### INFORMATION TECHNOLOGY

#### 3rd Semester

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THIRD SEMESTER
Module 1

Module 2
Relations & Functions – Properties of binary relations – Equivalence relations and partitions – Functions and pigeon hole principle.

Module 3

Module 4

Module 5
Graph Theory: Basic concept of graphs, subgraphs, connected graphs, Paths, Cycles, Multigraph and Weighted graph – Trees – spanning trees.

References
3. Discrete Mathematics - Richard Johnsoubaugh (Pearson Education Asia)
ELECTRICAL CIRCUITS AND SYSTEMS

T 302 3+1+0

Module 1

Module 2

Module 3

Module 4
Impedance function – Concept of Computer frequency. Transform Impedance and transform circuits, series and parallel combinations of elements. Theorem – Super position, reciprocity, Thevenins and Norton’s theorems – proof and examples.

Module 5

Text Book
1. Network Analysis – M. E. Van Valkenburg – PHI

References
1. Introductory Circuit Theory – Errist A. Guillemin – John Wiley & Sons

SOLID STATE ELECTRONICS

RT 303 2+1+0

Module 1

Module 2
FET, FET amplifier – MOSFET, depletion and enhancement type – source drain characteristics and transfer characteristics.

Module 3
Oscillators – Concept of feedback – Transistorised phase shift oscillator – wein bridge Oscillator – Hartley Oscillator – Colpits Oscillator (Operation and Expression for frequency)

Module 4
Clipping, Clamping, Integration, Differentiation – Astable, Bistable and Monostable Multivibrators – Sweep generators, Simple Bootstrap sweep generators.

Module 5
Power supplies & Special semi conductor devices – Regulator power supplies – IC regulated Power supplies, 7805, 7905, LM317 – LED, LCD, Photodiode, Photo transistor, opto coupler. Seven segment display, SCR, UJT (basic concepts only), DIAC, TRIAC.

References
1. Integrated Electronics - Millman and Halkias, McGraw Hill.
2. Pulse Digital and Switching wave forms - Millman and Taub.
Module 1
Problem solving with digital Computer - Steps in Computer programming - Features of a good program - Modular Programming - Structured - Object Oriented - Top down and bottom up approaches - Algorithms - Flowchart - Pseudocode, examples

Module 2
C fundamentals: - Identifiers, keywords, data types, operators, expressions, data Input and Output statements, simple programming in C.

Module 3
Control statements & Functions: If - else, for, while, do - while, switch, break & continue statements, nested loops. Functions - parameter passing - void functions Recursion – Macros.

Module 4
Structured data types: Single dimensional arrays - multidimensional arrays, strings, structures & unions - Program for bubble sort.

Module 5
Pointers & files - Declaration, passing pointers to a functions- Accessing array elements using pointers - Operations on pointers - Opening & Closing a file - Creating & Processing a file, Command line arguments.

Text
1. Programming with C - Byron S. Gottfried, Tata McGraw Hill

References
1. Computer Programming in C - Kernighan & Ritchie, PHI
2. Programming with ANSI and Turbo C - Ashok N. Kamthan, Pearson Eduacation
3. Let us C - Yeaswanth Khanetkar, BPB
4. Programming in C - Stephen C. Kochan, CBS publishers
5. Using C in Program Design - Ronald Leach, Prism Books Pvt. Ltd, Bangalore
6. Mastering Turbo C - Bootle, BPB Publications
7. Programming and Problem Solving with PASCAL - Micheal Schneider, Wiley Eastern Ltd.
8. Pointers in C - Yeaswanth Khanetkar, PBP
10. Newyork Structured and Object Oriented Problem Solving using C++ - Andrew C Staugaard Jr., PHI
Module 1

Module 2

PART B: ENGINEERING ECONOMICS

Module 3

Module 4

Module 5

References
1. Management - Stoner, Freeman and Gilbert.
3. Indian Economy - Ruddar Datt, S. Chand and Company Ltd.
Module 1
Review of number Systems – Binary, Octal, Hexadecimal – Conversion,
Binary codes – BCD, Self complementing, Excess – 3 and Gray code, Alphanumeric codes
Boolean Algebra – Postulates, Switching function, Sum of Product, Product of Sum, switching circuits, simplification – rules, laws and theorems, Karnaugh map, Completely and incompletely specified functions, Quine – Mc Clauskey method.
Logic gates, Realization using logic gates, Design with NAND and NOR gates.

Module 2
Combinational logic circuits – adder – half and full, subtractor – half and full, Serial & Parallel adders, Carry save adder, Look ahead carry adder, BCD adder, Multiplexers, Encoders, Demultiplexers, Decoders, Comparators, Implementation of logic functions using multiplexers and decoders.

Module 3
Logic families – positive and negative logic, TTL NAND – analysis – characteristics, open collector gate, tri-state gates, ECL & IIL logic (Brief explanation only), CMOS – Inverter, NAND, NOR, Characteristics, properties, Comparison of logic families, Typical IC’s.

Module 4
Sequential logic Circuits – classification, flip flops – SR, JK, Master slave, D, T. applications, Truth table and Excitation table, Conversion of one type of flip flop to another.
Memories – ROM- organization of a ROM, Programmable ROMs, EPROM, EEPROM, PLD – PLA and PAL, RAM – basic structure, static and dynamic RAM.

Module 5
Shift registers – SISO, SIPO, PISO, PIPO, universal shift register, applications, Ring counter, Johnson Counter.
Binary counters – Asynchronous and Synchronous – Design, decade, Up-Down counters, Typical counter IC’s.

Text Book
1. Digital Electronics and Logic Design - B. Somanathan Nair - PHI 2002

References

C PROGRAMMING LAB  
T 307  0+0+4

1. Familiarization with computer system, Processor, Peripherals, Memory etc.
2. Familiarization of operating system-DOS, Windows etc. (use of files directories, internal commands, external commands, compilers, file manager, program manager, control panel etc.)
3. Familiarization with word processing packages like MS Excel, MS Access, MS PowerPoint and MS Word.
4. Programming experiments in C to cover control structures-functions-arrays-Structures-pointers and files.

(Any experiment according to the syllabus of RT304 can be included.)

ELECTRONIC CIRCUITS LAB  
T308  0+0+4

2. Rectifiers with filters- Half Wave, Full wave&amp; Bridge
5. Wave shaping. Design of clipping, clamping, RC differentiator and Integrator.
6. Design of Astable multivibrator for specified time period sharpening edges.
7. Simple sweep circuits.
8. RC Phase shift oscillator. Wein bridge oscillator.
FOURTH SEMESTER
Module 1

Module 2
Partial Differential Equations - formation by eliminating arbitrary constants and arbitrary Functions - solution of Lagrange Linear Equations –Charpits Method – solution of homogeneous linear partial differential equation with constant coefficients – solution of one dimensional wave equation and heat equation using method of separation of variables – Fourier solution of one dimensional wave equation.

Module 3

Module 4
Probability and statistics: Binomial law of probability - The binomial distribution, its mean and variance - poisson distribution as a limiting case of binomial distribution - its mean and variance - fitting of binomial & poisson distributions - normal distribution - properties of normal curve - standard normal curve - simple problems in binomial, poisson and normal distributions.

Module 5
Population & Samples: Sampling distribution of mean (σ known) –Sampling distribution of variance, F and Chi square test – Level of significance - Type 1 and Type 2 errors – Test of hypothesis – Test of significance for large samples – Test of significance for single proportion, difference proportion, single mean and difference of mean (proof of theorems not expected)

References
Module 1

Module 2
Linked lists - Linked stacks and queues, Doubly linked list, applications, Circular linked list, Polynomial representation using linked list.

