### I SEMESTER

<table>
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<tr>
<th>SUBJECT CODE</th>
<th>NAME OF SUBJECT</th>
<th>HOURS/WEEK</th>
<th>CREDIT POINTS</th>
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<td>01MDC101</td>
<td>Signal Theory</td>
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<td>Digital Signal Processing</td>
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<td>Advanced Optical Communication</td>
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Semester I

SIGNAL THEORY

Course/Paper: 01MDC-101
MDC Semester-I


Random Processes: Definition and classification, stochastic integrals, Fourier transforms of random processes, stationary and non-stationary processes, correlation functions. Ergodicity, power spectral density, transformations of random processes by linear systems.


Optimum Filtering: Matched filters for deterministic signals in white and colored Gaussian noise. Wiener filters for random signals in white and colored Gaussian noise.

Reference:
1. Populis – “random variable & stochastic processes”, TMH

DIGITAL COMMUNICATION SYSTEM

Course/Paper: 01MDC-102
MDC Semester-I


Reference:
1. B.P.Lathi – “Communication system”, John Willy
4. Taub & Shilling – “communication system”, TMH.
6. Singh & Shpre “communication System”, TMH

SATELLITE COMMUNICATION

Course/Paper: 01MDC-103
MDC Semester-I

Introduction: Orbital mechanics and launching, earth station and satellite sub systems, satellite link: design and analysis, multiplexing techniques, multiple accesses for satellite links: FDMA, TDMA CDMA & DAMA, propagation effects, DBS-TV, GPS. VSAT: Network architecture, access control protocol & link analysis.

Reference:
1. Prett – "satellite Communication", John Willy
3. william Stallings – “wireless communication”, Pearson
OPTIMIZATION TECHNIQUES

Course/Paper: 01MDC-104
MDC Semester-I

Introduction: Historical development, application to engineering problems, statement of optimization, classification of optimization, examples of optimization problems.
Linear Programming: Graphical method, simplex method, revised simplex method, Big-M method, phase method, alternate optimal solutions, unbounded LPs, degeneracy and convergence, duality in linear programming, sensitivity analysis, dual simplex method, Transportation, assignment and other applications.
Non-Linear Programming: Unconstrained optimization techniques, direct search methods (Fibannoci method, golden section, quadrature and cubic interpolation) descent methods, constrained optimization, direct and indirect methods, optimization with calculus, kuhn-tucker conditions.
Dynamic Programming: Multistage decision process, principles of optimality, computational procedures in dynamic programming.

Reference:
2. A.L.Fox – "Optimization method for engineering design", Addition weshley,
4. Jain & Rawat – "optimization Technique", CBC.

COMMUNICATION SYSTEM LAB

Course/Paper: 01MDC-201
MDC Semester-I

PART I : PCM AND LINK ANALYSIS
Link establishment, Noise on PCM link, Error detection, BER calculation, Error correction, TDM.
PART II : DIGITAL MODULATION & KEYING
ASK, FSK, PSK, QPSK Modulation and Demodulation.
PART III : CDMA - DSSS
Modulation, Demodulation & BER measurement.
PART IV : SIMULATION IN MATLAB ENVIRONMENT
BPSK, QPSK, FSK Modulation & Demodulation. BER calculation.

Semester II

DIGITAL SIGNAL PROCESSING

Course/Paper:02MDC-101
MDC Semester-II

FIR filter design: Symmetric and anti symmetric linear phase. FIR filter by rectangular, triangular and Blackman window functions.
Finite word length effects in FIR and IIR digital filters: Quantization, round off errors and overflow errors.

Reference:
2. Prokis & Monalskis – "Digital signal processing", PHI.
INFORMATION THEORY & CODING

Course/Paper: 0MDC-102
MDC Semester-II

Shannon’s fundamental coding theorems, Differential entropy & mutual information for discrete & continuous ensembles, source coding, Rate distortion theory.
Introduction to Algebra: Groups, fields, Binary field arithmetic, Basic properties of Galois field GF($2^m$) and vector spaces.

Channel coding & decoding: Run length limited codes, LBC, cyclic code, BCH code, convolution code, Trellis coded modulation, Reed-Solomon code.

Reference:
1. R. Bose "Information Theory & Coding",
2. Shamungum "Digital Communication", John Wiley
3. Singh & Shapre "digital Communication", TMH.

