E/CS/EB/EC/EE/EI/IT/ME/MRE/SE 301 ENGINEERING MATHEMATICS-III

Module I

Fourier series and Fourier Integrals: Periodic Functions, Euler formulae for Fourier Coefficients, functions having arbitrary period, even and odd functions, half range expansions, Fourier Integral, Fourier Cosine and Sine transformations, linearity property, transform of Derivatives, convolution theorem (No Proof)

Gamma and Beta Functions, error functions – definitions and simple properties .

Module II

Special functions: Legendre polynomial, Rodrigue's formula- generation function, recurrence formula for Pn(x), orthogonality. Bessel function, Jn(x)-recurrence formula, general function, orthogonality.

Module III

Partial differential equations: Solutions of equations of the form F(p, q) = 0, F(x,p,q) = 0, F(y,p,q) = 0, F(z,p,q) = 0, F1(x,p)=F2(y,q), Lagrange's form Pp+Qq = R.

Vibrating String: one dimensional wave equation, D Alembert's solution, solution by the method of separation of variables, solution of Laplace's equation over a rectangular region and a circular region by the method of separation of variables.

Module IV

Probability and Statistics: **Probability Distributions:** Random variables (discrete & continuous),probability density, mathematical expectation, mean and variance of a probability distribution, binomial distribution, poisson approximation to the binomial distribution, uniform distribution, normal distribution

Curve Fitting: Method of least squares, Correlation and regression, lines of regression.

Module V

Sampling distributions: Population and samples**,** Sampling distribution of the mean (? known) Sampling distribution of the mean (? unknown), sampling distribution of the variance, Point estimation, Interval estimation, tests of hypotheses, null hypotheses and significance tests, hypothesis concerning one mean, type I & type II errors, hypotheses concerning two means.

The estimation of variances: Hypothesis concerning one variance- Hypothesis concerning two variances.

Note: Treatment of the topics under modules IV, V should be oriented towards application of statistical techniques to problems in real life.

References:

1) Ervin Kreyzing : Advanced Engineering Mathematics, Wiley Eastern
2) Potter, Goldberg : Mathematical Methods, Prentice – Hall
3) Churchill R.V. : Fourier series and Boundary Value Problems – McGraw Hill
4) Irvin Miller & Freind : Probability and statistics for Engineers, Prentice- Hall of India
5) Bowker & Lieberman : Engineering Statistics , Prentice – Hall
6) Kirk – Patrick : Introductory statistics and probability for engineering Science and technology , Prentice – Hall
7) Parzen E : Modern Probability Theory and its Applications, Wiley Estern.

CS/EB/EC/EI/IT/ME/MRE 302 ELECTRICAL TECHNOLOGY

Module I

Transformers: Working principles and elementary theory of an ideal transformer, Constructional features of single phase transformer, emf equation, turns ratio, vector diagram, equivalent circuit, impedence transformation, transformer losses, flux leakage, efficiency, open circuit and short circuit test, load test. Auto transformer – Working principle and saving copper, basic idea of current transformer and potential transformer, distribution and power transformer, applications, standard rating, IS specifications.

Module II

Basic principles of electrical machines: concepts of motoring and generating action

DC machines: Main constructional features, principles of operation, types of generators, emf equation, characteristics, applications, armature reaction and commutation, types of motors, torque, speed and power characteristics, applications, starting losses and efficiency, speed control, testing, load test of dc machines.

Module III

AC Machines: Alternator – rotating field, speed and frequency, effect of distribution of winding, coil span, characteristics, emf equation, losses and efficiency, regulation (emf method only) ,applications, synchronous motor- principle of operation, over excited and under excited, starting, applications, synchronous capacitor.

Module IV

Induction Motor: Three phase induction motor, principles of operation, constructional features of squirrel cage and slip ring motors , torque-slip characteristics, starting, speed control, losses and efficiency.

Single phase induction motor: Principle of operation, types of single phase induction motors.

Module V

Generation, transmission & distribution of electrical energy:

Different methods of power generation –thermal, hydro-electric, nuclear, diesel, gas turbine stations (general idea only), electrical equipments in power stations , concept of bus bar, load dispatching, methods of transmission, overhead lines and insulators, corona skin effect of DC & AC distribution, substation (elementary idea only)

References:

1) Electrical machines : By F.S.Bimbra, Khanna publications.
2) Advanced Electrical Technology : By H.Cotton, Wheeler Publications.
3) Electrical Machines : Nagrath & Kothari (TMH)

CS / IT 303 DISCRETE MATHEMATICAL STRUCTURES

1. Introduction to set theory-sets and subsets-operation on sets- sequences-characteristic functions- Introduction to logic propositions and logic operations- methods of proof – mathematical induction. Counting- Permutations and combinations – elements of probability.
2. Relations and Digraphs – properties of relations – paths in relation and digraphs- Equivalence relations and partitions- operations on relations. Functions- Composition of functions- functions for computer science.
3. Introduction to graph theory- graphs – Eulerian paths and circuits – Hamiltonian paths and circuits – coloring of graphs – trees – minimal spanning trees.
4. Algebraic systems – Semi groups and monoids. Groups-subgroups and homomorphism-group codes – error correcting codes.
5. Partially ordered sets – Hasse diagram- isomorphism –external elements-lattice-properties of lattices.

References

1) J.P.Tremblay, R.Manohar, "Discrete Mathematical Structures with Applications to Computer Science, McGrawHill
2) Bernard Kolman, et.al., "Discrete Mathematical Structures ", 3rd ed., Prentice Hall India, New Delhi, 1999
3) John Truss, "Discrete Mathematical Structures for Computer Science", Addison Wesely
4) Seymor Lipchutz, Marc Lipson, "Discrete Mathematics", Tata McGraw-Hill

IT 304 ELECTRONIC CIRCUITS AND LOGIC DESIGN

Module I

Amplification: CE amplifier – Low, Medium & high frequency analysis and design of RC coupled amplifier – FET construction & characteristics - classifications class A, Class B, Class C amplifiers – transformer coupled amplifier - Push pull amplifier- Negative & positive feedback.

Module II

Pulse Circuits: Pulse shaping using RC circuits – differentiating integrating circuits- clipping – clamping using diodes and transistors – UJT – construction – characteristics- relaxation oscillator-Tunnel diode, SCR- Theory of operation and characteristics.

Operational Amplifier: - Differential amplifier common mode and difference mode operation – characteristics of ideal opamp block diagram – CMRR – Drift and offset problems.

Module III

Number system – Binary – HEX and other number systems – conversion from one radix to another - Boolean algebra – ASCII – EBCDIC –Grey Code- Excess 3 code – Code Conversion – parity checking.

Basic logic gates – positive and negative logic – OR, AND, NAND, NOR, XOR and NOT gates – K map- Half adder –Full adder – subtractor - serial parallel addition- binary multiplication and division.

Module IV

Logic families - TTL, RTL, ECL, CMOS - tristate logic – specification – noise consideration – interfacing of CMOS to TTL and interfacing of TTL to CMOs.

Sequential circuits: Flip-flops – RS, JK, T and D flip flops – conversions – shift registers-counters- asynchronous counter – synchronous counter – up down counter- ring counter.

Module V

MSI – LSI circuits – multiplexer – demultiplexer- encoder – decoder - programmable logic arrays – programmed logic – advantage and disadvantages – data transmission principle – RAM, ROM, PROM, EPROM, BJTRAM CELLS – MOSRAMS.

References :

1) H.H.Taub and D.schgilling : Digital Integrated Electronics
2) R.Sandigi : Digital concepts with standard Integrated circuits
3) H.Blackly and John Viley : Digital Design with standard MSI and LST
4) Milman and Halbias : Electronic devices and circuits
5) Milman and Halbias : Integrated Electronics
6) Milman and Taub : Pulse and Digital circuits
7) Boyelstead : Electronic devices & Integrated circuits.

IT 305 OBJECT ORIENTED PROGRAMMING

Module I

Object –Encapsulation – Class- Class Structure- Implementation of a class- Persistance-Object identity-Inheritance-overriding-Polymorphism-abstract class-Multiple Inheritance-Repeated Inheritance-Object Oriented Design Process

Module II

C++ Class - class scope – constructor – creating an object or an instance – destructor- copy constructor – The dot operator - this pointer - pointer to an object- Array- Composite class definition- constructor for composite object- destructor for composite object- access control for component object –Special C++ Features

Module III

Static Member – friends to a class – pointers- Derived Class – copy constructor under derivation - virtual function - Multiple Inheritance Repeated inheritance.

Module IV

Operator Function Definition – Arithmetic operator- Logical operator-Relational operator – Operator [ ] – operator ( ) –Assignment operator – Dereferencing operator- Extraction operator –Insertion operator –Conversion operator

Module V

Class Template Definition –Template Class instantiation – Template Class Specialisation – Function Templates – Template Class Static member – Multiple Template Parameters

Text Book

1. Object Orientation Through C++ - Parimala N, Macmillian India Ltd.

Reference:

1) Programming in C++- Balaguruswamy, TMH

IT 306 LOGIC DESIGN LAB

A. ANALOG

1. Study of Multimeters, Signal Generators, CRO etc and measurement of electrical quantities.

2. Testing of active and passive components – Resistors , Capacitors, Inductors, Transformers, Diodes, Transistors etc.

3. Characteristics of active devices:
   i. Forward and reversed characteristics of a diode measurement of forward resistance .
   ii. Common base characteristics of a transistor – measurements of current gain, input resistance and output resistance , maximum ratings of the transistor.
   iii. Common emitter characteristics of a transistor – measurement of current gain, input resistance and output resistance, relation between and study of the effect of leakage current, maximum ratings of the transistor.

4. Rectifying circuits: FW Rectifier – HW Rectifier – FW Bridge Rectifier Filter circuits – capacitor filter , inductor filter and FT section filter (Measurement of ripple factor maximum ratings of the devices)

5. Study of RC and RLC circuits – Frequency response, pulse response, Filter Characteristics, Differentiating circuit and integrating circuit.

