FACULTY OF ENGINEERING, TECHNOLOGY AND MANAGEMENT SCIENCES

(V.M.K.V.ENGINEERING COLLEGE, SALEM

AND

AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY,

PAIYANOOR, CHENNAI)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E. – COMPUTER SCIENCE AND ENGINEERING (PART TIME)

(SYLLABUS)

2015 ONWARDS

SEMESTER I (4+1)

CODE No.	COURSE TITLE	L	P	C
THEORY				
	Engineering Mathematics	3	0	3
	Programming in C	3	0	3
	Environmental Science in Engineering	3	0	3
	Data structures	3	0	3
PRACTICAL				
	Data structures lab	0	3	2
		TOTAL:		**14**

SEMESTER II (5+1)

THEORY				
	Advanced Engineering Mathematics	3	0	3
	Database Management Systems	3	0	3
	Computer Organization	3	0	3
	Electron Devices	3	0	3
	Object Oriented programming	3	0	3
	PRACTICAL			
	Object Oriented programming Lab	3	0	2
		TOTAL:		**17**

SEMESTER III (4+1)

THEORY				
	Artificial Intelligence	3	0	3
	System Software	3	0	3
	Microprocessors and Microcontrollers	3	0	3
	Operating Systems	3	0	3
PRACTICAL				
	System Programming Laboratory	0	3	2
		TOTAL:		**14**

SEMESTER IV (4+1)

CODE No.	COURSE TITLE	L	P	C
THEORY				
	Probability and Queuing Theory	3	0	3
	Data Communication and Networks	3	0	3
	Software Engineering	3	0	3
	Object Oriented Analysis and Design	3	0	3
PRACTICAL				
	Computer Networks Laboratory	0	3	2
		TOTAL:		**14**

SEMESTER V (4+1)

THEORY				
	Mobile Computing	3	0	3
	Web Technology	3	0	3
	Graphics and Multimedia	3	0	3
	Elective I	3	0	3
PRACTICAL				
	Web Technology Laboratory	0	3	2
		TOTAL:		**14**

SEMESTER VI (4+2)

THEORY				
	Total Quality Management	3	0	3
	Compiler Design	3	0	3
	Security in Computing	3	0	3
	Elective II	3	0	3
PRACTICAL				
	Compiler Design Lab	0	3	2
	Mini Project	0	3	3
		TOTAL:		**17**

SEMESTER VII (4+1)

CODE No.	COURSE TITLE	L	P	C
THEORY				
	Principles of Programming Languages	3	0	3
	Scientific Computing Technique	3	0	3
	Elective III	3	0	3
	Elective IV	3	0	3
PRACTICAL				
	Project Work	0	18	6
		TOTAL:		**18**

Total Credits : 108

LIST OF ELECTIVES

CODE No.	COURSE TITLE	L	P	C
	Knowledge Management	3	0	3
	Unix Internals	3	0	3
	Soft Computing	3	0	3
	Advanced Java Programming	3	0	3
	Real Time Systems	3	0	3
	Advanced Database Technology	3	0	3
	TCP/IP Design and Implementation	3	0	3
	C# and .NET Technology	3	0	3
	Data Warehousing and Data Mining	3	0	3
	High Speed Networks	3	0	3
	Component Based Technology	3	0	3
	Embedded Systems	3	0	3
	Software Testing and Quality Assurance	3	0	3
	Software Project Management	3	0	3
	Visual Programming	3	0	3
	XML and Web Services	3	0	3
	Design and Analysis of Algorithms	3	0	3
	Distributed Systems	3	0	3
	Digital Signal Processing	3	0	3

SEMESTER- I

ENGINEERING MATHEMATICS

(COMMON TO THE BRANCHES MECH,ECE,CSE, CSSE,EEE,EIE,CIVIL,IT,MECHTRONICS,AERONAUCTICAL ,ETC,AUTOMOBILE)

L	P	C
3	0	3

(PART TIME)

UNIT I

MATRICES **09**

Characteristic equation – Eigen values and eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors (Without proof) – Cayley-Hamilton theorem (excluding proof) – Orthogonal transformation of a symmetric matrix to diagonal form.

UNIT II

ORDINARY DIFFERENTIAL EQUATIONS **09**

Solutions of First and Second order linear ordinary differential equation with constant coefficients – Method of variation of parameters –Simultaneous first order linear equations with constant coefficients.

UNIT III

MULTIPLE INTEGRALS AND VECTOR CALCULUS **09**

Double integration - Cartesian and polar coordinates –Area as a double integral – Triple integration – volume as a triple integral- Directional derivatives – Gradient, Divergence and Curl – Irrotational and solenoidal- vector fields – vector integration.

UNIT IV

LAPLACE TRANSFORMS **09**

Laplace transform – transform of elementary functions – basic properties – derivatives and integrals of transforms – transforms of derivatives and integrals – initial and final value theorems – Transform of periodic functions.

UNIT V

APPLICATIONS OF LAPLACE TRANSFORMS **09**

Inverse Laplace transform – Convolution theorem – Initial and Final value theorem-Solution of linear

ODE of second order with constant coefficients and first order simultaneous equation with constant coefficients using Laplace transforms.

Total hours : 60
Lecture Hours: 45
Tutorial Hours: 15

TEXT BOOKS

1**. "**Engineering Mathematics**"** by Department of Mathematics, VMU

2. Veerarajan, T., "Engineering Mathematics", Tata McGraw Hill Publishing Co., NewDelhi, 2006.

3. Prof.Dr.A .Singaravelu , Engineering Mathematics Volume I & Volume II by Meenakshi Publications.

REFERENCE BOOKS

1. Grewal, B.S., "Higher Engineering Mathematics" (36th Edition), Khanna Publishers, Delhi 2001.
2. Kreyszig, E., "Advanced Engineering Mathematics" (8th Edition), John Wiley and Sons (Asia) Pvt Ltd., Singapore, 2001.
3. Kandasamy .P., Thilagavathy. K., and Gunavathy. K., "Engineering Mathematics", Volumes I & II (4th edition), S.Chand & Co., New Delhi., 2001.

PROGRAMMING IN C

L P C
3 0 3

OBJECTIVES :
To enable the student to learn programming knowledge in C.
Outcomes: Do develop the skill of the student to develop the programming in C language.

UNIT I

Introduction: Algorithms & flowcharts-Overview of C-Features of C-IDE of C Structure of C program-Compilation & execution of C program-Identifiers, variables, expression, keywords, data types, constants, scope and life of variables, local and global variables. Operators: arithmetic, logical, relational, conditional and bitwise operators- Special operators: size of () & comma (,) operator-Precedence and associativity of operators & Type conversion in expressions.

Basic input/output and library functions: Single character input/output i.e. getch(), getchar(), getche() & putchar()-Formatted input/output: printf() and scanf()-Library Functions: concepts, mathematical and character functions.

UNIT II

Control structures: Conditional control-Loop control and Unconditional control structures.
Functions: The Need of a function-User defined and library function- Prototype of a function-Calling of a function-Function argument-Passing arguments to function- Return values-Nesting of function- main()-Command line arguments and recursion. Storage class specifier – auto, extern, static, & register.

UNIT III

Arrays: Single and multidimensional arrays-Array declaration and initialization of arrays-Array as function arguments.
Strings: Declaration-Initialization and string handling functions.
Structure and Union: Defining structure-Declaration of structure variable-Accessing structure members-Nested structures-Array of structures-Structure assignment-Structure as function argument-Function that returns structure- Union.

UNIT IV

Pointers: The '&' and * operators-Pointers expressions-Pointers vs arrays-Pointer to functions-Function returning pointers-Static and dynamic memory allocation in C.
DMA functions: malloc(), calloc(), sizeof(), free() and realloc()-Preprocessor directives.

UNIT V

File management: Defining, opening & closing a file, text file and binary file- Functions for file handling: fopen,fclose, gets, puts, fprintf, fscan, getw, putw, fputs, fgets, fread, fwrite-Random access to files: fseek, ftell, rewind-File name as Command Line Argument.

TEXT BOOKS:

1. Balaguruswami.E, 'Programming in C', TMH Publications,1997

REFERENCE BOOKS:

1. Behrouz A. Forouzan & Richard F. Gilberg, "Computer Science A Structured Programming
using C", Cengage Learning, 3rd Edition, 2007
2. Gottfried , 'Programming with C', schaums outline series, TMH publications,1997
3. Mahapatra , 'Thinking in C', PHI publications, 2nd Edition, 1998.
4. Stevens , 'Graphics programming in C', BPB publication, 2006
5. Subbura.R , 'Programming in C', Vikas publishing, 1st Edition, 2000

ENVIRONMENTAL SCIENCE AND ENGINEERING

L P C
3 0 3

Objectives

To Create An Awareness On The Various Environmental Pollution Aspects And Issues. To Give A Comprehensive Insight Into Natural Resources, Ecosystem And Biodiversity. To Educate The Ways And Means To Protect The Environment From Various Types Of Pollution. To Impart Some Fundamental Knowledge On Human Welfare Measures.

1. Introduction To Environmental Studies And Natural Resources 10

Definition, Scope And Importance – Need For Public Awareness – Forest Resources: Use And Over-Exploitation, Deforestation, Case Studies. Timber Extraction, Mining, Dams And Their Ground Water, Floods, Drought, Conflicts Over Water, Dams-Benefits And Problems – Mineral Resources: Use Effects On Forests And Tribal People – Water Resources: Use And Over-Utilization Of Surface And And Exploitation, Environmental Effects Of Extracting And Using Mineral Resources, Case Studies – Food Resources: World Food Problems, Changes Caused By Agriculture And Overgrazing, Effects Of Modern Agriculture, Fertilizer-Pesticide Problems, Water Logging, Salinity, Case Studies – Energy Resources: Growing Energy Needs, Renewable And Non Renewable Energy Sources, Use Of Alternate Energy Sources. Case Studies – Land Resources: Land As A Resource, Land Degradation, Man Induced Landslides, Soil Erosion And Desertification – Role Of An Individual In Conservation Of Natural Resources – Equitable Use Of Resources For Sustainable Lifestyles. Field Study Of Local Area To Document Environmental Assets – River / Forest / Grassland / Hill / Mountain.

2. Ecosystems And Biodiversity 14

Concept Of An Ecosystem – Structure And Function Of An Ecosystem – Producers, Consumers And Decomposers – Energy Flow In The Ecosystem – Ecological Succession – Food Chains, Food Webs And Ecological Pyramids – Introduction, Types, Characteristic Features, Structure And Function Of The (A) Forest Ecosystem (B) Grassland Ecosystem (C) Desert Ecosystem (D) Aquatic Ecosystems (Ponds, Streams, Lakes, Rivers, Oceans, Estuaries) – Introduction To Biodiversity – Definition: Genetic, Species And Ecosystem Diversity – Biogeographical Classification Of India – Value Of Biodiversity: Consumptive Use, Productive Use, Social, Ethical, Aesthetic And Option Values – Biodiversity At Global, National And Local Levels – India As A Mega-Diversity Nation – Hot-Spots Of Biodiversity – Threats To Biodiversity: Habitat Loss, Poaching Of Wildlife, Man-Wildlife Conflicts – Endangered And Endemic Species Of India – Conservation Of Biodiversity: In-Situ And Ex-Situ Conservation Of Biodiversity.

Field Study Of Common Plants, Insects, Birds. Field Study Of Simple Ecosystems – Pond, River, Hill Slopes, Etc.

