Zero Semester

IT01.Computational, Numerical and Statistical Methods
Floating points, Errors and their propagation, interpolation and Extrapolation approximations, Spline function & their uses, Numerical Integration, Solution of differential equation, Solution of linear and non-linear systems of equations, Eigen vector and Eigen value. Probability, distributions, random variables and generating functions, point and interval estimation, testing of hypothesis, non-parametric methods, curve fitting from least square method, Regression analysis, Analysis of variance, Monte Carlo Analysis, Introduction to optimization Linear and non-linear Programming. Stress will be laid on use of statistical packages and Numerical analysis software using MATHLAB/MATLAB Tools.

IT02.Foundations of Linear System Theory
Introduction to system characterization, Classification of Continuous and Discrete time Systems Signals, Impulse response, Convolution, Computational Techniques, Fourier Analysis of Continuous and Discrete Systems, Laplace Transform, Z- Transform, Frequency Response, State space methods, Introduction to Analog and Digital Filtering. Open and closed loop Systems, Transient Analysis, Integral and Derivative Feedback systems. Introduction to stability, Introduction to Root loci analysis.

IT03.Introduction to Programming
Conceptual frame work of computer languages, C-language, Data types, Operators, Expressions, Control flow, Sub program, Recursion, Input, Output, file access, Abstract data types e.g. Stack, Queue, List and Tree, Pointer, Array, Structure, Union, Structured Program, O.S. Interface. Introduction to Formal languages and Design of programming Languages, Introduction to Object Oriented Programming.

IT04.Analog Electronics
Bipolar, Unipolar Transistor Biasing, Transistor amplifiers, Audio and RF amplifiers, Calculation of gain, input and output impedance, Frequency response, Feedback power amplifiers, Operational amplifiers and their applications, timer and their applications, Regulators, Oscillators, Multimeters, PLL and its applications.

IT05.Digital Electronics and Computer Organization
Operation of transistor as a switch, flip-flop of various types: Master-Slave, JK & D type flip flops, Gates, Half adder, Full adder, Number systems, Code converters, Error detection and correction, Counters, A/D and D/A converters, Registers, Buffers, Multipliers, Memories, Introduction to MSI, LSI, VLSI. Organization of a computer, I/O, ALU, CPU, Control unit, Registers and Flags, Memory systems, Assembly language, Programming with reference to a particular Microprocessor, Introduction to various Bus systems, Introduction to IBM architecture.

FIRST SEMESTER

IT11.Programming Methodology

Concept of programming and structured program development, Problem specifications: Top down design, Step-wise refinement, Sub programs, Recursion algorithms, Analysis of algorithms. Data structure and data types, Program debugging and testing, Performance evaluation, Correctness of programs, Programming exercises as a part of laboratory.

IT12.Computer Architecture

us based architecture, IBM PS ISA, EISA, PCI, VME bus, Peripheral devices, Devices drivers, IDE driver for HDD, Communication in inter parallel ports, Kernel and Device drivers, Power PC architecture, Evaluation of Computers, Information representation, Instruction formats, Instruction types. ALU design, Instruction Sequencing and Interpretation, Hardwired control, Microprogrammed Virtual memory, Parallel processing, Pipe line processing, Multiprocessing. IBM PC Architecture overview, RISC Architecture, Hardware overview of peripheral devices e.g. Key Board, Display monitor, Printers, Storage devices etc.

IT13.Introduction to Communication Systems

Introduction to Communication Systems, Analysis of transmission of Signals, Fourier Series and Transform, Power and Energy spectra, Distortion less Transmission, Signal distortion over a Channel, Bandwidth and Rate of Transmission, Amplitude Modulation, DSB, SSB, VSB Modulation types. Base band and carrier Communication, Detection, Interference and Noise Generation, Generation of FM, Interference and Noise in FM, Phase Locked Loops. Pulse Modulation, PAM, PPM, PCM and their detection, Communication in Noisy channels, Digital systems, Optimum Signal Detection, Introduction to Probability and Random Variables. Introduction to Information Theory, Channel capacity, Hartley Shannon Law, Error Correcting codes.

IT14.Mathematical Foundation for Computer Science

Discrete Mathematics Set, Relations, Functions, Operations, Well Ordering and Equivalence relation, Partial Order. Lattice and Combinatorics, Boolean Algebra, Normal forms, Trees, Graphs, Matrix representations and Enumeration of Graphs, probability, Time series Analysis, Stock'sProcess, Mathematical Logic and Methods of Computation (Finite State Machines, Push down Automata, Turing m/c), Regular Set finite Automata, Introduction to Recurring functions.