6. Clipping and clamping circuits using diodes/transistors

B. DIGITAL

1. Transfer characteristics and specifications of TTL and MOS gate.

2. Design of half adder and Full adder using NAND gates, set up R-S & J-K flip flops using NAND gates.

3. Asynchronous UP/DOWN counter using J-K F/Fs.

4. Study of shift registers and design of Ring counter using it.

5. Study of IC counter 7490,7492,7493 and 74192.

6. Study of MUX & DEMUX

IT 307 OBJECT ORIENTED PROGRAMMING LAB

Fifteen Lab Exercises covering

Functions

Arrays

Pointers

Structures

Classes and Objects

Inheritance

Polymorphism

Data file operation

CEACS/EB/EC/EE/EI/IT/ME/MRE/SE 401 ENGINEERING MATHEMATICS IV

Module I

Complex Analytic functions and conformal mapping : curves and regions in the complex plane, complex functions, limit, derivative, analytic function, Cauchy - Riemann equations, elementary complex functions such as powers, exponential function, logarithmic, trigonometric and hyperbolic functions.

Conformal mapping: Linear fractional transformations, mapping by elementary functions like e^z, sin z, cos z, sin hz, and cos hz, Schwarz - Christoffel transformation.

Module II

Complex integration: Line integral, Cauchy's integral theorem, Cauchy's integral formula, Taylor's series, Laurent's series, residue theorem, evaluation of real integrals using integration around unit circle, around the semi circle, integrating contours having poles, on the real axis.

Module III

Numerical Analysis : Errors in numerical computations, sources of errors, significant digits. *Numerical solution of algebraic and transcendental equations*: bisection method, regula falsi method, Newton - Raphson method, method of iteration, rates of convergence of these method,

Solution of linear system of algebraic equations: exact methods, Gauss elimination method, iteration methods, Gauss-Jacobi method.

Polynomial interpolation : Lagrange interpolation polynomial, divided differences, Newton's divided differences interpolation polynomial.

Module IV

Finite differences: Operators ?,?,?, and ?,Newton's forward and backward differences interpolation polynomials, central differences, Stirlings central differences interpolation polynomial.

Numerical differentiation: Formulae for derivatives in the case of equally spaced points.

Numerical integration: Trapezoidal and Simpson's rules, compounded rules, errors of interpolation and integration formulae. Gauss quadrature formulae (No derivation for 2 point and 3 point formulae)

Module V

Numerical solution of ordinary differential equations: Taylor series method, Euler's method, modified Euler's method, Runge-Kutta formulae 4^{th} order formula,

Solution of linear difference equations with constant co-efficients: Numerical solution of boundary value problems, methods of finite differences, finite differences methods for solving Laplace's equation in a rectangular region, finite differences methods for solving the wave equation and heat equation.

Reference:

1) Ervin Kreyszig : Advanced Engineering Mathematics, Wiley Eastern
2) S.S.Sastry : Introductory Method of Numerical Analysis, PHI
3) Ralph G. Stanton : Numerical Methods for Science and Engg., PHI
4) S.D.Conte and Carl de Boor : Elementary Numerical Analysis An Alograthmic approach McGraw Hill
5) M.K.Jani, S.R.K Iyengar and R.K. Jain : Numerical Methods for scientific and Engineering Computations. Wiley Eastern.
6) P.Kandaswamy K.Thilagavathy : Numerical Mehtods , S.Chand & Co.
7) E.V.Krishnamurthy, S.K.Sen : Numerical Algorithms, Affiliated East West.

IT 402 MICROPROCESSOR ARCHITECTURE AND SYSTEM DESIGN

Module I

Introduction to microprocessors: Evolution of microprocessors – Organisation of a microcomputer – Intel 8085architecture – CPU Registers- ALU, Decoders, Bus system- Tristate Logic – Opcode and operands – Instruction word size – Instruction cycle – Timing Diagram – Introduction to RISC and CISC processors and transputer processors.

Module II

Instruction set: Instruction and data formats – Addressing modes –Status flags – Intel 8085- Instruction set – Memory and I/O- Interfacing memory sections – Timing Analysis –DMA- structure - I/O Interfacing – Intel 8085 I/O structure – programming examples.

Module III

Interrupt structures: Need for interrupt structures – Handling of specific source of interrupts – software interrupts – Hardware interrupts – Programmable interrupts controllers – 8259-PIC

Peripheral devices and interfacing : I/O ports – Programmable peripheral interface- Architecture of Intel 8255 – Programmable DMA controller – 8257- Data transfer schemes – Asynchronous and synchronous interrupt driven data transfer – multiple interrupts.

Module IV

Need for microprocessor based design : 8279 keyboard/display controller – 6845 CRT controller – temperature controller – keyboard interface- display interface – ADC/DAC interface – stepper motor control –microprocessor based frequency counter – interfacing of digital multiplexer / data selector.

Module V

Introduction to 16 & 32 bit microprocessors. Intel 8086,Intel 80386 – Registers- addressing Schemes – Instruction set- Memory addressing and access schemes of 80386 – Simple programming examples with assembler directives.

References:

1) R.S.Gaonkar : Microprocessor architecture programming & Application
2) Douglas .V.Hall : Microprocessor & Interfacing
3) Mohammed Rafiquzzaman : Microprocessors & microcomputer system design
4) A.P.Mathew : An Introduction to microprocessors
5) Barry B.Brey : Intel Microprocessors.
6) Microprocessors and Interfacing – Hall, TMH Publications

IT 403 DATA COMMUNICATIONS

Module I

Introduction – Various types of communication systems- Modulation – Need for modulation - different types – definition – Expression , modulation index ,bandwidth – Modulator – (Block level treatment) – AM Modulator – Balanced Modulator – FM Modulator – Phase Modulation

Module II

Transmitters (Block level Treatment) – AM Transmitter – Low level , High level, AM stereo transmitter – FM stereo transmitter – receivers (Block level treatment) – AM receiver – Image frequency – Super heterodyne receiver – AM stereo receiver – FM receiver- FM stereo receiver

Module III

Digital Transmission: Advantages of digital transmission – sampling- Encoding – Pulse communication (Block level) – Pulse modulation – PAM, PWM, PPM- Modulation schemes – ASK, FSK, PSK, Quardature PSK, QAM, data compression, bandwidth consideration-Two tone modulation- PCM, Delta modulation, PCM transmitter –FSK & PSK transmitter.

Module IV

Components in a data communication system – transmission path – transmission rate – bandwidth requirements – Shannon's theorem – channel capacity – Bandwidth, Signal/Noise Trade off - Modems- Switching – multiplexing – Terminals –digital PBXs.

Module V

Error in transmission – factors contributing to error – major impairments – error detection and forward error correction – parity code – hamming code – block codes- convolution and cyclic codes- ARA approach to error control

References:

1) Housley, "Data Communication"
2) Kennedy, "Electronic Communication System"
3) Taub & Schilling , "Communication Systems"
4) Uyless D Black , "Data Communication and Distributed Networks"
5) Data and Computer Communication – Stalling, PHI

IT 404 COMPUTER ORGANIZATIONS

Module I

Basic structure of computer hardware and software – Addressing methods and machine program sequencing- different addressing modes – instruction sets – Computer Arithmetic – Logic design and fast adders – multiplication -Booth's algorithm – Fast multiplication – integer division – floating point numbers

Module II

Control Unit –Instruction execution cycle- sequencing of control signals – hardwired control – PLAs – microprogrammed control – control signals – microinstructions – microprogram sequencing – Branch address modification- Pre fetching of microinstructions – emulation- Bit-slice processors

Module III

Memory Organisation – Semiconductor RAM memories-internal organisation-Bipolar and MOS devices- Dynamic Memories- multiple memory modules and interleaving-cache memories-mapping functions-replacement algorithms-virtual memory – address translations-page tables-memory management units-Secondary memory-disk drives-organisation and operations- different standards

Module IV

Input-Output organisation – accessing I/O devices – Direct Memory Access(DMA)-interrupts-interrupt handling-handling multiple devices- device identification- vectored interrupts-interrupt nesting-Daisy chaining-I/O interfaces –serial and parallel standards – buses-scheduling-bus arbitration-computer peripherals-printers-plotters-VDUs-Introduction to computer communications- synchronous and asynchronous communication-circuit switching and packet switching-Local Area Networks (LAN)

Module V

Introduction to systems software – Assemblers-Loaders and Linkers-Compilers-Operating systems-Structures-functions-Introduction to parallel processing and architecture-classification-array processors-pipe line architecture- interconnection networks-multistage networks-message passing architecture

Text Books :

1. Hamacher C V, "Computer Organisation –3rd Edition", McGraw Hill, New York, 1990

References:

1) Pal Chaudhary P, "Computer Organisation and Design", Prentice Hall, New Delhi, 1995.
2) Bartee TC, "Digital Computer Fundamentals", McGraw Hill, New York, 1977.
3) Hayes J P, "Computer Organisation and Architecture –2nd Edition", McGraw hill, New York, 1988.
4) Tannenbaum A S, "Structured Computer Organisation – 3rd Edition", Prentice Hall, New Jersey, 1990.

CS/IT 405 DATA STRUCTURES AND ALGORITHMS

Module I

Introduction to data structures - Arrays . Sparse matrices. Strings –representation. Implementation of abstract data type (ADT) string, Linked Lists, Representation of Polynomials using linked lists, Doubly linked lists, Garbage collection, Buddy systems.

Module II

Stacks, Implementation of ADT stack using arrays and lists, Typical Problems, Conversion of infix to postfix, Evaluation of postfix expression ,Queues and dequeues implementation, Priority queues.

