

R.T.M. NAGPUR UNIVERSITY, NAGPUR
SCHEME FOR M.Sc. (I.T.)

Sr. No.	M.Sc. (I.T.) Part I Semester-1	Teaching Scheme per week (hrs.)			Credits	Examination Scheme					
		Th.	Pr	Total		Duration (Hrs)	Max. Marks		Total Marks	Minimum Passing	
							External Marks	Internal Marks		Th.	Pr.
1	Computer Architecture and Organization	4	-	4	4	3			100	40	
2	Internet Computing With ASP.NET	4	-	4	4	3			100	40	
3	Distributed Operating System	4	-	4	4	3			100	40	
4	Advanced DBMS and Administration	4	-	4	4	3			100	40	
5	Practical-I based on theory paper-1 and 2	-	8	8	4	4	80	20	100	--	40
6	Practical-II based on theory paper-3 and 4	-	8	8	4	4	80	20	100	--	40
7	Seminar			2	1	0.5			25	10	
	Total	16	16	34	25	-			625	170	80

Sr. No.	M.Sc. (I.T.) Part I Semester-2	Teaching Scheme per week (hrs.)			Credits	Examination Scheme					
		Th.	Pr	Total		Duration (Hrs)	Max. Marks		Total Marks	Minimum Passing	
							External Marks	Internal Marks		Th.	Pr.
1	Windows Programming using VC++	4	-	4	4	3			100	40	
2	Theory of Computation and Compiler Construction	4	-	4	4	3			100	40	
3	Network Programming	4	-	4	4	3			100	40	
4	Open source Web Programming using PHP	4	-	4	4	3			100	40	
5	Practical-I based on theory paper-1 and 2	-	8	8	4	4	80	20	100	--	40
6	Practical-II based on theory paper-3 and 4	-	8	8	4	4	80	20	100	--	40
7	Seminar			2	1	0.5			25	10	
	Total	16	16	34	25	-			625	170	80

Sr. No.	M.Sc. (I.T.) Final Semester-3	Teaching Scheme per week (hrs.)			Credits	Examination Scheme					
		Th.	Pr	Total		Duration (Hrs)	Max. Marks		Total Marks	Minimum Passing	
							External Marks	Internal Marks		Th.	Pr.
1	Data Communication and Networks	4	-	4	4	3			100	40	
2	Software Engineering	4	-	4	4	3			100	40	
3	Soft Computing	4	-	4	4	3			100	40	
4	Elective-1 1.1 Distributed Databases 1.2 Object Oriented Analysis and Design using UML 1.3 CORBA	4	-	4	4	3			100	40	
5	Practical-I based on theory paper-1 and 2	-	8	8	4	4	80	20	100	--	40
6	Practical-II based on theory paper-3 and 4	-	8	8	4	4	80	20	100	--	40
7	Seminar			2	1	0.5			25	10	
	Total	16	16	34	25	-			625	170	80

Sr. No.	M.Sc. (I.T.) Final Semester-4	Teaching Scheme per week (hrs.)			Credits	Examination Scheme					
		Th.	Pr	Total		Duration (Hrs)	Max. Marks		Total Marks	Minimum Passing	
							External Marks	Internal Marks		Th.	Pr.
1	Data Warehousing And Data Mining	4	-	4	4	3			100	40	
2	Artificial Intelligence and Expert System	4	-	4	4	3			100	40	
3	Design and Analysis of Algorithms	4	-	4	4	3			100	40	
4	Elective-2 2.1 Cloud Computing 2.2 Mobile Computing 2.3 Enterprise Computing	4	-	4	4	3			100	40	
5	Practical-I based on theory paper-1 to 4	-	8	8	4	4	80	20	100	--	40
6	Project	-	8	8	4	4	80	20	100	--	40
7	Seminar			2	1	0.5			25	10	
	Total	16	16	34	25	-			625	170	80

M.Sc. (I.T.) Part I
Semester -1

Paper I : Computer Architecture and Organization

Hours/Week : 4

Credits : 4

Unit-1 :

Principle of computer design : Software, hardware interaction, layers in computer architecture, central processing and machine language instruction, addressing modes, instruction types, instruction set selection, instruction and execution cycle.

Unit-2 :

Control Unit : Data path and control path design, microprogramming v/s hardwired control, pipelining in CPU design, RISC v/s CISC, superscalar processors.

Unit-3 :

Memory subsystem : Storage technologies, memory array organization, memory hierarchy, interleaving , cache memory and virtual memory including architectural aids to implement these.

Unit-4 :

Input/ Output Processing : Bus Interface, Data transfer techniques, I/O interrupts and channels,. Performance evaluation : SPECmarks , Transaction Processing Benchmarks.