Module 3
Trees - basic terminology - binary tree-binary search tree-insertion, search, traversal, deletion, need for balancing, Balanced trees - AVL Trees & B Trees (basic idea only)

Module 4
Graphs - representation, traversal, applications
Hashing - Hashing functions, Collision resolution
Dynamic memory management, Storage allocation and compaction.

Module 5
Selection sort, insertion sort, bubble sort, radix sort, tree sort, heap sort, quick sort & merge sort
Sequential search, binary search, Interpolation search

References
1. Introduction to Data Structures with Applications - Tremblay & Sorenson, TMH
2. Data Structures in C & C++ - Tanenbaum, et., al., Pearson Education
3. Classic Data Structures - Samanta, PHI
6. Data Structures and Program design in C - Robert L Kruse, et.al., Pearson Education
Module 1
Operational Amplifiers – Block diagram, Equivalent circuit, Ideal Op Amp-characteristics, Non-ideal Op Amp - finite open loop gain, offset voltage, bias current, drift, frequency response, band width, CMRR, circuit stability and slew rate.

Module 2
Active Filters: Butterworth and Chebyshev filters- I & II order filters – low pass, high pass, band pass, band reject, filter design.
Comparators, Oscillators, Multivibrators, Waveform generators.

Module 3
D/A converters- Weighted resistor, R-2R networks, Hybrid converters .
A/D converters- Successive approximation, Integrating ADC, Dual slope, Flash converters (parallel), Analog multipliers.

Module 4
Voltage regulators- voltage references, block diagram of linear voltage regulators, voltage regulator ICs and their design, three terminal voltage regulators, negative voltage regulators, dual tracking and switching regulators.

Module 5
PLL: Operating principle, lock range and capture range, applications of PLL, building blocks of PLL, LM 565 and its applications. Signal generators-monolithic waveform generators. IC power amplifiers.

References
1. OP-AMPS and Linear Integrated Circuits, 4rd Edn. - Ramakant A.Gayakwad, Pearson Education
Module 1  Introduction
Organization & Architecture, Functional Units of a computer, CPU-Memory connection, Review of basic operational concepts like CPU registers, Instruction formats, Addressing modes, Instruction cycle, Interrupt, Operating system, Interconnection structures, Layered view of a computer system.
Internal architecture of a typical 8-bit Microprocessor (Intel 8085), Signals, Registers, Machine cycles

Module 2  Instruction set
Instruction set of 8085, Addressing modes-Register, Direct, Immediate, Indirect and Implicit addressing, examples
Instruction types – Arithmetic, Logic, Data transfer, Branch, Stack, I/O and Machine control Instructions, examples (Assembly language programming not intended)

Module 3  CPU organization
Processor Organization-Single bus and 2 bus organization, execution of a complete instruction, Hardwired and micro programmed control units, Sequencing, Horizontal & vertical microprogramming.
Arithmetic-Review of addition & subtraction techniques, Carry look ahead & Carry save addition, Multiplication-array multiplier, Booth’s algorithm, Division-Restoring & non-Restoring division

Module 4  Memory Organization
Memory Hierarchy, characteristics, Memory system considerations, High speed techniques-Cache memory, Associative memory, Memory interleaving, Virtual memory-paging.

Module 5  I/O Organization
I/O Module- Functions & Structure, I/O Processor, I/O techniques-Programmed I/O, Interrupt driven I/O, DMA
Standard I/O interfaces: RS 232 C, GPIB, SCSI

References
1. Microprocessor Architecture, Programming & Applications – Ramesh S Gaonkar, Penram International
5. Computer Organization & Design-Pal Chaudhari, PHI

SIGNALS AND SYSTEMS

LTA 405 2+1+0

Module 1
Dynamic Representation of Systems - Systems Attributes- Causality linearity-
Stability- time-invariance. Special Signals- Complex exponentials- Singularity
functions (impulse and step functions).. Linear Time-Invariant Systems:
Differential equation representation- convolution Integral. Discrete form of
special functions. Discrete convolution and its properties. Realization of LTI
system (differential and difference equations).

Module 2
Fourier Analysis of Continuous Time Signals and Systems - Fourier Series-
Fourier Transform and properties- Parseval’s theorem- Frequency response of
LTI systems. Sampling Theorem.

Module 3
Fourier Analysis of Discrete Time Signals & Systems - Discrete-Time Fourier
series- Discrete-Time Fourier Transform (including DFT) and properties.
Frequency response of discrete time LTI systems.

Module 4
Laplace Transform - Laplace Transform and its inverse: Definition- existence
conditions- Region of Convergence and properties- Application of Laplace
transform for the analysis of continuous time LTI system (stability etc.)
Significance of poles & zeros- Z-Transform - Z-Transform and its inverse:
Definition- existence- Region of convergence and properties- Application of Z-
Transform for the analysis of Discrete time LTI systems- Significance of poles
and zeros.

Module 5
Random Signals - Introduction to probability. Bayes Theorem- concept of random
variable- probability density and distribution functions- function of a random

References


OBJECT ORIENTED PROGRAMMING IN C++

T 406 3+1+0

Module 1
Need for OOP- Characteristics of Object Oriented Language- Basic concepts and terminology-C++ and object oriented programming
C++ Programming basics, loops and decisions

Module 2
Structures- Structure specifier, accessing, nested structures, structures and classes.
Functions- Declarations, definition, argument passing.
Variables and storage classes

Module 3
Objects and classes –creation and usage, member functions, constructors and destructors Arrays- Definition, accessing, Arrays as class members, arrays of objects

Module 4
Operator overloading, Function overloading, Inheritance, Classification of inheritance, virtual functions, Polymorphism-Run time and compile time polymorphism.

Module 5
Advanced OO concepts- iterations and sequences, Virtual destructors, Virtual base classes, Templates, exceptions and exceptions handling, standard library design.

References
2. C++ Programming language: Bjarne Stroustrup, Pearson Education
3. Object Oriented Programming in C++: Nabajyoti Barkakati, PHI
4. C++ Primer: Lippman and Zajoie, Pearson Education
5. C++ for You++: Maria Litwin & Garry Litwin, Vikas Publishing

C++ & DATA STRUCTURES LAB

T 407 0+0+4

Using C++ Modern Compiler

1. Desk Calculator example.
2. Name spaces and Exceptions
3. Programming with Multiple files
4. Using classes, derived classes
5. Templates
6. Standard Library, standard containers, algorithms, Strings, Streams
7. Using a Debugger

(Any experiment based on the syllabus of T 402 can be substituted.)

Simple experiments based on the syllabus of T 402 - Arrays, Stack, Queues, Trees,
Simple sorting and searching techniques.

INTEGRATED CIRCUITS LAB

T 408 0+0+4

1. Characteristics of TTL and CMOS gates.
2. Realization of logic circuits using TTL and CMOS NAND/NOR gates.
3. Arithmetic Circuits- Half adder, Full adder, 4-bit adder/subtractor.
4. Realization of RS, T, D, JK and Master-Slave Flip-flops using gates and study of flip-flop ICs.
5. Shift Registers, Ring Counter and Johnson Counter.
8. Inverting and non-inverting amplifiers, Summing amplifiers.
10. Triangular and square wave generators using OP-AMPs.
11. IC Voltage regulator, fold back protection.
12. IC power amplifier
13. VCO, PLL
14. Filters- LP, HP and BP, Notch Filter.
FIFTH SEMESTER
Module 1  QUEUEING THEORY
General Concepts - Arrival pattern - service pattern - Queue disciplines - The Markovian model M/M/1/$, M/M/1/N - steady state solutions – Little’s formula.