Module III

Trees definition and mathematical properties .Binary trees. Binary tree traversal – preorder, inorder and postorder. Expansion Trees. Threaded binary trees. Representation of trees using binary trees. Search trees. Balanced binary trees.

Module IV

Graphs. Mathematical Properties – Degree – Connectedness. Directed graphs- Directed acyclic graphs. Representation using matrix. Graphs traversal. Shortest path, minimum spanning tree - Kruskal algorithm.

Module V

Sorting and searching – linear and binary search – bubble sort, insertion sort, quick sort , heap sort ,merge sort- symbol tables. Hash tables, hashing functions. File structures. Random access files , Indexed sequential files. B-Trees and B+ trees. External sorting algorithms.
Merge sort and Bucket sort.

Note: The course should be taught using Object Oriented Programming Language JAVA.

References:

1) Ellis Horowitz and Satraj Sahni, “An introduction to data structures”, Computer Science Press, Rockville,MA,1984
2) Gregory L. Heileman, “Data structures, Algorithms and object oriented Programming”, McGraw Hill, New York, 1997.
3) Jean Paul Tremblay & Paul G Sorenson, “An introduction to data structures with applications”, McGraw Hill, Singapore 1984.
4) Mark Allen Weiss, “Data structures and algorithm analysis in JAVA”, Peachpit Press, 1998.
5) Mark Allen Weiss, “Data structures and algorithm analysis in C++”, Benjamin/Cummings publishing company Inc., Redwood city, CA, 1991
6) Michael T. Goodrich & Roberto Tamassia, “ Data structures and algorithms in JAVA “, John Wiley and Sons,Inc.,1999
7) Michael Waite & Robert Lafore, “Data Structures and Algorithms in Java”, Techmedia, New Delhi, 1998
8) Shahani, Data Structures and Algorithms and Applicationin JAVA, TMH
9) Thomas A Standish, Data Structures in JAVA, Addison Wesley

IT 406 PC HARDWARE AND MP LAB

Part A - **PC HARDWARE LAB**

Study of SMPS, TTL and composite type monitor circuits, Emulator, Logic state analyser, Serial port, Parallel port, Mother board, CGA card, Floppy disk controller, Hard disk controller, Printer Interface, Keyboard Interface

Diagnostic Softwares, Diagnostic card, Designing and programming add on cards

Floppy Disk drive:

Alignment, Programming, Formatting

Hard Disk drive:

Partitioning, Familiarisation of disk maintenance, Software Tools.

Trouble shooting and maintenance

Preventive and maintenance, Common maintenance problems

Familiarisation:

Device drivers, Microcontrollers, Transputers

Part B - MICROPROCESSOR LAB

1. Study of typical microprocessor trainer kit
2. Simple Programming examples using 8085 instruction set to understand the use of various instructions and addressing modes – Monitor routines – at least 20 examples
3. Programming examples to initialise 8251 and to understand it's I/O operations
4. Programming examples to initialise 8255 and to understand it's I/O operations
5. Programming examples to initialise 8253 and to understand it's I/O operations
6. Programming examples to initialise 8279 and to understand it's I/O operations
7. Demonstration of

   Cassette Interface
   Programming EPROM 2716,2732 etc
   A/D and D/A convertor Interface
   Interface 8255 poet to high power devices
   Stepper Motor Interface

IT 407 DATA STRUCTURES LAB

1. Simple Programming Exercises with JAVA
2. Stack and Queues and their Applications
3. Linked List
4. Tree Traversal and Set Representation
5. Exercises in graph Representation of application
6. Sorting, Searching & Merging

IT 501 SYSTEM PROGRAMMING

Module I

Introduction system software and machine Architecture . – Instruction formats and Addressing modes – program relocation – linking – one pass and two pass assemblers – symbol tables.

Module II

Loaders and Linkers – absolute and bootstrap loader . Data structures for Linkers and Loaders linkage editors dynamic linking

Module III

Macros – macro definition and expansion . Algorithms and data structures. Conditional macro expansion . General of unique labels . Recursive macro expansion.

Module IV

Compilers – Introduction to grammars – lexical analysis and parsing . Different types of parsers .Intermediate code generation. Storage allocation . Code generation and optimization.

Module V

Operating systems . General structure . Process management and scheduling . Interprocess communication. Memory management virtual memory – paging and segmentation . File and device management – file system concepts.

Reference

1. Leland L.Beck , “System Software – An Introduction System Programming “, Addison Wesely
2. D.M.Dhamdhere , “System Programming and Operating Systems”, 2nd Ed., Tata Mcgrawhill
3. Micheal Palmer,”Guide to Operating System” –Vikas Thomson Learning Publishing, New Delhi.
4. Kenneth C Louden, “Compiler Construction- Principles & Practices” –Vikas Thomson Learning Publising, New Delhi.
5. Dick Grune,”Modern Compiler Design”-Wiley Dreamtech, India P Ltd, New Delhi.

CS/IT 502 SOFTWARE ENGINEERING

Module I

Software Life Cycle – Waterfall Model – Prototyping – Object Oriented Analysis – Object, Dynamic & Functional Models – SRS – Format for SRS – Data Dictionary

Module II

Design: Principles – Cohesion & Coupling – Abstraction.

Object Oriented Design:- System Design – Object Design – Designing Algorithms – Design of association – Design Implementation

Module III

UML: Structural Modeling:

Developing UML Object diagrams – Basic Components of Object Diagrams – Classes – Interfaces – Packages

UML: Behavioural Modeling: Use Case Diagrams – Activity Diagrams – State Chart Diagrams

Module IV

UML Architectural Modeling:

Component Diagrams – Deployment Diagrams – Unified Process

Case Study: - Applying Object Oriented Methodologies in Software Development

Module VI

Case Tools: - A Study on Computer Aided Software Engineering – Workbenches – General Study on Case Tool usage in various phases

Case Study: - Preparing SRS, Plan and Object Oriented Design of typical Software project.

References:

1) Pankaj Jalote ,An Integrated approach to Software Engg: ,Narosa Publishers
2) Roger. S. Pressman.,Software Engg – A Practioner's approach (Mc. Graw Hill Publishers)
3) Stephen Albin "The Art of Software Architecture, Design Methods & Techniques"-Wiley DreamTech India P Ltd.
4) Mordechai Ben-Menachem, Garry S Marliss, "Software Quality: Producing Practical, Consistent Software–Vikas Thomson Learning Publising, New Delhi.

IT 503 OPERATIONS RESEARCH

Module I

Linear Algebra : Review of the properties of matrices and matrix operations, partitioning of matrices, vectors and Euclidean spaces , unit vectors , sum vectors, linear dependence, bases, spanning set , rank, product form of inverse, simultaneous equations , basic solutions, point sets, lines and hyper planes, convex sets, extreme points, fundamental theorem of linear programming.

Module II

Linear Programming : Statement of LP problem, slack and surplus variables, basic feasible solutions, reduction of feasible solutions to basic feasible solutions, artificial variables, optimality conditions, unbounded solutions, Charne's M method, two phase method, degeneracy, duality .

Module III

Transportation, Assignment & Game problems : the transportation problem, the coefficient matrix and its properties , basic set of column vectors , linear combination of basic vectors, the tableau format, stepping stone algorithm, U-N method , inequality constraints, degeneracy in transportation problem , Koening's method

Module IV

Rectangular zero sum games : Von Neumans' theorem, saddle points, pure and mixed strategies , formulation of primal and dual LP problem for mixed strategies, dominance graphical solution.

Module V

Queueing theory : Basic structure of queueing models, exponential and poisson distribution, the birth and death process , queueing models based on poissons input and exponential services time, the basic model with constant arrival rate and service rate, finite queue, limited source Q models involving non exponential distributions, single service model with poission arrival and any services time distribution , poission arrival with constant service time , poisson arrival with constant service time , poission arrival and Erlang service time priority disciplines.

References

1) Hadely G. : Linear Programming(Addision Weselys)
2) Hiller & Lieberman : Operation Research (Holden – Day – Inc)
3) H.A Taha : Operation Research (Prentice Hall)
4) Sasieni, Yaspen & Friedman : Operation Research
5) Gue & Thomas : Operation Research
6) S.Kalavath : Operation Research-Vikas Thomson Learning Publishing, NewDelhi
7) N.G.Nair : Resource Management-Vikas Thomson Learning Publishing,NewDelhi
8) C.R.Kothari : Introduction to Operational Research- Vikas Thomson Learning Publishing, NewDelhi

IT 504 Automata Languages and Computation

Module I

Finite State systems – Non Deterministic Finite Automata and Deterministic Finite Automata. Equivalence of NFA and DFA. Equivalence of NFA with and without epsilon moves.

Module II

Regular expressions – Equivalence of Finite Automata and regular expressions. Finite Automata with output. Moore and Meelay Machines. Equivalence of Moore and Meelay machines. Applications – Lexical Analysers. Properties of regular sets. Pumping Lemma for regular sets. Closure properties. Decision algorithms. Myhill Nerode's theorem and Minimisation of Finite Automata. Minimisation algorithm.

Module III

Context Free Grammars – Derivation of Languages – Derivation trees. Ambiguity. Simplification. Chomsky Normal Form and Greibach Normal Form. Push Down. Automata. Deterministic Push Down Automata. Equivalence of Push Down Automata and Context Free Languages. Pumping Lemma for Context free languages. Closure properties. Decision Algorithms.

Module IV

Turing machines – Computation – languages and functions. Techniques for Turing machine construction – storage in finite control – multiple tracks – checking of symbols, shifting over - subroutines. Non Deterministic Turing machines.

Module V

Undecidability – Recursive and recursively enumerable functions. Universal Turing machine. Halting problem of Turing machine. Chomsky Hierarchy – Equivalence of regular grammar and Finite Automata. Equivalence of Unrestricted grammar and Turing Machine. Context Sensitive Grammars. Equivalence of Context Sensitive languages and Linear Bound Automata (LBA). Relation between classes of Languages.