3. Environmental Pollution 8

Definition – Causes, Effects And Control Measures Of: (A) Air Pollution (B) Water Pollution (C) Soil Pollution (D) Marine Pollution (E) Noise Pollution (F) Thermal Pollution (G) Nuclear Hazards – Soil Waste Management: Causes, Effects And Control Measures Of Urban And Industrial Wastes – Role Of An Individual In Prevention Of Pollution – Pollution Case Studies – Disaster Management: Floods, Earthquake, Cyclone And Landslides.
Field Study Of Local Polluted Site – Urban / Rural / Industrial / Agricultural

4. Social Issues And The Environment 7

From Unsustainable To Sustainable Development – Urban Problems Related To Energy – Water Conservation, Rain Water Harvesting, Watershed Management – Resettlement And Rehabilitation Of People; Its Problems And Concerns, Case Studies – Environmental Ethics: Issues And Possible Solutions – Climate Change, Global Warming, Acid Rain, Ozone Layer Depletion, Nuclear Accidents And Holocaust, Case Studies. – Wasteland Reclamation – Consumerism And Waste Products – Environment Production Act – Air (Prevention And Control Of Pollution) Act – Water (Prevention And Control Of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues Involved In Enforcement Of Environmental Legislation – Public Awareness

5. Human Population And The Environment 6

Population Growth, Variation Among Nations – Population Explosion – Family Welfare Programme – Environment And Human Health – Human Rights – Value Education – Hiv / Aids – Women And Child Welfare – Role Of Information Technology In Environment And Human Health – Case Studies.

Total=45

Text Book

1. Gilbert M.Masters, Introduction To Environmental Engineering And Science, Pearson Education Pvt., Ltd., Second Edition, Isbn 81-297-0277-0, 2004.
2. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co.
3. Townsend C., Harper J And Michael Begon, Essentials Of Ecology, Blackwell Science.
4. Trivedi R.K. And P.K. Goel, Introduction To Air Pollution, Techno-Science Publications.

Reference

1. Bharucha Erach, The Biodiversity Of India, Mapin Publishing Pvt. Ltd., Ahmedabad India,
2. Trivedi R.K., Handbook Of Environmental Laws, Rules, Guidelines, Compliances And Standards, Vol. I And Ii, Enviro Media.
3. Cunningham, W.P.Cooper, T.H.Gorhani, Environmental Encyclopedia, Jaico Publ., House, Mumbai, 2001.
4. Wager K.D., Environmental Management, W.B. Saunders Co., Philadelphia, Usa, 1998.

DATA STRUCTURES

L P C
3 0 3

1. Problem Solving – Lists, Stacks And Queues

Problem solving techniques and examples – Abstract Data Type (ADT) – The List ADT – The Stack ADT – The Queue ADT

2. Trees

Preliminaries – Binary Trees – The Search Tree ADT – Binary Search Trees – AVL Trees – Tree Traversals – B-trees

3. Hashing And Priority Queues

Hashing – General Idea – Hash Function – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing – Priority Queues (Heaps) – Model – Simple implementations – Binary Heap – Application of Priority Queues

4. Sorting

Preliminaries – Insertion Sort – Shellsort – Heapsort – Mergesort – Quicksort – External Sorting

5. Graphs

Definitions – Topological Sort – Shortest-Path Algorithms – Minimum Spanning Tree – Applications of Depth – First Search

Text Books:

1. M. A. Weiss, "Data Structures and Algorithm Analysis in C", Second edition, Pearson Education Asia, 2002
2. R. G. Dromey, "How to Solve it by Computer", Prentice-Hall of India, 2002.

References:

1 Brian W. Kernighan and Rob Pike, "The Practice of Programming", Pearson Education Asia, 1999.
2. Aho, J. E. Hopcroft and J. D. Ullman, "Data Structures and Algorithms", Pearson Education Asia, 1983.
3. Thomas H. Cormen, Charles E. Leiserson and Ronald L. Rivest, "Introduction to Algorithms",second edition., Prentice-Hall of India, 2002.
4. Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia / Prentice-Hall of India, 2004.

DATA STRUCTURES LAB

L	P	C
0	3	2

1. Array implementation of List Abstract Data Type (ADT)
2. Linked list implementation of List ADT
3. Cursor implementation of List ADT
4. Stack ADT - Array and linked list implementations

The next two exercises are to be done by implementing the following source files

(a) Program source files for Stack Application 1
(b) Array implementation of Stack ADT
(c) Linked list implementation of Stack ADT
(d) Program source files for Stack Application 2

An appropriate header file for the Stack ADT should be #included in (a) and (d)

1. Implement any Stack Application using array implementation of Stack ADT (by implementing files (a) and (b) given above) and then using linked list implementation of Stack ADT (by using files (a) and implementing file (c))
2. Implement another Stack Application using array and linked list implementations of Stack ADT (by implementing files (d) and using file (b), and then by using files (d) and (c))

3. Queue ADT – Array and linked list implementations
4. Search Tree ADT - Binary Search Tree
5. Hash Table – separate chaining
6. Implement an interesting application as separate source files and using any of the searchable ADT files developed earlier. Replace the ADT file alone with other appropriate ADT files. Compare the performance.
7. Heap Sort
8. Quick Sort

SEMESTER II

ADVAVCED ENGINEERING MATHEMATICS

(**Common to CIVIL, MECH, AUTO, AERO, MECHAT, ECE, EEE, ETC, E&I, CSE, IT, CSSE)**

L	P	C
3	0	3

APPROVED BY THE BOARD OF STUDIES CONDUCTED AT VMKVEC, SALEM
On 28th and 29th JULY 2012

1. PARTIAL DIFFERENTIAL EQUATIONS 9

Formation - Solutions of standard types f(p,q)=0,clairatus form,f(z,p,q)=0,f(p,x)=g(q,y)of first order equations - Lagrange's Linear equation - Linear partial differential equations of second and higher order with constant coefficients.

2. FOURIER SERIES 9

Dirichlet's conditions - General Fourier series - Half-range Sine and Cosine series - Parseval's identity – Harmonic Analysis.

3. BOUNDARY VALUE PROBLEMS 9

Classification of second order linear partial differential equations - Solutions of one - dimensional wave equation, one-dimensional heat equation

4. FOURIER TRANSFORMS 9

Statement of Fourier integral theorem - Fourier transform pairs - Fourier Sine and Cosine transforms – Properties - Transforms of simple functions - Convolution theorem - Parseval's identity.

5. Z - TRANSFORM 9

Z-Transform – Elementary Properties – Inverse Z-Transform – Convolution Theorem – Formation of Difference Equations – Solution of Difference Equations using Z-Transform.

Total hours: 45

TEXT BOOKS:

1. Kreyszig, E., " Advanced Engineering Mathematics " (8th Edition), John Wiley and Sons, (Asia) Pte Ltd.,Singapore, 2000.
2. Grewal, B.S., " Higher Engineering Mathematics " (35th Edition), Khanna Publishers, Delhi 2000.
3. Prof.Dr.A .Singaravelu, Transform and Partial Differential Equations by Meenakshi Publications.

REFERENCES:

1. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., " Engineering Mathematics ", Volumes II & III (4th Revised Edition), S. Chand & Co., New Delhi, 2001.
2. Narayanan, S., Manicavachagom Pillay, T.K., Ramanaiah, G., " Advanced Mathematics for Engineering Students ", Volumes II & III (2ndEdition), S.Viswanathan (Printers & Publishers, Pvt, Ltd.) 1992.
3. Venkataraman, M.K. " Engineering Mathematics " Volumes III - A & B, 13th Edition National Publishing Company, Chennai, 1998.
4. Shanmugam, T.N. : http://www.annauniv.edu/shan/trans.htm

DATABASE MANAGEMENT SYSTEMS

L	P	C
3	0	3

1. INTRODUCTION **5**

File System vs. DBMS – Views of data – Data Models – Database Languages – Database Management System Services – Overall System Architecture – Data Dictionary – Entity – Relationship (E-R) – Enhanced Entity – Relationship Model.

2. RELATIONAL APPROACH **8**

Relational Model – Relational Data Structure – Relational Data Integrity – Domain Constraints – Entity Integrity – Referential Integrity – Operational Constraints – keys – Codd's Rules – Relational Algebra – Fundamental operations – Additional Operations – SQL – Basic Structure – Set operations – Aggregate Functions – Null values – Nested Sub queries – Derived Relations – Views – Modification of the database – Joined Relations – Data Definition Language – Embedded SQL – Dynamic SQL – Triggers.

3. DATABASE DESIGN **10**

Functional Dependencies – Pitfalls in Relational Database Design – Decomposition – Normalization using Functional Dependencies – Normalization using Multi-valued Dependencies – Normalization using Join Dependencies – Domain-Key Normal form.

4. IMPLEMENTATION TECHNIQUES **14**

Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary storage – File Organization – Organization of Records in Files – Indexing and Hashing – Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Catalog Information for Cost Estimation – Selection Operation – Sorting – Join Operation – Other Operations – Transaction Processing – Concepts and States – Implementation of Atomicity and Durability – Concurrent Executions – Serializability – Implementation of Isolation – Testing for Serializability – Concurrency control – Lock Based Protocols – Timestamp Based Protocols – Deadlock Handling – Recovery-Failures – Storage Structures – Log based Recovery – Shadow paging – Recovery with concurrent Transactions.

5. CURRENT TRENDS **8**

Distributed Databases – Data Storage – Network Transparency – Query processing – Transaction Model – Commit Protocols – Coordinator selection – Object Oriented Databases – Object Oriented Data Model – Object Oriented Languages – Persistent Programming languages – Persistent C++ Systems – Object relational Databases – Nested Relations – Complex types and Object Orientation – Querying with complex types – Creation of complex values and objects – Introduction to Data mining and Data Warehousing.

TOTAL HOURS: 45

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Fourth Edition, Tata McGraw Hill, 2002.

REFERENCES:

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Fourth Edition, Addision weskey, 2002.
2. Raghu Ramakrishnan, "Database Management Systems", Third Edition, McGraw Hill, 2002.
3. Peter Rob and Corlos Coronel, "Database Systems – Design, Implementation and Management, Fifth Edition, Thompson Learning, Course Technology, 2003.

COMPUTER ORGANIZATION

L	P	C
3	0	3

1. DIGITAL FUNDAMENTALS 8

Number Systems and Conversions – Boolean Algebra And Simplification – Minimization Of Boolean Functions – Karnaugh Map – Quine Mcclusky Method – Logic Gates – NAND – NOR Implementation.

2. COMBINATIONAL AND SEQUENTIAL CIRCUITS 10

Design Of Combinational Circuits – Adder / Subtracter – Encoder – Decoder – Mux / Demux – Comparators – Flip Flops – Triggering – Master – Slave Flip Flop – State Diagram and Minimization – Counters – Registers.

3. BASIC STRUCTURE OF COMPUTERS 9

Functional Units – Basic Operational Concepts – Bus Structures – Performance and Metrics – Instruction and Instruction Sequencing – Hardware – Software Interface – Addressing Modes – Instructions – Sets – RISC and CISC – ALU Design – Fixed Point and Floating Point Operation.

4. PROCESSOR DESIGN 9

Processor Basics – CPU Organization – Data Path Design – Control Design – Basic Concepts – Hard Wired Control – Micro Programmed Control – Pipeline Control – Hazards – Super Scalar Operation.

5. MEMORY AND I/O SYSTEM 9

Memory Technology – Memory Systems – Virtual Memory – Caches – Design Methods – Associative Memories – Input/Output System – Programmed I/O – DMA And Interrupts – I/O Devices And Interfaces.

TOTAL HOURS: 45

TEXT BOOKS:

1. Morris Mano, “Digital Design”, Third Edition, Pearson Education, 1997.
2. Carl Hamacher, Zvonko Vranesic And Safwat Zaky, “Computer Organization”, Fifth Edition,Tata Mcgraw Hill, 2002.

REFERENCES:

1. Charles H. Roth, Jr., “Fundamentals Of Logic Design”, Fifth Edition, Jaico Publishing House, 1992.
2. William Stallings, “Computer Organization And Architecture – Designing For Performance”, Sixth Edition, Pearson Education, 2003.
3. David A. Patterson And John L. Hennessy, “Computer Organization And Design: The Hardware/Software Interface”, Second Edition, Morgan Kaufmann, 2002.
4. John P. Hayes, “Computer Architecture And Organization”, Third Edition, Tata McGraw Hill, 1998.