Module 2  NUMERICAL METHODS

Module 3  FINITE DIFFERENCES
Meaning of operators – Δ, ∇μ ,δ ,E - interpolation using Newton’s forward and backward formula - Langrange’s and Newton’s divided difference interpolation formula - numerical differenciation - first and second order derivatives using forward and backward formula - numerical integration - trapizoidal rule - Simpson’s 1/3 and 3/8 rules.

Module 4  LINEAR PROGRAMMING PROBLEM
Graphical solution of LPP- general problem - solution of LPP using simplex method - Big M method – duality in LPP.

Module 5  TRANSPORTATION AND ASSIGNMENT PROBLEM
Balanced transportation problem - initial basic feasible solution -Vogel’s approximation method - optimum solution by Modi method - Assignment problem - Hungarian techniques

References
4. Operations research Schaum’s Outline Series  - Richard Bronson,
5. Operations research - Panneer Selvam, PHI
OPERATING SYSTEM CONCEPTS

Module 1 Introduction
O.S. Objectives and functions, evolution of O.S, Basic concepts and terminology, O.S. hierarchy, Different types of O.S – multiprogramming, time sharing, real time, microkernel, multithreading, multiprocessing, distributed O.S etc. (basic idea only), Windows – 2000 overview, UNIX overview.

Module 2 Process Management

Module 3 Memory Management
Memory management requirements, Techniques, Partitioning, Paging, Segmentation, Virtual memory – hardware and software support, Brief study of memory management in UNIX, Linux, Win 2000 and Solaris.

Module 4 I/O and File Management

Module 5 Distributed Systems

Text Books
2. Operating system Concepts - Silber Schatz, John Wiley.

References
DATA BASE MANAGEMENT SYSTEMS

RT503  

Module 1
Basic Concepts - Purpose of database systems-Components of DBMS – DBMS Architecture and Data Independence- Data modeling - Entity Relationship Model, Relational – Network- Hierarchical and object oriented models-Data Modeling using the Entity Relationship Model.

Module 2
Structure of relational databases – relational databases – relational algebra- tuple relational calculus. Data definition with SQL, insert, delete and update statements in SQL – views – data manipulation with SQL

Module 3
Oracle case study: The basic structure of the oracle system – database structure and its manipulation in oracle- storage organization in oracle.- Programming in PL/SQL- Cursor in PL/SQL

Module 4

Module 5
Distributed databases: Distributed Database Concepts- Data Fragmentation, Replication and Allocation Techniques- Different Types- Query Processing – semijoin -Concurrency Control and Recovery.

Text Book
1. Fundamentals of Database System - Elmasri and Navathe (3rd Edition), Pearson Education Asia

References

2. An Introduction to Database Systems - C.J.Date (7th Edition) Pearson Education Asia
4. An Introduction to Database Systems - Bibin C. Desai

MICROPROCESSORS

Module 1
Evolution of 8086 family of microprocessors – 8088 to Itanium, Internal architecture of 8086, block diagram, Registers, flags, Programming model, 8086 and 8088, 8086 memory organization, segmented memory, Physical address calculation, Memory Addressing, Addressing modes.

Module 2
Instruction set, Classification of instructions – Data transfer, Arithmetic and Logic instructions, Program control instructions, Simple programs in 8086 Assembly language.
IBM PC Assembly Language Programming, Program Development Tools – DEBUG, MASM, TASM etc.

Module 3
8086 hardware design – bus buffering and latching, bus timing – read and write, timing diagram, ready and wait states, Minimum mode and Maximum mode, 8086 Memory interface, address decoding.

Module 4
Comparative study of the features of the 8086, 80286, 80386, 80486, Pentium, Pentium Pro, Pentium II, Pentium III and Pentium IV Processors.
Introduction to Micro controllers – architecture, applications.

Module 5
Study of Peripheral chips
8255 – Programmable peripheral interface
8251 - USART
8259 – Programmable interrupt controller.
8279 – Programmable keyboard and display interface.
8237 – DMA controller.
8254 – Programmable Interval Timer
Brief study of interfacing of Stepper motor, keyboard, 7-segment display and ADC with the Microprocessors.

References

2. The 80X86 family, 3rd Edn - John Uffenbeck, Pearson Education.
4. IBM PC Assembly Language Programming- Peter Abel, PHI
5. Microprocessors and Interfacing - Douglas V. Hall, TMH
6. Advanced Microprocessors & Peripherals- Roy & Bhurchandi, TMH

LANGUAGE PROCESSORS

RT 505

3+1+0

Module 1  Assembler

Module 2  Introduction to Compilers
Compilers and Translators – Structure of a compiler – lexical analysis – syntax analysis – context free grammars – basic parsing techniques- top down and bottom up parsing (brief idea only)- Recursive Decent parser – Shift reduce parser.

Module 3  Storage allocation
Data descriptors- Static and Dynamic storage allocation – Storage allocation and access in block structured programming languages – Array allocation and access- Compilation of expressions – Handling operator priorities – Intermediate code forms for expressions –code generator.

Module 4  Compilation of Control Structures
Control transfer- Conditional and Iterative constructs- Procedure calls – Code optimization – Optimization transformations – Local optimization and global optimization – Compiler writing tools – Incremental Compilers

Module 5  Loaders and Linkers
Text Books


References


DATA COMMUNICATION

RT 506 2+1+0

Module 1

Module 2
Multiplexing - Frequency Division Multiplexing (FDM) – Time Division Multiplexing (TDM), Synchronous Time Division Multiplexing – Statistical time Division multiplexing – Key Techniques - ASK, FSK, PSK, DPSK - Channel capacity - Shannon’s Theorem.

Module 3
Digital data transmission – Serial, Parallel, Synchronous, Asynchronous and Isochronous transmission. Transmission mode- Simplex - Half duplex – Full duplex, Noise- different types of noise – Basic Principles of Switching (circuit, packet, message switching)

Module 4
Module 5
Terminal handling – Point to point, Multidrop lines. Components of computer communication – Concentrators - Front end Processor – Transmission media – Guided media – Twisted pair cable, coaxial cable, fibre optic cable. GSM service and GSM system architecture.

References

1. Electronic communication system - Kennedy, Mc Graw Hill.
4. Data Communication, Computer Networks & Open Systems - Fred Halsall Pearson Education Asia
5. Principles & Application of GSM - Vijay K. Garg Pearson Education Asia
7. Computer Networks - A.S. Tanenbaum, PHI

DBMS LAB
T 507 0+0+3

Experiments for performing the following:

1. Creation, Updating, Deletion of tables, indexes, views, reports, Queries, Relational Operations, Trigger
2. Importing and Exporting Data.
3. Use of Link Libraries.
4. Natural Language Support
5. Administration.
6. ODBC Interface
7. Exposure to Data Base management packages (Preferably on 4 GLs like ORACLE/INTEGRA/SYBASE, Foxpro or the latest packages)

(Any experiment according to the syllabus of RT 503 can be substituted)
1. Study of 8 bit /16 bit microprocessor kit.
2. Assembly language programming with 8 bit /16 bit Microprocessor kit.
3. Interfacing experiments such as:
   a. Stepper motor control.
   b. DAC/ADC interface.
   c. Data Acquisition Board.
   d. Keyboard interfacing.
   e. Video display board.
   f. LED moving graphic display board.
   g. Serial communication.
4. IBM PC Assembly language programming using MASM/TASM.
SIXTH SEMESTER
Module 1  PROJECT PLANNING
Overview – Capital expenditure - Phases of capital budgeting – Project development cycle – 7-s of project management – Requirements of a project manager – Forms of project organization.

Module 2  PROJECT ANALYSIS

Module 3  CONTROL OF PROJECT
Control Systems – Control of major constraints – Project management software & information systems.
REVIEW: Performance of Evaluation – Abandonment Analysis – Behavioral issues in Project Management

Module 4  TOTAL QUALITY MANAGEMENT

Module 5  CONCEPTS IN SAMPLING
Sampling designs and schemes – Errors in sampling – Simple random sample – stratified random sample – Cluster sample.