Text Books

1. J.E. Hopcroft, J.D. Ullman, "Introduction to Automata Theory, Languages and Computation", Addison Wesley, 1990.
2. K.L.P. Misra, N. Chandrasekharan, "Theory of Computation", Prentice Hall, 1998.

References

1) H.R. Lewis, Shistos H. Papadimitrou, "Elements of Theory of Computation", Prentice Hall India, New Delhi, 1991.
2) John Martin, "introduction to Language and Theory of Computation", Tata McGraw-Hill, New Delhi, 1998.
3) Peter Linz, An Introduction to Formal Languages and Automata, Narosa Publications, 2000
4) Thomas A. Sudkamp, "languages and Machine – An Introduction to Computer Science", Addison Wesley, Reading, MA, 1990

CS / IT 505 Data Base Management Systems

Module I

Introduction: Characteristics of the Database approach – Data models, schemas and instances – DBMS architecture – Data independence – Database languages and interfaces – Database administrator – Data modeling using Entity - Relationship (ER), Entity sets, attributes and keys - Relationships, Relationship types, roles and structural constraints - Weak Entity types - Enhanced Entity-Relationship (EER) and object modeling. Sub classes, super classes and inheritance - Specialization and generalization.

Module I

Record storage and file organizations: Placing file records on disks – Fixed length and variable length records – Spanned Vs unspanned records – Allocating file records on disk– Files of unordered records(Heap files), Files of ordered records(Sorted files).- Hashing Techniques. Indexed structures for files – Types of single level ordered index, multi-level indexes - B - trees and B^+ trees, Indexes on multiple keys, Other types of indexes.

Module III

The Relational model: Relational model concepts – Relational model constraints - The Relational Algebra – Relational calculus – Tuple Relational calculus, Domain Relational calculus. - SQL.

Database Design: Functional dependencies – Basic definitions – Trivial and non trivial dependencies – Closure of a set of dependencies – Closure of a set of attributes – Irreducible sets of dependencies – Non loss decomposition and Functional dependencies. First, Second and Third normal forms – Boyce-codd normal form.

Module IV

Transaction processing - Desirable properties of Transactions, Schedules and Recoverability - Serializability of Schedules. Concurrency Control Techniques - Locking techniques, Time Stamp Ordering, Multi version concurrency control techniques, Granularity of data items. Database recovery techniques - Database recovery techniques based on deferred update and immediate update, Shadow paging, ARIES recovery algorithm. Database security and Authorization - Security issues, Access Control based on granting/revoking of privileges, Mandatory access for Multilevel Security.

Module V

Distributed databases: Motivation for distributed databases – concepts – Types of distribution – Distributed Query Processing – Commit Protocol for distributed databases.

Introduction to object oriented databases, Active databases. Data warehouses – Data mining.

References:

1) Elmasri and Navathe, *"Fundamentals of Database Systems"* , 3/e, Addison - Wesley, 2001.
2) A. Silberschatz, H. F. Korth, and S Sudarshan, *"Database System Concepts"*, 3/e,Tata McGraw Hill, 1997
3) C.J Date, *" An Introduction to Database Systems "*, Addison-Wesley, 1995
4) M.Tamer Ozsu & Patric Valduriez , *"Principles of Distributed Database Systems"*.
5) Margaret.H.Dunham ,*"Data Mining. Introductory and advanced topics"* , Pearson Education,2003.
6) Hector Garcia-Molina,Jeffret D. Ullman, Jenniffer Widom ,*"Database System implementation"* ,Prentice Hall International , Inc,2000.
7) Alexis Leon ,"Database Management System",Vikas Thomson Learning Publishing, N Delhi
8) V K Jain "DBMS", Wiley Dream Tech India P Ltd, N Delhi
9) Philip J Pratt, "Concept of DBMS", Vikas Thomson Learning Publishing, N Delhi

IT 506 MINOR PROJECT – RDBMS BASED

Any of the following projects or similar one using relational database systems like UNIFY, INGRESS, ORACLE, SYBASE, INFORMIX, Visual Foxpro etc

1. Hospital Automation
2. Bank Transaction Management
3. Hotel Management
4. Scheduling in Power Plant
5. Promotion Management for a Firm
6. Manufacturing System Database
7. Placement Center Database Management
8. Gas Agency Management
9. Office Automation
10. Railway Reservations
11. Computerizing Course Reservation
12. Hostel Management
13. Managing of Research Laboratory Activities
14. Business Transaction in an Industry
15. Inventory Management
16. Cricket Board Database
17. Carrier Planning
18. Employee Database
19. Production Management
20. Natural Resources Database
21. Salary Payment Database
22. Airless Reservations
23. Finance Database Management
24. Transport Management System
25. Library Management System
26. College Admission
27. Question Paper Bank

IT 507 SYSTEM PROGRAMMING LAB

Programming Assignments

1. Introduction to assembly Language Programming in a suitable Assembly language
2. Symbol Tables

3. Different passes of the compiler

IT 601 FINANCE MANAGEMNT AND CORPORATE TAX PLANNING

Module I

The basic concepts of Accounting: The separation of ownership and control, The users of accounts, Computers and users of accounts, Accounting concepts and conventions, Accounting equation, Balance sheet, Classifying items, The processing function. Book-Keeping: The double-entry system, Double-entry of expenses, Asset of stock, Capital and revenue expenditure, Balancing accounts on computers, The trial balance, The final accounts, Depreciation, Bad debts and provision for bad debts, Division of the ledger, Books of original entry, Source documents, Accounting systems, Interpretation of accounts.

Module II

Costing: Cost Accounting, Classifying costs, The implications for programming, The operating statement, the cost of raw materials, the cost of direct labour, the cost of overheads, job costing, Break-even analysis, Break-even graphs, Budgeting, Standard costing, Variance analysis, Marginal costing. Ratio Analysis: Ratio meaning, profitability ratios, profit in relation to sales, profit in relation to investments, Liquid ratios, Solvency ratios, other ratios, Activity ratios, Eps, DuPont Financial analysis, ratios for predicating bankruptcy, Inter-fim comparison, ratios limitations.

Module III

Fund Flow Statement : Meaning, Importance , Definition of terms, Funds and Flow, Sources and use of funds, Changes in working capital, Preparation of funds flow statements, cash flow statements, Sources and uses, preparation. Cost Reduction: Difference between cost control and cost reduction, Prequisites for an effective cost reduction, Concept of value analysis- crux of the cost reduction, steps involved in introducing a cost reduction program, some examples of cost reduction, Common limitations.

Module IV

Capital Investment Decisions: Capital Investment- Meaning, Types, Significance of capital investment decisions. Classification of investment proposals – mutually exclusive, independent and contigent projects; Capital budgeting process, feasibility reports, Its segments – technical, commercial, financial and economic aspects, cash flows – estimation. Evaluation Techniques: Pay back period, accounting rate of return, NPV, profitability index, IPR, NPV and IRR relationship, Independent projects and capital rationing, Mutually exclusive projects – Projects with equal lives ,unequal lives , capital budgeting and prolice level changes, capital budgeting and risk.

Module V

Inflation accounting : Impact of inflation in financial statements, Adjustment for price level changes: Approaches –Periodical evaluations, current purchasing power, current cost accounting, Legal requirements of companies Act, Finance management including the management of cash, accounts receivables and inventories. Emerging trends in Accounting and Finance: Business competitiveness, and emerging trends, Leasing: Financial lease and Operating lease, Financial lease and infrastructure lease,. Financial reporting: Compliance reporting –accounting standards and creative accounting, Voluntary reporting, value added statements , human resource accounting.

Direct Tax Laws, computation of income from salary, business operations/profession, capital gains, rebates and reductions.

References

1) Finance & Accounting for Managerial Competiveness - Nand Dharmeja & K.S. Sastry, Weeler Publishing, Allahabad 1994
2) Computerised Accounting -P.H. Bassett, NCC Blackwell Ltd. , Oxford, 1994
3) Adbvanced Accounts -M.C Shukla & T.S.GrewalS.Chand & Co. , New Delhi
4) Direct Taxes: Laws & Practice - Dr. Vinod K. Singhania, Taxmans Publications, 1996.
5) Theory and Problems in Financial Management - Khan and Jain tata Mc Graw Hill
6) Financial Management -I.M.Pandey,Vikas Thomson Learning Publishing,NewDelhi

CS/IT 602 Operating Systems

Introduction to Operating Systems. Extended Machine - Operating System Structure . Processes - Interprocess Communication - Race Conditions - Critical Sections - Mutual Exclusion - Busy Waiting - Sleep And Wakeup - Semaphores - Event Counters - Monitors - Message Passing. Process Scheduling - Round Robin Scheduling - Priority scheduling - multiple queues - Shortest Job First - Guaranteed scheduling - Two-level scheduling.

Memory management. Multiprogramming. Multiprogramming and memory usage - Multiprogramming with fixed partitions. Swapping - multiprogramming with variable partitions - Memory management with bit maps, linked lists, Buddy system - allocation of swap space. Virtual memory - paging and page tables, associative memory - inverted page tables. Page replacement algorithms. Design issues for paging systems - Working set model. Example systems.

File systems and I/O files. Directories - File system implementation - security and protection mechanisms. Principles of I/O hardware - I/O devices - device controllers - DMA. Principles of I/O software - interrupt handlers - device drivers - Disk scheduling - clocks and terminals.

Deadlock - conditions for deadlock - deadlock modelling. Deadlock detection and recovery. Deadlock avoidance - resource trajectories - safe and unsafe states - bankers algorithm. Deadlock prevention. Two phase locking – non-resource deadlocks - starvation.

Introduction to distributed operating systems - distributed systems - design issues. Client server model. Remote procedure call. Synchronisation in distributed systems - clock synchronisation - concurrency control - Deadlocks in distributed systems. Process management - threads - system models - processor allocation algorithms - distributed file systems.

