FOURIER TRANSFORM (DFT)

Definition, its properties, DFT, IDFT pair, circular convolution, Computations for evaluating the DFT, FFT algorithm, Analytic derivation of the "decimation-in – time FFT algorithm", Some general observation on the FFT.

Unit4: INFINITE IMPULSE RESPONSE (IIR) FILTER DESIGN TECHNIQUES:

Introduction, Analog filter system function & frequency response, Analog low pass filter design techniques for Butterworth, Chebyshev Type-I and Type-II filters, Impulse invariance and Bilinear Transformation methods to convert Analog filters into Digital Filters. Transformation for converting low pass filters into other types.

FINITE IMPULSE RESPONSE (FIR) FILTER DESIGN TECHNIQUES:

Introduction, Designing, FIR filters by DFT method and frequency sampling method. Study of windows (Rectangular, Triangular, Hamming and Kaiser). Designing FIR filters with the windowing methods.

DIGITAL FILTER STRUCTURE:

The direct form I & II structures, Cascade & Parallel combination of IInd order sections.

Books:

1. J.G Proakis and D.G Manolakis: Digital Signal Processing, 1995 (PHI) III, Editon.
2. A.Oppenheim, R. Schafer, and J.Buck: Discrete Time Signal Processing, 1996 (PHI) VI, Editon.
3. L.Rabiner and B.Gold, Theory and Application of Digital Signal Processing, 1975, Prentice Hall of India.

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BASICS OF STATE-VARIABLE TECHNIQUES

MTEC 1.3

L	T	P		
3	1	0	Exams :	60
			Sessionals:	40
			Time:	3 Hours

INSTRUCTIONS: There shall be eight questions in total, two from each unit. Students are required to attempt five questions selecting at least one from each unit. All questions will carry equal marks.

Unit1: MATRIX ALGEBRA and LINEAR SPACES: Upper and lower triangular, symmetric matrices, various operations on matrices, eigenvalues and eigenvectors, similarity transformation , modal matrix, companion form, diagonal form, Cayley-Hamilton theorem, matrix functions, vectors, linear spaces, basis, orthonormal basis, norms and their properties, singular value decomposition (SVD).

Unit2: STATE SPACE TECHNIQUES: Definition of state, state variables, state vectors, simulation of deferential equations and transfer functions, obtaining state equation from simulation. Canonical forms (controllable, observable and Jordan (diagonal) canonical forms), solution of state equations, transfer function from state equations, controllability, observability.

Unit3: LYAPUNOV STABILITY: Positive (Negative) definite and semidefinite scalar functions, quadratic forms, nonlinear systems, equilibrium points, limit cycles, Lyapunov equation for linear time-invariant systems.

Unit4: DISCRETE-TIME SYSTEMS: Difference equation for LTI systems, state equation, solution of state equation, Jury's stability test, Lyapunov stability and Lyapunov equation.

Books:

1. M.Gopal, Modern Control System Theory, 2nd Edition, New Age International (P) Limited 2004.
2. K. Ogata, Modern Control Engineering, Prentice-Hall of India.
3. B.C Kuo, Digital Control System, 2nd Edition, Oxford University Press.

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STOCHASTIC MEHTODS

MTEC 1.4

L	T	P			
3	1	0	Exams	:	60
			Sessionals:		40
			Time:		3 Hours

INSTRUCTIONS: There shall be eight questions in total, two from each unit. Students are required to attempt five questions selecting at least one from each unit. All questions will carry equal marks.

Unit1: RANDOM VARIABLES: Probability Bay's rule, Distribution function, Discrete random vectors, different distributions, jointly distributed random variables, order statistics, Distribution of sums, expectations, moments, transform methods mean time to failure, Inequalities and limit theorems, Mixture distribution, Conditional expectations , Imperfect fault coverage & reliability, Random sums.

Unit2: STOCHASTIC PROCESSES: Classification Bernoulli process, Poisson process, Renewal processes, available analysis, Random incidence, renewal model of program behavior.