References
3. Project Management - Harvey Maylor - Pearson Education
5. Quality control and Improvement – Amitava Mitra – Pearson Education
SOFTWARE ENGINEERING

Module 1  Introduction to Software engineering

Module 2  Project Planning

Module 3  System Design

Module 4  Coding
Top-down and Bottom-up - Structured Programming - Information Hiding - Programming style - Internal Documentation – Verification - Code Reading - Static Analysis - Symbolic execution - Proving Correctness - Code inspections – Unit testing.

Module 5  Testing

Text Book
1. An integrated approach to Software Engineering - Pankaj Jalote, Narosa Publication

References
Module 1

Module 2

Module 3

Module 4
Finite word length effects in digital filters: Introduction- Number Representation - Fixed Point- Sign-Magnitude - One’s-complement- Two’s - complements - forms - Addition of two fixed point numbers- Multiplication in Fixed Point arithmetic - Floating point numbers- Block floating point numbers- quantization - truncation- rounding - effects due to truncation and rounding- Input quantization error - Product quantization error - Co-efficient quantization error- zero-input limit cycle Oscillations - Overflow limit cycle Oscillations - Scaling- Quantization in Floating Point realization IIR digital filters - Finite Word Length Effects in FIR Digital Filters- Quantization effects in the Computation of the DFT- quantization errors in FFT algorithms.
Module 5

References
2. Discrete time signal processing Oppenheim- Pearson edn.
3. Digital signal processing: Oppenheim and Sheffer- PHI
4. Introduction to Digital signal processing: Johny R Johnson
5. Digital signal processing: Proakis and Manolakis.

COMPUTER NETWORKS

Module 1

Module 2
Data Link Layer: - Design issues-Error Detection and correction – Elementary Data link protocols- Sliding window protocols.
LAN Protocols: - Static & Dynamic channel allocation in LAN’s and WAN’s, Multiple access protocols – ALOHA – Pure ALOHA – Slotted ALOHA – Carrier Sense Multiple Access protocols – persistent and non-persistent CSMA – CSMA with collision detection – IEEE 802.3 standards for LAN

Module 3

Module 4
Application Layer: Domain name system – DNS name space – Resource records – Name servers – operation of DNS - Electronic Mail – MIME

References

2. An Introduction to computer networking: Kenneth C. Mansfield Jr., James L. Antonakos, Prentice-Hall India
5. Computer Networking: James F Kurose & Keith W Ross, Pearson Education
6. Introduction to Data Communications and Networking: Behrouz, Forouzan, McGraw Hill

NETWORK COMPUTING

RT 605 3+1+0

Module 1
HTML Documents
Basic Tags for Font & Paragraph Formatting Lists, Tables, Frames, image Maps Cascading Style Sheets
Style Element, Inline style sheets, Embedded style sheets, External Style sheets, CLASS Attribute, Absolute and relative positioning of elements, DIV & SPAN Tags.

Module 2
Dynamic HTML Pages
Client side scripting - Java Script – variables, Arithmetic operations – message boxes, Arrays, control statements, functions, event handling, document object model.
Dynamic updating of pages with JAVA Script.
Embedding ActiveX controls - using the structured graphics – ActiveX Control.

Module 3
Java programming – Features of Java, Creating & using classes in Java – Static classes – Inheritance – Final methods, variables and classes – Interfaces - Nested classes – Inner classes – Anonymous Inner classes – Exception handling – Creating & using exceptions, Multithreaded programs and thread synchronization, creating and using packages. Creating GUI with AWT and Swing – -JDK1.1 event model

Module 4

Module 5
HTTP Protocol working – HTTP methods, GET, PUT, DELETE, POST, HEAD Server side scripting – HTML Forms & CGI – GET & POST, Basic working of a CGI supported web server – Simple CGI program in C to validate user name & Password.
Email: Working of SMTP and POP protocols (Overview only).

Text Books

Module 1,2,5
1. Internet and World Wide Web – How to program - Deitel, Deitel & Nieto, Pearson Education Asia
2. HTML, DHTML, Java Script, Perl, CGI - Evan Bayross, BPB

Module 3,4,5
4. Computer Networks - Tenanbaum, PHI/ Pearson Education Asia

References
1. Unix Network Programming - Stevens W Richard, PHI
2. TCP/IP Protocol suite, 2/e - Behrouz A. Forouzan, TMH

PERSONAL COMPUTER HARDWARE

T 606 4+1+0

Module 1  Introduction to PC
Hardware components – study of motherboards – Different types of ports, slots and connectors-Add-on cards-Power supply– SMPS- function & operations.

Module 2  Storage Devices
Floppy – Floppy Disk Controller - Disk Physical specification & operations – Disk magnetic properties – Cylinders – Clusters – Hard disks – Hard disk drive operation – Magnetic data storage - Sectors – Disk formatting – partitioning -

Module 3  Optical Storage

Module 4  Memory Management in PC

Module 5  Bus Structures
ISA, PCI, PCMCIA, AGP, USB, Hard Disk Interfaces – IDE, EIDE, ATA – Communication ports – Serial – Parallel port – Keyboard / Mouse Interface connectors.

References

1. PC Hardware Complete Reference - Craig Zacker & John Rourke, Tata McGraw Hill
2. Inside the PC (8th Edition) - Peter Norton, Techmedia Publications
3. The Indispensable PC Hardware Book - Messmer, Pearson Education
4. Troubleshooting and Repairing Your PC - Corey Candler, Wiley
5. Upgrading and repairing PC’s (4th edition) - Scott Mueller, Pearson Education
6. IBM PC Assembly Language Programming - Abel, PHI
7. PC Upgrading Maintenance & Trouble shooting guide - Dr. S. K. Chauhan, Kataria

SYSTEMS PROGRAMMING LAB

T607  0+0+3

1. Symbol table construction
2. Single pass and two pass assembler.
3. Macro processor module binder (with limited Instruction set)
4. Lexical analyzer.
5. Bottom Up and Top Down Parser.

(Any experiment according to the syllabus of T 502 and RT 505 can be substituted.)

MINI PROJECT

T608 0+0+3

The aim of the mini project is to prepare the students for the final year project. The topic for the mini project should be simple as compared to the main project, but should cover all the aspects of a complete project.
SEVENTH SEMESTER
Module 1


Module 2

**Dynamic modeling:** Events and states – Operations – Nested state diagrams – Concurrency – Advanced dynamic modeling concepts – A sample dynamic model – Relationship of Object and Dynamic models.


Module 3

**Analysis:** Analysis in object modeling, dynamic modeling and functional modeling, Adding operations- Iterating the analysis

**System Design:** Breaking system into subsystems - Identifying concurrency- allocating subsystems to processors and tasks, managing of data stores. Handling of global resources- handling boundary conditions-Common Architectural Frameworks

Module 4

**Object Design:** Overview of Object design – Combining the three models – Designing algorithms – Design optimization – Implementation of control – Adjustment of inheritance - Design of association – Object representation – Physical packaging – Documenting design decisions-Comparison of methodologies

Module 5


Text Books

1. Object Oriented Modeling and Design -JamesRumbaugh, Prentice Hall India
2. Object Oriented Analysis and Design with Applications - Grady Booch, Pearson Education Asia
References

1. Object Oriented Software Engineering - Ivan Jacobson, Pearson Education Asia
2. Object Oriented Software Engineering - Berno Bruegge, Allen H. Dutoit, Pearson Education Asia
4. Succeeding with the Booch OMT Methods - A practical approach - Lockheed Martin, Addison Wesley

COMPUTER GRAPHICS

RT 702 3+1+0

Module 1


Module 2


Module 3


Module 4


Module 5

Advanced Technologies: Fractals – Classification of Fractals – Self-Squaring Fractals, Animation- Raster Animation, Morphing.