ELECTRON DEVICES

L	P	C
3	0	3

1.ELECTRON BALLISTICS AND INTRINSIC SEMICONDUCTORS 9

Force on charge in electric field - Motion of Charge in uniform and time varying electric fields - Force on a moving charge in a magnetic field - calculation of cyclotron frequency - calculation of electrostatic and magnetic deflection sensitivity.

Energy band structure of conductors, semiconductors and insulators - Density distribution of available energy states in semiconductors - Fermi- Diac probability distribution function at different temperatures - Thermal generation of carriers - Calculation of electron and hole densities in intrinsic semiconductors - Intrinsic concentration - Mass Action Law.

2.EXTRINSIC SEMICONDUCTOR AND PN JUNCTIONS 9

N and P type semiconductors and their energy band structures - Law of electrical neutrality - Calculation of location of Fermi level and free electron and hole densities in extrinsic semiconductors - Mobility, drift current and conductivity - Diffusion current - Continuity equation - Hall effect. Band structure of PN Junction - Current Component in a PN Junction - Derivation of diode equation - Temperature dependence of diode characteristics.

3.SWITCHING CHARACTERISTICS OF PN JUNCTION AND SPECIAL DIODES 9

Calculation of transition and diffusion capacitance - Varactor diode - charge control description of diode - switching characteristics of diode - Mechanism of avalanche and Zener breakdown - Temperature dependence of breakdown voltages - Backward diode - Tunneling effect in thin barriers Tunnel diode - Photo diode - Light emitting diodes.

4.BIPOLAR JUNCTION TRANSISTORS AND FIELD EFFECT TRANSISTORS 9

Construction of PNP and NPN transistors - BJT current components - Emitter to collector and base to collector current gains - Base width modulation CB and CE characteristics - Breakdown characteristics - Ebers - Moll model - Transistor switching times.

Construction and Characteristics of JFET - Relation between Pinch off Voltage and drain current - Derivation. MOSFETS - Enhancement and depletion types.

5.METAL SEMICONDUCTOR CONTACTS AND POWER CONTROL DEVICES 9

Metal Semiconductor Contacts - Energy band diagram of metal semiconductor junction Schottky diode and ohmic contacts.Power control devices: Characteristics and equivalent

circuit of UJT - intrinsic stand off ratio. PNPN diode - Two transistor model, SCR, Triac, Diac.

TOTAL HOURS : 45

TEXT BOOKS:

1. Jacob Millman & Christos C.Halkias, "Electronic Devices and Circuits" Tata McGraw-Hill, 1991 .

REFERENCES:

1. Nandita Das Gupta and Amitava Das Gupta, Semiconductor Devices - Modelling and Technology, Prentice Hall of India, 2004.

2.Donald A.Neaman," Semiconductor Physics and Devices" 3rd Ed., Tata McGraw-Hill 2002.

3.S.M.Sze, Semiconductor Devices - Physics and Technology, 2nd edn. John Wiley, 2002.

4.Ben G.Streetman and Sanjay Banerjee, Solid State Electronic Devices, Pearson Education 2000.

OBJECT-ORIENTED PROGRAMMING

L	P	C
3	0	3

1. FUNDAMENTALS: 9

Object-Oriented Programming concepts – Encapsulation – Constructors and Destructors -Programming Elements – Program Structure – Enumeration Types – Functions and Pointers – Function Invocation – Overloading Functions – Scope and Storage Class – Pointer Types – Arrays and Pointers – Call-by-Reference – Assertions – Standard template library.

2. IMPLEMENTING ADTS AND ENCAPSULATION: 9

Aggregate Type struct – Structure Pointer Operators – Unions – Bit Fields – Data Handling and Member Functions – Classes – Static Member – this Pointer – reference semantics – implementation of simple ADTs.

3. POLYMORPHISM: 9

ADT Conversions – Overloading – Overloading Operators – Unary Operator Overloading – Binary Operator Overloading – Function Selection – Pointer Operators – Visitation – Iterators – containers – List – List Iterators.

4. TEMPLATES: 9

Template Class – Function Templates – Class Templates – Parameterizing – STL – Algorithms – Function Adaptors.

5. INHERITANCE: 9

Derived Class – Typing Conversions and Visibility – Code Reuse – Virtual Functions – Templates and Inheritance – Run-Time Type Identifications – Exceptions – Handlers – Standard Exceptions.

TOTAL HOURS: 45

TEXT BOOK:

1. Ira Pohl, “Object-Oriented Programming Using C++”, Pearson Education, Second Edition, 2003.

REFERENCES:

1. Stanley B. Lippman, Josee Lajoie, “C++ Primer”, Pearson Education, Third Edition, 2004.
2. Kamthane, ”Object Oriented Programming with ANSI and Turbo C++”, Person Education, 2002.
3. Bhave, “Object Oriented Programming With C++”, Pearson Education, 2004.
4. Dietel & Dietel, “C++ How to Program”, Second Edition, Prentice Hall.

OBJECT-ORIENTED PROGRAMMING LAB

L	P	T	C
3	0	0	3

1. Design C++ classes with static members, methods with default arguments, friend functions. (For example, design matrix and vector classes with static allocation, and a friend function to do matrix-vector multiplication)
2. Implement complex number class with necessary operator over loadings and type conversions such as integer to complex, double to complex, complex to double etc.
3. Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.
4. Overload the new and delete operators to provide custom dynamic allocation of memory.
5. Develop a template of linked-list class and its methods.
6. Develop templates of standard sorting algorithms such as bubble sort, insertion sort, merge sort, and quick sort.
7. Design stack and queue classes with necessary exception handling.
8. Define Point class and an Arc class. Define a Graph class which represents graph as a collection of Point objects and Arc objects. Write a method to find a minimum cost spanning tree in a graph.
9. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism and RTTI.
10. Write a C++ program that randomly generates complex numbers (use previously designed Complex class) and writes them two per line in a file along with an operator (+, -, *, or /). The numbers are written to file in the format (a + ib). Write another program to read one line at a time from this file, perform the corresponding operation on the two complex numbers read, and write the result to another file (one per line).

SEMESTER III

L	P	C
3	0	3

ARTIFICIAL INTELLIGENCE

1. Introduction **8**

Intelligent Agents – Agents and environments – Good behavior – The nature of environments – structure of agents – Problem Solving – problem solving agents – example problems – searching for solutions – uniformed search strategies – avoiding repeated states – searching with partial information.

2. Searching Techniques **10**

Informed search strategies – heuristic function – local search algorithms and optimistic problems – local search in continuous spaces – online search agents and unknown environments – Constraint satisfaction problems (CSP) – Backtracking search and Local search – Structure of problems – Adversarial Search – Games – Optimal decisions in games – Alpha – Beta Pruning – imperfect real-time decision – games that include an element of chance.

3. Knowledge Representation **10**

First order logic - syntax and semantics – Using first order logic – Knowledge engineering – Inference – prepositional versus first order logic – unification and lifting – forward chaining – backward chaining – Resolution – Knowledge representation – Ontological Engineering – Categories and objects – Actions – Simulation and events – Mental events and mental objects.

4. Learning **9**

Learning from observations – forms of learning – Inductive learning - Learning decision trees – Ensemble learning – Knowledge in learning – Logical formulation of learning – Explanation based learning – Learning using relevant information – Inductive logic programming - Statistical learning methods – Learning with complete data – Learning with hidden variable – EM algorithm – Instance based learning – Neural networks – Reinforcement learning – Passive reinforcement learning – Active reinforcement learning – Generalization in reinforcement learning.

5. Applications **8**

Communication – Communication as action – Formal grammar for a fragment of English – Syntactic analysis – Augmented grammars – Semantic interpretation – Ambiguity and disambiguation – Discourse understanding – Grammar induction – Probabilistic language processing – Probabilistic language models – Information retrieval – Information Extraction – Machine translation.

TOTAL = 45

Text Books:

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education, 2004.

References:

1. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd., 2000.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", Second Edition, Tata McGraw Hill, 2003.
3. George F. Luger, "Artificial Intelligence-Structures And Strategies For Complex Problem Solving", Pearson Education, 2002.

SYSTEM SOFTWARE

L	P	C
3	0	3

1. Introduction **9**

Background: Introduction – System software and machine architecture – The Simplified Instructional Computer (SIC) – Machine Architectures (SIC and SIC/XE) – Data and Instruction Formats – Addressing Modes –Instruction sets – I/O Programming.

2. Assemblers **9**

Basic assembler functions: A simple SIC assembler – Assembler algorithms and data structures – Machine dependent assembler features: Instruction formats and addressing modes – Program relocation – Machine independent assembler features: Literals – Symbol-defining statements – Expressions – Program Blocks – Control Sections and Program Linking – One Pass Assembler and Multipass Assemblers – Implementation examples: MASM assembler.

3. Loaders and Linkers **9**

Basic loader functions: Design of an Absolute Loader – A Simple Bootstrap Loader. Machine dependent loader features: Relocation – Program Linking – Algorithm and Data Structures for Linking Loader. Machine-independent loader features: Automatic Library Search – Loader Options. Loader design options: Linkage Editors – Dynamic Linking – Bootstrap Loaders. Implementation examples: MSDOS linker.

4. Macroprocessors **9**

Basic macro processor functions: Macro Definition and Expansion – Macro Processor Algorithm and data structures. Machine-independent macro processor features: Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters – Macro Processor Design Options – Recursive Macro Expansion – Algorithm – General Purpose macro Processors – Macro Processing within Language Translators – Implementation examples: MASM Macro Processor – ANSI C macro language.

5. Other System Software **9**

Text editors: Overview of Editing Process – User Interface – Editor Structure. Interactive debugging systems: Debugging functions and capabilities – Relationships with Other parts of the system – User Interface Criteria.

TOTAL = 45

Text Books:

1. Leland Beck, “System Software – An Introduction to Systems Programming”, Third Edition, Pearson Education Inc, 1985.

References:

1. D.M. Dhamdhere, "Systems Programming and Operating Systems", Tata McGraw Hill Company, 1999.
2. John J. Donovan, “Systems Programming”, Tata McGraw Hill Edition, 1972.

MICROPROCESSORS AND MICROCONTROLLERS

L	P	C
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1. The 8085 Microprocessor **9**

Introduction to 8085 – Microprocessor architecture – Instruction set – Programming the 8085.

2. 8086 Software aspects **9**

Intel 8086 microprocessor – Architecture – Instruction set and assembler directives – Addressing modes – Assembly language programming – Procedures – Macros – Interrupts and interrupt service routines.

3. 8086 System design **9**

8086 signals – Basic configurations – System bus timing – System design using 8086 – Multiprocessor configurations – Coprocessor – Closely coupled and Loosely Coupled configuration-Introduction to 80286.

4. I/O interfacing **9**

Memory Interfacing and I/O interfacing – Parallel communication interface – Serial communication interface – Timer – Keyboard / Display controller – Interrupt controller – DMA controller – Programming and applications.

5. Microcontrollers **9**

Architecture of 8051 – Signals – Operational features – Memory and I/O addressing – Interrupts – Instruction set – Applications.

TOTAL = 45

Text Books:

1. Ramesh S. Gaonkar, "Microprocessor – Architecture, Programming and Applications with the 8085", Fifth edition Penram International publishing Pvt. Ltd.,.
2. Yu-cheng Liu, Glenn A. Gibson, "Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design", Second edition, Prentice Hall of India, 2003.
3. Mohamed Ali Mazidi, Janice Gillispie Mazidi, "The 8051 microcontroller and embedded systems", Pearson education, 2004.

