

SEMESTER – III

IT 3021 DISCRETE MATHEMATICS & GRAPH THEORY 3 (3-0-0)

MODULE - I

Introduction to Logic: Compound Statements, Proofs in Mathematics, Truth Tables, The Algebra of Propositions, Logical Arguments.

MODULE - II

Induction and Recursion: Mathematical Induction, Recursively Defined Sequences, Solving Recurrence Relations; The Characteristic Polynomial, Solving Recurrence Relations; Generating Functions.

MODULE - III

Principles of Counting and Algorithms: The Principle of Inclusion- Exclusion, The Addition and Multiplication Rules, The Pigeon-Hole Principle, What is an Algorithm?, Complexity, Searching and Sorting, Enumeration of Permutations and Combinations

MODULE - IV & V

Graphs, Paths and Circuits and Applications: A Gentle Introduction, Definitions and Basic Properties, Isomorphism, Eulerian Circuits, Hamiltonian Cycles, The Adjacency Matrix, Shortest Path Algorithms, The Chinese Postman Problem, Digraphs, Tournaments, Scheduling Problems.

MODULE - VI

Trees and Searching: What is a Tree?, Properties of Trees, Spanning Trees, Minimum Spanning Tree Algorithms, Acyclic Digraphs and Bellman's Algorithm, Depth – First Search.

MODULE - VII

Planar Graphs, Colorings and Maximal Flows: Planar Graphs, Coloring Graphs, Flows and Cuts, Constructing Maximal Flows, Applications.

Text Books:

1. E.G. Goodaire & M.M Parmenter- Discrete Mathematics with Graph Theory, 2nd Edⁿ Pearson Education, New Delhi - 2002.

Reference Books:

1. B.Kolman et.al- Discrete mathematical Structures, 5th Edⁿ, Pearson Education, New Delhi - 2004.
2. K.H. Rosen – Discrete Mathematics and Its Applications – 4th Edⁿ, Tata McGraw Hill, New Delhi - 2001
3. D.B. West – Introduction to Graph Theory, 2nd Edⁿ, Pearson Education, New Delhi 2002.
4. N.Deo – Graph Theory with Application to Engineering and Computer Science, PHI, New Delhi- 2004.

IT 3023 JAVA PROGRAMMING 4 (3-1-0)

MODULE – I

Introduction to Java Applications, Memory Concepts, Arithmetic, Decision making, Equality and Relational Operators. Introduction to Java Applets, Drawing strings and lines.

Control Statements : if, if ... else, selection statements, while statement, compound assignment operators, increment decrement operators, for ... statement, do while, switch, break and continue, labeled break and continue, logical operators.

Methods in java : declarations, argument promotions, scope of declarations, method overloading, Recursion.

Arrays : declaring and creating references and reference parameters, passing arrays to methods, multi dimensional arrays.

MODULE – II

Object based programming, classes, class scope, controlling access to members, this keyword and its use, constructors, overloading constructors, composition, garbage collection, static class members, final instance variables, crating packages, package access, Data abstraction and encapsulation.

MODULE – III

Inheritance and polymorphism : super class and subclass, protected members, Relation ship between super and sub class. Inheritance hierarchy , abstract classes and methods, final methods and classes, nested classes, Type wrappers.

MODULE – IV

Exception handling, Java exception hierarchy, rethrowing an exception, finally clause, stack unwinding, chained exception, Declaring new exception types.

MODULE-V

Multithreading : Life cycle of a thread, priorities and scheduling, creating and executing threads synchronization.

MODULE – VI

Files and streams, hierarchy, files and streams, File class, Sequential access file manipulation, random access file handling, Introduction to String class and its members.

MODULE – VII

Fundamental of GUI , Applet and swing programming.

Text Book :

1. Dietel,Dietel - Java How to program , 5th edition; Pearson Education , New Delhi.
2. S. Raj Kamal – Intrernet and Web Technology, Tata McGraw Hill, New Delhi, 2002.

Reference:

1. C. Horstmann,G. Cornell - Core Java 2 Vol I & Vol II ; Pearson Education , New Delhi.
2. Balagurusamy -Programming in Java , 2nd Edition; Tata McGraw Hill Publication; New Delhi.
3. Patrick Naghton & H. Schildt – The Complete Reference Java 2, Tata McGraw Hill Publication, New Delhi.

IT 3025 COMPUTER ORGANIZATION & ARCHITECTURE 4 (3-1-0)

MODULE - I

Introduction: Organization and Architecture, Structure and Function, Why Study Computer Organization and Architecture?

Computer Evolution and Performance: A Brief History of Computers, Designing for Performance, Pentium and PowerPC Evolution.

MODULE - II

A Top-Level view of Computer Function and Interconnection: Computer Components, Computer Function, Interconnection Structures, Bus Interconnection, PCI.

MODULE - III

Cache Memory: Computer Memory System Overview, Cache Memory Principles, Elements of Cache Design, Pentium 4 and PowerPC Cache Organizations.

Internal Memory: Semiconductor Main Memory, Error Correction, Advanced DRAM Organization.

MODULE - IV

External Memory: Magnetic Disk, RAID, Optical Memory, Magnetic Tape.

Input/Output: External Devices, I/Os, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels and Processors.

MODULE - V

Computer Arithmetic: The Arithmetic and Logic Unit, Integer Representation, Integer Arithmetic, Floating-Point Representation, Floating-Point Arithmetic.

MODULE - VI

Instruction Sets- Characteristics and Functions: Machine Instruction Characteristics, Type of Operands, Pentium and PowerPC Data Types, Types of Operations, Pentium and PowerPC Operation Types.

Instruction Sets- Addressing Modes and Formats: Addressing, Pentium and PowerPC Addressing Modes, Instruction Formats, Pentium and PowerPC Instruction Formats.

MODULE - VII

Processor Structure and Function: Processor Organization, Register Organization, Instruction Cycle, Instruction Pipelining, The Pentium Processor, The PowerPC Processor.

Reduced Instruction Set Computers: Instruction Execution Characteristics, The Use of a Large Register File, Compiler-Based Register Optimization, Reduced Instruction Set Architecture, RISC Pipelining, MIPS R4000, SPARC, RISC versus CISC Controversy.

Text Book:

1. William Stallings- Computer Organization & Architecture: Designing for Performance, 7th Edn, Pearson Education, New Delhi-2006.

Reference Books:

1. C. Hamacher- Computer Organization, 5th Edn, McGraw Hill, International Education, New Delhi-2002.
2. M.M.Mano- Computer System Architecture, 3rd Edn, PHI/Pearson Education, New Delhi-2006.

SEMESTER – IV

IT 4021 DATABASE SYSTEM CONCEPTS 4 (3-1-0)

MODULE-I

Introduction: Purpose of Database System; View of Data, Database Languages, Transaction Management, Database architecture, Database Users and Administrator, Types of database System.

MODULE-II

Database Design and Entity - Relational Model: Overview of design process, E-R model, Constraints, E – R Diagram, E-R Diagram issues, Weak Entity Sets, Extended E – R Features, Reduction to E – R Schemas.

MODULE-III

Relational Model: Structure of Relational Database, Codd's Rules, Fundamental Relational Algebra Operations, Additional Relational Algebra Operations, Extended Relational Algebra Operations.

MODULE-IV

SQL & Advanced SQL: Data definition, Basic structure of SQL queries, Set Operations, Aggregate Functions, Null Values, Nested Sub Queries, complex queries, views, modification of database, Joined relations, SQL data types & schemas, Integrity constraints, authorization, Embedded SQL.

MODULE-V

Relational Database Design: Functional dependency, Decomposition, Normalization, First normal form, Second normal form, Third normal form, BCNF, Multivalued dependencies and Fourth normal form, Join dependencies and Fifth normal form.

MODULE-VI

Indexing & Hashing: Ordered Indices, B+ Tree index files, B-Tree index files, Multiple key access Static hashing, Dynamic Hashing, Comparison of ordered indexing and hashing, Index definition in SQL.

Query Processing: Measure of Query Cost, Selection Operation, Evaluation of Expressions.

MODULE-VII

Transaction & Concurrency Control: Transaction Concepts & ACID Properties, Transaction States, Implementation of Atomicity & Durability, Concurrent Executions, Serializability & Its Testing, Recoverability, Lock-Based protocols, Validation based protocol, Multiple Granularity, Multiversion Schemes, Deadlock Handling.

Text Book:

1. A.Silberschatz et.al - Database System Concepts, 5/e, Tata Mc-Graw Hill, New Delhi – 2000.

Reference Books:

1. Date C.J. - An Introduction to Database System, Pearson Education, New Delhi- 2005
2. R.Elmasri, Fundamentals of Database Systems, Pearson Education, New Delhi, 2005.
3. S.K.Singh.-Database Systems, Pearson Education, New Delhi- 2006

IT 4023 OPERATING SYSTEM CONCEPTS 3 (3-0-0)

MODULE - I

Operating-System Structures: Operating-System Services, User Operating-System Interface, System Calls, Types of System Calls, System Programs, Operating-System Design and Implementation, Operating-System Structure, Virtual Machines, Operating-System Debugging, Operating-System Generation

MODULE - II

Processes: Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication
Threads: Overview, Multithreading Models, Thread Libraries, Threading Issues

MODULE - III

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Operating System Examples, Algorithm Evaluation

MODULE - IV

Process Synchronization: The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization Examples, Atomic Transactions

MODULE - V

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

MODULE - VI

Memory Management: Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation

Virtual Memory: Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory, Other Considerations

MODULE - VII

File-System Interface: File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, File Sharing, Protection

File-System Implementation: File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery, NFS

MODULE - VIII

Mass-Storage Structure: Overview of Mass-Storage, Structure, Disk Structure, Disk attachment, Disk Scheduling, Disk Management, Swap-Space Management, RAID Structure, Stable-Storage Implementation, Tertiary-Storage Structure

Text Book:

1. Avi Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Concepts", Eight Edition. John Wiley & Sons,

Reference Books:

1. D.M. Dhamdhare- Operating Systems: A Concept-Based Approach, 2nd Edn, TMH, New Delhi-2006.
2. C.Cronsley-Operating Systems: A Design-Oriented Approach, TMH, New Delhi, 2002.
3. H.M.Deitel-Operating Systems, 2nd Edn, Pearson Education, 2003.
4. A.S.Tanenbaum-Operating System:Design and Implementation, PHI, New Delhi, 2002.

