Tentative syllabus of 5TH SEM ECE  
  
Course Curriculum  
B.TECH. (EC) III-Year, V-Semester   
Theory Paper I  
L T P Credits  
  
3 1 0 4  
  
EC-301 Information Theory and Coding  
  
Unit-I  
  
Source: Memory-less, Information Entropy, Extended Sources, Sources Coding, Mutual information, entropy for discrete ensembles;   
Unit-2  
  
Shannon`s noiseless coding theorem; Encoding of discrete sources. Code length for Markov Sources, Shannon’s IInd Theorem for calculation Probability of error.   
  
Unit-3  
  
Channel Modeling: Binary Symmetrical Channel, Binary Erase Channels, Representation of Signals, Symmetrical /Linear Channels, Un-Symmetrical/Non-linear channels, Shannon’s Ist theorem for Code Length.  
  
Unit-4  
  
Galois Fields (FG (23) , GF (24) Block Codes, General Expression for Coded message in terms of Generator Matrix.   
  
Unit-5  
  
Cyclic Redundancy Codes- BCH Codes Golay Code, Reed- Solomon Code, Reed – Muller Codes, Convolution Codes, Majority Logic Decoding,  
Unit-6  
Tree-Trellis, Viterbi Decoding, LDPC Codes, Turbo Codes, Space-time ,Code Quasi-LDPC Codes.  
  
Text Books:  
  
1. “Information and Coding” by N. Abramson; McGraw Hill, 1963.  
2. “Introduction to Information Theory” by M. Mansurpur; McGraw Hill, 1987.  
  
Reference Books:  
1. “Error Control Coding” by Shu Lin and D.J. Costello Jr.; Prentice Hall, 1983.  
2. “Information Theory” by R.B. Ash; Prentice Hall, 1970.

Course Curriculum  
B.TECH. (EC) III-Year, V-Semester   
Theory Paper II  
L T P Credits  
  
3 1 0 4  
EC-302: Digital Signal Processing  
  
UNIT-1  
Review: Basic elements of a DSP system, Analog to digital conversion, Digital processing of  
Analog signals, Z-Transform.  
Implementation of Discrete Time Systems: Structure of FIR systems: Direct form, Cascade form. Structure of IIR systems: Direct form, Cascade form, Lattice, Ladder Lattice Structure.  
UNIT-2  
Computation of DFT: Review of DFT and its properties, Decimation in time, Algorithm, Decimation in frequency algorithm, Chirp z and Goertzel Algorithm, Implementation of FFT Algorithms  
UNIT-3  
Design of Digital Filters: FIR Filters: Design of FIR filters using windows, Design of FIR filters using frequency sampling method, Design of FIR differentiator.  
Design of IIR Filter: Impulse Invariance Method, Bilinear method, Frequency transforming in analog and digital domain, Matched-z transformation. Design of filter based on Least square method.  
UNIT-4  
Deconvolution: Minimum phase,Maximum phase and mixed phase system, cepstrum, deconvolution- homomorphic, concept of pole –zero on z-plane, comb filter, notch filter, digital resonator.  
UNIT-5  
Multirate Digital Signal Processing: Decimation, Interpolation, sampling Rate conversion, polyphase representation, multistage implementation, 2 channel maximally decimated perfect reconstruction filter banks, 2 channel Para unitary filter banks. Applications.  
UNIT-6   
Introduction to Digital Signal Processors Fixed point and Floating point processors, architectures. TMS 320C54XX and TMS320C67XX Architecture, Memory, Addressing Modes, filter implementation on fixed and floating point processors.  
  
Text Books:  
  
1. “Digital signal Processing” by Oppenhiem and Schafer, PHI  
2. “Digital signal Processing-Principles, algorithms, and applications” , J G Proakis, D G Manolakis and D. Sharma.: Pearson Education India  
  
Reference Books  
1. “Digital Signal Processing Matlab Based Approach” , Ingle: Cengage Learning.  
2. “Digital signal Processor: Architectures Implementations and Applications by Sen M. Kuo and   
Woon-Seng Gan, Pearson Education India.  
3 Digital Signal Processing: Fundamentals and Applications by Li Tan: Elsevier Publications

Course Curriculum  
B.TECH. (EC) III-Year, V-Semester   
Theory Paper III  
  
L T P Credits  
  
3 1 0 4  
EC-303: Antenna and Wave Propagation   
  
Unit-1  
Antenna as a terminated line, Short dipole -Vector potential of short dipole, Electric and magnetic field components, Far and near field components. Linear dipole- Current distribution, Electric and magnetic field components. Radiated power and antenna radiation resistance.  
  
Unit-2  
Radiation Pattern of Antenna- E-plane and H-plane pattern, three dimensional pattern. Power pattern of antenna. Classification of antenna based on pattern. Beam solid angle of antenna.  
  
Unit-3  
Antenna directivity, Antenna gain, Antenna efficiency, Effective length and aperture of antenna. Beamwidth and bandwidth of antenna, Antenna polarization.  
  