Unit3: MARKOV CHAINS: n-step transition probabilities, limiting distribution, distribution of times between state changes, irreducible finite chains with a periodic states, the m/g/I, queueing system discrete parameter, Birth Data Processes, Markov chains with absorbing states, Birth and death Processes, Non Birth Death Processes.

Unit3: NETWORK of QUEUES: Open and close queuing networks, Non exponential service item distributions and multiple job type, non product form networks. Correlation & Regression: Introduction, least squares curve fitting, Coefficient of determination, Confidence of intervals in linear regression, conciliation analysis, non linear regression, Analysis of variance.

Books:

1. Papoulis, A., Probability , Random Variables and Stochastic Processes, Third Edition,
   McGraw-Hill.
2. K.S Trivedi: Probability and Statistics, PHI, 3rd Ed.
3. S.P Gupta, Statistical Methods, Sultan Chand and Sons.
4. V.K Kapoor and S.C Gupta, Fundamentals of Statistics, Sultan Chand and Sons.

Digital Communication Laboratory

M.TECH 1.5

1. To study the PCM Modulation Y Demodulation Characteristics.
2. To study the characteristics of the ASK Modulation & Demodulation techniques.
3. To study the characteristics of the PSK Modulation & Demodulation techniques.
4. To study the characteristics of the FSK Modulation & Demodulation techniques.
5. To study the characteristics of the QPSK Modulation & Demodulation techniques.
6. Develop software to get the different pattern of Gaussian function by varying the standard deviation (cr) from 1 to 5, using the Matlab.
7. Develop software to get the different pattern of Rayleigh function by varying the Rayleigh constant (J.I) from 1 to 5 using Matlab.

List of Experiments Beyond Syllabus

*8. To study Sampling theorem & reconstruction of signal
*9. To study Delta Modulation and Demodulation techniques.
*10. To study PAM, PPM, and PWM Modulation and Demodulation techniques.

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INFORMATION THEORY & CODING

MTEC 2.1

L	T	P			
3	1	0	Exams	:	60
			Sessionals:		40
			Time:		3 Hours

INSTRUCTIONS: There shall be eight questions in total, two from each unit. Students are required to attempt five questions selecting at least one from each unit. All questions will carry equal marks.

Unit1: **Basic Concepts of Information Theory:** A measure of Uncertainty, Binary Sources, Measure of Information for two-dimensional discrete finite probability Scheme, Noise characteristics of channel, Basic relationship among different entropies, Measure of mutual information channel capacity, Capacity of channel with symmetric noise structure BSC and BEC.

Unit2: **Elements of Encoding:** Purpose of encoding separable binary codes, Shannon Fano encoding. Noiseless coding. Theorem of decidability, MC Millen's Theorem. Average length of encoding massage, Shannon's Binary encoding, Fundamental Theorem of discrete Noiseless coding, Huffman's Minimum Redundancy codes.

Coding for Reliable Digital Transmission & Storage: Introduction, types of codes, Modulation and Demodulation, Maximum likelihood decoding, types of codes, Modulation and Demodulation, Maximum likelihood decoding, types of error, error control strategies.

Unit3: **Introduction to Algebra:** Groups, Fields Binary field Arithmetic, Construction of Galois field GF (2m), Basic Properties of Galois Field GF (2m), Vector Spacer, Matrices.

Linear Block Codes: Introduction to Linear Block codes, Syndrome and Error detection, Minimum distance of block code, Hamming Code.

Cyclic Codes: Description of Cyclic codes, Generator and parity check matrices of cyclic codes, encoding of cyclic codes syndrome computation & error detection decoding of cyclic codes, Error trapping decoding of cyclic codes, Goley Codes.

Unit4: **BCH Codes:** Description of codes, Decoding of BCH codes, Implementation of Galoes Fields Arithmetic, Implementation of error connection.

Convolution Codes: Encoding of convolution codes, structural properties of Convolution codes, distance properties of Conventional codes, Distance Properties of convolution codes, Maximum likelihood decoding of convolution codes.