IT 4025 THEORY OF COMPUTATIONS 3 (3-0-0)

MODULE I & II

Sets, Relations, and Languages : Sets, Relations and functions, Special types of binary relations, Finite and infinite sets, Three fundamental proof techniques, Closures and algorithms, Alphabets and languages, Finite representations of languages.

Finite Automata: Deterministic finite automata, Nondeterministic finite automata, Finite automata and regular expressions, Languages that are and are not regular, State minimization, Algorithmic aspects of finite automata.

MODULE III & IV

Context-free Languages: Context-free grammars, Parse trees, Pushdown automata, Pushdown automata and context-free grammars, Languages that are and are not context-free, Algorithms for context-free grammars, Determinism and parsing.

MODULE - V & VI

Turing Machines: Definition and Computing with Turing machines, Extensions of Turing machines, Random access Turing machines, Nondeterministic Turing machines, Grammars, Numerical functions.

MODULE -VII

Undecidability : The Church-Turing thesis, Universal Turing machines, The halting problem, Unsolvable problems about Turing machines, Unsolvable problems about grammars, Properties of recursive languages.

Text Book:

H.R. Lewis & C.H. Papadimitriou, Elements of the theory of computation – 2nd Edn. Pearson Education.

Reference Books:

1. Fundamentals of the Theory of Computation : Principles and Practices : Horcourt India Pvt Ltd. 2000 Morgan Kaufmann Publishers.
2. J.C. Martin – Introduction to Languages and the theory of computation, 2nd Edn., TMH, New Delhi 2000
3. K.L.P. Misra – et.al., “Theory of Computer Science”, 2nd Edn. PHI, New Delhi, 2000

IT 4027 SCIENTIFIC COMPUTING 3 (3-0-0)

A – NUMERICAL COMPUTING

MODULE - I

High Speed Computation: Introduction, Computer Arithmetic, Errors, Machine Computation.

Transcendental and Polynomial Equations: Introduction, Bisection Method, Iterative Methods, Rate of Convergence, Methods for Complex Roots, Polynomial Equations.

MODULE - II

System of Linear Algebraic Equations and Eigenvalue Problems: Introduction, Direct Methods, Error analysis, Iteration Methods, Eigenvalues and Eigen Vectors.

Interpolation and Approximation: Introduction to Lagrange and Newton Interpolations, Finite difference operators, Interpolating polynomial using finite differences, Hermite interpolations, Piecewise and spline interpolation.

MODULE - III

Differentiation and Integration: Introduction, Numerical differentiation, Numerical integration, Methods based on interpolation.

Ordinary Differential Equations: Introduction, Euler methods, Single and Multistep methods, Predictor-corrector methods.

B – STATISTICAL COMPUTING

MODULE - IV

Empirical and Probability Distributions : Basic Concepts, The Mean Variance, and Standard Deviation, Continuous-Type Data, Exploratory Data Analysis, Graphical Comparisons of Data Sets, Probability Density and Mass Functions.

Probability : Properties of Probability, Methods of Enumeration, Conditional Probability, Independent Events,

Bayes Theorem.

MODULE – V & VI

Discrete, Continuous & Multivariable Distributions : Random Variables of the Discrete Type, Mathematical Expectation, Bernoulli Trials and the Binomial Distribution, The Moment-Generating Function, The Poisson Distribution, Random Variables of the Continuous Type, The Uniform and Exponential Distributions, The Gamma and Chi-Square Distributions, The Normal Distribution, Distributions of Functions of a Random Variable, Distributions of Two Random Variables.

Sampling Distribution Theory : Independent Random Variables, Distributions of Sums of Independent Random Variables, Random Functions Associated with Normal Distributions, The Central Limit Theorem, Approximations for Discrete Distributions, The t and F Distributions.

MODULE - VII

Estimation & Tests of Statistical Hypotheses : Point Estimation, Confidence Intervals for Means, Confidence Intervals for Difference of Two Means, Sample Size,

Tests About Proportions, Tests of the Equality of Two Normal Distributions, Chi-Square Goodness of Fit Tests, Contingency Tables, Tests of the Equality of Several Means.

Text Books:

1. Jain, M.K., et al : Numerical Methods for Scientific and Engineering Computation, 3rd Edn. New Age Publication, New Delhi, 1999
2. Hogg, R.V. & Tanis E. A. : Probability and Statistical Inference, 6th Edn., Pearson Education, New Delhi, 2004.

Reference Books :

1. Sastry, S.S. – Introductory Methods of Numerical Analysis, 4th Edn., PHI, New Delhi, 2005
2. Hines, W.W. et al – Probability and Statistics in Engineering, 4th edn., John Wiley, Singapore (Indian Reprint), 2003.
3. Veerarajan, T. – Probability, Statistics and Random Processes, 2nd Edn., TMH, New Delhi, 2003.

SEMESTER –V

IT 5021 DATA COMMUNICATIONS 3 (3-0-0)

Module - I

Data Communications and Networking Overview: A Communications Model, Data Communications, Data Communication Networking.

Protocol Architecture: The Need for Protocol Architecture, A Simple Protocol Architecture, OSI, The TCP/IP Protocol Architecture

Module - II

Data Transmission: Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments, Channel Capacity.

Guided and Wireless Transmission: Guided Transmission Media, Wireless Transmission, Wireless Propagation, Line-of-Sight Transmission.

Module - III

Signal Encoding Techniques: Digital Data Digital Signals, Digital Data Analog Signals, Analog Data Digital Signals, Analog Data Analog Signals.

Module - IV

Digital Data Communication Techniques: Asynchronous and Synchronous Transmission, Types of Errors, Error Detection, Error Correction, Line Configurations, Interfacing.

Module - V

Data Link Control: Flow Control, Error Control, High-Level Data Link Control (HDLC).

Multiplexing: Frequency Division Multiplexing, Synchronous Time Division Multiplexing, Statistical Time Division Multiplexing.

Module - VI

Circuit Switching and Packet Switching: Switching Networks, Circuit-Switching Networks, Circuit-Switching Concepts, Control Signaling, Soft switch Architecture, Packet-Switching Principles, X.25, and Frame Relay.

Module -VII

Asynchronous Transfer Model: Protocol Architecture, ATM Logical Connections, ATM Cells, Transmission of ATM Cells, ATM Service Categories, ATM Adaptation Layer.

Routing in Switched Networks: Routing in Circuit-Switching Networks, Routing in Packet-Switching Networks, Least-Cost Algorithms

Text Book:

1. W. Stallings - Data and Computer Communications, 7th Edn., Pearson Edn./ PHI, New Delhi, 2006

Reference Books:

1. B. A. Forouzan - Data Communications and Networking, 4th Edn. TMH, New Delhi 2006
2. P.C. Gupta – Data Communications and Computer Networks, PHI, New Delhi 2006

IT 5023 SOFTWARE ENGINEERING PRINCIPLES 4 (3-1-0)

MODULE – I

Introduction: Some Definitions, FAQs about software engineering, The evolving role of software, Software characteristics, SW applications

Software Processes: Software process models, Waterfall model, the Prototyping model, Spiral model, RAD and Incremental model.

MODULE – II

Project Management : Management activities, Project planning, Project scheduling, Risk Management.

MODULE – III

Software Requirements : Functional and non functional requirements, User requirements, System requirements, The software requirements document. IEEE standard of SRS, Quality of good SRS.

Requirement Engineering Process : Feasibility study, Requirements elicitation and analysis, Requirements validation, Requirement management.

MODULE – IV

Software Design : Design Concepts and Principles, Architectural Design, Object oriented Design, User interface design

UML : Class diagram, Sequence diagram, Collaboration diagram

MODULE – V

Verification and Validation : Verification and Validation Planning, S/W inspection, static analysis.

Software Testing : Testing functions, Test case design, White Box testing, Black box testing, Unit testing, Integration Testing, System testing, Reliability.

MODULE – VI

Management : SW cost estimation : Estimation techniques, Algorithmic cost modelling, Project duration and staffing.

Quality Management : Quality assurance and standards, Quality planning, Quality control.

MODULE – VII

Software Change : Program Evolution Dynamic, S/W Maintenance in detail.

Text Book :

I. Sommerville : Software Engineering, Pearson Education Publication, 7th ed.

Reference Books:

1. R. S. Pressman : Software Engineering : A Practitioners Approach, 5th Edn., TMA, New Delhi.
2. J. F. Peters & W. Pedrycz– Software Engineering, John Wiley & Sons, Inc. 2000
3. A. Behforooz & F.J. Hudson – Software Engineering Fundamentals, Oxford Univ. Press, New York, 2000.

IT 5025 PRINCIPLE OF SOFT COMPUTING 3 (3-0-0)

I FUZZY LOGIC

MODULE -I

Fuzzy Set Theory: Basic Definition and Terminology, Set Theoretic Operations, MF Formulation and Parameterization, MF of two dimension, Fuzzy Union, Intersection and Complement.

MODULE -II

Fuzzy Rules and Fuzzy Reasoning : Extension Principles and Fuzzy Relations, Fuzzy IF THEN Rules, Fuzzy Reasoning.

MODULE –III

Fuzzy Inference System Introduction, Mamdani Fuzzy Models, Other Variants, Sugeno Fuzzy Models, Takamoto Fuzzy Models.