Case Study

UNIX / LINUX operating system

Text Book

Andrew S. Tanenbaum, “Modern Operating Systems”, Prentice Hall, 1991

Reference

1) Bach, M.J., “Design of UNIX Operating System”, Prentice Hall
2) Charles Crowley, “Operating systems – A Design Oriented Approach”, Tata McGrawhill, 1997
3) D.M.Dhamdhere, “System Programming and Operating Systems”, Tata McGraw-Hill,1996
4) Deital, H.M., “Operating Systems”, Addison Wesley, 1992
5) Garry Nutt, “Operating Systems – A Modern perspective ”, Second Edition, Addison Wesley, 2000
6) Pradeep K.Sinha, “Distributed Operating Systems”, Tata McGrahill, 1998
7) Silberschatz et.al., “Operating System Concepts”, Addison Wesley, 1993
8) William Stallings, “Operating systems”, Prentice Hall, 1997
9) Michel Palmer “Guide o Operating Systems”, Vikas Thomson Learning Publishing, N Delhi

IT 603 ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

Module I

Introduction to AI : Problems, Techniques and programming Languages. Introduction to LISP : List manipulations, functions, predicates, and conditionals , input , output and logical variables, iteration and recursion. Lists and arrays. Introduction to PROLOG

Module II

Knowledge representation : Syntax and semantics , properties of coefficients, conversion to casual form , inference rules, resolution principle, introduction to predicate logic, inter maintenance systems , default reasoning, predicate completion and circumspection, model and temporal logic fuzzy logic, natural language computations. Probabilities reasoning: Baye's probabilistic references and Dempster –Shafer theory and heuristic methods.

Module III

Structured Knowledge : Introduction to graphics , Frames and related structures. Knowledge organisation and manipulation : breadth first search, depth first search, rendering and retrieval techniques , frame problems.

Module IV

Expert System Architecture : Rule base architecture, Non production system architecture, knowledge system and building tools, Knowledge acquisition concepts , types learning, general learning model , performance measures, learning by induction, The INUCE system.

Reference

1) Dan W Peterson : Introduction of Artificial Intelligence and Expert Systems, PHI
2) E. Rich and K Knight : Artificial Intelligence, Tata Mc Graw hill.
3) Joseph Giarratano : Expert Systems-Vikas Thomson Learning Publishing, NewDelhi
4) M Tim Jones,"A I Applications Programming", Wiley Dreamtech India P Ltd.
5) John. F .Sowa : Knowledge Representation-Logical, Philosophical & Computational Foundation, Vikas Thomson Learning Publishing, N Delhi

IT 604 TELECOMMUTING

Module I

An Overview of Telecommuting Industry : Definition of Telecommuting, Buyers of Telecommuting Services, Computing and Communications Equipments, Introduction to Networking Solutions, Applications Solutions, Networks and Applications Solution Providers, Analytical Methodologies in support of Telecommuting, course of Investigation.

Module II

Telecommuting Demand Characteristics : Telecommuting Demand Size and Distribution, Telecommuting Demand Drivers and Inhibitors, Corporate Telecommuting Program Participants, Basic Communication Applications for Administrative Telecommuters : Who are the Administrative Telecommuters Networking Requirements of Information System Managers, Networking Solutions

Module III

High-Bandwidth Communications Applications for Technical Telecommuters : Who are the Technical Telecommuters ?, Technical Telecommuting Applications, Networking Requirements of Technical Telecommuters, Networking Solutions, Mobile Data and Video Communications Applications for Marketing Telecommuters : Who are the Marketing Telecommuters, Networking Solutions. Computer/Telephone Integration Applications for Home Agents ? Communications Requirements of Call Center Managers, Networking Requirements of IS Managers, Computer Telephone Integration Solutions, CTI Networking Solutions, CTI Cost, the Benefits and Risks of CTI Private and Public Applications-Level Solutions : IS Management Requirements, Groupware Solutions, The Internet, The Van Solution, Van/Internet Complementarity.

Module IV

Emerging Telecommuting Services : Native Mode LAN Interconnection Service, Emerging Telecommuter/Corporate office Networking Solutions, Integrated Telephony Services for Telecommuters.

Module V

The Network Service Providers; Current Network Service Providers, The Local Exchange Carriers, The Inter Exchange Carriers, The New Entrants, telecommuting Business Opportunities for Network Service Providers . Implications for the Demand and Supply Sides : A summary of Telecommuter Needs and Communications Solutions, Critical Success factors on the Demand Side, Recommendations to Current AMD Potential Telecommuters, Recommendations to the Network Service Providers.

References :-

1) Osman E Eldib & Daniel Minoli : Telecommuting , Artech House, 1995.

IT 605 COMPUTER GRAPHICS AND ANIMATION

Module I

Computer – Aided Design, Presentation graphics, Computer art, Entertainment , Education & Training, Visualization, image- Processing, Graphical User Interfaces, Over view of graphic systems. Points and Lines, Line drawing algorithms, Circle Generating algorithms, Ellipse generating algorithms, Parallel curve algorithms, Attributes of output primitives.

Module II

Basic transformations, Matrix representations and homogeneous co-ordinates, Composite transformations, other transformations, Raster methods for transformations. The viewing Pipe-Line , Viewing Co-ordinate reference frame, Window-to-viewport co-ordinate transformation, 2-D viewing functions, Clipping operations.

Module III

Structure concepts, Editing structures, Basic modeling concepts, Hierarchical modeling with structures, Graphical user Interfaces and interactive input methods.

Module IV

3-D Display methods, 3-D Graphics packages. Polygon surfaces, Curved lines and surfaces, spline representations, Bezier curves and surfaces, B-spline curves and surfaces, Beta splines, Relational splines, Conversion between spline representations, Displaying spline curves, Sweep representations, Constructive Solid-Geometry Methods, Octrees, BSP trees, Fractal Geometry methods.

Module V

Transformation, Rotation scaling, Other transformations , composite Transformations, 3-D Transformation functions, Modeling and co-ordinate transformations, 3-D Viewing concepts.Classification of visible surface detection algorithms, Back-face detection, Depth-Buffer method, A-Buffer method, Scan-Line method, Depth-Sorting method, BSP-Tree method, Area subdivision method, Octree methods, Ray-Casting methods, Curved surfaces, Wireframe methods, Visibility- Detetction functions, Illumination models and surface rendering methods, colour applications, Computer Animation.

References :

1) William .M.Newmann & Robert.F.Sproull : Principles of Interactive Computer Graphics, McGraw Hill Inc. 1981
2) Roy .A. Plastock & Gordon Kelly : Computer graphics, Schaum's Series in Computers , Int Edn.
3) Steven Harrington: Computer Graphics – A Programming Approach McGraw Hill , Int Edn.
4) Donald Hearn & M.Paulin Baker : Computer Graphics- Eastern Economy Edn, 1995
5) Anirban Mukhopadhyay,"Introduction to Computer Graphics", Vikas Thomson Learning Publishing, N Delhi
6) Peter Ratner, "Human Modeling & Animation", Wiley Dream Tech India P Ltd, N Delhi

IT 606 COMPUTER GRAPHICS LAB

This lab exercises are to be done in JAVA language

Program to draw line using Bresenham’s algorithm for all quadrants.

Program to draw a circle.

Program to draw an ellipse.

Program to draw a spiral using Bresenham’s circle drawing algorithm.

Procedure to move a line around the circle.

Procedure to rotate a wheel.

Procedure to translate a circle.

Program to show 2D clipping and windowing.

Development of 2D graphics package.

Segmentation.

IT 607 MINOR PROJECT - MULTIMEDIA BASED

Multimedia project involving Painting and 3D Animation , 3D Titling, 3D Modeling and Animation, Working with sound, Frame and Video Capturing and special Effects, Authorising and Presentation.

(Each student has to do separate project)

CS/EB/ EC /EE/EI/IT 701 COMPUTER NETWORKS

Module I

Introduction to Computer Network and Physical Layer

Types of Networks: Broadcast and Point-to-point- LAN-MAN-WAN- Wireless networks. Layered Architecture and Reference Models: Layered architecture- OSI reference model, TCP/IP reference model –

Internet Protocol Stack – Network Entities in Layers- Connection oriented and Connection less services,

Examples of networks: Novell Netware, Arpanet, and Internet. Examples of Data Communication Services:

X.25 Networks, Frame relay, Broad band ISDN and ATM. Physical Layer: Transmission media - Narrow band ISDN: Services-Architecture- Interface , Broad band ISDN and ATM- Virtual Circuits versus Circuit

Switching –Transmission in ATM networks . FDDI

Module II

Link Layer and Local Area Networks Data link layer:

Service provided by data link layer-Error detection and correction Techniques-Elementary data link layer protocols-Sliding Window protocols- Data link layer in HDLC, Internet and ATM . Multiple Access protocols: Channel partitioning protocols: TDM-FDM-Code Division Multiple Access(CDMA) .Random Access protocols : ALOHA-CSMA and CSMA/CD . Local area Network: LAN addresses-Address Resolution Protocol-Reverse Address Resolution Protocol. Ethernet: Ethernet Technologies-IEEE standards- Hubs-Bridges and Switches

Module -III

Network Layer and Routing

Network Service model – Datagram and Virtual circuit service-Roting principles-Link state routing-distant

vector routing-hierarchical routing-multicast routing-IGMP Internet Protocol (IP): IPv4 addressing-routing and forwarding datagram-datagram format-datagram fragmentation- ICMP- DHCP- Network Address Translators (NATs)-IPv6 packet format-transition from IPv4 to IPv6-Mobile IP. Routing in the Internet: Intra Autonomous System Routing : RIP and OSPF-Inter Autonomous System Routing : BGP – Network layer in ATM.