Automatic Repeat Request Strategies: Stop and wait, Go back and selective repeat ARQ strategies, Hybrid ARQ Schemes.

Books:

1. F.M Reza: Information Theory, Mc Graw Hill
2. ShuLin & J Costeib: Error Control Coding, PHI
3. Dass, Mullick & Chatterjee: Digital Communication, John Wiley, Ed. 1992

Master of Technology (Electronics and Communication Engg.)

OPTICAL COMMUNICATION

MTEC 2.2

L	T	P	Exams	:	60
3	1	0	Sessionals:		40
			Time:		3 Hours

INSTRUCTIONS: There shall be eight questions in total, two from each unit. Students are required to attempt five questions selecting at least one from each unit. All questions will carry equal marks.

Unit1: Introduction: Advantage of optical fiber communication, Elements of fiber communication link, Ray theory and electromagnetic mode theory for optical propagation, step index and graded index fiber numerical aperture.

Optical Filters: Attenuation, Absorption, Linear and non-linear scattering losses, Dispersion, overall fiber dispersion, polarization, fiber bending losses, multimode step index and graded index fibers, single mode fiber, plastic clad and all plastic fibers, optical fibers cables, Doped fiber amplifier Dispersion shifted and dispersion flattered fibers, practical fiber profiles.

Unit2: Optical Sources: Basic concepts; LED for optical communication, Burrus type double hetro structure, Surface emitting LED's, Shape geometry, Edge emitting LED's, LED to fiber launch system semiconductor lasers theory, modulation and characteristics, Fabry-Perot lasers quantum well and distributed feedback lasers.

Photo Detectors: P-I-N Photo diodes: Theory and their characteristics, Avalanche Photo detectors, theory and their bandwidth Noise in APD.

Unit3: Optical Fiber Communication Systems: Optical transmitter circuit; LED and laser drive of optical receiver circuit, structure, preamplifier, AGC equalization, optical power budge loading, Analog systems; analog modulation, Direct modulation, Sub carrier mode Distribution system, optical TDM sub carrier multiplexing, WDM.

Unit4: Coherent Systems: Coherent receivers, homodyne and heterodyne detection, noise in receiver, polarization control, Homodyne receiver, reusability and laser synchronous demodulation, phase diversity receiver.

Books:

1. John Grover: Optical Communication Systems, PHI
2. Gerd Keiser: Optical Fiber Communication, 2nd Ed. Tata Mc Graw-Hill
3. Franz Jh &Jain VK, Optical Communication, Narosa Pub.

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WIRELESS MOBILE COMMUNICATION

MTEC 2.3

L	T	P			
3	1	0	Exams	:	60
			Sessionals:		40
			Time:		3 Hours

INSTRUCTIONS: There shall be eight questions in total, two from each unit. Students are required to attempt five questions selecting at least one from each unit. All questions will carry equal marks.

Unit1: MOBILE RADIO SYSTMES: Introduction to mobile radio system, Paging systems, cordless telephone system, Cellular telephone systems-Cellular concept, frequency reuse, channel assignment strategies, interference and system capacity, trucking and grade of service, cell splitting, sectoring, microcell zone concept, HO Strategies.

Unit2: MOBILE RADIO PROPAGATION: Mechanism, free space path loss, long-distance path loss models, Okumara model, Hata model, PCS model, Wideband PCS microcell model, indoor propagation models, Jake's channel model, Multipath characteristics of radio waves, signal fading, time dispersion,. Doppeler spread, coherence time LCR, fading statistics, diversity techniques.

Unit3: SPREAD SPECTRUM COMMUNICATION: Introduction to spread spectrum communication, multiple access techniques used in mobile wireless communication: FDMA/TDMA/CDMA, Cellolar CDMA, packet radio protocols, CDMA, reservation protocols, capacity of cellular CDMA, soft HO.

Unit4: WIRELESS SYSTEMS: Wireless systems and standards – GSM standards, signaling and call control, mobility management, location tracing, wireless data networking, packet error mode line on fading channels, Performance analysis of link and transport layer protocols over wireless protocols over wireless channels, mobile data networking (Mobile IP), wireless data services, IS-95, GPRS.