II GENETIC ALGORITHMS

MODULE –IV

Fundamentals of Genetic Algorithms: Basic Concepts Creation, Offsprings Encoding, Fitness functions, Reproduction, Genetic Modelling: Inheritance Operators, Cross over, Inversion and detection, Mutation operator, Bitwise operators.

ARTIFICIAL NEURAL NETWORKS :

MODULE -V

Introduction, Architecture, Back Propagation and feed Forward Networks, Offline Learning, Online Learning.

MODULE -VI

Supervised Learning of Neural Networks : Introduction, Perceptrons, Adaline, Back Propagation Multilayer Perceptrons, Back Propagation Learning Rules, Methods of Speeding. Radical Basis Function Networks, Functional Expansion Networks.

MODULE -VII

Unsupervised Learning : Competitive Learning Networks, Kohonen self-organising networks, Hebbian Learning, The Hopfield Network

Text Book :

1. J.S.R. Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing” PHI/Pearson Education, New Delhi 2004.
2. S. Rajasekaran & G.A. Vijayalakshmi Pai, PHI, New Delhi 2003

Reference Book:

1. T. J. Ross, “ Fuzzy Logic with Engineering Applications.” TMH, New York, 1997.

IT 5027 DESIGN OF COMPUTER ALGORITHMS 4 (3-1-0)

MODULE-I

Introduction: Some linear and non-linear Data structures, Asymptotic notation to measure complexity, of algorithms, Analysis of algorithms efficiency, Analysis of non recursive & recursive algorithms, Space and Time trade-offs

MODULE-II&III

Divide & Conquer: Merge Sort, Quick sort, Binary search, Large integer- multiplication, Strassen's matrices multiplication, Closest pair & convex hull problems

Decrease & Conquer: DFS& BFS, decrease-by α -constant-factor algorithms, Variable-Size-decrease algorithms

Transform & Conquer: Horner's Rule & Binary exponentiation, Problem reduction : Input enhancement in string matching

MODULE- IV

Greedy Techniques: Knapsack problem, Job-scheduling, Prim's & Kruskal algorithms, Dijkstra's algorithm, Huffman coding alg.,

MODULE- V

Dynamic Programming: Warshall's & Floyd's algorithm, Optional binary search trees, Knapsack problem ,

MODULE- VI

Backtracking, Branch and Bound Methods.

MODULE-VII

Limitations of Algorithm Power: Lower bound arguments-decision trees, P, NP & NP Complete problem, Approximation algorithms for NP-hard problems

Text Book:

1. Thomas H. Cormen, An Introduction to Algorithms, PHI publication, 2009

Reference Books:

1. Fundamentals of Computer algorithms, Horowitz & Sahni, Galgotia publications.
2. Introduction to Design & Analysis of Algorithms, Anany Levitin, Pearson Education 2003.

MODULE –I

Signal Analysis: Introduction of Signal, Representation of Signals in the Frequency and Time Domain, Fourier Transform and its Application to signal Analysis. The Discrete Spectrum, The Continuous Spectrum, Dirac Delta Functions, Energy Density Spectra.

MODULE -II

Amplitude Modulation System: Basics Communication system, Modulation, Need of Modulation, Introduction of Amplitude Modulation, Frequency spectrum of Amplitude Modulation, Modulator: Square law Modulator, Switching Modulator, Demodulator: Envelop Detector, Square law detector, AM-DSB-SC, Balanced Modulator and Ring Modulator, AM-SSB-SC, Generation of SSB-SC signal and demodulation of SSB-SC and DSB-SC signal. Comparisons of Various AM systems

MODULE -III

Angle Modulation System: Introduction, Concept of Angle Modulation, Frequency and phase Modulations, Types of Frequency Modulation, Generation of FM wave: Direct and Indirect Method Detection of FM wave using slope detector, Balanced Slope Detector and Phase Discriminator, Comparison of Frequency Modulation and Amplitude Modulation.

MODULE –IV

Multiplexing: Introduction and its classification, Frequency division Multiplexing. Time Division Multiplexing.

MODULE –V

AM and FM receivers: Introduction, Classification of Radio receiver, Superheterodyne receiver, Sensitivity, Selectivity, Fidelity and Image rejection ratio.

MODULE -VI

Random Signal Theory: Random Variables, Continuous and Statistically Independent random variables, Examples of probability Density functions of Uniform, Gaussian, Rayleigh functions. Stationary & Ergodic Processes, Auto Correlation Functions, Energy Spectral Density.

MODULE -VII

Noise: White Noise, Atmospheric Noise, Thermal Noise, Equivalent Noise Band width Shot noise, Partition Noise, Flicker Noise, Noise Figure, Signal to Noise Ratio, Noise Factor, Noise Temperature. Equivalent Noise figure of Amplifiers.

Text Book:

Communication Systems by S. Haykin; 4th Edition-2001

Reference Books:

D. Roddy & J. Coolen: Electronics Communication 4th Edition, PHI-2005

IT 6023 COMPUTER NETWORK AND SECURITY 3 (3-0-0)

MODULE-I

OSI Security Architecture: Classical Encryption techniques – Cipher Principles – Data Encryption Standard – Block Cipher Design Principles and Modes of Operation .

MODULE-II

Evaluation criteria for AES: AES Cipher – Triple DES – Placement of Encryption Function – Traffic Confidentiality.

MODULE-III

PUBLIC KEY CRYPTOGRAPHY

Key Management: Diffie-Hellman key Exchange – Elliptic Curve Architecture and Cryptography .

Introduction to Number Theory: Confidentiality using Symmetric Encryption – Public Key Cryptography and RSA.

MODULE-IV

AUTHENTICATION AND HASH FUNCTION

Authentication requirements: Authentication functions – Message Authentication Codes Hash Functions – Security of Hash Functions and MACs.

MODULE-V

MD5 message Digest algorithm: - Secure Hash Algorithm – RIPEMD – HMAC Digital Signatures – Authentication Protocols – Digital Signature Standard

MODULE-VI

NETWORK SECURITY

Authentication Applications: Kerberos – X.509 Authentication Service – Electronic Mail Security – PGP – S/MIME - IP Security – Web Security.

MODULE-VII

SYSTEM LEVEL SECURITY

Intrusion detection: password management – Viruses and related Threats – Virus Counter measures – Firewall Design Principles – Trusted Systems.

Text Book

William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of India, fifth Edition, 2009.

Reference Book

1. Atul Kahate, “Cryptography and Network Security”, Tata McGraw-Hill, 2003.
2. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2001.

IT 6025 INFORMATION AND CODING THEORY 3(3-0-0)

MODULE – I & II

The concept of Amount of Information, Average Information, Entropy, Information rate, Shannon's Theorem, Channel Capacity & Coding: Introduction to Channel Capacity & Coding, Channel Models, Channel Capacity Theorem, Shannon Limit.

MODULE-III

Data Compression Techniques: RLE, Lempel-Ziv Algorithm, Introduction to Image Compression, The JPEG standard for loss less and Lossy Image Compression & Decompression.

MODULE – IV & V

Error Control Coding: Introduction, Forward & Backward error Correction, Hamming Weight and Hamming Distance, Linear Block Codes, Encoding and decoding of Linear Block-codes, Parity Check Matrix, Syndrome Decoding, Hamming Codes.

MODULE – VI

Cyclic Codes: Introduction, Method for generating Cyclic Codes, Matrix description of Cyclic codes, Burst error correction, Cyclic redundancy check (CRC) codes, Circuit implementation of cyclic codes.

MODULE – VII

Convolutional Codes: Introduction, Polynomial description of Convolutional Codes, Generating function, Matrix description of Convolutional Codes, Viterbi Decoding of Convolutional codes.

Text Book:

Ranjan Bose, Information Theory, Coding & Cryptography", TMH, 2001, New Delhi.

Reference Books:

1. Salvatore Gravano, Introduction to Error-Control Codes, Oxford Univ. Press, New Delhi, 2010

IT 6027 OPTIMIZATION TECHNIQUES 3 (3-0-0)

MODULE -I

Introduction To Linear Programming : Prototype Example, The Linear Programming Model, Assumptions of Linear Programming, Additional Examples, Some Classic Case Studies.

Solving Linear Programming Problems- The Simplex Method : The Essence of the Simplex Method, Setting Up the Simplex Method, The Algebra of the Simplex Method, The Simplex Method in Tabular Form, Tie Breaking in the Simplex Method, Adapting to Other Model Forms, Postoptimality Analysis.

MODULE -II

The Theory Of The Simplex Method : Foundations of the Simplex Method ,The revised Simplex Method, A Fundamental Insight.

Duality Theory And Sensitivity Analysis : The Essence of Duality Theory, Economic Interpretation of Duality, Primal-Dual relationships, Adapting to Other Primal Forms, The Role of Duality Theory in Sensitivity Analysis.

MODULE -III

Other Algorithms For Linear Programming : The Dual Simplex Method, Parametric Linear Programming, The Upper Bound Techniques, An Interior-Point Algorithm.

Network Optimization Models: Prototype Example, The Terminology of Networks, The Shortest-Path Problem, The Minimum Spanning Tree Problem, The Maximum Flow Problem, The Minimum Cost flow Problem, The Network Simplex Method.

MODULE -IV

Dynamic Programming : A Prototype Example for Dynamic Programming, Characteristics of Dynamic Programming Problems, Deterministic Dynamic Programming, Probabilistic Dynamic Programming.

MODULE -V

Integer Programming : Prototype Example, Some BIP Applications, Innovative Uses of Binary Variables in Model Formulation, Some Formulation examples, Some Perspectives on Solving Integer Programming Problems, The Branch-and-Bound Technique and Its Application to Binary Integer Programming, A Branch-and-Bound Algorithm for Mixed Integer.

