

FIRST SEMESTER		ME DIGITAL COMMUNICATION				
COURSE CONTENTS						
EC-11001	Micro Controller based System	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	70	28

UNIT - I

8-Bit and 16-bit microprocessor INTEL 8086, support chips and interfacing techniques, single chip micro-computers, architecture, program and data memory, ports, input Output interfacing and programming.

UNIT - II

Single chip micro controllers- INTEL 8051/ 8751, MOTOROLA 68HC0/68HC11 architecture, instruction set and programming, Memory mapping, addressing modes, Registers, expanded modes. Interrupt handling timing and serial I / O. Microcontroller 8051 interfacing and applications.

UNIT - III

Software development Modular approach, integrated software development environment, Object oriented interfacing and programming, Recursion and debugging. Assembly language programming in 8051.

UNIT - IV

ATMEL 89C51 / 52 and PIC micro-Controllers- Case studies. Design and application of Micro-Controller in Data acquisition, Embedded controllers, Process control etc.

UNIT - V

DSP Processor architecture instruction set and programming. Application of DSP Processor and sample design using TI – DSP. Introduction to Embedded system.

Reference Books:

1. Embedded Systems 8051 by Majidi & Majidi
2. Design with Micro-Controllers by John P. Peatman Tmh
3. Embedded Micro-Computers System by Jonathan W. Valvano
4. Data Manuals – Intel Motorola

FIRST SEMESTER		ME DIGITAL COMMUNICATION				
COURSE CONTENTS						
EC-11002	DSP and Applications	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	70	28

UNIT – I

Review of Discrete time signals: sequences, representation. Discrete time systems: linear, time in variant, LTI systems, properties, and constant coefficients difference equations. Frequency Domain representation of discrete time signals and systems

UNIT – II

Review of Z Transform – Properties, ROC, Stability, Causality, Criterion. Inverse Z Transform, Recursive and Non Recursive systems, Realization of discrete time system

UNIT – III

DFT: Properties, Linear and Circular convolution, Discrete Cosine Transform, Relationship between DFT and DCT. Computation of DFT: FFT/Decimation in Time and Decimation in Frequency. Advance signal processing technique and transforms: multi rate signal processing- down sampling /up sampling, introduction to discrete Hilberts Transform, Wavelet Transform, Haar Transform etc.

UNIT – IV

FIR and IIR systems: Basic structure of FIR and IIR, Bilinear Transformation, Design of Discrete time IIR filter-Butterworth, Chebychev, Inverse Chebychev, Elliptic etc. Design of FIR filters by windowing – Rectangular, Bartlett, Hann, Hamming, Kaiser, Window filter, Design method relationship of Kaiser to other window. Application of MATLAB for Design of Digital filter. Effect of Finite register length in filter Design

UNIT – V

Discrete time Random signals: Discrete time random process, Averages, Spectrum Representation of finite energy signals, response of linear systems to random signals. Power spectrum estimation: Basic principals of spectrum estimation, estimate of auto con variance, power spectrum, cross con variance and cross spectrum. DSP Applications in speech synthesis and video processing etc.

Reference Books:

1. Discrete Time Signal Processing by Oppenheim & Schaffer PHI 2nd Edition
2. Digital Signal Processing using MATLAB by S. Mitra
3. Digital Signal Processing By Proakis Pearson Education
4. Theory & application of Digital Signal Processing by L.R. Rabiner & B. Gold PHI

FIRST SEMESTER		ME DIGITAL COMMUNICATION				
COURSE CONTENTS						
EC-11003	Digital Communication	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	70	28

UNIT – I

Introduction to digital modulation technique and their spectral characteristics. Basic components of Digital Communication System, Transmitters and Receivers for Digital Communication System. Optimum receivers for PCM, regenerative repeaters and link budget analysis.

UNIT – II

Estimation of signal parameters, carrier phase and symbol timings, Signal design band limited channels and their characterization, probability of error in detection PAM with zero ISI, modulation codes for spectrum spacing.

UNIT – III

Optimum receivers for channels with ISI and AWGN, linear equalization and decision feed back equalization, adaptive linear and adaptive decision feed back equalizer.

UNIT – IV

Multi channel and multi carrier systems, spread spectrum signals for digital communication, direct sequence spread spectrum signals and frequency hopped spread spectrum signals and their performance, OFDM.