Text Book
References

4. Fundamentals of Computer graphics & - D. P. Mukherjee, Prentice Hall of India multimedia

MODERN COMMUNICATION SYSTEMS

Module 1  Optical Fibre communication
Advantages, Disadvantages, System block diagram, Fibre types, Cable configurations, Light propagation through optical fibre, Fibre configurations, Acceptance angle and acceptance cone, Cable losses, Light sources, Light detectors.

Module 2  Microwave communication
Advantages, Analog Vs Digital Microwave, Frequency modulated microwave radio system – Transmitter, Repeater, Receiver (block diagram only) Microwave terminal station – transmitter and receiver, path characteristics – fading.

Module 3  Satellite Communication
Satellite orbits, Geostationary satellites, Satellite classifications, Spacing, Frequency allocation, Satellite uplink and down link models (block diagram only), Earth station, Multiple accessing – FDMA, TDMA, CDMA, Satellite Radio Navigation, GPS (Basic idea only)

Module 4  Mobile Communication
Mobile communication services, Cellular telephone, Concepts – Cells, Frequency reuse, Interference, Cell splitting, Segmentation and Dualisation, Call system layout, Call processing, Analog and Digital Cellular Telephones, Block diagram of a typical transceiver, PCSS Mobile telephone system.

Module 5  Advanced Concepts
Concepts of Wireless LAN, ISDN-Protocol, Architecture, B-ISDN, ATM Blue tooth Technology
WAP and WWW- Architecture, Protocols and Applications.

Text Book


References

3. Mobile Communications - Jochen Schiller, Pearson Education.

MULTIMEDIA TECHNIQUES

T 704                        2+1+0

Module 1  INTRODUCTION
Definition of multimedia, multimedia, hardware, software applications and software environments, - Media Types - Analog and digital video, digital audio, music and animation - Analog & Digital video - Memory storage - Basic tools - Authoring tools.

Module 2  BUILDING BLOCKS
Text - Hyper text - Sound - Sound cards - Standards - Image - Image types - Image compression, RLE, JPEG, MPEG - Fractal and Wavelet Compressions - Image file types - Animation - Capture and Playback techniques. (basic ideas only)

Module 3  MULTIMEDIA ENVIRONMENTS
The Compact Disc family, CD-interactive, Digital Video Interactive, QuickTime, Multimedia PC and Microsoft Multimedia Extensions.

Module 4  MULTIMEDIA PROGRAMMING
Framework: Overview, Media classes, Transform classes, Format classes and Component classes - Problems related to programming - Composition, Synchronisation, Interaction, Database integration.

Module 5  ADVANCED MULTIMEDIA

References
3. Multimedia making it work - Tay Van Ghan – Osborne Tata Mcgraw Hill
4. Authoring Interactive multimedia - Arch C Luther
5. Optimizing your Multimedia PC - L.J. Skibbe, Susan Lafe Meister - Comdex
6. Multimedia Bible - Winn L. Rosch, Sams
10. Integrated Multimedia Systems - Palikom, The communication Wall Overview

WEB TECHNOLOGIES

RT 705

Module 1

Module 2
Document Type declarations – Creating XML DTDs – Element type declaration – Attribute List Declaration – Attribute types – Attribute defaults – Displaying XML Data in HTML browser as HTML tables – Storing XML data in HTML document – Converting XML to HTML with XSL minimalist XSL style sheets – XML applications

Module 3

Module 4

Module 5

References

Module 1, 2
1. XML by Example: Building Ecommerce applications - Sean McGrath, Pearson Education Asia

Module 3
2. Java 2, AWT, Swing, XML and JavaBeans Programming Black Book - Steven Holzner, Wiley Dreamtech

Module 4
1. Java Server pages - Larne Pekowsky – Pearson Education Asia
2. JSP: Java server pages - Barry Burd, IDG Books India

Module 5
2. EJB Design Patterns - Floyd Marinescu

Additional Reference
1. Internet & Web Technologies - Raj Kamal, TMH

ELECTIVE -I

T 706 3+1+0

LIST OF ELECTIVE SUBJECTS

1. CMELRPTA 706-01 Optimization Techniques
2. T 706-02 Digital Image Processing
3. RT 706-03 Principles of real time systems
4. RT 706-04 Windows Programming
5. RT 706-05 Mobile Computing
6. RT 706-06 Software Architecture
7. T 706-07 Optical Communication
Note
New Elective subjects related to the recent trends in Information Technology can be added to this list. Institutions offering such courses should submit the detailed syllabus and get it approved from the University before offering the course.

OPTIMIZATION TECHNIQUES (ELECTIVE - I)
CMELRPTA 706-1  3+1+0

Module 1 Classical optimization techniques

Module 2 Constrained multivariable optimization

Module 3 One-dimensional unconstrained minimization

Module 4 Integer – Linear programming problem
Gomory’s cutting plane method – Gomory’s method for all integer programming problems, mixed integer programming problems.

Module 5 Network Technique

References
1. Optimization theory and application - S.S. Rao, New Age International P. Ltd.
5. Operation Research – R. Pannerselvam, PHI

DIGITAL IMAGE PROCESSING
T 706-2  3+1+0
Module 1

Module 2
Point operations, Uses, Linear point operations, Point operations and the histogram, Applications of point operations. Introduction to algebraic operations, Applications, Geometric operations, Grey level interpolation, Spatial transformation, applications, geometric operations, linear filtering theory – Harmonic signals and complex signal analysis.

Module 3
Convolution operation, Applications of digital filtering some useful functions, Convolution filtering – Dimension sampling, Reconstruction of images from its samples, Nyquist rate, Aliasing and foldover frequencies. Non rectangular grid sampling, Practical limitation in sampling and construction. Display aperture and interpolation, Moire effect and flat field response.

Module 4
Processing sampled data, Computing data, Truncation, Optics and System analysis, Diffraction limited optical systems, Abbreviation in an imaging system. Applications of Digital image processing – Image restoration, Approaches and models, Super resolution, System identification, DTF from degraded image spectrum, noise modeling.

Module 5

References
Module 1
Introduction to Real Time Systems – Structure of real time systems, real time computer, task classes – Periodic, Aperiodic, critical, Non-critical, definition of real time systems – real time systems, embedded systems - Hard real time systems, soft real time systems, real time design issues.

Module 2

Module 3
Communication – Communication Media and message sending topologies, network architecture issues, protocols – contention – based, token - based, stop and go multiloop, polled bus, hierarchal, round robin, fault tolerant routing – clocks and synchronization – fault tolerant synchronization in hardware, synchronization in software.

Module 4

Module 5
Programming Languages – Desired language characteristics, Real time databases, characteristics, main memory databases, Transaction, Disk schedule algorithms, Databases for hard real time systems, maintaining serialization constituency.

Text Book

Reference
Module 1
Visual Basic Programming: Basic Language features – Variables, data types, constants, control statements – Forms – Creating and Using basic Controls – text boxes, labels, buttons - Event handling procedures – Properties Window – Common properties for Controls. Message boxes

Module 2
Visual Basic Programming (Contd) Standard Controls – List boxes, Comboboxes, Image box, picture box, Shape controls, Timer, Scrollbars, Frames, Checkboxes, Option Boxes – Frames - File, Drive and Directory List boxes - MDI and SDI interfaces – Menus

Module 3
ActiveX controls - RichTextBox, Tree View Control, List view Control, Progessbar, Flexgrid Control, Common dialog Controls – Font, File, Print Dialogs – Creating Custom activex controls – Creating Events and properties for ActiveX controls.