MODULE -VI

Nonlinear Programming : Sample Applications, Graphical Illustration of Nonlinear Programming Problems, Types of Nonlinear Programming Problems, One-Variable Unconstrained Optimization, Multivariable Unconstrained Optimization, The Karush-Kuhn-Tucker (KKT) Conditions for Constrained Optimization, Quadratic Programming, Separable Programming , Convex Programming.

MODULE -VII

Queueing Theory : Prototype Example, Basic Structure of queueing Models, Examples of Real Queueing Systems, The role of the Exponential Distribution, The Birth-and-Death Process, Queueing Models Based on the Birth-and-Death Process ,Queueing Models Involving Nonexponential Distributions.

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Text Book:

S. Hiller & G.J. Lieberman – Operations Research, 8th Edn, TMH, New Delhi – 2006.

Reference Books:

1. H.A.Taha – Operations Research, 8/e , Pearson Education , New Delhi-2007.
2. J.K. Sharma – Operations Research, 3/e, Mcmillan , India Ltd, 2007.

IT 7021 DATA MINING CONCEPTS AND TECHNIQUES 3 (3-0-0)

MODULE - I

Data Mining: Introduction, Relational Databases, Data Warehouses, Transactional databases, Advanced database Systems and Application, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining.

MODULE – II

Data Processing: Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

Data Warehouse: Introduction, A Multidimensional data Model, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology, From Data Warehousing to Data Mining.

MODULE - III

Data Mining Primitives, Languages and System Architecture: Data Mining Primitives, DMQL, Architectures of Data Mining Systems.

MODULE – IV

Concept Description: Data Generalization & Summarization – Based Characterization, Analytical Characterization, Mining class Comparisons, Mining Descriptive Statistical Measures in Large Databases.

MODULE - V

Mining Association Rules in Large Databases: Association Rule Mining, Single – Dimensional Boolean Association Rules, Multilevel Association Rules from Transaction Databases, Multi Dimensional Association Rules from Relational Databases, From Association Mining to Correlation Analysis, Constraint – Based Association Mining.

MODULE - VI

Classification and Prediction: Classification & Prediction, Issues Regarding Classification & Prediction, Classification by decision Tree Induction, Bayesian Classification, Classification by Backpropagation, Classification based on concepts & Association Rule Analysis, Other Classification Methods, Prediction, Classification Accuracy.

MODULE - VII

Cluster Analysis: Introduction , Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Method - k- Medoids Algorithm, CLARANS, Hierarchical Methods - BIRCH, ROCK Density-Based Methods - DBSCAN, Grid-Based Methods – STING, WaveCluster

Text Book :

Jiawei Han & Micheline Kamber - Data Mining Concepts & Techniques
Publisher Harcout India. Private Limited, Second Edition

Reference Books :

G.K. Gupta – Introduction to Data Mining with case Studies, PHI, New Delhi – 2006.
A. Berson & S.J. Smith – Data Warehousing Data Mining, COLAP, TMH, New Delhi – 2004
H.M. Dunham & S. Sridhar – Data Mining, Pearson Education, New Delhi, 2006.

LIST OF ELECTIVES - I

IT 7023 SIMULATION & MODELLING

MODULE-I

The concepts of a system, System Environment , Stochastic Activities, continuous and discrete systems, System Modeling, Types of models.

The full corporate Model.

MODULE-II

The technique of simulation, the monte carlo method, comparison of simulation and analytical methods, experimental nature of simulation, types of system simulation, numerical computation technique for continuous & discrete models, distributed lag models, cobweb models.

Continuous system models, differential equations, analog computers & methods, hybrid computers. CSSLs, CSMP-III, Feedback Systems, Simulation of an Autopilot.

MODULE-III

Exponential Growth & decay models, modified exponential growth models, logistic curves, generalization of growth models, system dynamics diagrams, Simple system dynamics diagrams, multi –segment models, representation of time delays.

MODULE-IV

Stochastic variables, discrete & continuous probability functions, measures of probability functions, numerical evaluation of continuous probability functions, continuous uniformly distributed random numbers, a uniform random number numbers, generating discrete distributions, non-uniform continuously distributed random no.s. the rejection method.

Random no's Generation : Techniques for generating random numbers. Tests for random numbers.

Random variate Generation: Inverse transform technique, exponential distribution, uniform distribution.

MODULE-V

Congestion in systems, arrival patterns , poisson arrival patterns, the exponential distribution, the erlang distribution, service times, normal distributions, queuing disciplines, measures of queues.

MODULE-VI

Discrete events, representation of time, generation of arrival patterns, simulation of a telephone system, delayed calls, simulation programming tasks, measuring utilization and occupancy.

MODULE-VII

GPSS programs, general description, action times, succession of events, choice of paths, simulation of a Manufacturing shop, facilities and storage, gathering statistics, conditional transfers. Program control statements. simscript:

Text Book:

1. Gordon Geoffrey, System Simulation, 4th edition, PHI, 2008.

Reference Book:

Simulation Modeling and Analysis Third Edition by Law kelton Mc Graw Hill Publication.

IT 7025 ARTIFICIAL INTELLIGENCE

MODULE – I

Overview of Artificial Intelligence : Definition & Importance of AI.

Knowledge : General Concepts : Introduction, Definition and Importance of Knowledge, Knowledge-Based Systems, Representation of Knowledge, Knowledge Organization, Knowledge Manipulation, Acquisition of Knowledge.

MODULE – II

LISP and Other AI Programming Languages : Introduction to LISP : Syntax and Numeric Function, Basic List Manipulation Functions in LISP, Functions, Predicates and Conditionals, Input, Output and Local Variables, Iteration and Recursion, Property Lists and Arrays, Miscellaneous Topics, PROLOG and Other AI Programming Languages.

MODULE – III

Knowledge Representation : Introduction, Syntax and Semantics for Propositional logic, Syntax and Semantics for FOPL, Properties of Wffs, Conversion to Clausal Form, Inference Rules, The Resolution Principle, No deductive Inference Methods, Representations Using Rules.

MODULE – IV

Dealing With Inconsistencies and Uncertainties : Introduction, Truth Maintenance Systems, Default Reasoning and the Closed World Assumption, Predicate Completion and Circumscription, Modal and Temporal Logics.

Probabilistic Reasoning : Introduction, Bayesian Probabilistic Inference, Possible World Representations, Dumpster-Shafer Theory, Ad-Hoc Methods.

MODULE – V

Structured Knowledge : Graphs, Frames and Related Structures : Introduction, Associative Networks, Frame Structures, Conceptual Dependencies and Scripts.

Object-Oriented Representations : Introduction, Overview of Objects, Classes, Messages and Methods, Simulation Example using an OOS Program.

MODULE – VI

Search and Control Strategies : Introduction, Preliminary Concepts, Examples of Search Problems, Uninformed or Blind Search, Informed Search, Searching And-Or Graphs.

Matching Techniques : Introduction, Structures Used in Matching, Measures for Matching, Matching Like Patterns, Partial Matching.

MODULE – VII

Knowledge Organization and Management : Introduction, Indexing and Retrieval Techniques, Integrating Knowledge in Memory, Memory Organization Systems.

Text Book :

1. Dan W. Patterson - Introduction to Artificial Intelligence and Expert Systems, PHI, New Delhi, 2006.

Reference Books:

1. E. Rich & K. Knight - Artificial Intelligence, 2/e, TMH, New Delhi, 2005.
2. P.H. Winston - Artificial Intelligence, 3/e, Pearson Edition, New Delhi, 2006.
3. D.W. Rolston,- Principles of AI & Expert System Development, TMH, New Delhi.

IT 7027 DIGITAL IMAGE PROCESSING

MODULE - I

Introduction : Background, Digital Image Representation, Fundamental Steps in Image Processing, Elements of a Digital Image Processing System.

Digital Image Fundamentals : Elements of Visual Perception, A Simple Image Model, Sampling and Quantization, Some Basic Relationships between Pixels, Imaging Geometry.

MODULE - II

Image Transforms : Introduction to the Fourier Transform, The Discrete Fourier Transform, Some Properties of the Two-Dimensional Fourier Transform, Other Separable Image Transforms.

MODULE - III

Image Enhancement : Spatial Domain Methods, Frequency Domain Methods, Some Simple Intensity Transformations, Histogram Processing, Image Subtraction, Image Averaging, Background, Smoothing Filters, Sharpening Filters, Lowpass Filtering, Highpass Filtering, Generation of Spatial Masks from Frequency Domain Specifications.

MODULE – IV & V

Image Restoring : Degradations Model - Definitions, Degradation Model for Continuous Functions, Diagonalization of Circulant and Block-Circulant Matrices, Circulant Matrices, Block Circulant Matrices, Effects of Diagonalization on the Degradation Model, Algebraic Approach to Restoration, Unconstrained Restoration, Constrained Restoration, Inverse Filtering – Formulation, Removal of Blur Caused by Uniform Linear Motion, Restoration in the Spatial Domain, Geometric Transformation.

MODULE – VI & VII

Image Compression : Fundamentals – Coding Redundancy, Interpixel Redundancy, Psychovisual Redundancy, Fidelity Criteria. Image Compression Models – The Source Encoder and Decoder, The Channel Encoder and Decoder. Elements of Information Theory – Measuring Information, The Information Channel, Fundamental Coding Theorems, Using Information Theory. Error-Free Compression – Variable-Length Coding, Bit-Plane Coding, Lossless Predictive Coding. Lossy Compression – Lossy Predictive Coding, Transform Coding.

Text Book :

1. Rafael. C. Gonzalez & Richard E.Woods.- Digital Image Processing, 2/e Pearson Education, New Delhi - 2006

Reference Books :

1. W.K.Pratt.-Digital Image Processing ,3/e Edn., John Wiley & sons, Inc. 2006
2. A.K.Jain.- Fundamentals of Digital Image Processing, PHI, New Delhi, 2006
3. M. Sonka et.al Image Processing, Analysis and Machine Vision, 2/e, Thomson, Learning, India Edition, 2007.