References:

1. Barry B. Brey, "The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, PentiumPro Processor, PentiumII, PentiumIII, PentiumIV, Architecture, Programming & Interfacing", Sixth Edition, Pearson Education / Prentice Hall of India, 2002.
2. Douglas V. Hall, "Microprocessors and Interfacing: Programming and Hardware", Tata Mc Graw Hill, Third edition.
3. A.K. Ray & K. M. Bhurchandi, "Advanced Microprocessors and peripherals – Architectures, Programming and Interfacing", Tata Mc Graw Hill, 2002 reprint.
4. Peter Abel, "IBM PC Assembly language and programming", Fifth edition, Prentice Hall of India Pvt. Ltd,2001.

OPERATING SYSTEMS

L	P	C
3	0	3

1. Operating Systems Overview **8**

Introduction: Operating system – Mainframe systems – Desktop systems – Multiprocessor systems – Distributed systems – Clustered systems – Real-time systems – Handheld systems. Computer System Structures: Computer-system operation – I/O structure – Hardware Protection. Operating System Structures: System components – System calls – System programs – System structure.

2. Process Management **12**

Processes: Process concept – Process scheduling – Operations on processes – Cooperating processes – Interprocess communication – Communication in client-server systems. Threads: Multithreading models – Threading issues – Pthreads. CPU Scheduling: Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling – Algorithm Evaluation – Process Scheduling Models. Process Synchronization: The critical-section problem – Synchronization hardware – Semaphores – Classic problems of synchronization – critical regions – Monitors. Deadlock: System model – Deadlock characterization – Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock.

3. Storage Management **9**

Memory Management: Background – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with paging. Virtual Memory: Background – Demand paging – Process creation – Page replacement – Allocation of frames – Thrashing.

4. I/O Systems **8**

File-System Interface: File concept – Access methods – Directory structure – File-system mounting – Protection. File-System Implementation : Directory implementation – Allocation methods – Free-space management. Mass-Storage Structure: Disk scheduling – Disk management – Swap-space management.

5. Case Study **8**

The Linux System: History – Design Principles – Kernel Modules – Process Management – Scheduling – Memory management – File systems – Input and Output – Inter-process Communication – Network Structure – Security – Windows 2000: History – Design Principles – System Components – Environmental subsystems – File system – Networking.

TOTAL = 45

Text Books:

1. Silberschatz, Galvin and Gagne, “Operating System Concepts”, Sixth Edition, John Wiley & Sons Inc 2002.

References:

1. Andrew S. Tanenbaum, “Modern Operating Systems”, Second Edition, Addison Wesley, 2001.
2. Gary Nutt, “Operating Systems”, Second Edition, Addison Wesley, 2001.
3. Harvey M. Deital, “Operating Systems”, Second Edition, Addison Wesley, 2000.

SYSTEMS PROGRAMMING LABORATORY

L	P	C
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1. Assemblers.
2. Linkers.
3. Loaders.
4. Features of text editors.
5. Basic UNIX commands.
6. Shell Programming.
7. Grep, sed, awk.
8. File system related system calls.
9. Process management – Fork, Exec.
10. Message queues.
11. Pipe, FIFO's.
12. Signals.
13. Shared memory.

TOTAL = 45

SEMESTER IV

PROBABILITY AND QUEUEING THEORY

L	P	C
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OBJECTIVES:

The syllabus for the Probability and statistics has been framed catering to the needs of the Engineering students. It is purely application oriented. To mention a few (i) the theory of probability had its origin in gambling and games of chance. (ii) In the analysis of electrical systems, signal processing operations can be viewed as transformations of a set of input variables into a set of output variables. If these variables are random variables then we can use probability distribution.(iii) Markov Process and Markovian Queues will be helpful to students in learning and using other subjects

1.	PROBABILITY AND RANDOM VARIABLES Probability concepts, Random variables, moments, Moment Generating function and their properties.	9
2.	STANDARD DISTRIBUTIONS Binomial, Poisson, Geometric, Negative binomial, Uniform, Exponential, Gamma, Weibull distributions, Functions of random variable, Chebychev inequality	9
3.	TWO-DIMENSIONAL RANDOM VARIABLES Marginal and conditional distributions, Covariance, Correlation and regression, Transformation of random variables, Central limit theorem	9
4.	RANDOM PROCESSES, MARKOV CHAIN Classification, Stationary process, Markov process, Binominal process, Poisson process, Birth and death process, Renewal process, Markov chain, Transition probabilities, Limiting distributions.	9
5.	QUEUEING THEORY Markovian queueing models, Little's formula, M/M/1, M/M/C – finite and infinite capacity , M/G/1 Queues, Pollaczek-Khintchinev formula (Statement only)	9

Tutorial : 15
Total Hours : 60
Credits : 04

TEXT BOOK:

1. G. Balaji, “Probability and Queuing Theory”,G. Balaji Publishers,Chennai (2012)

REFERENCES:

1. T.Veerarajan, “Probability, Statistics and Random processes” (Second Edition), Tata McGraw-Hill Publishing Company Ltd., New Delhi (2006).
2. P.Kandasamy, K.Thilagavathy, K.Gunavathy “ Probability, Random Variables and Random Processes” (First Edition 2003) : S.Chand &Company Ltd., New Delhi
3. Kapur.J.N. and Saxena.H.C.”Mathematical Statistics”,S.Chand & Company Ltd.New Delhi(1997)
4. Dr.A.Singaravelu, “Probability and Queuing Theory”, Meenakshi Agency,Chennai(2012).

DATA COMMUNICATION AND COMPUTER NETWORKS

L	P	C
3	0	3

1. Communication Fundamentals **9**

Data Transmission – Transmission Media – Data Encoding- Data Communication Interface – Multiplexing

2. Data Link Layer **9**

Network architecture – Layering – OSI Architecture – Framing – Error Detection – Reliable Transmission -IEEE Standards – Ethernet – Token Ring – FDDI – Token Bus – Wireless LAN – Bridges.

3. Network Layer **9**

Circuit switching – Packet switching – Internetworking – Address Resolution Protocol – Reverse Address Resolution Protocol – Dynamic Host Configuration Protocol – Internet Control Message Protocol – Routing – Routing algorithms – Addressing – Subnetting – CIDR – Inter domain routing – IPv6 – Quality of Service.

4. Transport Layer **9**

Transport Layer – User Datagram Protocol (UDP) – Transmission Control Protocol – Congestion control – Flow control – Queuing Disciplines – Congestion Avoidance Mechanisms.

5. Applications **9**

Domain Name System (DNS) – E-mail – World Wide Web (HTTP) – Simple Network Management Protocol – File Transfer Protocol (FTP)– Security – Multimedia Applications.

TOTAL = 45

Text Books:

1. William Stallings, "Data and Computer Communication", Sixth Edition, Pearson Education, 2000.
2. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Third Edition, Morgan Kauffmann Publishers Inc., 2003.
3. James F. Kuross, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Third Edition, Addision wesley,may 13 2004.

References:

1. Andrew .S. Tanenbaum, "Computer Networks", Fourth Edition, 2003.
2. Comer, "Computer Networks and Internets with Internet Applications", Fourth Edition, Pearson Education, 2003.

SOFTWARE ENGINEERING

L P C
3 0 3

1. Software Product And Process **9**

Introduction – S/W Engineering Paradigm – Verification – Validation – Life Cycle Models – System Engineering – Computer Based System – Business Process Engineering Overview – Product Engineering Overview.

2. Software Requirements **9**

Functional and Non-Functional – Software Document – Requirement Engineering Process – Feasibility Studies – Software Prototyping – Prototyping in the Software Process – Data – Functional and Behavioral Models – Structured Analysis and Data Dictionary.

3. Analysis, Design Concepts And Principles **9**

Systems Engineering - Analysis Concepts - OO Concepts – OOA Design Process And Concepts – Modular Design – Design Heuristic – Architectural Design – Data Design – User Interface Design – Real Time Software Design – System Design – Real Time Executives – Data Acquisition System – Monitoring And Control System.

4. Testing **9**

Taxonomy Of Software Testing – Types Of S/W Test – Black Box Testing – Testing Boundary Conditions – Structural Testing – Test Coverage Criteria Based On Data Flow Mechanisms – Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing And Debugging – Software Implementation Techniques

5. Software Project Management **9**

Measures And Measurements – ZIPF's Law – Software Cost Estimation – Function Point Models – COCOMO Model – Delphi Method – Scheduling – Earned Value Analysis – Error Tracking – Software Configuration Management – Program Evolution Dynamics – Software Maintenance – Project Planning – Project Scheduling– Risk Management – CASE Tools

TOTAL = 45

Text Books:

1. Roger S. Pressman, "Software Engineering – A practitioner's Approach", Fifth Edition,McGraw-Hill International Edition, 2001.
2. Ian Summerville, "Software engineering", Sixth edition, Pearson education Asia, 2000.

References:

1. Pankaj Jalote, "An Integrated Approach to Software Engineering", Second Edition Springer Verlag, 1997.
2. Ali Behforooz and Frederick J. Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.
3. Stephan R. Schach, "Software Engineering with JAVA", Tata McGraw Hill, 1998.
4. Shari Lawrence Pfleeger,Second edition, "Software Engineering theory and practice", Pearson Education Asia,Feb 7,2001.
5. Kathy Schwalbe, "Information Technology Project Management", Course Technology Inc, 2003.
6. William E. Perry, "Effective Methods for Software Testing", Second Edition, John Wiley & sons Inc., 2001.
7. Edward Kit, "Software Testing in the Real World", Addition Wesley, 2000.

OBJECT ORIENTED ANALYSIS AND DESIGN

L	P	C
3	0	3

1. Introduction **8**

An Overview of Object Oriented Systems Development – Object Basics – Object Oriented Systems Development Life Cycle.

2. Object-Oriented Methodologies **12**

Rumbaugh Methodology – Booch Methodology – Jacobson Methodology – Patterns – Frameworks – Unified Approach – Unified Modeling Language – Use case – class diagram – Interactive Diagram – Package Diagram – Collaboration Diagram – State Diagram – Activity Diagram.

3. Object-Oriented Analysis **9**

Identifying use cases – Object Analysis – Classification – Identifying Object relationships – Attributes and Methods.

4. Object-Oriented design **8**

Design axioms – Designing Classes – Access Layer – Object Storage – Object Interoperability.

5. Software Quality and Reusability **8**

Designing Interface Objects – Software Quality Assurance – System Usability – Measuring User Satisfaction.

TOTAL = 45

Text Books:

1. Ali Bahrami, "Object Oriented Systems Development", Tata McGraw Hill, 1999.
2. Martin Fowler, "UML Distilled", Second Edition, Prentice Hall of India / Pearson Education, 2002.

References:

1. Stephen R. Schach, "Introduction to Object Oriented Analysis and Design", Tata McGraw Hill, 2003.
2. James Rumbaugh, Ivar Jacobson, Grady Booch "The Unified Modeling Language Reference Manual", Addison Wesley, 1999.
3. Hans-Erik Eriksson, Magnus Penker, Brain Lyons, David Fado, "UML Toolkit", OMG Press Wiley Publishing Inc., 2004.

COMPUTER NETWORKS LABORATORY

L	P	C
0	3	2

1. Socket Programming
    a. TCP Sockets
    b. UDP Sockets
    c. Applications using sockets.

2. Simulation of ARP/RARP.

3. Simulation of Sliding Window Protocol.

4. Simulation of routing protocols.

5. RPC.

6. DNS/HTTP.

TOTAL = 45

SEMESTER V

MOBILE COMPUTING

L	P	C
3	0	3

1. Wireless Communication Fundamentals **9**

Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

2. **Telecommunication Systems** **11**

GSM – System Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Handover – Security - GPRS

3. Wireless Networks **9**

Wireless LAN – IEEE 802.11 Standards – Architecture – services – HIPERLAN – AdHoc Network – Blue Tooth.

4. Network Layer **9**

Mobile IP – Dynamic Host Configuration Protocol – Routing – DSDV – DSR – AODV – ZRP – ODMR.