Unit-4  
Antenna array- Broadside antenna array, End-fire antenna array, Increased directivity end-fire antenna array. pattern multiplication theorem. Grounded and ungrounded antenna, Resonant and non-resonant antenna.  
Unit-5  
Folded dipole, Loop antenna, Helix, YAGI-UDA, LPDA, Aperture Antenna; Horn, Parabolic reflector antenna, Corner reflector antenna. Microwave antenna: Lens antenna and Microstrip antenna  
  
Unit-6  
Classification of RF waves, RF Propagation in free space, Path loss, Different modes of wave propagation. Surface wave- Field strength, Effect of ground and polarization, Range. Space wave-Direct and reflected wave, Range, Field strength ,Effect of change in refractive index. Sky wave-Effect of ionization, Refractive index of different layers of ionosphere, Critical Frequency, MUF, LUF, OWF.  
  
TEXT BOOK:  
1. Antenna Theory- C.Ballanis  
2. Antennas: For All Applications - Kraus, JohnD & Mashefka, Ronald J - Tata McGraw Hill, 3rd Ed.  
  
REFERENCE BOOKS:  
1. Antennas and Wave Propagation – R.E.Collin  
2. Field and Wave Electromagnetics, David K Cheng, Pearson Education Asia, 2nd edition, - 1989, Indian Reprint – 2001.  
3. Antenna Handbook – Collin and Zucker

Course Curriculum  
B.TECH. (EC) III-Year, V-Semester  
Theory Paper IV  
L T P Credits  
3 1 0 4  
  
EC-304: Digital Communications  
Unit- I   
Analog Pulse Modulation: Sampling theorem for band-pass signals, Pulse Amplitude  
modulation: generation and demodulation, PAM/TDM system, PPM generation an  
demodulation, PWM, Spectra of Pulse modulated signals, SNR calculations for pulse  
modulation systems.  
Unit-II  
Waveform coding: quantization, PCM, DPCM, Delta modulation, Adaptive delta modulation-  
Design of typical systems and performance analysis.   
Unit- III   
Pulse Shaping, Nyquist criterion for zero ISI, Signalling with duobinary pulses, Eye diagram,   
Equalizer, Scrambling and descrambling.   
Unit-IV  
Signal space concepts: geometric structure of the signal space, L2  
space, distance, norm and   
inner product, orthogonality,- Base band pulse data transmission: Matched filter receiver,   
Inter symbol interference, Gram-Schmidt Orthogonalization Procedure.   
Unit- V  
Review of Gaussian random process, Optimum threshold detection, Optimum Receiver for   
AWGN channel, Matched filter and Correlation receivers, Decision Procedure: Maximum a-  
posteriori probability detector- Maximum likelihood Detector, Probability of error, Bit error   
rate.   
Unit- VI   
Digital modulation schemes:   
Coherent Binary Schemes : ASK, FSK, PSK, MSK,GMSK. Coherent M-ary Schemes, Incoherent Schemes, Calculation of average probability of error for different modulation schemes, Power spectra of digitally modulated signals, Performance comparison of different digital modulation schemes.  
  
Text books:   
1. “Communication Systems” by Simon Haykin; John Wiley & Sons.   
2. “Modern Digital and Analog Communication”, 3rd Edition by B.P. Lathi; Oxford University Press.   
  
References:  
1. “Digital Communication”, 2E by Sklar; Pearson Education.   
2. “Digital and Analog Communication Systems” by K.Sam Shanmugham; John Wiley & Sons   
3. “Principles of Communications” by R.E. Ziemer and W.H. Tranter; JAICO Publishing House.   
4. “Principles of Communication Systems” by H.Taub and Schilling; TMH.  
5. “Digital Communications” by John G.Proakis; McGraw Hill.   
6. “Fundamental Concepts in Communication” by Pierre Lafrance; Prentice Hall India.   
7. “Analog and Digital Communication” by Couch.

Course Curriculum  
B.TECH. (EC) III-Year, V-Semester  
Theory Paper V  
L T P Credits  
3 1 0 4  
EC-305 Microprocessors and Interfacing  
Unit-1  
Introduction to microprocessor, history of computers, timing and control, memory devices-semiconductor memory organization, category of memory, 8-bit microprocessor (8085):Architecture, Instruction set, Addressing mode, assembly language programming  
Unit-2  
16-bit microprocessor (8086):architecture, physical address ,segmentation, memory organization, bus cycle, addressing modes, introduction to 80186/80286,assembly language programming of 8086.  
Unit-3  
Data transfer scheme: introduction, types of transmission, 8257(DMA), 8255(PPI), serial data transfer (USART 8251), keyboard- display controller (8279), programmable priority controller ( 8259)  
Unit-4  
Programmable interval timer/ counter (8253/8254): introduction , modes, interfacing of 8253, application. ADC/DAC: introduction DAC methods, ADC converters, Types of ADC, ADC IC ( 0808/0809) , DAC and ADC interfacing and applications.  
Unit-5  
Advance microprocessor: introduction to 32-bit and 64-bit microprocessor, power PC, microcontroller (8051) : introduction, Architecture  
Unit-6  
Alphanumeric displays, LCD, Graphic Displays, high power Devices. Communication Bus protocols :RS 232,RS 485,SPI, Inter integrated circuits interfacing I2C standard.  
Text books:  
1. D.V. Hall : Microprocessor interfacing, TMH second edition  
2.” The Intel Microprocessor 8086/8088. 80186, 80286, 80386 and 80486 Architecture Programming and Interfacing ”Barry.B.Brey , PHI  
Reference books:  
1. Y.C.Liu and G. A. Gibson: microcomputer systems : the 8086/ 8080A family architecture programming and design, PHI 2nd edition  
2. John P. Hayes : digital system design and microprocessors, mcgrawhill publication