UNIT – V

Characterization of fading multi path channels, frequency non-selective slowly fading channels, diversity techniques for fading multi path channels, coded waveform for fading channels and their application. Introduction to Mobile and Satellite communication system.

Reference Books :

1. Digital Communication by Proakis TMH.
2. Digital Communication by Glover and Grant PHI.
3. Digital Communication by Simon Hykins.

FIRST SEMESTER		ME DIGITAL COMMUNICATION				
COURSE CONTENTS						
EC-11004	Data Communication and Computer Network	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	70	28

UNIT – I

Review of synchronous and asynchronous transmission, circuit switching, message switching, packet switching and their comparison, various detector techniques, parity check, vertical and longitudinal redundancy check and CRC code and their error detecting capabilities. RS-232 C and X.21 standards, modern operation, null modem.

UNIT – II

Data link control, point-to-point and multi-point links, flow control, sliding window protocol, various ARQ technique for error control and their comparison and performance analysis, HDLC as a bit oriented link control protocol.

UNIT – III

Communication Network: Virtual circuit and datagram, routing algorithm, dijkstera and Bellman ford least cost, algorithm, various routing protocol, congestion control technique, deadlock and its avoidance.

UNIT – IV

Local Area network: Various topologies and medium access control schemes such as contention, polling, token parsing and performance analysis, various IEEE standards for LAN, UBS LANs, FDDI.

UNIT – V

Introduction to WAN packet switching technologies such as ATM and Frame relay. Introduction to TCP / IP protocols.

Reference Books:

1. Data and Computer Communication By W. Stalling Phi
2. Computer Networks Y Tanenebaum Phi
3. Telecommunication Network, Protocols, Modeling and Analysis By M. Schwartz
4. Local Area Network by Keiser TMH

FIRST SEMESTER		ME DIGITAL COMMUNICATION				
COURSE CONTENTS						
EC-11007	Applied Computational Methods	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	70	28

UNIT - I

Review of signals and systems concepts, Z-transform properties, Discrete Fourier transform (DFT) properties, Fast Fourier transform (FFT) properties, Discrete-Hilbert transform properties.

Matrix Computations and Decompositions: Matrix factorization, complexity, least square, singular value and Eigen value decompositions.

UNIT - II

Random variables: Concept, distribution function: properties, Distribution Process: Binomial, Normal, Poisson's distribution.

Statistical Methods: Population; Sample; Statistics; Estimation of parameters; Sampling distribution, sample mean and variance.

UNIT - III

Wavelet transforms and time- frequency analysis: Fundamentals, discrete cosine transform (DCT), continuous wavelet transform (CWT), discrete wavelet transform (DWT), Instantaneous Frequency and Bandwidth, Time-Frequency Localization, Quadratic Time-Frequency Transform, Signal Processing Applications, Image Processing Applications.

UNIT - IV

Probability, Compound probability, Elementary concept of estimation and theory of hypothesis, recurrent relations.

Introduction and definition of Reliability, Derivation of reliability functions, Failure rate, Hazard rate, Mean time to failure and their relations, Concepts of fault tree analysis, elementary idea about Decision Theory and Goal programming.

UNIT - V

MATLAB Application: MATLAB fundamentals, MATLAB programming techniques, MATLAB application to solve - Introduction to linear algebra and statistical methods, solving nonlinear equation & solving ordinary differential equation.

Reference Books:

1. Proakis and Manolakis, Digital Signal Processing (4th edition), Prentice Hall, 2007, ISBN: 0131873741.
2. C.D. Meyer, Matrix Analysis and Applied Linear Algebra, SIAM, 2000, ISBN 0-89871-454-0.
3. Advance Engineering Mathematics by Ervin Kreszig, Wiley Eastern Edd.
4. Applied Numerical Methods with MATLAB by Steven C chapra, Tata McGraw Hill.
5. L. Debnath, Wavelet transforms and their applications, Birkhäuser Boston, 2001.
6. C. K. Chui, An Introduction to Wavelets, Academic Press, 1992.
7. L. Cohen, Time-Frequency Analysis, Prentice Hall, 1995, ISBN: 0135945321.
8. Getting started with MATLAB by RudraPratap.
9. Fourier transforms by J.N. Sheddon.

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