Module IV

Transport Layer

Transport Layer Services-Relationship between Transport Layer and Network Layer-Transport Layer in Internet-Multiplexing and De multiplexing. Connectionless Transport: UDP-Segment structure-Checksum

Connection Oriented Transport: TCP-TCP connection-TCP Segment Structure-Round trip Time estimation and Time out-Reliable Data transfer-Flow control-TCP connection Management. Congestion Control: Causes and costs of congestion- Approaches to congestion control- TCP congestion control: Fairness-TCP delay modeling. ATM ABR congestion control. ATM AAL Layer protocols.

Module V

Application Layer and Network Security .

Application Layer Protocols- WWW and HTTP-File transfer Protocol: FTP Commands and Replies – Domain Name System (DNS)- SMTP - SNMP- multimedia. Remote Procedure Call. Security in Computer Networks: Principles of Cryptography-Symmetric key-Public key-authentication protocols-Digital Signatures – Firewalls. Security in different Layers: Secure E-mail- SSL – IP security.

References:
1. James F. Kurose and Keith W. Ross, Computer Networking – *A Top-Down ApproachFeaturing the Internet*, 2/e Pearson Education ,2003
2. S. Keshav, *An Engineering Approach to Compute r Networkin*g, Pearson education ,2002
3. F. Halsall, *Data Communication, Computer Networks and Open System*s, Addison Wesley, 1996
4. Andrew S. Tanenbaum, *Computer Networks* , 4/e, Pearson education, 2003
5. Behrouz A. Fourouzan ,*Data Communications and Networking*, 2/e Tat McGrawhill,2000
6. Leon-Garcia and I. Widjaja, *Communication Network*s, Tata McGraw Hill, 2000
7. Bertsekas and Gallagar , *Data Network*s, 2/e, PHI, 1992
8. Douglas Comer and David L. Stevens, *Internetworking with TCP/IP Vol. I, II, and III*,Prentice Hall, New York, 1990
9. Richard Stevens. W, *TCP/IP Utilities - Vol. I, The protocol*s, Addison Wesley, 1994
10. Sidnie Feit, *TCP/IP, Architecture, Protocols and implementatio*n, McGraw-Hill, New York, 1993
11. Uyless Black, *Computer Networks - Protocols, Statndards and Interface*s, Prentice Hall India, New Delhi, 1994

IT - 702 SOFTWARE PROJECT MANAGEMENT

Module I

Software Development Overview : Need for Software Engineering, Software Engineering, Impact of Software Engineering on Software Development. Software Life Cycle ; Life Cycle Models, Implementation of a Life Cycle Model, Application of Life Cycle Models.

Module II

Project Management Organisation and Functions; Management products Management Organisation, Technical Organisation , Job Descriptions and Objectives, Setting Objectives for each project role. Project Planning Techniques - I : Steps in Planning, Product Breakdown Structure, Product Flow Diagrams, Activity Breakdown Activity Network (Arrow Diagram & Precedence Diagram), Other allied techniques like Gantt Chart, check list etc. Project Planning Techniques-II : Outline Product Descriptions, using standard Methods (SSADM, COMPACT), Prototyping, Turnkey Projects Procurement, Resource Allocation and Scheduling. Sizing and Estimating : Approaches to Sizing and Estimating, COCOMO Model Function Point Analysis.

Module III

Planning the Software Project : Structure of Plan Components (Technical Plan, Resource Plan, Quality Considerations), Levels of Planning (Project Plans, State Plans, Detailed Plans, Individual Work Plans, Exetion Plans), Planning Guidelines. Project Monitoring and Control : Project Initiation, End-Stage Assessment, Mid- Stage Assessment, Checkpoints, Project closure Project Measurement and Review, Quality Review, Technical Exceptions, Configuration Management. Quality Assurance, Quality Concepts, Quality Planning, Quality Review, Quality Characteristics, Technical Exceptions.

Module IV

Configuration Management : Configurations Identification, Configuration control, Configuration Status, Accounting, Configuration Audits.

Module V

Productivity Guidelines : Software Packages, Productivity Attributes, Productivity Tools and their selection, Establishing a Productivity Improvement Program. Team Management : Motivation Theories, Motivation Factors for Software Development, Leadership, Performance Evaluation.

References :

1. Harold Kerzner - Program Management – A System Approach, Planning, Scheduling and Controlling, CBS
2. Cleland D L & King W R – System Analysis and Project Management, McGraw Hill
3. Meredith J R – Project Management – A Management Approach, Willey – NY

4. Charles S Parker - Management Information Systems – Strategy and Action- McGraw Hill
5. Ann Von Maryrhause – Software Engg Methods and Management, Academic Press

IT - 703 ELECTRONIC DATA INTERCHANGE

Module I

EDI Concepts, Standard & Technologies : The Global Village, Historical Background to EDI, Definitions of EDI, EDI System Integration Option, Strategic Implications of EDI, Implementing EDI, EDI in India. Development and Implementation of EDI standards : Introduction, What the process is all about- Translation form Paper to Electronic, International Trade and EDI, Introduction to EDIFACT, Implementation Guidelines.

Module II

Legal and Audit Issues in EDI Implementation : Legal Issues; Contractual issues, Trading Partner (Interchange) Agreements, Service Provider(VAN/VAD) Agreements, Software Licensing Agreements, Statutory Issues, Issues that arise in International Trade, An Examination of local and Overseas Problem Situations, Material Items, Issues in a Future Global Trading Network. Audit Issues : Introduction, Auditing in Paper Based Environment, Auditing in an EDP Systems Environment, Auditing in An EDI Environment, Audit Approaches In Hybrid Systems, Fraud Detection and Prevention in EDI Environments.

Module III

Integration Strategies and Knowledge Based Support : Business Reengineering Requirements, Project Management Issues in the Development of EDI Business Strategies, Software Interfaces for Commercial Integration, Knowledge Management Issues, Open EDI Model, Knowledge Based Design for EDI Integration.

Module IV

International Trading Network and Communication Protocols : Logistics of International Trade, APEC, EC Initiatives, EDI Networking and the Role of Corporate Gateways, Case Study.

Module V

Security, Authentication & Validation Mechanisms : The need to consider Security Authentication & Validation Mechanisms, Why EDI Systems are more vulnerable than the Systems they replace, How to combat the threats, Symmetric Algorithms, Asymmetric Algorithms Key Management, Comparing the use of Symmetric and Asymmetric Algorithms, EDI Security in the Company & Trading Partners.

References :-

1.	Dawna Travis Dewire	:	Client Server Computing, Mcgraw Hill
2.	W.H.	:	Developing C/S Applns., BPB Publs, 1993.
3.	Jeffrey .D. Schank	:	C/S Application and Architecture , Novell Press, BPB, 1994.
4.	Joe Salemi	:	Guide to C/S Databases, BPB Publn., 1994.
5.	David Vaskevitch	:	Client Server Strategies, Galgotia, 1994.
6.	Patricia.A.Goglia	:	Testing Client/Server Applications, Schroff Publishers and Distributors, 1993.

IT 704 DISTRIBUTED COMPUTING

Module I

Distributed systems - architecture - Key characteristics - resource sharing openness - concurrency - scalability - fault tolerance - transparency. Design issues - naming - communication - software structure - workload allocation - consistency maintenance. User requirement - functionality - Quality service - reconfigurability. Review network protocols. Interprocess communication - building blocks - client-server communication - group communication. Interprocess communication in UNIX. Remote procedure calling. Design issues - interface definition - language exception handling. Implementation - interface processing - communication - handling. Binding. Case study - sun RPC - java RMI.

Module II

Distributed operating systems - kernel - processes and threads - Naming and protection - communication and Invocation - virtual memory. Distributed file service - design issues - interfaces - implementation techniques. Case study sun NFS. Name service SNS and DNS.

Module III

Time and co-ordination. Synchronizing physical clocks - logical time and logical clocks. Distributed co-ordination - distributed mutual exclusion - elections. Replication - basic architecture model - consistency and request ordering.

Module IV

Shared data and transaction - client server - fault tolerance and recovery - transactions - nested transactions. Concurrency control - locks - optimistic concurrency control - timestamp ordering. Distributed transactions - atomic commit protocols - concurrency control indistributed transactions - distributed - deadlocks - transaction with replicate data.

Module V

Recovery and fault tolerances. Transaction recovery - logging - shadow versions - fault models for transactions. Fault tolerance - characteristics - . Hierarchical and group masking - of faults. Security - authentication and key distribution - logic of authentication digital signature. Distributed shared.

References

1. C A R Hoare, “Communicating Sequential Processes”, Prentice Hall, 1980
2. Dimitri P Bertsekas, John N Tsitikils, “Parallel and Distributed Computation: Numerical Methods, “Pretice Hall International, Inc., 1989
3. Dougls Comer and David L.Stevens, “Internet working with TCP/IP Vol III: Client Server programming and Applications”, Prentice Hall, New York, 1990
4. George Couloris, et. al., “Distributed Systems - Concept and Design”, Second ed., Addison Wesely, 2000
5. General Tel, “Introduction to Distributed Algorithms”, Cambridge University Press, 1994.
6. H S M Sedan, “ Distributed Computing Systems”, Butterwirths, London, 1988
7. Joel M.Crichlow, “Introduction to Distributed and Parallel Computing”, Prentice Hall, New York, 1988.

705 ELECTIVE

CS/EE/IT 705(A) Digital Image Processing

Module I. Image representation and modelling - enhancement - restoration - Image analysis and reconstruction - image data compression. Two dimensional systems - linear systems and shift invariance. Fourier transform - Z - transform - Block matrices and Kronecker products - Random signals

Module II. Image perception - introduction - light - luminance - brightness and contrast - MTF of the visual system - visibility - function - monochrome vision models - color representation - color matching and reproduction - color vision model Image sampling and quantization - Two dimensional sampling theory - reconstruction of images from its samples - Myquistrate - aliasing - sampling thorem. Practical limits in sampling reconstruction. Image quantization - visual quatization.