5. Transport and Application Layers **7**

TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing – Selective Retransmission – Transaction Oriented TCP – WAP – WAP Architecture – WDP – WTLS – WTP – WSP – WML – WML Script – WAE – WTA.

TOTAL = 45

Text Books:

1. Jochen Schiller, “Mobile Communications”, Second Edition, Pearson Education, 2003.
2. William Stallings, “Wireless Communications and Networks”, Second Edition, Prentice Hall of India / Pearson Education, 2004.

References:

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, New York, 2003.
3. C.K.Toh, “AdHoc Mobile Wireless Networks”, Pearson Education, 2002.

WEB TECHNOLOGY

L P C
3 0 3

1. Introduction **9**

Internet Principles – Basic Web Concepts – Client/Server model – Retrieving data from Internet – Scripting Languages – Perl Programming – Next Generation Internet – Protocols and applications.

2. **Common Gateway Interface Programming** **9**

HTML forms – CGI Concepts – HTML tags Emulation – Server–Browser communication – E–mail generation – CGI Client side Applets – CGI Server Side Applets – Authorization and security – CGI programs using Perl.

3. **XML** **9**

Creating Markup with XML – Document Type Definition – Schemas – Document Object Model – Simple API for XML – Extensible Stylesheet languages – Formatting Objects – Xpath, XLink and XPointer – Introduction to SOAP – case studies – custom markup languages.

4. **Server Side Programming** **9**

Dynamic web content – Server side includes – communication – Active and Java Server Pages – Firewalls – proxy servers – Web Service implementation.

5. **Online applications** **9**

Simple applications – On–line databases – monitoring user events – plug–ins – database connectivity – Internet Information Systems – EDI application in business – Internet commerce – Customization of Internet commerce.

TOTAL = 45

Text Books:

1. Deitel and Deitel, Nieto, Sadhu, "XML How to Program," Pearson Education publishers, 2001.
2. Eric Ladd, Jim O' Donnel, "Using HTML 4, XML and Java", Prentice Hall of India – QUE, 1999.

References:

1. Jeffy Dwight, Michael Erwin and Robert Niles, "Using CGI", prentice Hall of India – QUE, 1999.
2. Scot Johnson, Keith Ballinger, Davis Chapman, "Using Active Server Pages", Prentice Hall of India, 1999.

GRAPHICS AND MULTIMEDIA

L	P	C
3	0	3

1. 2D Graphics **9**

Line, Curve and ellipse Algorithms – Attributes – 2D: transformation – Viewing.

2. 3D Graphics **9**

3D Concepts – Object Representation – Transformation – Viewing – Color models – Animation

3. Multimedia Systems **9**

Multimedia Systems Design: An Introduction – Multimedia applications – Multimedia System Architecture – Evolving technologies for Multimedia – Defining objects for Multimedia systems – Multimedia Data interface standards – Multimedia Databases.

4. Multimedia Technologies **9**

Compression & Decompression – Data & File Format standards – Multimedia I/O technologies: Digital voice and audio – video image and animation – Full motion video – Storage and retrieval Technologies.

5. Multimedia and Hypermedia **9**

Multimedia Authoring & User Interface – Hypermedia messaging: Mobile Messaging – Hypermedia message component – creating Hypermedia message – Integrated multimedia message standards – Integrated Document management – Distributed Multimedia Systems.

TOTAL = 45

Text Books:

1. Donald Hearn & Pauline Baker, "Computer Graphics", Second Edition, 1996.
2. Prabath K. Andleigh & Kiran Thakrar, "Multimedia Systems & Design", First Edition , Prentice Hall of India,1995.

References:

1. Judith Jeffcoate, "Multimedia In Practice Technology And Applications", First Edition, Prentice Hall of India, 1995.
2. Foley, Vandam, Feiner, Huges, "Computer Graphics: Principles and Practice", Second Edition, Pearson Education, 2003.
3. Cooley, "Essence of Computer Graphics", First Edition, Pearson Education, 2004.

WEB TECHNOLOGY LABORATORY

L	P	C
0	3	2

1. Designing Web pages using Client Side Scripting and DHTML
2. Client Server Scripting Programs
3. Simulation of Email and file transfer protocols
4. Development of Web Services
5. XML and Databases
6. Server side application using JSP
7. Web customisation
8. Development of E-business application

TOTAL = 45

SEMESTER VI
TOTAL QUALITY MANAGEMENT

L	P	C
3	0	3

1. Concept Of TQM **9**

Philosophy of TQM, Customer Focus, Organization, Top Management Commitment, Teamwork, Quality philosophies of Deming, Crossby and Muller.

2. TQM Process **9**

QC Tools, Problem solving methodologies, New Management Tools, work habits, Quality Circles, Bench Marking, Strategic Quality Planning.

3. TQM Systems **9**

Quality policy deployment, quality function deployment, standardization, designing for quality, manufacturing for quality.

4. Quality System **9**

Need for ISO 9000 system, advantages, clauses of ISO 9000, Implementation of ISO 9000, Quality Costs, Quality auditing, Case Studies.

5. Implementation Of TQM **9**

Steps, KAIZEN, 5S, JIT, POKAYOKE, Taguchi Methods, Case Studies.

TOTAL = 45

References:

1. Rose, J.E., "Total Quality Management", Kogan Page Ltd., 1993.
2. John Bank, "The Essence of Total Quality Management", Prentice Hall of India, 1993.
3. Greg Bounds, Lyle Yorks et all, "Beyond Total Quality Management", McGraw-Hill, 1994.
4. Takashi Osada, "The 5S's The Asian Productivity Organisation", 1991.
5. Masaki Imami, "KAIZEN", McGraw-Hill, 1986.

COMPILER DESIGN

L	P	C
3	0	3

1. Source Program Analysis 9

Compilers – Analysis of the Source Program – Phases of a Compiler – Cousins of Compiler – Grouping of Phases – Compiler Construction Tools – Lexical Analysis: Role of Lexical Analyzer – Input Buffering – Specification of Tokens – Recognition of Tokens – A Language for Specifying Lexical Analyzer – Role of Parser – Context free Grammars – Writing a Grammar – Predictive Parser – LR Parser.

2. Intermediate Code Generation 9

Intermediate Languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back Patching – Procedure Calls.

3. Basic Optimization 9

Constant-Expression Evaluation – Scalar Replacement of Aggregates – Algebraic Simplifications and Re-association – Value Numbering – Copy Propagation – Common Sub-expression Elimination – Loop-Invariant Code Motion – Partial-Redundancy Elimination – Redundancy Elimination and Re-association – Code Hoisting – Induction Variable Optimization – Unnecessary Bounds-Checking Elimination.

4. Procedural and Low-level Optimization 9

Tail-Call Optimization and Tail-Recursion Elimination – Procedure Integration – Inline Expansion – Leaf Routine Optimization and Shrink Wrapping – Register Allocation and Assignment – Graph Coloring – Unreachable Code Elimination – Straightening – If Simplifications – Loop Simplifications – Loop Inversion – Un-switching – Branch Optimizations – Tail Merging or Cross Jumping – Conditional Moves – Dead Code Elimination – Branch Prediction – Machine Idioms and Instruction Combining.

5. Code Generation 9

Issues in the Design of Code Generator – The Target Machine – Runtime Storage management – Next-use Information – A simple Code Generator – DAG Representation of Basic Blocks – Peephole Optimization – Generating Code from DAGs.

Total = 45

Text Books:

1. Alfred Aho, V. Ravi Sethi, D. Jeffery Ullman, “Compilers Principles, Techniques and Tools”, Addison Wesley, 1988.
2. Steven S. Muchnick, “Advanced Compiler Design Implementation”, Morgan Koffman, 1997.

References:

1. Allen Holub “Compiler Design in C”, Prentice Hall of India, 1990.
2. Charles N. Fischer, Richard J. Leblanc, “Crafting a compiler with C”, Benjamin Cummings, 1991.

SECURITY IN COMPUTING

L	P	C
3	0	3

1. Introduction **10**

Security problem in computing – Elementary Cryptography – DES – AES – Public Key Encryption – Uses of Encryption.

2. Program Security **8**

Security Programs – Non-malicious Program Errors – Virus and other Malicious Code – Targeted Malicious Code – Control against program Threats.

3. Security in Operating Systems **9**

Protected Objects and Methods of Protection – Memory and Address Protection – Control of Access generated Objects – File Protection Mechanisms – User Authentication – Trusted Operating Systems – Models of Security – Trusted Operating Systems Design – Assurance in Trusted Operating Systems.

4. Database and Network Security **11**

Database Security Requirements – reliability and integrity – Sensitive Data – Inference – Multilevel Databases and Multilevel Security – Threats in Networks – Network Security Controls – Firewalls – Intrusion Detection Systems – Secure E-Mail

5. Administering Security and Ethical Issues **7**

Security Planning – Risk Analysis – Organizational Security Policies – Physical Security – Protecting Programs and Data – Information and the Law – Software Failures – Computer Crime – Privacy – Ethical Issues.

TOTAL = 45

Text Books:

1. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education, 2003.

References:

1. Matt Bishop, "Computer Security – Art and Science", First Edition, Pearson Education, 2003.
2. William Stallings, "Cryptography And Network Security – Principles and Practices", Third Edition, Prentice Hall of India, 2003.
3. Atul Kahate, "Cryptography and Network Security", Tata McGraw Hill, 2003.

COMPILER DESIGN LAB

L	P	C
0	3	2

1. Write a program for Constructing NFA from a regular Expression**.**
2. Write a program for Constructing DFA from a regular Expression.
3. Write a program to find leading and Trailing of the given Grammar.
4. Write a program for constructing Top Down Parsing table.
5. Write a program to implement Shift reduce parsing Algorithm.
6. Write a program to implement Operator precedence Parsing Algorithm.
7. Write a program to find the Closure of the given Grammar.
8. Write a program for constructing LR Parsing table.
9. Write a program to generate DAG for the given expression.
10. Write a program to simulate the storage management.
11. Write a program to generate a code for a given intermediate code.

TOTAL = 45

MINI PROJECT

L	P	C
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1.The objective of Mini Project is to provide opportunity for the student to apply the knowledge acquired during the academic programme to real-life problems which he/she may have to face in future as an engineer

2. Four periods per week shall be allotted in the time table for the activity and this time shall be utilized by the students to receive guidance from the members of faculty on solving real-life problems, practice solving these problems, seminar presentation as assigned by the faculty member in-charge

3. The continuous assessment and semester evaluation may be carried out as specified in the guidelines to be issued from time to time and finally he/she should submit the report.

SEMESTER VII

PRINCIPLES OF PROGRAMMING LANGUAGES

L	P	C
3	0	3

1. Introduction **9**

Reasons for Studying the Concepts of Programming Languages – Language evaluation criteria – Language categories – Implementation methods – Evaluation of Programming Languages.

2. Data **9**

Syntax – Semantics – Names – Data Types – Primitive – Composite – Binding – Typing – Scope – Static – Dynamic – Abstract Data Types.

3. **Control** **9**

Expressions – Assignment – Selective – Iterative.

4. **Subprograms** **9**

Fundamentals – Parameter Passing Methods – Semantics of Calls and Returns – Implementation Issues – Exception Handling.

5. **Programming Paradigms** **9**

Logic – Concurrent – Functional – Object-Oriented.

TOTAL = 45

Text Books:

1. Robert W. Sebesta, "Concepts of Programming Languages", Sixth Edition Addison Wesley, July 24,2003.

References:

1. Carlo Ghezzi, Politec Nico Di Milano, Mehdi Jazayeri, Technische Universitat Wien, "Programming Language Concepts", John Wiley and Sons, 1998.
2. Ravi Sethi, "Programming Languages – Concepts and Constructs", Second Edition, Addison-Wesley Publishing Company, Feb First,1996.
3. T.W. Pratt and M.V. Zelkowitz, Programming Languages: Design and Implementation, Third Edition, PHI, 1999.