Module 4

Module 5
Database Access – Using DAO, RDO and ADO for accessing databases – Creating tables, inserting, deleting and updating records – Using the Data Control – Using the ADO Data Control

References
1. Visual Basic 6 Programming Black Book - Steven Holzner (Dreamtech Press)
3. Visual Basic - Ivan Petrosaus (BPB)
4. Visual Basic - Garry Cornell (BPB)
5. Using Visual Basic - Resselman (PHI)

MOBILE COMPUTING (ELECTIVE - I)

Module 1

Module 2

Module 3

Module 4

Module 5

Text Book
1. Mobile Communications – Jochen Schiller, Preason Education Asia

References

1. Computer Networks – Andrew S. Tanenbaum, PHI

SOFTWARE ARCHITECTURE (ELECTIVE - I)

R706-6 3+1+0

Module 1

Module 2
Shared Information Systems – Integration in software Development Environment – Integration in the design of Buildings – Architectural structures for based information systems

Module 3
Guidance for user interface architecture Artificial design space – Formal models and specifications-The value of architectural formalism – Formalizing the architecture of a specific system – Formalizing the architectural style – Formalizing an architectural design space

Module 4
Linguistic issues - Requirements for architecture – Description languages – first class connectors – Adding implicit invocation to factorial processing languages.

Module 5
Tools for architectural design – Unicon – Exploiting style in architectural design environments – Architectural interconnection

Reference

1. Software Architecture – perspectives on an emerging discipline- Mary Shaw, David Garlan, PHI

OPTICAL COMMUNICATION

T 706-7 3+1+0
Module 1
Optical fibres: Graded index and step index fibres- refractive index profiles, numerical aperture propagation of optical beams in fibres. Mode characteristics and cut off conditions (mathematical derivations required). MCVD technique for fibre fabrication, losses in fibres- attenuation, absorption, scattering and radiation losses.

Module 2

Module 3

Module 4
Optical communication systems: Direct detection and heterodyne receivers. SNR, advantage of coherent optical communications. Optical digital communications, Transmission link analysis, point to point links – system consideration – link power budget and rise time budget.

Module 5
Classification of light wave systems – linear systems: Intensity modulated Direct Detection (IMDD) and coherent systems. Non linear systems. Introduction to solitons –Solitons communications using lumped amplifiers, Bit error Rate performance.

References
1. Optical Fibre Communications- Gerd Keiser, Mc Graw Hill.
3. Optical Fibre Communications- Senior, PHI.
6. Optical Communication Systems – Gowar, PHI
MULTIMEDIA LAB

T 707 0+0+3

1. Programs for
   a. Point plotting
   b. Line and circle drawing
   c. Line and Polygon clipping
   d. Transformations
   e. Hidden line elimination
   f. Curves
2. Web page design with HTML
4. Familiarization of latest multimedia development tools.

COMMUNICATION SYSTEMS LAB

T 708 0+0+3

1. Analog optical communication experiments based on optical communication kits / benches
2. Digital optical communication experiments based on optical communication kits / benches
3. Digital communication experiments based on trainer kits.
4. Design of digital filters (software simulation using MATLAB/ SIMULINK)
5. FFT, DFT Implementation using software simulation (MATLAB/ SIMULINK)
7. Study of modems-NIC-Cable connectors and their usages
8. Study of Internet-accessing, services and applications
9. Simple network programming experiments in Java.

PROJECT & SEMINAR

T 709/ T 808 0+0+3

Each student is required to present a technical paper on subject approved by the department. The paper should, in general, reflect the state of the art technology. Report should be submitted to the department.
In addition to the seminar, the students shall undertake a project work (as a team or individually) in the 7th semester itself in consultation with the guide(s). On completion of the project work in the 8th semester, each student shall present the work done before a panel of staff members, and submit a report of the project work to the department.
EIGHTH SEMESTER
Module 1

Module 2
OS Security – Protection Mechanisms – Authentication & Access control – Discretionary and Mandatory access control – Authentication mechanisms – Official levels of computer security (DoD) - Security breaches – Concept of a hole - Types of a holes – Study of the security features for authentication, access control and remote execution in UNIX, WINDOWS 2000

Module 3

Module 4

Module 5

Text Books

Module 1, 4

Module 2
1. Modern operating System - Andrew S. Tanenbaum, Pearson Education Asia

Module 3
2. Information theory coding and cryptography - Ranjan Bose, TMH

Module 4,5
1. Designing security Architecture Solutions - Jay Ramachandran, Wiley Dreamtech

Module 5
1. Database Security Mechanisms for Computer Network - Sead Muftic, John wiles

References

2. Database Security Mechanisms for Computer Network - Sead Muftic, John wiles
4. Firewalls Complete - Marcus Gonsalvus, TMH
5. Networking Technologies - Jaisal, Galgotia Publication
8. Implementing IPv6 - Mark A. Miller P.E, IDG Books

INFORMATION SYSTEMS AND MANAGEMENT

T 802 3+1+0

Module 1
Introduction, Management and Systems, Classical and systems approach to organization, Organizational theory, Management and organizational behaviour, Factors affecting productivity, Leadership Styles, Organizational Effectiveness, Managerial Grid, Tasks and functions of Management, General management system. ERP & Related technologies, MIS, DSS, EIS.

Module 2
The management process and information needs, Data Bank concept, Information systems for decision making, Automation of Decision making, Management science and the Decision rule, Decision assisting Information systems – MIS, DSS, EIS, ERP.

Module 3
Management Information systems, Strategic and Project Planning for MIS, Conceptual system design, detailed system design, Implementation and maintenance. (Brief study only)
Module 4
ERP, Introduction, ERP-modules, benefits, market. Implementation Life cycle, Vendors, Consultants and Users, Future direction in ERP.

Module 5
Decision Support Systems – Managers and decision making, Decision Support Tools, Concept of DSS, Components, Basic concepts of Data Mining, Data Warehousing and Knowledge Management. Knowledge based decision support – Basic concepts only.

References
Module 1,2&3
1. Information Systems for Modern Management - Murdick, Ross & Claggett, PHI.

Module 4
2. Enterprise Resource Planning- Alexis Leon, TMH

Module 5

E-COMMERCE
T803 2+1+0

Module 1 Introduction to Electronic Commerce

Module 2 Electronic Payment Systems
Types of Electronic Payment Systems, Digital Token Based Electronic Payment System, Smart Cards, Credit Cards, Credit card based Payment system, Online payment process, Risk in Electronic Payment Systems, Designing Electronic Payment Systems.

Module 3 Electronic Data Interchange

Module 4 Intra Organizational E-Commerce
Internal Information System, Work-flow Automation and Coordination, customization and internal Commerce, Supply Chain Management, Document
Library, Types of Digital Documents, Technological Architecture for Internal Commerce, Corporate Data Warehouses, advantages of Data Warehouses.

**Module 5  Recent Trends in E-Commerce**

**Text Book**
1. Frontiers of Electronic Commerce - Ravi Kalakota & Andrew B Whinston/Pearson Education

**References**
2. E- Commerce The cutting edge of Business - Kamlesh K Bajaj & Debjani Nag / Pearson Education

**ARTIFICIAL INTELLIGENCE**

**RT 804**

**Module 1**

**Module 2**

**Module 3**
Game playing and knowledge structures – Games as search problem – Imperfect decisions – Evaluation functions – Alpha – Beta pruning – state of art game programs, Introduction to frames and semantic nets.