Module III. Image transforms - Two dimensional orthogonal and unitary transforms - properties of unitary transforms - one dimensional DFT - cosine, sine Harmrd and Haar transforms

Module IV. Image enhancement - Point operations - contrast stretching - clipping and thresholding - digital negative intensity level slicing - bit extraction. Histogram modelling - histogram equalisation - modification. Spatial operations - smoothing techniques. Magnification and interpolation. Transform operations. Color image enhancement.

Module V. Image analysis and computer vision - spatial feature extraction - transform features. Edge detection - gradient operators - compass operators - stochastic gradients - line and spot detection.

References:

1) Jain Anil K , “Fundamentals of Digital Image Processing-” , Prentice Hall
2) Gonzalez Rafel C, Wintz Paul , “Digital Image Processing,-”, Addison Wesley
3) Pratt William K , “Digital Image Processing, “, John Wiley and Sons
4) Rosenfield Azriel, Kak Avinash C, ” Digital Picture Processing”, Academic Press Inc.

CS/IT 705(B) INFORMATION RETRIEVAL

Module I

Introduction – Information versus Data Retrieval. Modelling of Information retrieval. Formal charectrisation of Information retrieval- Alternate set theoretic models. Alternate algebric

models. Alternate probablistic models. Stuctured text retreival models. Models for Browsing. Retreival Evaluation.

Module II

Query languages. Text and multimedia languages-structure-syntax, semantics. Mark up languages. Text Operations-Document pre processing. Text compression.

Module III

Indexing and searching.Inverted files. Suffix trees and suffix arrays. Boolean queries. Sequential searching. Pattern matching. Structural queries. User interface and visualization.

Module IV

Parellel and Distributed Information Retreival. Implementation of Inverted files, suffix arrays and signature files in MIMD architecture. Implementation of Inverted files,suffix arrays and signature files in SIMD architechture.

Module V

Searching the web. Modelling the web. Web as graph. Hubs and Authorities. Web self organization. Searching the web. crawling, Indexing, Ranking web pages, Web self organisation. Searching the web, Crawling, Indexing, Ranking web pages, Web Directories.

Text Book

R. Baeza-yates and B. Riberio-Neto, Modern Information retrieval, Addison Wesley Longman, 1999

References

1. J. Kleinberg, et.al, The Web as a graph: Measurements, models and methods, Lecture notes in computer Science, springer Verlag, 1999
2. Gary Flake et. Al, Selff- Organization and Identification of Web communities, IEEE Computer",Vol35, No 3,
3. Sergey Brin and Lawrence page, The anatomy of large scale hyper textual (Web) search engine, Computer- Networks and ISDN systems, Vol 30, No,1—7.

CS/EB/EC/EI/IT 705(C) ARTIFICIAL NEURAL NETWORKS

Module I. Fundamentals of ANN – Biological prototype – Neural Network Concepts, Definitions - Activation. Functions – single layer and multilayer networks. Training ANNs – perceptrons – Exclusive OR problem – Linear seperability – storage efficiency – perceptron learning - perceptron training algorithms – Hebbian learning rule - Delta rule – Kohonen learning law – problem with the perceptron training algorithm.

Module II. The back propagation Neural network – Architecture of the back propagation Network – Training algorithm – network configurations – Back propagation error surfaces – Back propagation learning laws – Network paralysis _ Local minima – temporal instability

Module III. Counter propagation Networks – Architecture of the counter propagation network – Kohonen layer – Training the Kohonen layer – preprocessing the input vectors –

initializing the weight vectors – Statistical properties. Training the Grossberg layer- Feed forward counter propagation Neural Networks – Applications.

Module IV. Statistical methods – simulated annealing – Bloltzman Training – Cauchy training -artificial specific heat methods. Application to general non-linear optimization problems – back propagation and cauchy training.

Module V. Hopfield net – stability – Associative memory – statistical Hopfield networks – Applications – ART NETWORKS – GENETIC ALGORITHMS –Bidirectional Associative memories- retreiving stored information. Encoding the association – continous BAMS

References

1) Linus Fe, *Neural Network in Computer Intelligence* , McGrawHill
2) Philip D.Wasserman, *Neural Computing(Theory and Practice)*
3) Robert Hecht-Nilson, *Neuro Computing*
4) James A.Anderson, *An Introduction to Neural Networks*
5) Jack M. Zureda, *Introduction to Artificial Neural Systems*

IT - 705(D) CRYPTOGRAPHY AND DATA SECURITY

Module I

Cryptography and Cryptanalysis - aspects of security - cryptanalytic attacks - Transposition ciphers - substitution ciphers - the Hagelin Machine - Statistics and Cryptanalysis - The information theoretical approach - general scheme - information measure and absolute security - The unicity distance - Error probability and security - Practical security.

Module II

The DES algorithm-Characteristics of DES-Alternative Descriptions-Analysis of DES-The modes of the DES-Future of DES-International Data Encryption Algorithm-Stream and Block Enciphering -The theory of finite state machines-shift registers-Random properties of shift register sequences-the generating function-Cryptanalysis of LFSRs- Non-linear Shift registers.

Module III

Public Key Systems-The RSA system-The knapsack system-cracking the knapsack system-Public key systems based on elliptic curves.

Module IV

Authentication and Integrity-Protocols-message integrity with the aid of Hash functions-Entity authentication with symmetrical algorithm-Message authentication with digital signatures-Zero knowledge techniques.

Module V

Key Management and Network Security - General aspects of key management - key distribution for asymmetrical systems - key distribution for symmetrical algorithms- Network security-Fair cryptosystems.

References :-

1. Basic Methods of Cryptography - Jan C A - Cambridge University Press
2. Cryptography and Data Security - Dorothy Elizabeth Robling Denning, Addison Wesley Publishing Co
3. Fine Worlds and Encryption - TMH
4. Fire wall a Complete Code - Goucalvs - TMH.

IT - 706 INTERNET LAB

Part A :

Five exercises in C++

Part B :

1. Familiarisation of Internet components such as Modem,Gateways, Routers, Bridges etc.
2. Introduction to various internet softwares, services and Applications.
3. Familiariation of Internet accessing and trouble shooting Techniques.
4. Software simulation of communication protocols
5. Introduction to internet programming (Creation of Java applets, stand alone program etc.)

IT 707 Minor Project - Web Oriented

Design and development of a web oriented commercial site using HTML and JAVA

(Each student has to do separate projects)

IT 708 Seminar

Each student shall give a 45 minute presentation of a topic followed by a 15 minutes discussion and elaboration.

IT - 801 E _ COMMERCE AND SECURITY

Module I

Banking on the Internet-Investing on the Internet-Doing business on the Internet-Threats to E-Commerce - E-Commerce Security.

Module II

Executing Malware- ActiveXsecurity- Java Security-Desktop Integration Problems - Java Script- Plug Ins and Graphic files - Attachments - Push Technology and Active Channels.

Module III

Secure Channels - Stored Account Payment Systems - first Virtual - Cyber Cash - Secure electronic Transaction - Stored Value Payment Systems - Pros and Cons - How E-Cash works- Securing E-cash- Representing E-Cash - E-Cash-Cyber coin- Smart Cards- Mondex - Visa Card

Module IV

The Web Server- Data Base - Server side scripts - Web Server Security Dangerous CGI scripts - Data base Vulnerabilities - Designing more secure software - Analysing the security of software.

Module V

Securing Operating Systems- Firewall security - The Network Server vulnerabilities- Defending the server - Certifying components for Security.

Reference

1. E-Commerce Security - Anup K Ghosh, Wiley Computer Publishing.
2. E-Commerce, the Cutting Edge of Business - Kamalesh K Bajaj & Debjani Nag, TMH Publishing.

IT - 802 INTERNETWORKING

Module I

Introduction and overview - need for Internet - Internet architecture - Interconnection through IP gateways - TCP/IP layering - structure of TCP/IP software in an Operating System.

Module II

Network Interface Layer - Buffer Management - Demultiplexing incoming packets - ARP : conceptual organization of ARP software - data structures for ARP cache - Input and Output processing - ARP cache management IP : IP software design - IP software organisation and datagram flow - IP : Routing - Routing table organisation - Data structures - Routing a diagram - ICMP message Formats - Implementation of ICMP message.

Module III

TCP : Overview of TCP software - Transmission Control Blocks - TCP segment format - TCP finite state machine- Example State Transistion- Declaration of the Finite State Machine - TCB Allocation and Inititalisation.

Module IV

Client Server Model and S/W design - Concurrent processing in Client Server Software - Program interface to protocols - Socket Interface - Algorithms and Issues in Client S/W design.

Module V

Algorithms and Issues in Server S/W design - Interactive connectionless Servers - Interactive connection oriented Server - Concurrent connection oriented server Concurrency in Clients. Remote Procedure Call Concept - NFS concepts.

Text Book

Douglas Comer and David L. Stevens, “Internetworking with TCP/IP Vol. I, II and III”, Prentice Hall, New York, 1990.

Reference

1) Andrew S Tanenbaum, “Computer Networks”, Prentice Hall India, New Delhi, 1997
2) Dimitri Bertsckers, Robert Gallage, “Data Networks”, 2nd ed., Prentice Hall India, New Delhi, 1992..
3) Richard Stevens. W, “TCP/IP Utilities - Vol I, The Protocols”, Addison Wesley, 1994.
4) Sidnie Feit, “TCP/IP, Architecture, Protocols and Implementation”, Addison Wesley, 1994.
5) Uyless Black, “Computer Networks - Protocols , Standards and Interfaces”, Prentice Hall India, New Delhi, 1994.
6) Daniel Minoli, “Internet and Intranet Engineering”, Tata McGraw-Hill, 1999.