Books:

1. W.C.Jakes: Microwave Mobile Communication, IEEE Press.
2. T.S Rappaport: Wireless Communications, Principals and Practices, Prentice Hall 1996.
3. William C.Y.Lee: Mobile Cellular Telecommunications, Analog and digital systems, McGraw-Hill-1995.
4. Kaveh Pahlavan & Allen H. Levesque: Wireless Information Networks, Wiley series in Telecommunication and signal processing.
5. Karnilo Feher: Wireless Digital Communications, Modulation and Spread Spectrum Applications. PHI, 2001.

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SATELLITE COMMUNICATION

MTEC 2.4 (i)

L	T	P			
3	1	0	Exams	:	60
			Sessionals:		40
			Time:		3 Hours

INSTRUCTIONS: There shall be eight questions in total, two from each unit. Students are required to attempt five questions selecting at least one from each unit. All questions will carry equal marks.

Unit1: Introduction: Satellite communication, Brief History, Orbits of satellite: Low, medium and geo-synchronous main characteristics, Angle period, Returning period, Angle of Evaluation, Propagation Delay, Orbital spacing.

Unit2: Satellite Links: Delay transponder, Earth Stations, Antennas and Earth Coverage, Altitude and eclipses.

Unit3: Earth Space Propagation Effects: Frequency window, Free space loss, Atmospheric absorption, Rainfall Attenuation, Inospheric scintillation, Telemetry, Tracking and command of satellite.

Detection: QPSK offset QPSK and MSK, Coherent and non-coherent detection, Error rate performance.

Unit4: Synchronization: Principal and techniques, Multiple Access Techniques, FDMA, SPADE system, TDMA system, Concept and configuration, system timing frames format, SSMA Basu Principles, VSAT, Random Access, Space Communication, link design description of operational in TELSAT and INSAT system.

Books:

1. J.Martin: Communication Satellite System, PH Englewood
2. D.C Aggarwal: Satellite Communication, Khanna Pub.
3. Tri Ha Digital Satellite Communication Tata Mc Graw-Hill.
4. Harry and Vam Tress: Satellite Communication, IEEE Proceeding 1979.

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NEURAL NETWORKS

MTEC 2.4 (ii)

L	T	P	Exams	:	60
3	1	0	Sessionals:		40
			Time:		3 Hours

INSTRUCTIONS: There shall be eight questions in total, two from each unit. Students are required to attempt five questions selecting at least one from each unit. All questions will carry equal marks.

Unit1: **Introduction:** Biological neurons and memory: Structure and function of a single neuron; Artificial Neural Networks (ANN), Typical applications of ANNs; Classification, Clustering, Vector quantization, Function Approximation, Basic Approach to the working of ANN – Training, Learning and Generalization.

Unit2: **Supervised Learning:** Single-layer networks; Perception, Linear separability, Training algorithm, Limitations; Multi-layer networks-architecture, Back Propagation algorithm (BPA) and other training algorithms, Applications, adaptive, multi-layer networks-architecture, training algorithms; Recurrent Networks; Feed-forward Networks; Radial-Basis-Function (RBF).

Unit3: **Unsupervised Learning:** Winner-takes-all networks; Hamming networks; Simple competitive learning; learning; Kohonen's Self-organizing Map's; Principal Component Analysis.

Unit4: **Associated Models:** Hopfield Networks, Brain-in-a-Box network; Boltzmann machine.

Optimization Methods: Hopfield Networks for TSP, solution of simultaneous linear equations; Iterated Gradient Descent; Simulated annealing; Genetic Algorithm.

Text/References:

1. K.Mehrotra, C.K Mohan and Sanjay Ranka, Elements of Artifical Neural Networks, MIT, 1997.
2. Simon Haykin, Neural Networks- A Comprehensive Foundation, Macmillan Pub. Co. New York, 1994.
3. A. Cichocki and R. Unbehauen, Neural Networks for Optimization and signal Processing, John Wileyand Sons, 1993.
4. J.M Zurada, Introduction to Artifical Neural Networks, (Indian Edition) Jaico Publishers, Mumbai, 1997.