**Module 4**

**Module 5**

Text Books

**Module 1,2,3,4**
1. Artificial Intelligence – A modern approach - Stuact Russell – Peter Narang, Pearson Education Asia

**Module 5**
3. Artificial Intelligence - George F Luger, Pearson Education Asia

**Reference**

1. An Introduction to Artificial Intelligence – Eugene Charniak & Drew McDermot, Pearson Education Asia

**ELECTIVE - II**

**T 805**

3+1+0

**List of elective subjects**

1. CMELRPTA 805-01 Advanced Mathematics
2. RT 805-02 Client Server Computing
3. T 805-03 High Performance Computing
4. RT 805-04 Analysis and Modeling of Digital Systems
5. RT 805-05 Distributed Computing
6. RT 805-06 User Interface Design
7. T 805-07 Satellite & Mobile Communication
8. T 805-08 Data Compression

**Note:**

New Elective subjects related to the recent trends in Information Technology can be added to this list. Institutions offering such courses should submit the detailed syllabus and get it approved from the University before offering the course.

**ADVANCED MATHEMATICS (ELECTIVE - II)**

**CMELRTA 805-1**

3+1+0

**Module 1** Green’s Function

Module 2 Integral Equations
Definition of Volterra and Fredholm Integral equations – conversion of a linear differential equation into an integral equation – conversion of boundary value problem into an integral equation using Green’s function – integral equation with separable Kernels – Integral equations of convolution type – Neumann series solution.

Module 3 Gamma, Beta functions

Module 4 Power Series solution of differential equation
The power series method – Legendre’s Equation – Legendre’s polynomial – Rodrigues formula – generating function – Bessel’s equation – Bessel’s function of the first kind – Orthogonality of Legendre’s Polynomials and Bessel’s functions.

Module 5 Numerical solution of partial differential equations
Classification of second order equations- Finite difference approximations to partial derivatives – solution of Laplace and Poisson’s equations by finite difference method – solution of one dimensional heat equation by Crank – Nicolson method – solution one dimensional wave equation.

References
7. Principles and Techniques of Applied Mathematics - Bernard Friedman, John Wiley and sons

CLIENT SERVER COMPUTING (ELECTIVE - II)
RT 805-2 3+1+0
Module 1  INTRODUCTION

Module 2  DESIGNS
Fundamentals of client server design - Managing the interaction of client and server - Communications Techniques protocols & Client server interaction protocols - Preparing applications for client server - Optimizing applications for client server - Example client server implementations - Request acceptance dispatching - Execution of requests - Client server interaction using message.

Module 3  MULTITASKING
Multi programming vs multitasking - Processor - Advantages and draw backs of multiple processor - Child and parent processor - Case study Novell Netware and Windows NT - Developing server applications - Threads - Server communication model.

Module 4  SYNCHRONIZATION
Scheduling implementations - processing queues - context switching pre emptive systems - critical sections - mutual exclusion - semaphores - semaphore implementations in NT & Netware.

Module 5  COMMUNICATIONS
Network communication - Inter process communication - Building portable client server applications.

References
3. Developing Client Server Applications -W.H.Inman, BPB.
5. Client Server Strategies - David Vaskevitch, Galgotia.

HIGH PERFORMANCE COMPUTING
T 805-3 3+1+0

Module1
Introduction to parallel processing - Trends towards parallel processing - Parallelism in uniprocessor - Parallel computer structures-Architecture classification schemes - Indian contribution to parallel processing.
Module 2
Principles of pipelining and vector processing - Linear pipelining - Classification of pipeline processors - General pipelines - Instruction and Arithmetic pipelines – Design of Pipelined instruction unit-Principles of Designing Pipeline Processors-Instruction prefetch and branch handling- Dynamic pipelines - Architecture of Cray-1.

Module 3
Array processors - SIMD array processors - Interconnection networks - Static vs dynamic networks - mesh connected networks - Cube interconnection networks - Parallel algorithms for array processors - SIMD matrix multiplication-Parallel sorting on array processors - Associative array processing - Memory organization.

Module 4
Multiprocessor architectures and Programming - Loosely coupled and Tightly coupled multiprocessors - Interconnection networks - Language features to exploit parallelism - Process synchronisation mechanisms.

Module 5
Dataflow computers - Data driven computing and Languages - Data flow computers architectures - Static data flow computer -Dynamic data flow computer -Data flow design alternatives.

Text Book

References
1. Elements of Parallel computing - V. Rajaraman - PHI
2. Super Computers - V. Rajaraman - Wiely arstern
5. Advanced computer Architecture - Sima, Fountain and Kacsuk, Pearson Edn

ANALYSIS AND MODELING OF DIGITAL SYSTEMS (ELECTIVE - II)
RT 805-4 3+1+0

Module 1

Module 2
Basic language concepts simulation: signals – Entity architecture – concurrent statements – Constructing VHDL models using CSAs – delays.
Synthesis: Interface from declarations, simple CSA statements, conditional signal assignment statements, and selected signal assignment statements.

Module 3

Module 4
Modeling structure: Describing structure – structural VHDL model – hierarchy, abstraction and accuracy – generics – component instantiation and synthesis – the generate statement
Subprograms: functions – procedures – sub program and operator overloading – packages and libraries.

Module 5

Text Book
1. Introductory VHDL  - Sudhakar Yalamanchili, Pearson Education Asia.

References
1. VHDL primer - J Bhaskar, Pearson Education Asia

DISTRIBUTED COMPUTING (ELECTIVE - II)  
RT805-5 3+1+0
Module I  Introduction
Introduction to Distributed Systems, evolution, characteristics, design issues, user requirements, Network technologies and protocols – overview, MACH, AMOBEA- overview.

Module 2  Distributed file system
File service components, design issues, interfaces, implementation techniques, Sun Network File System – architecture and implementation, other distributed file systems – AFS, CODA. Name services – SNS name service model.

Module 3  Communication in distributed systems
Client server communication, Group communication, Message passing – features, synchronizations, RPC – model, implementation, stub generation, messages, marshalling, Server management. Distributed shared memory – Architecture, design issues, structure of shared memory space, replacement strategy, thrashing. Synchronization – clock synchronization, event ordering, mutual exclusion

Module 4  Resource and Process management
Features of scheduling algorithms, Task assignment approach, load balancing, load sharing, Process migration mechanisms, Threads – scheduling.

Module 5  Consistency maintenance

References
1. Distributed Systems – Concepts and designing - George Coulouris, Jean Dellimore Tim Kindberg, Pearson Education Asia
2. Distributed Operating Systems - Andrew S. Tenenbaum Pearson Education Asia
3. Distributed Operating Systems - Concepts and designing - Pradeep. K.Sinha, PHI

USER INTERFACE DESIGN (ELECTIVE - II)
RT 805-6  3+1+0

Module 1  Introduction
Importance of user interface – definition, importance of good design, brief history – Graphical User Interface – Web User Interface – Principles of User interface design.

Module 2  Design Process
Human Interaction with computers, Importance of Human Characteristics, Human consideration, Human Interaction speeds – Understanding Business function
Module 3  Screen Designing

Module 4  Windows and components
Menus and navigation schemes, selection of windows, Selection of device based and screen based controls - text and messages – icons and images – Multimedia – colours- uses, problems, choosing colours.

Module 5  Software tools
Specification methods, interface building tools

Text Books

2. Designing the User Interface – Ben Shneiderman, Pearson Education Asia

References

2. The Essentials of User Interface Design - Alan Cooper, Wiley Dreamtech

SATELLITE AND MOBILE COMMUNICATION
T 805-7 3+1+0

Module 1

Module 2
Multiple access Techniques, Satellite earth station, special purpose communication satellite, satellite launch vehicles.
Module 3
Spread spectrum Communication – Direct Sequence or Pseudo noise, Frequency hopping, Time hopping, Hybrid and Chirp spread spectrum systems. Applications of spread Spectrum.