CS/EB/EC/IT 803 INDUSTRIAL ORGANISATION AND MANAGEMENT

Module I

Organisation : Concept of organisation, characteristics of organisation, elements of organisation, organisational structure, organisation charts, Types of organisation- formal line, military or scalar organisation, functional organisation, line & staff organisation, project organisation, matrix organisation, authority and responsibility, span of control, delegation of authority. Industrial ownership: Types of ownership- single ownership, partnership, joint stock company, cooperative societies, public sector, private sector, scientific management- review of different schools of thoughts.

Module II

Personal Management: Recruitment and training, labour turnover, operator training, suggestion systems. Industrial safety: working conditions, environmental factors, psychological attitude to work and working conditions, fatigue, accidents and hazards. Wages and Incentives: feature of wages, time and piece rate, different incentive plans, profit sharing, job evaluation and merit rating, factors of comparison and point rating. Industrial relations: industrial disputes, collective bargaining, trade unions, workers’ participation in management, labour welfare.

Module III

Marketing Management: Concept of marketing VS sales approach, consumer behaviour and demand concept, buying motives, influence of income level, product design, new product distribution, pricing decisions, major price policy considerations, pricing methods and tools, break even analysis and marginal costing in pricing, sales promotion, marketing research, test marketing, marketing of services, advertising management- types of advertising, choice of media, economic and psychological factors in advertising.

Module IV

Finance Management : Tasks, evolution of corporate management, long term financing, equity, preference and debenture capitals, term loans, dividends and share valuation, legal aspects of dividends, short term financing, working capital influencing factors, cash budgeting, terms of liquidity, management of receivable and inventories, budgets and budgetary control-objectives of budgeting, classification, ratio analysis.

Module V

Management accounting: Fundamentals of book keeping, journalising, ledger accounts, subdivision of journal, cash book, banking transactions, trial balance, preparation of trading, profit and loss account, and balance sheet, adjustments.

References:

1. Industrial Organisation and Management : Bethel et.al, McGraw Hill
2. Principles of Industrial Management : Kootnz & Donnel
3. Financial Management : Prasanna Chandra, Tata McGraw Hill
4. Operation Management : Fabricky et al, Tata McGraw Hill
5. Hand Book of MBO : Reddin & Ryan, Tata McGraw Hill.
6. Industrial finance of India : SK Basu
7. First steps in book keeping : J B Batliboi
8. Management accounting : Hingrani & Bemnath.

IT 804 ELECTIVE - II

IT 804 (A) ENTERPRISE NETWORKING

Module I

Digital Transmission Technology in Corporate Networks: Networking in the 1990s, Market size and Time Windows, Broadband at the Office / Campus level, Broadband at the Metropolitan-Area level, Existing High speed Dedicated Wan Services, Existing High-speed Switched Wan Services, Emerging High-Speed Switched Services Point-To-PointDS1/T1 Systems. Carrier Systems - A Telephony view, User Perspective of DS1/T1 connectivity.

Module II

Point-to-Point fractional DS1/T1 systems: Ft1 Network configurations, channel bit layout, Network Management issues, Ft1 marketplace, Ft1 equipment, Ft1 interchange carriers, Cost considerations for inclusion of Ft1 in private networks, Hubless DDS SWITCHED DSI and SWITCHED FRACTIONAL DS1/T1 SYSTEMS: Switched DS1 network configurations,

Cost-effectiveness issues, Switched 56 service, Inverse Multiplexing, some theoretical considerations on the general attractiveness of a switched service.

Module III

Channel Banks and Digital Cross-Connect systems: Channel Banks, Digital Cross connect systems, Managing Disasters-Communications Tools and Techniques. T1 Multiplexers: T1 Multiplexer functions, Technical aspects of T1 Multiplexers, Multiplexers type, commercial products, equipment trends, corporate backbone network Switches and fast packet switching technology, market issues.

CENTRAL OFFICE-BASED MULTIPLEXING: Service description, example of services using CSUs to support subtract channel and COBM carrier use of T1 Multiplexers, Disaster Recovery Application Example of usage-large Bank, Bandwidth reservation, standards for subnet Multiplexing

Module IV

POINT-TO-POINT DS3/T3 Systems : DS3 frame formats, DS3 Electrical characteristics, DS4NA signals, User applications. SONET Evolution, carriers Motivations, Key SONET Concepts, Network Equipment, Aspects of international SDH, End user utilization of SONET, ISDN and BISDN TECHNOLOGIES and services : ISDN, BISDN, Near-Team ATM services.

Module V

FRAME RELAY TECHNOLOGY and SEVICES: Background, Basic Frame Relay and cell Relay concepts, benefits of frame relay protocols and standards, implementing frame relay in a private corporate corporate network, Frame relay equipment, Carrier Services, frame relay product availability, the issue of traffic burstiness. SMDS concepts, SMDS service, MAN standards in support of SMDS, SMDS deployment.

References:

Daniel Minoli : Enterprise Networking, Artech House - 1993

IT - 804 (B) REAL TIME COMPUTER CONTROL SYSTEMS

Module I

Architectures for Computer Control Systems : Centralized Architecture, Distributed Computer control architecture, Data highway system, Foreseable future trends, Digital control algorithms : Introduction computer control, self tuning and adaptive algorithms Supervisory control systems : Introduction, Multilayer hierarchical Structures, System decomposition, Open-loop coordination strategies, Model reality differences, Closed - loop coordination strategies, integrated system optimisation and parameter estimation (ISOPE), Double iterative strategies, Illustrative example.

Module II

Construction of software for real-time computer control systems : Introduction, Problems of real-time software construction, Design techniques and tools, MASCOT, Structured Development of real-time systems. Dependability, Fault detection and fault tolerance : Use of redundancy, Fault tolerance in mixed hardware- software systems, Fault detection measures, Fault detection mechanisms, Damage containment and assessment, Provision of fault tolerance.

Module III

Languages for real-time control : Basic requirements, Software components, Creation and management of tasks, Interrupts and device handling, Communication between software components, Mutual exclusion, Exception handling.

Module IV

Expert systems in real-time control : Knowledge based process management, Representation of knowledge, Reasoning in real-time, Applications of knowledge based systems for process management. Real-time operating systems : Real-time multitasking operating systems, Task management, task scheduling and dispatch, Task co-operation and communication, Producer-consumer problem. Distributed processing : Distributed data, Distributed control.

Module V

Computer Aided control system design : Personal computer software packages for control system design : An introduction, Modeling and simulation, Control system analysis and design package, System identification, PC-MATLAB and PC-MATLAB based software packages : An introduction, Basics of MATLAB, Matrix operations and functions, Relational and logical operations, Vectors and subscript, Control flow constructs, M-files and functions, Other features, Control system toolbox, System identification tool box, Multivariable frequency domain toolbox, Tuning methods.

References :-

1. S.S. Lamba & Y.P.Singh, Distributed Computer Control Systems
2 Sylvia Goldsmith, Real-time Systmes Development, Prentice Hall, 1993.
3 Ian Pyle, Peter Hruschka, etal , Real-Time System, Wiley Series, 1993.

CS / IT - 804(C) BIO INFORMATICS

IT 804(D) REENGINEERING TECHNOLOGY

Module I

What is Reengineering : Definition, Reengineering Versus Other Theories, Approaches Towards Reengineering, Reengineering Principles, Dynamic Business Reengineering. Organisational Transformation Guidelines and Models : Reengineering the Organisation, The 6 R's of Organisational Transformation and Reengineering, Fundamentals of Process Reengineering, Preparing the Work Force for Transformation and Reengineering, Guiding Principles for Transformation and Reengineering, Transformation and Reengineering Methodology, Organisational Transformational Guidelines, LMICIP Transformation Models, DSMC Q&PMP Transformation Model, DSMC/ATI Performance Improvement Model.

Module II

Reengineering Process Improvement Models : PMI Leadership Expectation Setting Model, Edosomwan Production and Service Improvement Model, Moen and Nolan Strategy for Process Improvement, Quality Function Deployment (QFD), The quality Journal Model, LMI CIP Personal Improvement Model, NPRDC Process Improvement Model, FPL Quality Improvement Story, Joiner Associates, Model of Progress, LMI CIP Process Improvement Model.

Module III

Tools and Techniques for Organizational Transformation and Process Rengineering : Process Analysis Technique (PAT), Flowcharting and Process Analysis Technique, Work Flow Analysis (WFA), Value Analysis Approach, Nominal Group Technique, Fishbone Diagram or Cause and Effect Diagram, Pareto Analysis, Edosomwan Problem-Solving Framework, Cost of Quality, Success Factors and Addressing Common Implementation Problems. Fundamental Technologies for Reengineering : Networking - First step to the Information Superhighway, Databases, Desktop Tools, Voice Mail, Electronic Mail, Groupware, Electronic Communication Media, Wireless Communication.

Module IV

Re-Engineering Business Processes : The Approach, Project Scope : The Three Levels of Change, Reengineering the Operation, Identifying Possible Projects, Conducting Initial Impact Analysis, Selecting the Effort and Defining the Scope, Analysing Business and Work Process Baseline Information, Defining New Process Alternatives ; Simulating New Work Flows, Evaluating the Potential Costs and Benefits of each Alternative, Selecting Best Alternative, Implementing the Alternative Selected, Updating the Positioning Models and Information.

Module V

Reengineering Information Technology Resources : Using Technology in Business, Assessing Current Information Services and Office Technology, Finding Information and Technology-

Critical Areas, Improving Business Processing Using Technolgy, Defining Requirements for Information Systems and Technology Tools, Using Reengineering Data Models in Production.

References :-

1.	Dr. Johnson A Edosomwan	:	Organisational Transformation And Process Reengineering.
2.	Etheryl, Eurrid & Co.	:	Reengineering Toolkit, Galgotia
3.	Damiel Morris & Joel Branden	:	Reengineering your Business, MGH
4.	V.Daniel Hunt	:	Reengineering, Omanco, 1993.
5.	Peeparel Rowland, PHI	:	Business Process Reengineering

IT 805 - MAJOR PROJECT

IT 806 - VIVA VOCE