SCIENTIFIC COMPUTING TECHNIQUES

L	P	C
3	0	3

1. Roots of Equation and Linear Algebraic Equation 9

Graphical Method – Iterative Methods – Simple One-Point Iteration – Newton-Raphson Method – Break-Even Analysis – Ideal and Nonideal Gas Laws – Gauss Elimination – Solution of Linear Systems by Gaussian, Gauss-Jorda, Jacobi and Gauss-Seidel Method – Matrix Inversion – Gauss-Jordan Method – Gauss-Seidel Method.

2. Interpolation 10

Least-Square Regression – Newton's Divided-Difference Interpolating Polynomials – Lagrange's and Hermite's Polynomials – Newton's Forward and Backward Difference Formula – Stirling's and Bessel's Central Difference Formulea.

3. Numerical Differentiation and Integration 10

Numerical Differentiation with Interpolation Polynomials – Numerical Integration by Trapezoidal and Simpson's Rules – Two and Three point Gaussian Quadrature Formulea – Double Integral using Trapezoidal and Simpson's Rule.

4. Introduction to System Modeling 8

Modeling and General Systems Theory – Concept of Simulation – Types of Simulation – Design of Simulation Experiments – Logic Flow Chart – Experimental Design Consideration.

5. Simulation Languages and Case Studies 8

Comparison and Selection of Simulation Languages – Development of Simulation Models Using any one of the Languages for some Problems.

TOTAL = 45

Text Books:

1. Steven C. Chapra, Raymond P. Canale, "Numerical Methods for Engineering", Second Edition, McGraw-Hill, 1989.

2. Geoffrey Gordon, "System Simulation", Second Edition, PHI, 2002.

References:

1. Jerry Banks and John Carson, "Discrete Event System Simulation", Third Edition, PHI, 2002.
2. Sastry S.S "Introductory Methods of Numerical Analysis", third Edition, Prentice Hall India, 1998.

LIST OF ELECTIVES

KNOWLEDGE MANAGEMENT

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1. Introduction **9**

The value of Knowledge – Knowledge Engineering Basics – Knowledge Economy – The task and Organizational content – Knowledge Management – Knowledge Management Ontology.

2. Knowledge Models **9**

Knowledge Model Components – Template Knowledge Models –Reflective Knowledge Models– Knowledge Model Construction – types of Knowledge Models.

3. Techniques Of Knowledge Management **8**

Knowledge Elicitation techniques – Modeling communication aspects – Knowledge Management and Organizational learning.

4. Knowledge System Implementation **11**

Case Studies – Designing Knowledge Systems – Knowledge Codification – Testing and Deployment – Knowledge Transfer and Knowledge Sharing – Knowledge system implementation.

5. Advanced Km **8**

Advanced Knowledge Modeling – Value Networks – Business models for knowledge economy – UML Notations – Project Management.

TOTAL = 45

Text Books:

1. Guus Schreiber, Hans Akkermans, Anjo Anjewierden, Robert de Hoog, Nigel Shadbolt, Walter Van de Velde and Bob Wielinga, "Knowledge Engineering and Management", universities Press, 1999.
2. Elias M.Awad & Hassan M. Ghaziri, "Knowledge Management",perntice hall Pearson Education, 2003.

References:

1. C.W. Holsapple, "Handbooks on Knowledge Management", International Handbooks on Information Systems,Springer verlay 2004.
2. http://www.epistemics.co.uk.
3. http://depts.washington.edu/pettt/papers/WIN_poster_text.pdf.

UNIX INTERNALS

L P C
3 0 3

1. Overview **8**

General Overview of the System : History – System structure – User perspective – Operating system services – Assumptions about hardware. Introduction to the Kernel : Architecture of the UNIX operating system – Introduction to system concepts. The Buffer Cache: Buffer headers – Structure of the buffer pool – Scenarios for retrieval of a buffer – Reading and writing disk blocks – Advantages and disadvantages of the buffer cache.

2. File Subsystem **8**

Internal representation of files: Inodes – Structure of a regular file – Directories – Conversion of a path name to an Inode – Super block – Inode assignment to a new file – Allocation of disk blocks.

3. System Calls For The File system **10**

Open – Read – Write – File and record locking – Adjusting the position of file I/O – Lseek – Close – File creation – Creation of special files – Changing directory, root, owner, mode – stat and fstat – Pipes – Dup – Mounting and unmounting file systems – link – unlink.

4. Processes **10**

Process states and transitions – Layout of system memory – The context of a process – Saving the context of a process – Manipulation of the process address space - Sleep. Process Control : Process creation – Signals – Process termination – Awaiting process termination – Invoking other programs – user id of a process – Changing the size of a process - Shell – System boot and the INIT process– Process Scheduling.

5. Memory Management And I/O

Memory Management Policies : Swapping – Demand paging. The I/O Subsystem : Driver Interface – Disk Drivers – Terminal Drivers– Streams – Inter process communication.

TOTAL = 45

Text Books:

1. Maurice J. Bach, “The Design of the Unix Operating System”, First Edition, Pearson Education, 1999.

References:

1. B. Goodheart, J. Cox, “The Magic Garden Explained”, Prentice Hall of India, 1986.
2. S. J. Leffler, M. K. Mckusick, M. J. .Karels and J. S. Quarterman., “The Design And Implementation of the 4.3 BSD Unix Operating System”, Addison Wesley, 1998.

SOFT COMPUTING

1. **Introduction To Soft Computing And Neural Networks**

   Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radia Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures.

2. **Fuzzy Sets And Fuzzy Logic** **9**

   Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations - Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Logic – Fuzzy Expert Systems – Fuzzy Decision Making.

3. **Neuro-Fuzzy Modeling** **9**

   Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rulebase Structure Identification – Neuro-Fuzzy Control.

4. **Machine Learning** **9**

   Machine Learning Techniques – Machine Learning Using Neural Nets – Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

5. **Support Vector Machines** **9**

   Support Vector Machines for Learning – Linear Learning Machines – Support Vector Classification – Support Vector Regression - Applications.

TOTAL = 45

Text Books:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.
2. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.

References:

1. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
2. Amit Konar, "Artificial Intelligence and Soft Computing", First Edition,CRC Press, 2000.
3. Simon Haykin, "Neural Networks: A Comprehensive Foundation", Second Edition Prentice Hall, 1999.
4. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.
5. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.

ADVANCED JAVA PROGRAMMING

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1. Java Fundamentals **9**

Java Virtual Machine – Reflection – I/O Streaming – Filter And Pipe Streams – Byte Codes – Byte Code Interpretation – Dynamic Reflexive Classes – Threading – Java Native Interfaces – GUI Applications.

2. Network Programming In Java **9**

Stream Customization – Sockets – Secure Sockets – Custom Sockets – UDP Datagrams – Multicast Sockets – URL Classes – Reading Data From The Server – Writing Data – Configuring The Connection – Reading The Header – Content Handlers – Telnet Application – Java Messaging Services.

3. Distributed Computing In Java **9**

Remote Method Invocation – Activation Models – RMI Custom Sockets – Object Serialization – Call Back Model – RMI – IIOP Implementation – CORBA – IDL Technology – Naming Services – CORBA Programming Models – JAR File Creation.

4. Multi – Tier Application Development **9**

Server Side Programming – Servlets – Session Management – Cookies – HTTP Communication – JDBC –Multimedia Data Handling – Java Media Framework – Enterprise Applications.

5. Mobile Application Development **9**

Mobile Information Device Profile – Deployment Of Mobile Objects–Foundation Profile – RMI Profile For Mobile Devices – Development Of Midlets – Mobile Networking Applications.

TOTAL = 45

References:

1. Elliotte Rusty Harold, “Java Network Programming”, O’Reilly Publishers, 2000.
2. Cay S. Horstmannn, Gary Cornell, “Core Java, Volume 1 And 2”, Fifth Edition, Pearson Education Publishers, 2002.
3. Topley, “J2ME In A Nutshell”, O’Reilly Publishers, 2002.

4. Hunt, “Guide To J2EE Enterprise Java”, Springer Publications, 2004.
5. Ed Roman, “Enterprise Java Beans”, Wiley Publishers, 1998.
6. Avstin, “Advance Programming For The Java2 Platform” ‘Pearson Education, 2001.

REAL TIME SYSTEMS

L P C
3 0 3

1. Introduction 9

Introduction - Issues in Real Time Computing, Structure of a Real Time System. Task Classes, Performance Measures for Real Time Systems, Estimating Program Run times. Task Assignment and Scheduling - Classical Uniprocessor scheduling algorithms, UniProcessor scheduling of IRIS Tasks, Task Assignment, Mode Changes, and Fault Tolerant Scheduling.

2. Programming Languages And Tools 9

Programming Language and Tools – Desired Language characteristics, Data Typing, Control structures, Facilitating Hierarchical Decomposition, Packages, Run-time (Exception) Error handling, Overloading and Generics, Multitasking, Low Level programming, Task scheduling, Timing Specifications, Programming Environments, Run-time Support.

3. Real Time Databases 9

Real time Databases - Basic Definition, Real time Vs General Purpose Databases, Main Memory Databases, Transaction priorities, Transaction Aborts, Concurrency Control Issues, Disk Scheduling Algorithms, Two-phase Approach to improve Predictability, Maintaining Serialization Consistency, Databases for Hard Real Time systems.

4. Communication 9

Real-Time Communication - Communications Media, Network Topologies Protocols, Fault Tolerant Routing. Fault Tolerance Techniques - Fault Types, Fault Detection. Fault Error containment Redundancy, Data Diversity, Reversal Checks, Integrated Failure handling.

5. Evaluation Techniques 9

Reliability Evaluation Techniques - Obtaining Parameter Values, Reliability Models for Hardware Redundancy, Software Error models. Clock Synchronization - Clock, A Nonfault-Tolerant Synchronization Algorithm, Impact of Faults, Fault Tolerant Synchronization in Hardware, Fault Tolerant Synchronization in Software.

TOTAL = 45

Text Books:

1. C.M. Krishna, Kang G. Shin, “Real-Time Systems”, McGraw-Hill International Editions, 1997.

References:

1. Stuart Bennett, “Real Time Computer Control-An Introduction”,Second edition Perntice Hall PTR, 1994.
2. Peter D. Lawrence, “Real time Micro Computer System Design – An Introduction”, McGraw Hill, 1988.
3. S.T. Allworth and R.N. Zobel, “Introduction to real time software design”, Macmillan, II Edition, 1987.
4. R.J.A Buhur, D.L. Bailey, “ An Introduction to Real-Time Systems”, Prentice-Hall International, 1999.
5. Philip.A.Laplante “Real Time System Design and Analysis” PHI , III Edition, April 2004.

ADVANCED DATABASE TECHNOLOGY

L P C
3 0 3

1. Distributed Databases **5**

Distributed Databases Vs Conventional Databases – Architecture – Fragmentation – Query Processing – Transaction Processing – Concurrency Control – Recovery.

2. Object Oriented Databases **10**

Introduction to Object Oriented Data Bases - Approaches - Modeling and Design - Persistence – Query Languages - Transaction - Concurrency – Multi Version Locks - Recovery.

3. Emerging Systems **10**

Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases – Mobile Databases.

4. Database Design Issues **10**

ER Model - Normalization - Security - Integrity - Consistency - Database Tuning - Optimization and Research Issues – Design of Temporal Databases – Spatial Databases.