IT 7029 OBJECT-ORIENTED DESIGN

MODULE-I

What Is Object-Orientation: Introduction, Basic Concepts, The Origins of Object-Oriented languages Today.

Modelling Concepts: Introduction, Models and diagrams, Drawing Activity Diagrams.

MODULE-II & III

Requirements Capture: Introduction, User Requirements, Fact Finding Techniques, User Involvement, Documenting Requirements, Use Cases, Requirements Capture and Modelling.

Requirements Analysis: Introduction, What Must a Requirements Model Do, Use Case Realization, The Class Diagram, Drawing a Class Diagram, CRC (Class Responsibility Collaboration) Cards, Assembling the Analysis Class Diagram.

Refining The Requirements Model: Introduction, Component-based Development, Adding Further Structure, Software Development Patterns.

MODULE-IV

Object Interaction: Introduction, Object Interaction and Collaboration, Interaction Sequence Diagrams, Collaboration Diagrams, Model Consistency.

Specifying Operations: Introduction, The Role of Operation Specifications, Contracts, Describing Operation Logic, Object Constraint Language, Creating an Operation Specification.

MODULE-V

Specifying Control: Introduction, States and Events, Basic Notation, Further Notation, Preparing a Statechart, Consistency Checking, Quality Guidelines, Summary.

Moving Into Design: Introduction, How is Design Different from Analysis, Logical and Physical Design, System Design and Detailed Design, Qualities and Objectives of Analysis and Design, Measurable Objectives of Analysis and Design, Measurable Objectives in Design, Planning for Design.

MODULE-VI

System Design: Introduction, The Major Elements of System Design, Software Architecture Concurrency, Processor Allocation, Data Management Issues, Development Standards, Prioritizing Design Trade-offs, Design for Implementation.

OBJECT DESIGN: Introduction, Class Specification, Interfaces, Criteria for Good Design, Designing Associations, Integrity Constraints, Designing Operations, Normalization.

MODULE-VII

Design Patterns: Introduction, Software Development Patterns, Documenting Patterns-Pattern Templates, Design Patterns, How to Use Design Patterns, Benefits and Dangers of Using Patterns.

Designing Boundary Classes: Introduction, The Architecture of the Presentation Layer, Prototyping the User Interface, Designing Classes, Designing Interaction with Sequence Diagrams, The Class Diagram Revisited, User Interface Design Patterns, Modelling the Interface Using Statecharts.

Text Book:

1. S.Bennett, S.Mc Robb and R.Farmer – Object- Oriented Systems Analysis and Design Using UML 2nd edn, TMH, New Delhi – 2007.

Reference Books:

1. M.Blaha and J.Runbangh – Object- Oriented Modeling and Design with UML 2./e, Pearson Education, New Delhi,2007.
2. J.W. Satzinger, B.R. Jackson and S.D. Burd – Object –Oriented Analysis and Design, Thomson Learning, India Edition, 2007.
3. G. Booch – Object Oriented Analysis and Design with Applications,2/e, CA;Benjamin/Cumming,1994.

IT 7031 SYSTEM PROGRAMMING

MODULE – I

Background : Introduction, System Software and Machine Architecture, The Simplified Instructional Computer (SIC), Traditional (CISC) machines, RISC Machines.

MODULE – II & III

Assemblers : Basic Assembler Functions, Machine – Dependent Assembler Features, Machine – Independent Assembler Features, Assembler Design Options, Implementation Examples.

MODULE – IV & V

Loaders and Linkers : Basic Loader Functions, Machine - Dependent Loader Features, Machine – Independent Loader Features, Loader Design Options, Implementation Examples.

MODULE – VI

Macro Processors : Basic Macro Processor Functions, Machine – Independent Macro Processor Features, Macro Processor Design Options, Implementation Examples.

MODULE – VII

Software Engineering Issues : Introduction to Software Engineering Concepts, System Specifications, Procedural System Design, Object – Oriented Design, System Testing Strategies.

Text Book :

1. L. L. Beck – System Software – An Introduction to Systems Programming, 3/e, Pearson Education, New Delhi, 2004

Reference Books:

1. J.J. Donovan – System Programming, McGraw Hill , New Delhi, 1993.
2. D.M. Dhamdhere – System Programming and Operating Systems, 2/e., Tata McGraw Hill , New Delhi, 2000

IT 7033 WEB TECHNOLOGY

MODULE-I

Web Essentials : Clients , Server and Communication, The Internet, Basic Internet Protocols , The World Wide Web , Http Request Message, HTTP Response Message , Web Clients , Web Servers .

Markup Languages : XHTML 1.0 , Introduction to HTML ,History and Versions, Basic XHTML Syntax and Semantics, Some Fundamental HTML Elements , Relative URIs , List , Tables , Frames , Forms, Defining XHTML Abstract syntax : XML, Creating HTML Documents .

MODULE- II

Style Sheets : CSS , Introduction to Cascading Style Sheets and features , CSS Code Syntax , Style Sheets and HTML , Style Rule Cascading and Inheritance , Text Properties, CSS Box Model, Normal Flow Box Layout, Beyond the Normal Flow , Other useful style properties .

MODULE-III

Client – Side Programming : The Java Script Language , History and Introduction ,Java Script Perspective ,Basic Syntax , Variables and Data Types , Statements , Operators , Literals , Functions , Objects , Arrays , Build in Objects, Java Scripts Debuggers .

MODULE- IV

Host Objects : Browsers and the DOM, Introduction to Document Object Model , DOM History and Model, Intrinsic Event Handling , Modifying Elements Style, The Document Tree , DOM Event Handling .

MODULE- V

Server Side Programming : Java Servlet Architecture over view , Servlet generating Dynamic Content , Servlet life Cycle , Parameter Data , Session , Cookies , URL Rewriting , Other Servlet Capabilities , Data Storage , Servlets and Concurrency.

MODULE- VI

Representing Web Data : XML Documents , vocabularies, versions , declarations, Namespaces , Java Script and XML: AJAX, DOM based XML Processing , Event oriented Parsing :SAX, Transforming XML Documents

MODULE- VII

JSP Technology : Introduction JSP and Servlets , Running JSP Applications , JSP Basic , Java Beans classes and JSP, Tag Libraries and Files ,Support for Model View Controller Paradigm . Web Services : Concepts , Writing Java Web Services , Writing Java Web Service Client, Describing Web services : WSDL , Representing Data Types : XML Schema , Communication Object Data :SOAP

Text Book : Web Technologies: A Computer Science Perspective , Jeffrey C Jackson , Pearson Education , India.

Reference Book : Web Technology by Uttam K. Roy , Oxford University Press 2010

Module-I

Introduction: Computational Demand of Modern Science, Advent of Practical processing, Parallel Processing Terminology- Contrasting Pipelining and Data parallelism, Control Parallelism, Scalability, Control-Parallel Approach, Data-Parallel Approach with I/O.

Module-II

PRAM Algorithm: A Model of Serial Computation, The PARAM Model of Parallel Computation, PARAM Algorithm- Parallel Reduction, Prefix Sums, List Ranking, Preorder Tree Traversal, Merging Two Sorted Lists, Graph Colouring,

Module III

Mapping and Scheduling: Mapping Data to Processors on Processor Arrays Multicomputers., Dynamic Load Balancing on Multicomputers, Static Scheduling on UMA Multiprocessors, Deadlock,

Module-IV

Elementary Parallel Algorithm: Classifying MIMD Algorithm, Reduction. Matrix Multiplication: Sequential Matrix Multiplication, Algorithms for Processor Array, Algorithms for Multiprocessors.

Module-V

Introduction to Distributed System: Goals, Hardware concepts, Software concepts, and Client-Server model. Examples of distributed systems.

Communication: Layered protocols, Remote procedures call, Remote object invocation, Message-oriented communication, Stream-oriented communication

Module-VI

Synchronization: Clock synchronization, Logical clocks, Global state, Election algorithms, Mutual exclusion, Distributed transactions,

Module-VII

Consistency and Replication: Data centric consistency models, Client centric consistency models, Distribution protocols, Consistency protocols.

Text Books

1. M.J. Quinn-Parallel Computing-Theory and Practice, 2nd Edn., McGraw Hill Inc., New York.
2. M. Singhal, N. Shivaratri, Advanced Concepts in Operating Systems, TMH,2010

Referece Book:

3. Sunit Mahajan and Seema Shah, Distributed Computing, Oxford Unv. Press, New Delhi, 2010

MODULE-I

Introduction to Compiling, Analysis of the source program, The phases of the compiler, Lexical Analysis, The role of the lexical analyzer, Tokens, Patterns, Lexemes, Input buffering, Specifications of a token, Recognition of a tokens, Finite automata, From a regular expression to an NFA, From a regular expression to NFA, From a regular expression to DFA, Design of a lexical analyzer generator.

MODULE-II & III

Syntax Analysis, The role of a parser, Context free grammars, Writing a grammar, Top down Parsing, Non-recursive Predictive parsing (LL), Bottom up parsing, Operator precedence parsing, LR parsers (SLR, LALR), Parser generators (YACC).

MODULE-IV

Syntax directed translation, Syntax director definitions, Construction of syntax trees, Bottom-up evaluation of S attributed definitions, L attributed definitions, Bottom-up evaluation of inherited attributes.

MODULE-V

Type checking, Specification of a simple type checker, Equivalence of type expressions, Type conversions, Run time environments, Storage allocation strategies, Parameter passing (call by value, call by reference, copy restore, call by name), Symbol tables, dynamic storage allocation techniques.

MODULE-VI

Intermediate code generation, Intermediate languages, Graphical representation, Three-address code, Implementation of three address statements (Quadruples, Triples, Indirect triples).

