

1st Semester

COMPUTATIONAL METHODS FOR COMMUNICATION DC501

Solution of linear simultaneous and transcendental equations, Eigen values problems, Iterative method , Jacobi's method, and solution of communication problem .

Analytical method, separation of variables orthogonal functions, series expansion, some practical applications of communication.

Numerical integration, Euler's rule, Trapezoidal rule, Simpson rule, Newton Cote's method, Newton – Raphson method and Gaussian Quadrature method, Finite Element method, solution of poisson and wave equations and other communication problems.

Basic MATLAB function and applications. Fuzzy Set theory and application to communication problems, Fuzzy MATLAB tools.
DFT, FFT and MATLAB tools for wavelet transform.

Books:

1. Numerical methods in science & engineering, Dr. M.K Venkataraman, The national pub. Co. 1991.
2. Computer Oriented statistical and numerical methods, B Balaguru Swamy, Macmillan India Ltd. 1998
3. Numerical methods for scientific and engineering computation, M.K Jain, S.R.K Iyengar and R,K Jain , Wiley Eastern Ltd, 1987
4. Communication Systems , S Haykins, John Wiley and Sons

DETECTION AND ESTIMATION THEORY DC502

Stochastic signal, orthogonal representation of signals, random process, Markov process, correlation function, power spectral density, Tchebycheffi inequality

Detection in presence of noise, correlator, optimum filter, matched filter.

Weighted probabilities and hypothesis testing, composite hypothesis, likelihood ratio detection, sequential detection.

Principles of estimation, properties of estimator, Cramer – Rao Bound, Baye's maximum likelihood and least square estimation, parameter estimation, estimation of continuous waveforms, time invariant linear estimation.

Books:

1. Principles of Digital Communication: J. Das, S.K Mullick, P.K Chatterjee, New age International (P) Ltd publisher , New Delhi
2. Modern Digital and Analog Communication Systems , B.P Lathi, Oxford publishers.

ADVANCED DIGITAL COMMUNICATION DC503

Digital PAM, binary PAM formats, line coding, bandlimited digital PAM systems, Nyquist pulse shaping, equalization, synchronization techniques, bit and frame synchronization. Coded pulse modulation, voice digitization rate (VDR) of PCM, DPCM, DM, ADM, CVSD, log PCM, their performance comparison, VDR reduction by speech coding, VOCODERS, noise performance of PCM and DM, Digital multiplexes. AT & T and CCITT hierarchies, quasi-synchronous multiplexes.

Digital CW modulation, BPSK, DPSK, DEPSK, QPSK, M'ary PSK, QASK, BFSK, Doubinary encoding, QPR coherent and non-coherent systems, error probabilities in PSK, DPSK, FSK, QPSK, 16 QAM, MSK, QPR and bit.

Matched correlation and optimum filters and symbol error rate.

Spread Spectrum techniques: DS, CDMA, FH, PN sequence, Power requirement, PN-sequence code, and Walsh's code.

ISDN & Value added communication system simulation & Analysis using MATLAB & Simulink Application using communication toolboxes.

Books :

1. Digital Communication. By Haykins Mc Graw Hill Int Edition.
2. Modern Digital & Analog Communication . By B P Lathi,. Willey Eatern Ltd. 2000.
3. Communication. Systems by A B Carlson, Tata Mc Graw Hill, 2000.

OPTICAL COMMUNICATION DC504

Int. to optical communication, principles of light transmission , optical fiber modes and configuration , Mode theory for circular waveguides, single mode fibers, Multi – mode fibers, Numerical Aperture, Mode Field Diameter, V-Number, Fibre Fabrication Technique.

Optical sources, L.E.D's, LASER Diodes, Modal Reflection Noise, Power Launching & Coupling, Population Inversion, Fiber splicing, optical connector , photodetector PIN, Avalanche, Detector Response Time, Avalanche Multiplication Noise.

Signal Degradation in optical fibers, Attenuation losses, signal distortion in optical waveguides, material dispersion, waveguide dispersion, chromatic dispersion, Intermodal distortion, pulse broadening in graded-index fibers, mode coupling, Advance fiber

design: Dispersion shifted , Dispersion flattened, Dispersion compensating fiber, Design optimization of single mode fibres.

Coherent optical fiber communication, Modulation Techniques, Misalignment, Fiber to Fiber joints.

Optical Fiber Link Design: Rise Time Budget and Link power Budget, Long-Haul systems, Bit error Rate.

Line Coding: NRZ, RZ, Block codes, Error correction.

WDM concepts and components, operation, fiber gratings, Hologram, Tunable Filters, Directional coupler, Dispersion Management.

Optical Amplifiers – EDFA, Photonic Switching,.

Optical Networks – SONET/SDH, Optical Interfaces, Ring Topology, Star Architecture

Books:

1. G. Keiser, “ Optical Fiber Communication (3rd Edition) “, Mc Graw Hill International, 2000.
2. D.F Mynbacy and L. Scheiner,” Fiber optic communication technology, “ Pearson Education.
3. A. Ghatak and K. Thyangarajan, “ Int. to fiber optics” Cambridge University press, 1998.

**ELECTIVE – I: 1. INTERNET AND INTRANET
DC511**

Development of Internet, Designing principles of Internet, Internetworking architecture Internetworking issues.

Network layer structure, Internet protocol standards, Internet IP, Ipv6 The ISO Internet protocol , ISO routing protocols.

The world wide web : Web fundamentals, URL , Web protocols- HTTP, SSL , Services HTTP other web tools, FTP, HTML, Java , VRML, Jargon IRC, WAIS.

Net components: Internet terminology , provider, client & browser, services, viewers, Gateway and Routers.

Net applications : e mail, Netnews, Telnet, e commerce Network security firewalls, Digital Signature.

Intranet and extranet.

Books:

1. Data Communication, Computer Network and Open system: F Halshal, Addison Wesley.
2. Internetworking with TCP/IP: Volume I: Comer, PHI.
3. Launching Business on the Web: David Cook, PHI

ELECTIVE – I: 2. QUEUING SYSTEMS DC 512

Review of probability and stochastic processes.

Markov Chains, Little's Theorem.

Modelling and analysis of M/M/- queues

Burke's Theorem

Reversibility

Method of stages

Analysis of M/G/1 queues, Queues with vacations

Work conservation principle.

Priority queues, queues served in cyclic order

Fluid flow and diffusion approximations.

Books:

1. Advances in queuing by Jewegeni H. Dishalalow , CRC Press, Newyork
2. Frontiers in queuing (Probalilty & stochastic series) by Jewegeni H. Dishalalow , CRC Press, Newyork

ELECTIVE – I: 3 SATELLITE COMMUNICATION

DC 513

Evolution of Satellite Technology, Communication Satellites, Satellite frequency Bands.

Satellite Channel analysis, cross-links, Carrier to Noise ratios, Frequency reuse with spot beams. Multiple beams.

Satellite front end, Front-end noise. Noise temperature, Front end filters.

Satellite multiple access methods. FDMA, TDMA, CDMA Systems, DS-CDMA and frequency hopped CDMA, Satellite jamming, Code acquisition and tracking.

Satellite applications. Data Communication and VSAT network. Mobile satellite services (GEO and NONGEO).

Books :

1. The Satellite Communication applications handbook. By Brauce. R. Elbert Artech House, Inc. 1997.
2. Electronic Communication Systems by Wayne Tomasi, Regents Prentice Hall, 1988.
3. Satellite Communication by Robert M. Gagliardi, CBS Publisher & 1st ed. 1987
4. Digital Satellite Comm By Tri T. Ha, Mc Graw Hill.