5. Current Issues **10**

Rules - Knowledge Bases - Active And Deductive Databases - Parallel Databases – Multimedia Databases – Image Databases – Text Database

TOTAL = 45

References:

1. Elisa Bertino, Barbara Catania, Gian Piero Zarri, “Intelligent Database Systems”, Addison-Wesley, 2001.
2. Carlo Zaniolo, Stefano Ceri, Christos Faloustsos, R.T.Snodgrass, V.S.Subrahmanian, “Advanced Database Systems”, Morgan Kaufman, 1997.
3. N.Tamer Ozsu, Patrick Valduriez, “Principles of Distributed Database Systems”, Prentice Hal International Inc., 1999.
4. C.S.R Prabhu, “Object-Oriented Database Systems”, Prentice Hall of India, 1998.
5. Abdullah Uz Tansel et al, “Temporal Databases: Theory, Design and principles”, Benjamin Cummings Publishers, 1993.
6. Raghu Ramakrishnan, Johannes Gehrke, “Database Management Systems”, McGraw Hill, Third Edition 2004.
7. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, Fourth Ediion, McGraw Hill, 2002.
8. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Pearson Education, 2004.

TCP/IP DESIGN AND IMPLEMENTATION

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1. Introduction **9**

Internetworking concepts and architectural model– classful Internet address – CIDR–Subnetting and Supernetting –ARP– RARP– IP – IP Routing –ICMP – Ipv6.

2. TCP **9**

Services – header – connection establishment and termination– interactive data flow– bulk data flow– timeout and retransmission – persist timer – keep alive timer– futures and performance.

3. IP Implementation **9**

IP global software organization – routing table– routing algorithms–fragmentation and reassembly– error processing (ICMP) –Multicast Processing (IGMP).

4. TCP Implementation I **9**

Data structure and input processing – transmission control blocks– segment format– comparison–finite state machine implementation–Output processing– mutual exclusion–computing the TCP data length.

5. TCP Implementation II **9**

Timers–events and messages– timer process– deleting and inserting timer event– flow control and adaptive retransmission–congestion avoidance and control – urgent data processing and push function.

TOTAL = 45

Text Books:

1. Douglas E.Comer, "Internetworking with TCP/IP Principles, Protocols and Architecture", Vol 1 & 2, fourth edition, Pearson Education Asia, 2003.

2. W.Richard Stevens "TCP/IP illustrated" Volume 1 Pearson Education, 2003.

References:

1. Forouzan, "TCP/IP protocol suite" Second edition, Tata McGraw Hill, 2003.

2. W.Richard Stevens "TCP/IP illustrated" Volume 2, Pearson Education 2003.

C# AND .NET TECHNOLOGY

L P C
3 0 3

1. Basic Features Of C# 8

C# and the .NET Framework – Getting Started – C# Language Fundamentals – Classes and Objects – Inheritance and Polymorphism–Operator Overloading – Structs.

2. Advanced Features Of C# 9

Interfaces – Arrays – Indexers and Collections – Strings and Regular Expressions – Handling Exceptions – Delegates and Events.

3. Application Development On .Net 10

Building Windows Applications – Accessing Data with ADO.NET–Programming Web Applications with Web Forms–Programming Web Services.

4. The Clr And The .Net Framework 9

The Architecture – Deployment – Assemblies – Shared Assemblies –Automatic Memory Management – CLR Hosting – Appdomains–Reflection.

5. Remoting And Web Services Technology 9

Marshaling – Remoting – Threads – Synchronization – Streams – Web Services.

TOTAL = 45

Text Books:

1. Jesse Liberty, "Programming C#", Second Edition, O'Reilly Press, 2002.
2. Jeffrey Richter, "Applied Microsoft .NET Framework Programming", Microsoft Press, 2002.

References:

1. Robinson et al, "Professional C#", Fifth Edition, Wrox Press, 2002.
2. Herbert Schildt, "The Complete Reference: C#", Tata McGraw Hill, 2004.
3. Andrew Troelsen, "C# and the .NET Platform", A! Press, 2003.
4. Thuan Thai and Hoang Q. Lam, ". NET Framework Essentials", Second Edition, O'Reilly, 2002.

DATA WAREHOUSING AND DATA MINING

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1. Introduction **9**

Definition of Data Mining - Data Mining Vs Query Tools – Machine Learning – Taxonomy of Data Mining Tasks – Steps in Data Mining Process – Overview of Data Mining techniques.

2. Data Warehousing **9**

Definition – Multidimensional Data Model – Data Cube – Dimension Modelling – OLAP Operations – Warehouse Schema – Data Warehouse Architecture – Data Mart – Meta Data – Types of Meta Data – Data Warehouse Backend Process – Development Life Cycle.

3. Data Pre-Processing And Characterization **9**

Data Cleaning – Data Integration and Transformation – Data Reduction – Discretization and Concept Hierarchy Generation – Primitives – Data Mining Query Language – Generalization – Summarization – Analytical Characterization and Comparison - Association Rule – Mining Multi Dimensional data from Transactional Database and Relational Database.

4. Classification **9**

Classification – Decision Tree Induction – Bayesian Classification – Prediction – Back Propagation – Cluster Analysis – Hierarchical Method – Density Based Method – Grid Based Method – Outlier Analysis.

5. Applications **9**

Tools – Applications – Case Study.

TOTAL = 45

Text Books:

1. Paulraj Ponnaiah, “Data Warehousing Fundamentals”, Wiley Publishers, 2001.
2. Jiawei Han, Micheline Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufman Publishers, 2000.

References:

1. Usama M.Fayyad, Gregory Piatetsky Shapiro, Padhrai Smyth, Ramasamy Uthurusamy, “Advances in Knowledge Discover and Data Mining”, The M.I.T. Press, 1996.
2. Ralph Kimball, Margy Ross, “The Data Warehouse Toolkit”, John Wiley and Sons Inc., 2002.
3. Alex Berson, Stephen Smith, Kurt Thearling, “Building Data Mining Applications for CRM”, Tata McGraw Hill, 2000.
4. Margaret Dunham, ”Data Mining: Introductory and Advanced Topics”, Prentice Hall, 2002.

HIGH SPEED NETWORKS

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1. High Speed Networks 9

Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection – ATM Cell – ATM Service Categories – AAL. High Speed LAN's: Fast Ethernet – Gigabit Ethernet– Fibre Channel – Wireless LAN's: applications, requirements – Architecture of 802.11.

2. Congestion And Traffic Management 8

Queuing Analysis – Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

3. TCP And ATM Congestion Control 12

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats – ABR Capacity allocations – GFR traffic management.

4. Integrated And Differentiated Services 8

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline – FQ – PS – BRFQ – GPS – WFQ – Random Early Detection – Differentiated Services.

5. Protocols For QoS Support 8

RSVP – Goals & Characteristics, Data Flow, RSVP operations – Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking – Protocol details – RTP – Protocol Architecture – Data Transfer Protocol– RTCP.

TOTAL = 45

Text books:

1. William Stallings, "High speed networks and internet", Second Edition, Pearson Education, 2002.

References:

1. Warland, Pravin Varaiya, “High performance communication networks”, Second Edition , Jean Harcourt Asia Pvt. Ltd., , 2001.
2. Irvan Pepelnjk, Jim Guichard, Jeff Apcar, “MPLS and VPN architecture”, Cisco Press, Volume 1 and 2, 2003.

COMPONENT BASED TECHNOLOGY

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1. Introduction 9

Software Components – objects – fundamental properties of Component technology – modules – interfaces – callbacks – directory services – component architecture – components and middleware.

2. Java Component Technologies 9

Threads – Java Beans – Events and connections – properties – introspection – JAR files – reflection – object serialization – Enterprise Java Beans – Distributed Object models – RMI and RMI-IIOP.

3. CORBA Technologies 9

Java and CORBA – Interface Definition language – Object Request Broker – system object model – portable object adapter – CORBA services – CORBA component model – containers – application server – model driven architecture.

4. COM and .Net Technologies 9

COM – Distributed COM – object reuse – interfaces and versioning – dispatch interfaces – connectable objects – OLE containers and servers – Active X controls – .NET components - assemblies – appdomains – contexts – reflection – remoting.

5. Component Frameworks And Development 9

Connectors – contexts – EJB containers – CLR contexts and channels – Black Box component framework – directory objects – cross-development environment – component-oriented programming – Component design and implementation tools – testing tools - assembly tools.

TOTAL = 45

Text Books:

1. "Component Software: Beyond Object-Oriented Programming", Pearson Education publishers, 2003.

References:

1. Ed Roman, "Enterprise Java Beans", Third Edition, Wiley, 2004.

EMBEDDED SYSTEMS

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1. Introduction 9

Challenges of Embedded Systems – fundamental components – examples of embedded systems – hardware fundamentals – gates – timing diagrams – memory – direct memory access – buses – interrupts – schematics – build process of embedded systems.

2. Memory Management And Interrupts 9

Memory access procedure – types of memory – memory management methods – Pointer related issues – polling versus interrupts – types of interrupts – interrupt latency – re-entrancy – interrupt priority – programmable interrupt controllers – interrupt service routines.

3. Real-Time Operating Systems – RTOS 9

Desktop Operating Systems versus RTOS – need for Board Support Packages – task management – race conditions – priority inversion – scheduling – inter task communication – timers – semaphores – queues.

4. Embedded System Design And Implementation 9

Requirements of an embedded system – architecture styles and patterns – design practices – implementation aspects and choices.

5. Embedded Software Development Tools 9

Host and target machines – cross compilers – linker and locators for embedded software – address resolution – locating program components – initialized data and constant strings – PROM programmers – ROM emulators – Flash memory.

TOTAL = 45

Text Books:

1. Sriram V.Iyer, Pankaj Gupta, "Embedded Real-time Systems Programming", Tata McGraw Hill publishers, 2004.
2. David E.Simon, "An Embedded Software Primer", Pearson Education publishers, 1999.

References:

1. Raj Kamal, "Embedded Systems" Tata McGraw Hill.
2. A unified Hardware/Software Introduction, "Embedded System Design "Frank Vahid and Tony Givargis, John Wiley & Sons publishers, 2002.

SOFTWARE TESTING AND QUALITY ASSURANCE

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1. Introduction To Principles Of Product Quality 8

Ethical Basis for Software Quality – Total Quality Management Principles – Software Processes and Methodologies – Quality Standards, Practices & Conventions – Software Configuration Management – Reviews and Audits – Improving Quality with Methodologies – Structured/Information Engineering – Measuring Customer Satisfaction – Reliability Models – Reliability Growth Models – Software Quality Engineering – Defining Quality Requirements – Management Issues for Software Quality – Data Quality Control – Benchmarking and Certification.

2. Software Quality Assurance Plan 11

Writing Software Requirements and Design Specifications – Analyzing Software Documents using Inspections and Walkthroughs – Software Configuration Management – Software Metrics – Lines of code, Cyclomatic Complexity, Function Points, Feature Points – Software Cost Estimation (COCOMO) – Quality Management Standards – ISO and TickIt initiative – Accepted process models, (eg CMM) – Reliability.

3. Test Case Design 9

Testing as an Engineering Activity, Role of Process in Software Quality, Testing as a Process, Basic Definitions, Software Testing Principles, The Tester's Role in Software Development Organization, Origins of Defects, Defect Classes, The Defect Repository and Test Design, Defect Examples, Developer/Tester Support for Developing a Defect Repository – Introduction to Testing Design Strategies, The Smarter, Test Case Design Strategies, Using Black Box Approach to Test Case Design, Random Testing, Equivalence Class Partitioning, Boundary Value Analysis, Other Black-box Test Design Approaches, Black-Box testing and COTS, Using White-Box Approach to Test design, Test Adequacy Criteria, Coverage and Control Flow Graphs, Covering Code Logic, Paths: Their Role in White-box Based Test Design, Additional White Box Test Design Approaches, Evaluating Test Adequacy Criteria – Levels of Testing and different types of testing.

4. TEST MANAGEMENT 9

Introductory Concepts, Testing and Debugging Goals and Policies, Test Planning, Test Plan Components, Test Plan Attachments, Locating Test Items, Reporting Test Results, The role of three groups in Test Planning and Policy Development, Process and the Engineering Disciplines, Introducing the test specialist, Skills needed by a test specialist, Building a Testing Group.