MODULE-VII

Code optimization, Basic blocks & flow graphs, Transformation of basic blocks, DAG, representation of basic blocks, The principle sources of optimization, Loops in flow graph, Code generations, Issues in the design of code generator, a simple code generator, Register allocation & assignment.

Text Book:

1. Aho, Sethi, Ullman - "Compiler Principles, Techniques and Tools" - Pearson Education, New Delhi, 2007.

Reference Book:

1. Holub - "Compiler Design in C" – PHI, New Delhi, 2004

LIST OF ELECTIVES - II

IT 8025 ENTERPRISE RESOURCE PLANNING

MODULE - I

Introduction to ERP : Evolution of ERP, What is ERP, Reasons for the growth of the ERP market, Advantages of ERP, Reasons of Failure.

MODULE - II

Enterprise- An overview : Integrated Management information, Business Modeling, Integrated Data Model.

MODULE- III

ERP and Related Technologies : BRP (Business Process Reengineering), MIS (Management Information System), DSS (Decision Support System), EIS (Executive Information system), Data Warehousing, Data Mining, OLAP, Supply Chain Management.

MODULE - IV

A Manufacturing Perspective : ERP, CAD/CAM, Material Requirement Planning, Bill of Material, Closed loop MRP, MRP-II, Distributed Requirement Planning, JIT and Kanban, Product Data Management, Benefit of PDM, Data Management, Market to Order, Market to Stock, Assemble to order, Engineer to order, Configure to order.

MODULE -V

ERP Modules: Finance, Sales and distribution, Manufacturing, Human Resources, Plant Maintenance, Quality Management, Material Management.

MODULE - VI

Benefits of ERP :

ERP Market : SAP, BAAN, Oracle Corporation, People Soft.

ERP Implementation Life Cycle : Different phases of ERP implementation

MODULE - VII

Vendors, Consultants & Users's : In – house Implementation – pros & cons, Vendors, Consultants, End-users.

Future Directions in ERP: New Markets, New channels, Faster Implementation methodologies, Business Models and BAPIs, New business segments, Web enabling

ERP Case Studies.

Text Book :

1. Alexis Leon - Enterprise Resource Planning, TMH, New Delhi 2001.

Reference Book:

1. E. Monk & B. Wagner – Concepts in Enterprise source planning, 2/e, Thomson Learning, India Edition 2007.

IT 8027 DECISION SUPPORT SYSTEMS

MODULE-I

DSS Defined, history of DSS , Ingredients of a DSS, Data and Model Management, DSS Knowledge Base, User Interfaces, The DSS User, Categories and classes of DSSs.

MODULE-II

Decision Makers :who are they?, decision Styles, decision Effectiveness, how can a DSS help?, why are decision So hard?, A typology of decisions, decision theory and simon's model of problem solving, rational decision making, bounded rationality ,the process of choice, Cognitive Processes, biases and heuristics in decision making, effectiveness and efficiency.

MODULE-III

Understanding the organization, Organizational Culture, power and politics, supporting organizational Decision making, defining the problem and its structure, decision models, types of probability, techniques for forecasting probabilities calibration and sensitivity.

MODULE-IV

Group decision making, the problem with groups ,MDM support technologies, managing MDM activities, the virtual workplace, What Exactly is an EIS?, EIS history, EIS components, making the EIS work, the future of executive decision making and the EIS.

MODULE-V

The concepts of expertise, the intelligence of AI, the concepts and structure of expert systems, designing and building Expert Systems, evaluating the benefits of expert systems.

MODULE-VI

The concept of knowledge, knowledge Acquisition for expert systems, validating and verifying the knowledge base, Fuzzy logic and artificial neural networks, genetic algorithms , Application of machines that learn.

MODULE-VII

Stores, warehouses, and Marts, the data Warehouse Architecture, data have data-the metadata, interviewing the data-metadata extraction, implementing the data warehouse, data ware house technologies, the future of data warehousing.

Text Book:

1. George M. Markas, Decision support Systems in the 21st Century, 2nd edition, Pearson Education 2005.

Reference Book:

1. E. Turban, J.E. Aronson & T.P.Liang- Decision Support Systems and Intelligent Systems, 7/e, Pearson Education, New Delhi- 2006.

IT 8029 EMBEDDED SYSTEMS

MODULE - I

Introduction :Embedded systems overview, Design challenge, Processor technology, IC technology, Design Technology, Trade offs

MODULE - II

Custom Single-purpose processors: Hardware :Introduction, Combinational Logic, Sequential logic

MODULE -III

General-purpose processors: Software :Introduction, Basic architecture, Operation, Development environment, Application-specific instruction-set processors (ASIP's), Selecting a microprocessor, General-purpose processor design

MODULE - IV

Standard single-purpose processors: Peripherals : Introduction, Timers, counters, and watchdog timers, UART, Pulse width modulator, LCD controller, Keypad controller, Stepper motor controller, Analog-digital converters, Real-time clocks

MODULE - V

Memory : Introduction, Memory write ability and storage permanence, Write ability, Storage permanence, Common memory types, Composing memories, Memory hierarchy and cache, Advanced RAM

MODULE - VI

Interfacing: Introduction, Communication basics, Microprocessor interfacing: I/O addressing, Microprocessor interfacing: interrupts, Microprocessor interfacing: Direct memory access, Arbitration, Multi-level bus architectures, Advanced communication principles, Serial Protocols, Parallel protocols, Wireless protocols

MODULE - VII

State machine and concurrent process models : Introduction, Models vs. languages, text vs. graphics, A basic state machine model: finite-state machines (FSM), Finite-state machines with data path model: FSMD, Using state machines, Hierarchal/Concurrent state machine model (HCFSM) and the State charts language, Program-state machine model (PSM), The role of an appropriate model and language, Concurrent process model, Concurrent processes, Communication among processes, Synchronization among processes, Implementation, Data flow model, Real-time systems,

Text Book:

Embedded System Design: A Unified Hardware/Software Introduction by Frank Vahid and Tony Givargis, John Wiley & Sons 2002

IT 8031 PATTERN RECOGNITION

MODULE – I

Pattern Recognition Overview : Overview, Pattern Recognition, Classification and Description, Patterns and Feature Extraction, Training and Learning in PR Systems, Pattern Recognition Approaches.

MODULE – II

Statistical Pattern Recognition : Introduction, The Gaussian case and Class Dependence Discriminate Functions, Extensions, Classifier Performance, RISK and Errors.

MODULE – III

Supervised Learning : Parametric Estimation and Supervised Learning, Maximum Likelihood Estimation Approach, Bayesian Parameter Estimation Approach, Non – Parametric Approaches, Parzen Windows, K-nn Non-Parametric Estimation. Nearest Neighbour Rule.

MODULE – IV

Linear Discriminate Functions and The Discrete and Binary Feature Cases :

Introduction, Discrete and Binary Classification Problems, Techniques to Directly Obtain Linear Classifiers.

MODULE – V&VI

Syntactic Pattern Recognition : Overview Quantifying Structure in Pattern Description and Recognitions, Grammar Based Approach and Application, String Generation as Pattern Description.

Recognition by String Matching and Parsing. The Cocke-Younger Kasami ((ck) parsing algorithm.

MODULE – VII

Neural Pattern Recognition: Introduction to Neural Networks, Neural Network Structure from Pattern Recognition Applications. Physical Neural Network. The Artificial Neural Network Model, Neural Network Based Pattern Associators.

Text Book :

1. Robert Schalkoff - Pattern Recognition, Statistical, Structural and Neural Approach, John Wiley, Indian Edition, 200.

Reference Book :

1. R. U. Duda – Pattern Classification, John Wiley, Indian Edition, 2006.

IT 8033 COMPUTING AND COMPLEXITY THEORY

MODULE - I

The Church- Turing Thesis : Turing Machines- Formal definition of a Turing machine, Examples of Turing machines; Variants of Turing Machines- Multitape Turing machines, Nondeterministic Turing machines, Enumerators, Equivalence with other models; The Definition of Algorithm- Hilbert's problems, Terminology for describing Turing machines.

MODULE - II

Decidability : Decidable Languages- Decidable problems concerning regular languages, Decidable problems concerning context-free languages; The Halting Problem- The diagonalization method, The halting problem is undecidable.

MODULE - III

Reducibility: Undecidable Problems from Language Theory- Reductions via computation histories; A Simple Undecidable Problem; Mapping Reducibility-Computable functions, formal definition of mapping reducibility.

MODULE - IV

Advanced Topics In Computability Theory:- The Recursion Theorem, Self-reference, Terminology for the recursion theorem, applications; Decidability of logical theories- A decidable theory, An undecidable theory; Turing Reducibility; A Definition of Information- Minimal length descriptions, Incompressible strings and randomness.

MODULE – V&VI

Time Complexity: Measuring Complexity- Big-O and small-o notation, Analyzing algorithms, Complexity relationships among models; The Class P- Polynomial time, Examples of problems in P; The Class NP- Examples of problems in NP, The P versus NP question; NP-completeness- Polynomial time reducibility, Definition of NP-completeness, The Cook-Levin Theorem; Additional NP-complete Problems- The vertex cover problem, The Hamiltonian path problem, The subset sum problem.

MODULE - VII

Space Complexity: Savitch's Theorem, The Class PSPACE, PSPACE-completeness – The TQBF problem, Winning strategies for games, Generalized geography; The Classes L and NL, NL-completeness- Searching in graphs; NL equals coNL.

Intractability: Hierarchy Theorems- Exponential space completeness; Relativization- Limits of the diagonalization method; Circuit Complexity.

Text Book:

Michael Sipser – Introduction to the Theory of Computation, 2/e, Thomson Learning – India Edition 2006.

Reference Books:

1. R.G.Taylor – Models of Computation and Formal Languages, Oxford University New York, 1998.
2. B.M. Moret – The Theory of Computation , Pearson Education, New Delhi 2002.