IT15.Microprocessor and Interface Programming

Microprocessor Architecture, Micro Computer Architecture, Instruction Set and Timing Diagram, Programming Techniques, Microprocessor Development, System Programmable Timer, Programmable interrupt controller, I/O Interrupt, Interfacing ADC and DAC, Programmable Key Interface, Serial I/O and Data Communication, Programmable DMA controller, Bus Interfacing. Peripheral Interfacing, USART, Micro controllers, Special purpose Processors to Software Development Tools, Operating Systems, Compiler, Assembler, Linker, Loader, Introduction to Design of Assembler, Linker, Loader AND Compiler.

SECOND SEMESTER

IT21.Voice and Data Communication

Introduction and Evolution of Telecommunication, Electronic Space Division Switching, Speech Digitization and Transformation, Time Division Switching. Traffic Engineering, Networks, ISDN, Modems, Channel Capacity, Noise, Signal to Noise Ratio, Transfer Defection, Propagation Delay, Clock Synchronization, Multiplexing Techniques: FDM, TDM. Statistical overview of Satellite Communication System, Broadcast Channel and Optical Fiber Communication System.

IT22.Data Structure and Design Algorithm

Review of abstract data types and simple data structures. Linked list, Circular linked list, Array Stack, Queue, Trees, Hyper Graph, Forest and File. Introduction to Algorithms: Asymptotic notations, Summation, Recurrence relations. Divide and Conquer Binary Search, Quick sort, Merge sort. Dynamic Programming: Matrix chains Multiplication, trees, Knapsack problems, shortest path Algorithms. Graph Depth first search, Breadth first search, Topological sort and strongly connected components. Theory: Lower bounds for sorting and selection.

IT23.Operating Systems

UNIX, WINDOWS, DOS, C++, OS2. Programming in UNIX, Programming in WINDOWS, Programming in DOS based languages, UNIX system tools, Programming language interface, awk, lex, yacc, File and Shared Libraries, Inter process communication, Common object file format, Sdb, Link, Make source code control system, Programmers productivity tools, Extended terminal interface, D Security, X Windows.

IT24.Programming Languages

Syntax and semantics of Programming languages, Data types and Operations passing techniques, Program Structures, Control Structures, Runtime Structures and environmental languages for special purposes (string processing, multitasking processing), Introduction to C, C++, PASCAL, ADA, PERL, JAVA.Programming Methodology, Survey of old and new programming languages, Prolog, C++, Smalltalk 80 and Emphasis on design of programming language that will provide Expressiveness, Readability and Security.

IT25.Computer Graphics and Multimedia

Graphics system architecture, Rasterization algorithms, 2D and 3D Transformations, 3D surface Modeling, Viewing Transformation, Rendering Algorithms, Texture Mapping, Color Systems, Fractals, Particle systems, Introduction to Solid Modeling, Introduction to DUI, Current GUI Tools, Windows, X Windows, Motifs etc. Practical implementation, Multimedia Information, Convergence of Computer, Communication and Entertainment products, Multimedia systems Architecture. Technology of multimedia system components e.g. I/O devices, Storage devices and communication Network, Media (Audio, Video, Image), Coding and Compression, Media organization, Hypermedia encoding and standards. Virtual reality technology, Video Conferencing, Multimedia Broadcast Services, Multimedia Database. Content based retrieval for text and images, Indexing and retrieval of Video Database, Distributed Multimedia systems, Multimedia man machine interface, Operating system support for Multimedia Intelligent Multimedia systems.

THIRD SEMESTER

IT31.Network Architecture

Review of Data Communication principles, Multi accesses protocols and link data protocols. Network topology design, Network layer switching, Routing, Congestion and flow control, Internetworking, transport layer error recovery, TCP/IP protocols, Application layer services and protocols (RPC, NFC, FTP, TELENET), Network security and Management.

IT32.Database Management System

Introduction to database concepts, Goals of DBMS including data independence consistency, Data security and Integrity. DBMS models: Hierarchical, Network and Relational, Relational algebra, Relational calculus, Query languages. Relational database design, Functional and Multi valued dependencies & normal forms. Database query optimization, Data abstraction and Modeling, ER Model, Relational Model, Hierarchical Model, Normalization, Query Processing, Crash Recovery, Concurrency Control, Distributed database, Object Oriented database, Data Mining, Multimedia Database, Digital Libraries.