Module 4

Module 5

References
1. Electronics Communication 4th ed - Dennis Roody & John Coolen, PHI
5. Mobile and Personal Communication System and Services – Raj Pandya, PHI

DATA COMPRESSION 3+1+0

Module 1

Module 2

Module 3
Transform coding – orthogonal transformations – bit allocation – performance gain of transform coding – sub band coding – coding based on models of human perception (human auditory system and visual system)
Module 4

Module 5

References


ELECTIVE - III

T 806 3+1+0

List of elective subjects

1. T 806-01 Information Theory and Coding
2. RT 806-02 Embedded Systems
3. RT 806-03 Neural Network
4. RT 806-04 Genetic Algorithm and Applications
5. RT 806-05 Advanced Networking Trends
6. RT 806-06 Data Processing and Analysis Techniques
7. RT 806-07 Bio metrics
8. T 806-08 Fuzzy Systems

Note
New Elective subjects related to the recent trends in Information Technology can be added to this list. Institutions offering such courses should submit the detailed syllabus and get it approved from the University before offering the course.
Module 1
Information Theory: Concept of amount of information, units – entropy, marginal, conditional and joint entropies – relation among entropies – mutual information, information rate, channel capacity – redundancy and efficiency of a channel, symmetric channels – binary symmetric channel (BSC), binary erasure channel (BEC), deterministic and noiseless channels – capacity of band limited Gaussian channels, Shannon – Hartley theorem – band width – SNR trade off – capacity of a channel of infinite bandwidth, optimum modulation systems.

Module 2

Module 3

Module 4
Cyclic codes – description – generator and parity check matrices – encoding of cyclic codes – syndrome computation and error detection, decoding of cyclic codes, BCH codes- description and decoding, Reed Solomon codes, burst error correction – block and convolutional interleaving.

Module 5

References

EMBEDDED SYSTEMS (ELECTIVE - III)

RT806-2 3+1+0

Module 1  Overview of Embedded System

Module 2  Embedded Hardware & Software Development Environment
Hardware Architecture, Micro-Controller Architecture, Communication Interface Standards, Embedded System Development Process, Embedded Operating systems, Types of Embedded Operating systems.

Module 3  Embedded Communication System

Module 4  Real Time & Database Applications

Module 5  Java Applications & Future Trends in Embedded Systems

Text Book
NEURAL NETWORKS (ELECTIVE -III)

RT806-3 3+1+0

Module 1

Module 2

Module 3
Counter Propagation networks: Kebenon layer - Training the cohenen layer - Pre initialising the wright vectors - statistical properties - Training the Grosbery layer - Full counter propagation network - Application.

Module 4
Statistical methods - Boltzmann’s Training - Cauche training - Artificial specific heat methods - Applications to general non-linear optimization problems.

Module 5
1. Neural Computing Theory & Practice - Philip D. Wasserman.

References

1. Neural Networks - Simon Haykins
2. Adaptive Pattern Recognition & Neural Networks - Pay Y.H.
3. An Introduction to neural computing - Chapman & Hall

GENETIC ALGORITHMS AND APPLICATIONS (ELECTIVE - III)
RT806-4 3+1+0

Module 1 Architecture-Altering Operations

Module 2 Genetic Programming Problem Solver (GPPS)
Elements of GPPS 1.0-Problems Illustrating GPPS 1.0 - Elements of GPPS 2.0 - Problems Illustrating GPPS 2.0 - Previous Work on Automated Analog Circuit Synthesis.

Module 3 Automated synthesis of analog electrical circuits
Synthesis of a Low-pass Filter and High-pass Filter The Role of Crossover in Genetic Programming.

Module 4 Evolvable Hardware
Evolvable Hardware and Rapidly Re-configurable Field-Programmable Gate Arrays
Discovery of cellular Automata Rules: Discovery of a Cellular Automata Rule for the Majority Classification Problem.

Module 5 Programmatic Motifs for molecular Biology
Automatic Discovery of Protein Motifs –Programmatic Motifs and the Cellular Location Problem.

Reference

**ADVANCED NETWORKING TRENDS (ELECTIVE – III)**

**RT806-5**  
3+1+0

**Module 1**

**Module 2**
ISDN - Definition - Protocol architecture - System architecture - Transmission channels - ISDN interface, B-ISDN.

**Module 3**

**Module 4**
SATELLITE COMMUNICATION: Satellite communication principles - Geo stationary satellites - block schematic of satellite earth station - VSAT - VSAT networks - applications in personnel communication. (basic ideas only)

**Module 5**

**References**

**Module 1**

**Module 1,2,3**
2. Mobile Communication - Jochen Schiller, Pearson  Education Asia

**DATA PROCESSING AND ANALYSIS TECHNIQUES (ELECTIVE - III)**

**RT806-6**  
3+1+0
Module 1
Introduction to COBOL programming - elements of COBOL divisions, sections and paragraphs - Table writing - complete program in COBOL using various options verbs, statements-conditions and conditional statements.

Module 2
Table Handling – Occur clause – PERFORM verb – SET verb, SEARCH verb – Occurs depending clause – Sorting a Table.

Module 3

Module 4

Module 5

References
1. COBOL programming - M.K. Roy & D Ghosh Dastidar, Tata McGraw Hill
3. Data mining Concepts and Techniques- Jawei Han & Micheline Kamber (Morgan Kunfmann Pub.)
4. Data Mining - Pieter Adriaans, Dolf Zantinge, Person Education Asia

BIOMETRICS (ELECTIVE - III) 3+1+0

Module 1

Module 2
Module 3

Iris scan – features – components – operation (steps) – competing iris scan technologies – strength and weakness
Voice scan – features – components – operation (steps) – competing facial scan technologies – strength and weakness

Module 4

Other physiological biometrics-Handscan-retina scan- AFIS (automatic fingerprint Identification systems)-Behavioral Biometrics-Signature scan-Key stroke Scan.

Module 5

Biometrics Application – Biometric Solution Matrix-Bioprivacy-Comparison of privacy factor in different biometrics technologies - Designing privacy sympathetic biometric systems-Biometric standards - (BioAPI, BAPI) - Biometric middleware.

Reference

1. Biometrics - Identify Verification in a Networked World - Samir Nanavati, Michael Thieme, Raj Nanavati- WILEY-dreamtech
typical parameterized t – norms and s-norms (with simplified proof). Extension principle and its applications.

Module 4

Module 5
Further operations on fuzzy sets and proposed by Zadeh – concentration dilation, contrast Intensification, a linguistic hedges, computation of the meaning of values of a linguistic variable, fuzzy algorithms, fuzzy engineering – applications of fuzzy controls, case studies.

References
6. Fuzzy Thinking, Bart Kosko - Hooper Collins Publications.

INTERNET LAB
T 807 0+0+4
1. Familiarization of Internet Accessing and Trouble shooting
2. Internet Programming with JAVA applets
3. Web development with XML, JAVA script, JAVA beans.
4. Implementation of Search Engine
5. Web Development with JSP and EJB
6. Familiarization to the latest web development tools

(Any experiment according to the syllabus of RT 605 and RT 705 can be substituted)

PROJECT & SEMINAR
T 709 / T 808 0+0+4
Each student is required to present a technical paper on subject approved by the department. The paper should, in general, reflect the state of the art technology. Report should be submitted to the department.

In addition to the seminar, the students shall undertake a project work (as a team or individually) in the 7th semester itself in consultation with the guide(s). On completion of the project work in the 8th semester, each student shall present the work done before a panel of staff members, and submit a report of the project work to the department.

**VIVA VOCE**

T 809

A comprehensive viva voce examination will be conducted to assess the student’s overall knowledge in the specified field of Engineering. At the time of viva voce, certified report of seminar, mini project and project work are to be presented for evaluation.