IT 8035 SOFTWARE RELIABILITY AND TESTING

MODULE – I

Introduction : Software Reliability & Hardware Reliability, Basic Concepts, Availability, Modeling.

MODULE – II

Selected Models : Execution Time Component, Calendar Time Component, Model Choice.

MODULE - III

Applications : System Engineering, Project Management, Management of Operational Phase, Evaluation of S/W Engg. Technologies.

MODULE – IV

System Definition : Failure definition, System Configuration, Text Run Selection.

MODULE – V

Parameter Determination : Execution Time Component, Calendar Time Component.

MODULE – VI&VII

Project Specific Techniques : Unobserved Failures, Failure Time Measurement, Evolving Programs, Changes in Environment, Other Consideration.

Text Book :

1. J. D. Musa, et.al - Software Reliability: Measurement, Prediction & Application, McGraw Hill, New York.

Reference Books:

1. Hoang. Pham, et.al - Software Reliability and testing, IEEE Computer Society press.
2. Glenford J. Myers, Tom Badgett, Todd M. Thomas, Corey Sandler - The art of software testing, John Wiley & Sons, Inc.

IT 8037 DISTRIBUTED DATABASE SYSTEM

MODULE – I

Introduction: Distributed Data Processing ,Promises of DDBs ,Complicating Factors, Problem areas.

Distributed DBMS Architecture : DBMS Standardization , Architectural Models for Distributed DBMS s, Distributed DBMS Architecture.

MODULE – II

Distributed Database Design: Alternative Design Strategies, Distribution design issues, Fragmentation, Allocation. Semantic Data Control : View management, Data security, Semantic Integrity control.

MODULE-III

Overview of Query Processing: Query Processing Problem ,Objective of Query Processing , Complexity of Relational Algebra operations , Characterization of Query Processing , Layers of Query Processing.

MODULE- IV

Query Decomposition and Data Localization : Query Decomposition , Localization of Distributed Data, Optimization of Distributed Queries : Query optimization , Centralized Query optimization , Join ordering in fragment Queries , Distributed Query Optimization Algorithms.

MODULE – V

Introduction to Transaction Management: Definition of Transaction , Properties of Transactions, Types of Transactions .

Distributed Concurrency Control : Serializability Theory , Taxonomy of Concurrency Control Mechanisms, , Locking Based Concurrency control Algorithm , Time Stamp based concurrency control Algorithms, Optimistic Concurrency Control Algorithms ,Dead Lock management, RELAXED Concurrency Control.

MODULE – VI

Distributed DBMS Reliability: Reliability Concepts and Measures , Failures and Fault Tolerance in Distributed systems, Failures in Distributed DBMS, Local Reliability Protocols , Distributed Reliability Protocols, Dealing with Site Failures, Network Partitioning.

MODULE – VII

Parallel Database Systems : Data Base Servers , Parallel Architectures , Parallel DBMS Techniques , Parallel Execution Problems , Parallel Execution for Hierarchical Architecture.

Text Book:

M. Tamer Ozsu, Patrick Valduriez , S.Sridhar - Principles of Distributed Database Systems 2nd Edn., Pearson Education Asia,2001.

Reference Book :

Stefano Ceri , Guisepppe Pelagatti , - Distributed Databases Principles and Systems Tata McGraw-Hill Edition 2008

IT 8039 COMPUTER GRAPHICS AND MULTIMEDIA

MODULE- I

Introduction to computer graphics & graphics systems, Overview of computer graphics, representing pictures, preparing, presenting & interacting with pictures for presentations; Visualization & image processing; RGB color model, direct coding, lookup table; storage tube graphics display, Raster scan display, 3D viewing devices, Plotters, printers, digitizers, Light pens etc.; Active & Passive graphics devices; Computer graphics software.

MODULE- II

Scan conversion: Points & lines, Line drawing algorithms; DDA algorithm, Bresenham's line algorithm, Circle generation algorithm; Ellipse generating algorithm; scan line polygon, fill algorithm, boundary fill algorithm, flood fill algorithm.

MODULE- III & IV

2D transformation & viewing, Basic transformations: translation, rotation, scaling; Matrix representations & homogeneous coordinates, transformations between coordinate systems; reflection shear; Transformation of points, lines, parallel lines, intersecting lines. Viewing pipeline, Window to view port co-ordinate transformation, clipping operations, point clipping, line clipping, clipping circles, polygons & ellipse.

3D transformation & viewing

3D transformations: translation, rotation, scaling & other transformations. Rotation about an arbitrary axis in space, reflection through an arbitrary plane; general parallel projection transformation; clipping, view port clipping, 3D viewing.

MODULE- V & VI

Curves, Curve representation, surfaces, designs, Bezier curves, B-spline curves, end conditions for periodic B-spline curves, rational B-spline curves.

Hidden surfaces, Depth comparison, Z-buffer algorithm, Back face detection, BSP tree method, the Painter's algorithm, scan-line algorithm; Hidden line elimination, wire frame methods, fractal - geometry.

Color & shading models, Light & color model; interpolative shading model; Texture;

MODULE- VII

Multimedia: Introduction to Multimedia: Concepts, uses of multimedia, hypertext and hypermedia.; Image, video and audio standards. Audio: digital audio, MIDI, processing sound, sampling, compression. Video: MPEG compression standards, compression through spatial and temporal redundancy, inter-frame and intra-frame compression. Animation: types, techniques, key frame animation, utility, morphing. Virtual Reality concepts.

Text Books

1. Hearn, Baker – “Computer Graphics (C version 2nd Ed.)” – Pearson education, New Delhi, 2001
2. Buford J. K. – “Multimedia Systems” – Pearson Education, New Delhi, 2001
3. Andleigh & Thakrar, Multimedia, PHI, New Delhi, 2004

Reference Books:

1. D. F. Rogers, J. A. Adams – “Mathematical Elements for Computer Graphics (2nd Ed.)” – TMH, New Delhi
2. Mukherjee, Fundamentals of Computer graphics & Multimedia, PHI, New Delhi, 2001
3. Foley, Vandam, Feiner, Hughes – “Computer Graphics principles (2nd Ed.)” – Pearson Education, New Delhi, 2006
4. Elsom Cook – “Principles of Interactive Multimedia” – McGraw Hill, New Delhi, 2001

IT 8041 INFORMATION SYSTEM PROJECT MANAGEMENT

MODULE – I

Information Systems: Information as a resource, Concept of Information System, Components of Information Systems and their roles. Types of Information System. Information Economy.

MODULE - II

Introduction to Project Management: Project –Definition and Characteristics. Projects as Systems, Project Entities, The Information Systems Project Environment, Primary Reasons for Information Systems Project Failure, Perceptions of Project Success

MODULE - III

Project Adoption: Project Selection and Approval - Measurement of Project Effect, Selection Practice , Project Evaluation Techniques , Information Systems Project Approval , Cost/Benefit Analysis, Value Analysis, Multiple Objectives, Budget Optimization

Requirements Analysis: Analysis of User Needs, Methods of Elicit User Requirements
Risk Identification and Analysis.

MODULE - IV

Planning:

System Development: Overview of Analysis and Design Methods, Software Development Standards , Information Systems Project Types , System Development Approach

Estimation: Planning Process, Software Estimation , Planning for Change.

MODULE - V

Scheduling:

Quantitative Project Scheduling Methods : The Critical Path Method , Project Crashing , Resource Leveling , Resource Smoothing , Critical Path Criticisms

Probabilistic Scheduling Models: PERT , Simulation for Project Scheduling

MODULE - VI

Implementation:

Project Organization: Alternate Organization Structures, Comparison of Organizational Structures in Projects , Levels of Project Organization

Project Implementation : Information Systems Project Success , Company- Wide Information System , Information Systems Project failure , Information Technology Failure , Critical Success Factors , Quality Control in Project Implementation , User Involvement in Project Implementation , Integrated Requisitioning System

MODULE - VII

Project Control and Assessment: Project Control Failures, Risk Management, The Control Process and Project Evaluation

Text Book:

David L . Olson : “Introduction to Project Management” Irwin McGraw – Hill, 2001

IT 8043 DISTRIBUTED SYSTEMS

MODULE-I

Characterization of Distributed Systems : Introduction, Examples of distributed systems, Resource sharing and the Web, Challenges.

System Models : Introduction, Architectural models, Fundamental models, Summary.

MODULE-II

Networking and Internetworking : Introduction, Types of network, Network Principles, Internet protocols, Case studies: Ethernet, WiFi, Bluetooth and ATM.

MODULE-III

Interprocess Communication : Introduction, The API for the Internet protocols, External data representation and marshalling, Client-server communication, Group communication, Case study : interprocess communication in UNIX.

MODULE-IV

Time and Global States : Introduction, Clocks, events and process states, Synchronizing physical clocks, Logical time and logical clocks, Global states, Distributed debugging.

Coordination and Agreement : Introduction, Distributed mutual exclusion, Elections, Multicast communication.

MODULE-V

Transactions and Concurrency Control : Introduction, Transactions, Nested transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

MODULE-VI

Distributed Transactions : Introduction, Flat and nested distributed transactions, Atomic commit protocols, Concurrency control in distributed transactions. Distributed deadlocks, Transactions recovery.

MODULE-VII

Replication : Introduction, System model and group communication, Fault-tolerant services, Case studies of highly available services : the gossip architecture, Bayou and Coda, Transaction with replicated data.

Text Book:

1. G. Coulouris et. al. - Distributed Systems : concepts and Design, 4/e, Pearson Education, New Delhi.

IT 8045 ADVANCED COMPUTER GRAPHICS

MODULE-I

Representing Curves and Surfaces : Polygon Meshes, Parametric Cubic Curves, Parametric Bicubic Surfaces, Quadratic Surfaces.

MODULE-II

Achromatic and Colored Light Achromatic Light, Chromatic Color, Color Models for Raster Graphics, Reproducing color, Using Color in Computer Graphics.