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DSP ARCHITECTURE AND APPLICATIONS

MTEC 2.4 (iii)

L	T	P	Exams	:	60
3	1	0	Sessionals:		40
			Time:		3 Hours

INSTRUCTIONS: There shall be eight questions in total, two from each unit. Students are required to attempt five questions selecting at least one from each unit. All questions will carry equal marks.

Unit1: **Hardware:** TMS-320 Archicture, CPU, ALU, Program Controller, Address Generation Unit, Addressing Modes, Interrupt, Priority Register, CCS 6000.

Unit2: **Finite Wordlength Issues:** Effect of Coefficient Quantization in IIR Filters. Effect of Coefficient Quantization in FIR Filters. Effect of Round off Noiseon IIR and FIR systems.

Unit3: **Instruction Set:** Instruction set for TMS-320 family for arithmetic logic, bit manipulation, loop, program control instructions, etc.

Unit4: **Applications:** Designing and implementing FIR, IIR filters, implementing Fast Fourier Transforms with TMS-320.

Text/References:

1. Texas Instrument Instruction Manual for TMS-320 Series.
2. K.Padmanabhan, S.Ananth and R. Vijayarajeswaran, A Practical Approach to Digital Signal Processing, New Age International Publishers, 2003.

DSP Laboratory

M.TECH 2.5

1. Familiarization with some MATLAB commands used in DSP Lab.

2. Computation of FFT and IDFT of given sequences and verifying the results by actual calculations

3. Using MATLAB design Butterworth Filter for given specifications:
   (i) Find minimum order of the filter for the given specifications.
   (ii) Design analog filter to satisfy specifications.
   (iii) Obtain frequency response of the designed analog filter.

4. Using MA TLAB discretize the Butterworth tilter designed in Expt. 3 by
   (i) Impulse invariance technique, and
   (ii) Bilinear technique.
   (iii) Manually obtain Butterworth filter of Expt.3 and discretize it by impulse invariance and bilinear techniques using MATLAB and compare the results with (i) and (ii) above.

5. Using 1'v1A TLAB design Chebyshev Type-I filter to satisfy given specifications and verify the results by manual design of analog filter and discretizing it using bilinear transformation of MA TLAB.

6. Using MATLAB design Chebyshev Type-II filter to satisfy given specifications and verify it by manual design.

7. Study of window characteristics of Rectangular, Triangular, Hamming and Kaiser windows for various parameters using wintool.

8. Design ~ f FIR filter for given specifications using Hamming and Kaiser windows using fdatool and verifying the results manually.

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DATA COMMUNICATIONS

MTEC 3.1

L	T	P		
3	1	0	Exams :	60
			Sessionals:	40
			Time:	3 Hours

INSTRUCTIONS: There shall be eight questions in total, two from each unit. Students are required to attempt five questions selecting at least one from each unit. All questions will carry equal marks.

Unit1: Introduction: A Communication model, Data Communications, Data Communication Networking, Need for Protocol Architecture, A Simple Protocol Architecture, OSI Model, the TCP/IP Protocol Architecture.

Unit2: Data Communications: Concepts, Analog and Digital Data Transmission, Transmission Impairments, Channel Capacity, Guided Transmission Media, Wireless Transmission, Wireless Propagation, Line-of Sight Transmission.
Signal Encoding Techniques: Digital Data, Digital Signals; Digital Data, Analog Signals, Analog Data, Digital Signals; Analog Data, Analog Signals.

Unit3: Digital Data Communication Techniques: Asynchronous and Synchronous Transmission, Types of Errors, Error Detection, Error correction, Line Configurations, Interfacing.
Data Link Control: Flow control, Error Control, High-Level Data Control.
Multiplexing: Multiplexing using Frequency Division, Synchronous Time Division and Statistical Time Division; Asymmetric Digital Subscriber Line Xdsl.
Spread Spectrum: The Concept of Spread Spectrum, Frequency-Hoping and Direct Sequence Spread Spectrum, Code-Division Multiple Access.