IT33.Tele-Communication Networks and Technology

Wired, Wireless, Broadcast, Point to Point, Satellite medium-SCPC, VSAT Broadcast medium etc., Link budget analysis, Link behavior, Pe, Burst error, Optimum packet size, Error control, Elementary coding ideas, ATM as a transport mechanism, An overview of Telecom Network, ISDN.

IT34.Object Oriented Technology

Object statics, Objects, class, Instance, Ensemble, encapsulation, Object relationship, Inheritance, Multiple Inheritance, Polymorphism, Object Dynamism, Messages, Object Inter-Relationship, Class Relationship, Foundation Class, Object Oriented Analysis, and Object Oriented Design.

IT35.Software Engineering

Software life cycle, Requirement Definition, System Modeling, Requirement Specifications, Formal Specifications, Algebraic Specifications, and Model based Specifications. Software Design, SSAD, Object Oriented Design, Function Oriented Design, Real time system Design, U.I. Design, Reliability, Reusage, CASE, Software Verification, Testing and Validation, Software Management, Configuration Management, Documentation, Software Quality Assurance, project planning and Scheduling.

FOURTH SEMESTER

IT41.Network Application & Development

Evolution of Internet, Address and Domain Management, SNMP, Transport layer issues, TCP/IP, FTP, WWW, E-mail, Telnet, FTP, Gateway, Dial-up, SLIP/PPP, Dedicated lines. Internet searching tools, Gopher, Archie, Veronica, WWW, Lynx, Mosaic, WAIS, Usenet, Security issues, CGI, PERL, PHP, HTML, JAVA and other Internet development tools, Intranet, Internetworking, TCP/IP Administration, Modern Data Communication and Data networking. LAN and LAN Manager, twisted pair Ethernet, Serial Communication, Connecting LANs and WANs, serial Communication Circuits, Modems, PROTOCOLS, Synchronous Modems and Asynchronous Modems, ISDN Technology, Devices, Architecture Protocols. Flow control, Error detection and correction. Network Services architecture.

IT42.Tele-Communication Network Management

Different protocols for Telecommunication Networks, Empirically observed network traffic behavior and techniques for their management, Fundamentals of Network Management (NM). Need for NM, What is NM?, Elements of NM system (Manager, Agent and a protocol), Functional areas of NM defined by ISO 9Fault Management, Configuration Management, Performance Management, Security Management, Accounting Management), NM standards, Management, Information and underlying concepts (SMI, MIBs, OLD Tree, ASN1, GDMO, Object Oriented Design), SNMP, SNMPV2, CMIS/CMIP, TMN, Web based NM (Introduction), WAS frameworks (HP OpenView, IBM Netview, SUN Solaris Enterprise Manager).

IT43.Modeling, Simulation and Performance Evaluation

Discrete time and discrete event systems, Queuing systems, M/M1 systems, Multi server Multi Queue Networks, Mathematical analysis, System simulation, Simulation languages, Performance estimation, Sensitivity analysis, Examples from Transportation, Communication and Computer systems.

IT44. IT Management

Management of Tele-communication Enterprises: Fundamental aspects of daily telecommunication operations, human factors in organization, acquisition and procurement, research and Development, Logical planning, Relations with carriers and manufacturers.
Management and Marketing of Telecommunications: Strategic planning in regulated and competitive Telecommunication industries, the management and marketing of a technology based enterprise, the strengths and weaknesses of different Management and Marketing approaches, their legal constraints, responsibilities and ethics.
Finance in Telecommunication: The principles and methods of asset valuation, Interpretation and measurement, Financial statements risk assessment, Capital market, Capital budgeting and the effects of economic regulation on capital formation.
Networks for Enterprises: Telecommunication and networking as applied to enterprises in public and commercial sector.
Telecommunication Policy and Regulation

IT45.Software Engineering II

Selected topics in Requirement Engineering, Quality Engineering, Non functional requirements, Intelligent Information Systems, CASE Tool Interfaces etc. Object Oriented Data Bases, Distributed Data Bases, Fragmentation, Query decomposition and Optimization, Different kinds of query languages, Bibliographic databases, Geographical databases, Image databases, Data base Computers.