5. CONTROLLING AND MONITORING 8

Defining Terms, Measurement and Milestones for Controlling and Monitoring, Status Meetings, Reports and Control Issues, Criteria for Test Completion, SCM, Types of reviews, Developing a review program, Components of Review Plans, Reporting review results.

TOTAL = 45

Text Books:

1. Ilene Burnstein, "Practical Software Testing", Springer International Edition, Chennai, 2003.

References:

1. Edward Kit, "Software Testing in the Real World – Improving the Process", Pearson Education, New Delhi, 1995.
2. Elfriede Dustin, "Effective Software Testing", Pearson Education, New Delhi, 2003.
3. Renu Rajani and Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, New Delhi, 2003.
4. Metrics and Models in Software Quality by Stephen Kan, Addison-Wesley, 1995 (required).
5. The Capability Maturity Model: Guidelines for Improving the Software Process by Mark Paulik, Addison-Wesley, 1995 (recommended).

SOFTWARE PROJECT MANAGEMENT

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1. Introduction to Software Project Management **9**

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

2. Project Evaluation **9**

Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

3. Activity Planning **9**

Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

4. Monitoring And Control **9**

Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Priortizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

5. Managing People And Organizing Teams **9**

Introduction – Understanding Behavior – Organizational Behaviour:A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health And Safety – Case Studies.

TOTAL = 45

References:

1. Bob Hughes, Mikecotterell, “Software Project Management”, Third Edition, Tata McGraw Hill, 2004.
2. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
3. Royce, “Software Project Management”, Pearson Education, 1999.
4. Jalote, “Software Project Manangement in Practive”, Pearson Education, 2002.

VISUAL PROGRAMMING

L	P	C
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1. Windows programming **8**

The windows programming Model- Event driven programming- GUI concepts – Overview of Windows programming – Creating the window – Displaying the window – message Loop – windows procedure – WM_PAINT message – WM_DESTROY message – Data types – Resources - An Introduction to GDI – Device context- Text output- Scroll Bars – Keyboard – Mouse – Menus.

2. Visual C++ Programming **10**

Visual C++ components – Introduction to Microsoft Foundation Classes Library – Getting started with AppWizard – Class Wizard – Event handling – Keyboard and Mouse events - Graphics Device Interface, Colors, Fonts,Single and Multiple document interface - Reading and Writing documents –Basic–, Pen, Brush- WM – SIZE, WM-CHAR messages. Resources – Bitmaps creation, usage of BMP and displaying a file existing as a BMP.

3. Controls **9**

Dialog Based Applications, controls – Animate control, List Box, Combo Box, Label , Edit box , Radio button, frame, command button , image list, CRect tracker, Tree control , CtabControl - Dynamic controls – slider control , progress control. Inheriting CTreeView – CricheditView

4. Document Class **9**

Document view Architecture, Serialization - Multithreading. Menus – Keyboard Accelerators – Tool bars – Tool tip - property sheet. Modal Dialog, Modeless Dialog - CColorDialog, CfileDialog

5. Advanced Concepts **9**

Status bars – To display in existing status bar, creating new status bar - splitter windows and multiple views – Dynamic Link Library – Data base Management with ODBC, TCP/IP, Winsock and WinInet, ActiveX control – creation and usage, Container class.

TOTAL = 45

Text Books:

1. Charles Petzold, "Windows Programming", Microsoft press, 1996.
2. David Kruglirski.J, "Programming Microsoft Visual C++", Fifth Edition, Microsoft press, 1998.

References:

1. Steve Holzner, “Visual C++ 6 programming”, Wiley Dreamtech India PVt. Ltd.,2003.
2. Kate Gregory “Using Visual C++”, Prentice Hall of India Pvt., Ltd., 1999 3. 3. Herbert Sheildt , “ MFC from the GroundUp” .

XML AND WEB SERVICES

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1. XML Technology family **9**

XML – benefits – Advantages of XML over HTML, EDI, Databases – XML based standards – DTD – XML Schemas – X-Files – XML processing – DOM – SAX – presentation technologies – XSL – XFORMS – XHTML – voiceXML – Transformation – XSLT – XLINK – XPATH – XQuery

2. Architecting Web Services **9**

Business motivations for web services – B2B – B2C – Technical motivations – limitations of CORBA and DCOM – Service-oriented Architecture (SOA) – Architecting web services – Implementation view – web services technology stack – logical view – composition of web services – deployment view – from application server to peer to peer – process view – life in the runtime

3. Web services building block **9**

Transport protocols for web services – messaging with web services - protocols - SOAP - describing web services – WSDL – Anatomy of WSDL – manipulating WSDL – web service policy – Discovering web services – UDDI – Anatomy of UDDI – Web service inspection – Ad-Hoc Discovery - Securing web services

4. Implementing XML in e-Business **9**

B2B – B2C Applications – Different types of B2B interaction – Components of e-business XML systems – ebXML – RosettaNet - Applied XML in vertical industry – web services for mobile devices.

5. XML and Content Management **9**

Semantic Web – Role of Meta data in web content - Resource Description Framework – RDF schema – Architecture of semantic web – content management workflow – XLANG – WSFL

Text Books:

1. Ron Schmelzer et al. " XML and Web Services", Pearson Education, 2002.
2. Sandeep Chatterjee and James Webber, "Developing Enterprise Web Services: An Architect's Guide", Prentice Hall, 2004.

References:

1. Frank P.Coyle, “XML, Web Services and the Data Revolution”, Pearson Education, 2002.
2. Keith Ballinger, “.NET Web Services Architecture and Implementation”, Pearson Education, 2003.
3. Henry Bequet and Meeraj Kunnumpurath, “Beginning Java Web Services”, Apress, 2004.
4. Russ Basiura and Mike Batongbacal, “Professional ASP .NET Web Services”, Apress, 2003.

DESIGN AND ANALYSIS OF ALGORITHMS

L	P	C
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1. Fundamentals 12

Algorithms – Analyzing Algorithms – Asymptotic Notation – Standard Notations And Common Functions – Summation Formulas And Properties – Bounding Summations – Substitution Method – Iteration Method – Master Method – Red-Black Trees – B-Trees.

2. Sorting **12**

Heapsort – Heaps – Maintaining the Heap property – Building a Heap – The Heapsort Algorithm – Priority Queues – Quicksort: Description of Quicksort – Performance of Quicksort – Randomized version of Quick Sort – Analysis of Quicksort – Lower Bounce for Sorting – Counting Sort – Radix Sort – Bucket Sort.

3. Dynamic Programming and Greedy Algorithms **12**

Matrix Chain multiplication – Elements of Dynamic Programming – Longest Common Subsequence – Optimal Polygon Triangulation – Greedy Algorithms: An Activity Selection Problem – Elements of Greedy Strategy – Huffman Codes – Amortized Analysis – The aggregate Method.

4. Advanced Algorithms **12**

Flow Networks – The Ford-Fulkerson Method – Maximum Bipartite Matching – The Naïve String Matching Algorithm – The Rabin-Karp Algorithm – String Matching With Finite Automata – The Knuth-Morris-Pratt Algorithm – The Boyer-Moore Algorithm.

5. NP-Completeness and Approximation Algorithms **12**

Polynomial Time – Polynomial Time Verification – Np Completeness And Reducibility – Np Completeness Proofs – Np Complete Problems – The Vertex-Cover Problem – The Traveling Salesman Problem – The Set-Covering Problem – The Subset Sum Problem.

TOTAL = 60

Text Books:

1. Thomas H. Corman, Charles E. Leiserson, Ronald L. Rivest, "Introduction to Algorithms", Second Edition, Prentice Hall of India, 2003.

References:

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, "Computer Algorithms", Galgotia Publications Pvt. Ltd., 1999.
2. Donald E.Knuth, " The Art of Computer Programming ", Volume Third, Second Edition, Addison Wesley Publishing Company, 1999.

DISTRIBUTED SYSTEMS

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1. Introduction and Communication 8

Introduction – Middleware – Client-Server Model – Remote Procedure Call – Remote Object Invocation – Message-Oriented Communication –Threads in Distributed Systems – Code Migration.

2. Distributed Operating Systems **12**

Issues in Distributed Operating System – Lamport's Logical Clock –Vector Clock – Causal Ordering – Global States, Election Algorithms –Distributed Mutual Exclusion – Distributed Transactions – Distributed Deadlock – Agreement Protocol – Distributed File Systems.

3. Distributed Shared Memory and Fault Tolerance **9**

Introduction– Data-Centric Consistency Models – Client-Centric Consistency Models – Distribution Protocol – Consistency Protocol – Sequential Consistency and Ivy – Release Consistency and Munin –Introduction to Fault Tolerance – Distributed Commit.

4. Consistency and Replication **8**

Introduction – Data-Centric Consistency Models – Client-Centric Consistency Models – Distribution Protocol – Consistency Protocol – Orca – Causally-Consistent Lazy Replication.

5. Case Studies **8**

Distributed Object-Based System: – CORBA – COM and Globe –Distributed Coordination-based System – TIB/Rendenvous, JINI.

TOTAL = 45

Text Books:

1. George Coulouris, Jean Dollimore, Tim Kindberg "Distributed Systems Concepts and Design", Third Edition, Pearson Education Asia, 2002.
2. Mukesh Singhal, Ohio State University, Columbus, "Advanced Concepts In Operating Systems", McGraw-Hill Series in Computer Science, 1994.

References:

1. A.S.Tanenbaum, M.Van Steen, "Distributed Systems", Pearson Education 2004
2. M.L.Liu, "Distributed Computing Principles and Applications", Pearson, Addision Wesley, 2004.

DIGITAL SIGNAL PROCESSING

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1. Signals Systems **9**

Basic Elements of Digital Signal Processing – Concept of Frequency In Continuous Time And Discrete Time Signals – Sampling Theorem – Discrete Time Signals. Discrete Time Systems – Analysis of Linear Time Invariant Systems – Z Transform – Convolution and Correlation.

2. FFT **9**

Introduction To DFT – Efficient Computation of DFT Properties of DFT – FFT Algorithms – Radix-2 And Radix-4 FFT Algorithms – Decimation in Time – Decimation in Frequency Algorithms – Use of FFT Algorithms in Linear Filtering And Correlation.

3. IIR Filter Design **9**

Structure of IIR – System Design of Discrete Time IIR Filter From Continuous Time Filter – IIR Filter Design By Impulse Invariance – Bilinear Transformation – Approximation Derivatives – Design of IIR Filter In The Frequency Domain.

4. FIR Filter Design **9**

Symmetric and Antisymmetric FIR Filters – Linear Phase Filter – Windowing Technique – Rectangular – Kaiser Windows – Frequency Sampling Techniques – Structure For FIR Systems.

5. Finite Word Length Effects **9**

Quantization Noise – Derivation For Quantization Noise Power – Fixed Point And Binary Floating Point Number Representation – Comparison – Over Flow Error – Truncation Error – Co-Efficient Quantization Error –Limit Cycle Oscillation – Signal Scaling – Analytical Model Of Sample And Hold Operations – Application Of DSP – Model Of Speech Wave Form – Vocoder.

TOTAL = 45

Text Book:

1. John G Proakis, Dimtris G Manolakis, "Digital Signal Processing Principles, Algorithms and Application", Third Edition, Pearson Education, 2000.

References:

1. Sanjit K.Mitra, "Digital Signal Processing – A Computer Base Approach, Tata Mcgraw Hill, 2001.
2. Alan V. Oppenheim, Ronald W. Schafer, John R. Back, "Discrete Time Signal Processing", First Edition, Pearson Education, 2000.
3. Johny R. Johnson, "Introduction to Digital Signal Processing", Prentice Hall, 1989.
4. N. Sarkar, "Elements Of Digital Signal Processing", Second Edition, Khanna Publishers, 2000.
5. Proakis, "A Self-Study Guide for Digital Signal Processing", First Edition, Pearson Education, 2003.
6. Itearchor, "Digital Signal Processing", Second Edition, Pearson Education, 2002.