MODULE-III

The Quest for Visual Realism Why Realism, Fundamental Difficulties, Rendering Techniques for Line Drawings, Rendering Techniques for Shaded Images, Improved Object Model, Dynamics, Stereopsis, Improved Displays, Interacting with Our Other Senses, Aliasing and Antialiasing.

MODULE-IV

Visible-Surface Determination : Functions of Two Variables, Techniques for Efficient Visible-Surface Algorithms, Algorithms for Visible-Line Determination, The z-Buffer Algorithm, List Priority Algorithms, Scan-Line Algorithms, Area-Subdivision Algorithms, Algorithms for Octrees, Algorithms for Curved Surfaces, Visible-Surface Ray Tracing.

MODULE-V

Illumination and Shading : Illumination Models, Shading Models for Polygons, Surface Detail, Shadows, Transparency, Interobject Reflections, Physically Based Illumination Models, Extended Light Sources, Spectral Sampling.

MODULE-VI

Advanced Raster Graphics Architecture : Simple Raster-Display System, Display-Processor Systems, Standard Graphics Pipeline, Introduction to Multiprocessing, Pipeline Front-End Architectures, Parallel Front-End Architectures, Multiprocessor Rasterization Architectures.

MODULE-VII

Advanced Geometric and Raster Algorithms : Clipping, Scan-Converting Primitives, Antialiasing, The Special Problems of Text, Filling Algorithms, Making copyPixel Fast, The Shape Data Structure and Shape Algebra.

Text Book:

J.D. Foley et. al. – Computer Graphics Principles & Practical 2/e , Pearson Education, New Delhi, 2004.

IT 8047 REAL TIME SYSTEMS

MODULE-I

Basic Real-Time Concepts: Terminology, Real-Time System Design Issues, Example Real-Time Systems, Common Misconceptions, Brief History.

MODULE-II

Hardware Considerations: Basic Architecture, Hardware Interfacing, Central Processing Unit, Memory, Input/Output, Enhancing Performance, Other Special Devices, Non-von-Neumann Architectures.

MODULE-III

Real-Time Operating Systems: Real-Time Kernels, Theoretical Foundations of Real-Time Operating Systems, Intertask Communication and Synchronization, Memory Management, Case Study: POSIX.

MODULE-IV

Software Requirements Engineering: Requirements-Engineering Process, Types of Requirements, Requirements Specification for Real-Time Systems, Formal Methods in Software Specification, Structured Analysis and Design, Object-Oriented Analysis and the Unified Modeling Language, Organizing the Requirements Document, Organizing and Writing Requirements, Requirements Validation and Review.

MODULE-V

Software System Design: Properties of Software, Basic Software Engineering Principles, The Design Activity, Procedural-Oriented Design, Object-Oriented Design, Appendix: Case Study in Software Requirements Specification for Four-Way Traffic Intersection Traffic Light Controller System.

MODULE-VI

Programming Languages And The Software Production Process: Introduction, Assembly Language, Procedural Languages, Object-Oriented Languages.

MODULE-VII

Performance Analysis And Optimization: Theoretical Preliminaries, Performance Analysis, Application of Queuing Theory, I/O Performance, Performance Optimization.

Text Book:

1. Phillip A. Laplante- Real-Time Systems: Design and Analysis, John Wiley- India Edition, 2006.

Reference Books:

1. Rajib Mall- Real Time Systems; Theory and Practice, Pearson Edition, New Delhi- 2007.
2. J.W.S.Liu – Real Time Systems, Pearson Education, New Delhi – 2004.
3. C.M.Krishna & K.G. Shiv – Real Time Systems, Mc Graw Hill – 1997.

IT 8049 MODERN TELECOMMUNICATION SYSTEMS

MODULE – I & II

Introduction to Switching System : General principles of switching , signaling and control, stored program control concepts, Space Division and Time Division switching, 2 -, 3- , and n – stage networks, Blocking and Non – Blocking switching, Digital Exchange (basic concept only).

MODULE – III

ISDN & ATM : ISDN user interface, architecture and user access, ISDN channels. B – ISDN, concepts of ATM and user – network Interface. Brief descriptions and functions of different layers of ATM protocol.

MODULE – IV & V

Mobile Cellular telecommunications : Basic Cellular systems, components and operation of Cellular systems , mobile propagation and fading, co channel and adjacent channel interferences , frequency reuse channels, near - end - interferences , Handoff . Channel assignment and frequency assignment . spread Spectrum technique , Multiple Access Techniques : Introduction to FDMA, TDMA & CDMA.

MODULE – VI & VII

Mobile Antennas : Antenna parameters (Gain , Directivity , Efficiency , Effective Aperture etc.) and radiation characteristics . Qualitative description of Dipole antenna, LP antenna , Discone antenna , Helical antenna , Horn antenna , Patch and slot antenna . PIFA. Characteristics of cell site and mobile antennas .

Text Books :

1. T. Vishwanathan - Telecommunication Switching Systems and Networks - PHI, 2/e, New Delhi, 2002
2. Roy Blake - Wireless Communication Technology ,Thomson Asia Pvt. Ltd , Singapore 2002.
3. W.C.Y. Lee - Mobile Cellular telecommunications - Mc Graw – Hill Int. Edition,Singapore, 1995.

IT 8051 NEURAL NETWORKS & APPLICATIONS

MODULE - I

Recurrent Networks And Temporal Feedforward Networks: Introduction , Overview of Recurrent Neural Networks, Hopfield Associative Memory , Simulated Annealing, Boltzmann Machine , Overview of Temporal Feedforward Networks, Simple Recurrent Network, Time-Delay Neural Networks, Distributed Time-Lagged Feedforward Neural.

MODULE - II

Neural Networks For Optimization Problems : Introduction, Neural Networks for Linear Programming Problems, Neural Networks for Quadratic Programming Problems, Neural Networks for Nonlinear Continuous Constrained Optimization Problems.

MODULE - III

Solving Matrix Algebra Problems With Neural Networks: Introduction, Inverse and Pseudoinverse of a Matrix , LU Decomposition, QR Factorization, Schur Decomposition, Spectral Factorization- Eigenvalue Decomposition (EVD)(Symmetric Eigenvalue Problem), Neural Network Approach for the Symmetric Eigenvalue Problem.

MODULE – IV&V

Solution Of Linear Algebraic Equations Using Neural Networks: Introduction, Systems of Simultaneous Linear Algebraic Equations, Least-Squares Neurocomputing Approach for Solving Systems of Linear Equations, Conjugate Gradient Learning Rule for Solving Systems of Linear Equations, A Generalized Robust Approach for Solving Systems of Linear Equations Corrupted with Noise, Regularization Methods for Ill-Posed Problems with Ill-Determined Numerical Rank, Matrix Splittings for Iterative Discrete-Time Methods for Solving Linear Equations.

MODULE - VI

Statistical Methods Using Neural Networks: Introduction, Principal-Component Analysis, Learning Algorithms for Neural Network Adaptive Estimation of Principal Components, Principal- Component Regression, Partial Least-Squares Regression, A Neural Network Approach for Partial Least-Squares Regression.

MODULE- VII

Identification, Control, And Estimation Using Neural Networks: Introduction, Linear System Representation, Autoregressive Moving Average Models , Identification of Linear Systems with ARMA Models, Parametric System Identification of Linear Systems Using PLSNET, Nonlinear System Representation, Identification and Control of Nonlinear Dynamical.

Text Book:

1. M. Ham & I. Kostanic – Principles of Neurocomputing for Science & Engineering, TMH, New Delhi , 2002.

IT 8053 E-COMMERCE

MODULE - I

Introduction to Electronic Commerce: Electronic Commerce, Scope of Electronic Commerce, Definition of Electronic commerce, Electronic Commerce and Trade cycle, Electronic Market, Electronic Data Interchange, Internet Commerce, e-Commerce in perspective.

MODULE - II

Business Strategy in an Electronic Age: Value Chain, Supply Chains, Porter's Value Chain Model, Inter organizational Value chains, Competitive advantage, Competitive strategy, Porter's Model, First Mover advantage, Competitive advantage using e-commerce.

MODULE - III

Business strategy: Introduction to Business Strategy, Strategic implications of IT, Technology, Business Environment, Business Capability, Existing Business strategy, Strategy Formulation and Complementation Planning, e-commerce implementation, e-commerce & evaluation.

MODULE - IV

B2B e-Commerce Part1: Inter-organizational Transactions, The credit transaction trade cycle, Variety of transactions, Electronics Market, Advantage and disadvantage of electronics markets, Electronic Data Interchange, Benefits of EDI.

MODULE - V

B2B e-Commerce Part2: EDI technology, standards, communications, implementation, agreements, security, EDI and business, Organizations, Trading pattern, Transactions, Adoption and maturity, Inter-organizational e-Commerce, Purchasing online, After sales online.

MODULE – VI

B2C e-Commerce Part1: Consumer trade transactions, Internet e-Commerce, The e-Shop, Internet shopping and trade cycle, other e-Commerce technologies, Advantages and disadvantages of consumer e-Commerce

MODULE – VII

B2C e-Commerce Part2: The elements of e-Commerce, e-Visibility, Online payments, delivering the goods, After-sales service, Internet e-Commerce security.

E-Business: Introduction, Internet bookshop, Grocery Supplies, Software supplies and support, Electronics Newspaper, Internet Banking, Online share sealing, Gambling on the Net, e-diversity.

Conclusions.

Text Book :

2. David Whiteley - E-COMMERCE: Strategy, Technologies and Applications, TMH, New Delhi,2000.

Reference Book :

1. Ravi Kalakota & Andre B. Whinston - Electronic Commerce A Manager's Guide Pearson Education, 2005.
Efraim Turban, Dennis Viehland, David King, Jae Lee – Electronics Commerce: A Managerial Perspective, Pearson Education Asia, 2006/4E