Unit4: WAN and LAN:
WAN: Circuit Switching and Packet Switching: Switching Networks, Circuit Switching Networks, Circuit-Switching Concepts, Control Signaling, Softswitch Architecture, Packet –Switching Principles, X-25, Frame Realy.
Asynchronous Transfer Mode: Protocol Architecture, ATM Logical Connections, ATM Cell, Transmission of ATM Cells, ATM Service Categories, ATM Adaptation Layer.
LAN: Background Topologies and Transmission Media, LAN Protocol Architecture, Bridges, Layer 2 and Layer 3 Switches.

Text Book:

1. W Stallings, Data and Computer Communications, Prentice Hall of India, 1997, Pearson Edu.

Referecne Books:

2. R.G Gallager and D Bertsekas, Data Networks, Prentice Hall of India, 1992.
3. M Deprycker, ATM-solutions for Broadband ISDN, Prentice-Hall of USA, 1995.
4. Data Communication by FOROUZAN TMCG & NETWORKING.

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ADVANCED DIGITAL COMMUNICATIONS SYSTEM

MTECH 3.2

L	T	P
3	1	0

Exams : 60
Sessionals: 40
Time: 3 Hours

INSTRUCTIONS: There shall be eight questions in total, two from each unit. Students are required to attempt five questions selecting at least one from each unit. All questions will carry equal marks.

Unit1: **INTRODUCTION:** Geometric representation of modulation signals, Linear modulation technique,$\pi/4$ QPSK, offset QPSK, Constant envelop technique, MSK, GMSK, Linear & Constant envelop modulation technique, M-ary PSK, M-ary QAM.

Unit2: Spread spectrum system like DS-Spread spectrum, Pseudo noise sequences, Performance of DS-SS, Frequency Hopping systems, Modulation Error performance for Binary signal in AWGN, Detection of M-ary orthogonal, M-ary orthogonaling with non-coherent detection.

Unit3: Equalization: Adaptive equalizer, Linear Equalizer, Nonlinear Equalizer, ISI interference, RAKE receiver, Maximum likelihood sequence estimation (MLSE) equalizer.

Unit4: Railey fading distribution, Ricean fading distribution, Speech coding, Characterization of Speech signals, Vector quantization, Adaptive quantization, Power spectrum for general memory less modulation.

Books:

1. Stephen G.Wilson: Digital Modulation and Coding, Pearson Education (Singapore) pte. Ltd.
2. T.S Rappaport: Wireless Communications, Pearson Education (Singapore) pte. Ltd.
3. Proakis, J.G: Digital Communication, Mc Grawhill, 1995.
4. Hykin, S : Digital Communication, Wiley.

Advance Digital Communication Laboratory

M.TECH 3.4

L T P 3 1 0

Exam : 60
Sessional: 40

List of Experiments

1. Plot the power spectmm pattern of the Gaussian Minimwn Shift Modulator (GMSK), using Commsim Software & also compare the result of this pattern by varying the carrier frequency.

2. Plot the attenuated signal pattern, when the signal is propagated. over a long distance (Km), using Commsim Software.

3. Develop software to get the free space path loss propagation by varying the distances between the transmitter & receiver & Compare the result graphically, using the Matlab.

4. Develop Software to get the different, Pattern of Gaussian Function by varying the standard deviation (0-) from 1 to S, using the Matlab.

5. Develop software to get the different pattern of Rayleigh function by varying the Rayleigh constant (*f.I*) from I to S, using the Matlab.

6. Plot the Doppler fading power spectmm pattern & compare the result by varying the Doppler frequency shift. Using Commsim software.

7. Get the output of convolution encoder & decoder, also compare the result by varying the PN sequences graphically, using tqe Commsim software.

8. Generate the blue tooth GFSK (Gaussian frequency shift keying) base band signal by using the Commsim software.

9. Plot the output pattern of MSK (Minimum shift keying) & Compare the result graphically by varying the carrier frequency, using the Commsim software.