ADVANCED OPTICAL COMMUNICATION

Course/Paper: 02MDC103
MDC Semester-II

Optical fibers: review of fundamentals, Signal distortion and attenuation, Intermodal and intramodal dispersion, dispersion flattened and dispersion compensated fibers, Profile dispersion, study of PMD. Laser diode and photodiode, Photo detector noise analysis, Analog and Digital communication link design. WDM, DWDM, optical couplers, Mach-Zehnder interferometer multiplexer, optical add/drop multiplexers, isolators, circulators, optical filters, tunable sources and tunable filters, arrayed waveguide grating, diffraction grating, optical amplifiers, optical integrated circuits. Characterization of optical fibers, OTDR.
SONET: frame format, overhead channels, payload pointer, Virtual tributaries, multiplexing hierarchy.
SDH: Standards, frame structure and features.
Optical switching, WDM networks,
Classification of optical sensors. Intensity modulated, phase modulated and spectrally modulated sensors.

Reference:
2. Gerd Keiser – "Optical Fiber Communication", TMH.
3. J.N.Senior - "Optical fiber communication", PHI

ANTENNA THEORY AND TECHNIQUES

Course/Paper: 02MDC-104
MDC Semester-II

Review of the theory of electromagnetic radiation. Introduction to various antenna types wire, loop and helical antennas, analysis using assumed current distribution.
Printed antennas: Feeding methods, transmission line & cavity models, analysis and design of rectangular & circular microstrip antenna. Arrays: pattern synthesis, planar arrays, phased arrays. Active antennas and arrays.
Paraboloidal reflector antenna, different feed configurations, shaped beam antennas, lens antenna. Antennas for biomedical applications.
Smart antennas for mobile communications.
Antenna for infrared detectors.

Reference:

2. J.D.Kores. "antennas" MGH
4. R.E.Collin "antenna and Wave propagation", MGH.

MODELING & SIMULATION LAB

Course/Paper: 02MDC-201
MDC Semester-II

EXPERIMENTS USING TMS320C6XXX DSP KITS
1. FIR Digital Filter Design
2. IIR Digital Filter Design
3. FFT of a given signal
4. Plot PSD/Power Spectrum of a signal
5. Discrete Cosine Transform
6. Adaptive Filter Design using Standard LMS Algorithm
7. Speech analysis using L.P.C.

 Semester III

MOBILE COMMUNICATION

Course/Paper: 03MDC-101
MDC Semester-III


Reference:

1. Rapaport "wireless communication", Pearson .
2. William Stalings "wireless Communication & Network",Pearson
3. Dr. Kamilo Feher "digital wireless communication" PHI.

TELECOMMUNICATION SWITCHING & NETWORKS

Course/Paper: 03MDC-102
MDC Semester-III

Principles of circuit switching & signaling schemes, space time & space time division switching, single stage & multi stage switching network. Traffic engineering and teletraffic theory. Markov processes representing traffic. calculation of blocking probability. Modeling and analysis of important media access control protocols: ALOHA, slotted ALOHA,CSMA,CSMA/CD.
LAN: Ethernet, token ring, FDDI.
B-ISDN architecture, B-ISDN protocols, ATM traffic & congestion control, signaling, routing and addressing, Internetworking: switches, bridges, routers, gateways. ATM switching.
1. T. Wishwanathan "telecommunication switching system & Network", PHI
2. Floyd "Telecommunication Switching Traffic & Network", Pearson
4. Gallegar "Data Network", PHI.
5. Frouzan "data communication & networking", TMH

SEMINAR
Course/Paper: 03MDC-201
MDC Semester-III

OBJECTIVE
The students are to select one technical topic related its branch for Seminar. The student is to submit the synopsis for assessment and approval. Progress for preparation of the seminar topic would be continuously assessed from time to time. Two periods per week are to be allotted and students are expected to present the seminar Progress. A faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain the attendance.

Students have to give a final presentation for 15 minutes on his topic. Students are encouraged to use various teaching aids such as over head projectors, power point presentation and demonstrative models. This will enable them to gain confidence in facing the placement interviews

PROJECT
Course/Paper: 03MDC-202
MDC Semester-III

OBJECTIVE
The objective of the project work is to enable the students in convenient groups of not more than 3 members on a project involving theoretical and experimental studies related to the branch of study. Every project work shall have a guide who is the member of the faculty of the institution.

The student should select any one of the topics offered from the department or select one on his own duly approved from the department. Candidate is required to submit the detailed synopsis of the work that he would complete in the part-II

Each student shall finally produce a comprehensive report covering back ground information, literature survey, problem statement, project work details and conclusion. This final report shall be typewritten form as specified in the guidelines.

Semester IV

DISSERTATION
Course/Paper: 04MDC-201
MDC Semester-IV

The student will submit a synopsis at the beginning of the semester for the approval from the University project committee in a specified format. Synopsis must be submitted within a two weeks. The first defense, for the dissertation work, should be held with in a one month. Dissertation Report must be submitted in a specified format to the University for evaluation purpose.