Books :

1. Computer Architecture and Organization by Tenenbaum
2. Computer Architecture and Organization by J. P. Hayes.
3. Parallel Processing by Hwang

Paper II : Internet Computing with ASP.NET

Hours/Week : 4

Credits : 4

Unit-1 :

HTML Basics: Introduction to Internet, Applications, Web designing, web browser, web pages, home page, web site, web servers, www. Concepts of hypertext, hypermedia, versions of HTML, elements of HTML, syntax, sections of HTML, building & executing html documents, Various tags of HTML: Headings & Title, Text-level elements, Changing Colors font, size using FONT> Tag, Text alignment & paragraph Creating links with <A Href> tag, Inserting image using tag, Creating Table with <TABLE> tag, rowspan, colspan attributes. <FRAMESET> & <FRAME> tag, <FORM> tag, creating text boxes, buttons, checkboxes, radio buttons, hidden control, password, lists & dropdown list, textarea. Submitting a form, get & post method. ASP & HTML forms. Working with Cascading Style Sheet (CSS):

Unit-2 :

ASP.NET Controls: Overview of dynamic web page, introduction & features of ASP.NET, understanding ASP.NET controls, applications, web servers, installation of IIS. Web fors, web form controls, server controls, client controls, adding controls to web form, buttons, text box, labels, checkbox, radio buttons, list box. Adding controls a runtime, Running a web application, creating a multiform web project, Form validation: client side and server side validation, Validation controls: required field comparison range, Calendar control, Ad rotator control, Internet Explorer control.

Unit-3 :

ADO.NET: Overview of ADO.NET, from ADO to ADO.NET, ADO.NET architecture, Accessing data using data adapters and datasets, using command and data reader, binding data to data bind controls, displaying data in data grid.

XML in .NET: XML basics, attributes, fundamentals of XML classes: Document, text writer, text reader, XML validations, XML in ADO.NET, Data document

Unit-4 :

Web Services: Introduction, State management, view state, session state, application state, service description language, building & consuming a web service. Web application development, Caching, Threading concepts, Creating threads in .NET, Managing threads, Thread Synchronization, features of .NET, role based security & code access security, permissions

Books :

1. The Completer Reference ASP.NET – Mathew Macdonald (TMH)
2. Professional ASP.NET – Wrox publication
3. Learn HTML in a weekend – Steven E. Callihan (TMH)

Reference Books:

1. VB.NET Programming Black Book – Steven Holzner (Dreamtech pub.)
2. Introduction to .NET framework – Wrox publication.
3. ASP.NET Unleashed - bpb publication.
4. Using HTML – Lee Anne Philips (PHI)

Paper III : Distributed Operating System

Hours/Week : 4

Credits : 4

Unit-1 :

Fundamentals Introduction to Distributed Computing System, Distributed Computing system model, Advantages of Distributed computing System, Introduction to Distributed Operating System, Introduction to Distributed Computing Environment

Unit-2 :

Message Passing Introduction, Characteristics of Good message passing system, Issues in IPC by message passing Synchronization, Buffering, Multidatagram messages, Encoding and Decoding of message data, process addressing, Failure handling, Group Communication.

Unit-3 :

Remote Process Calls (RPC) Introduction, RPC Model, Implementing RPC Mechanism, Stub generation, RPC messages, Types of RPC's Marshaling arguments and results, Server Management, Call semantics, Communication Protocols for RPC's Client-Server Binding, Exception handling Security.

Unit-4 :

Distributed Shared Memory (DSM), Introduction Resource and Process Management, Characteristics of good global Scheduling algorithm, Various approaches for resource management, Process migration, Threads, Clock synchronization, Event ordering, Mutual Exclusion, Deadlock, Election algorithm.

Books:

1. Distributed Operating system, Sinha, PHI Publication.

Paper IV : Advanced DBMS and Administration

Hours/Week : 4

Credits : 4

Unit-1 :

Relational Database design: Functional dependencies, and Normalization Normal forms based on primary keys (1 NF, 2 NF, 3 NF, BCNF, 4 NF, 5 NF) Loss less joins and dependency preserving decomposition Query Processing: Query Processing Stages, Query Interpretation, Equivalence of Expressions, Query Resource Utilization, Query Execution Statistics, Query Execution Plan, Estimation of Query Processing Cost, Table Scan, Sample Index Access, Fill Factor, Multiple Index Access, Methods for Joining Tables (Nested Loop, Merge Join, Hybrid Join, Multiple Join) Structure of a Query Optimizer

Unit-2 :

Transaction Processing & Concurrency Control: Concept and definition of transaction, ACID properties, serializability, Prioritization, states of transaction, Types of failure, desirable properties of transaction schedules and recoverability, serial usability of schedules, levels of transaction consistency, deadlocks, long duration transactions, transaction performance, transaction processing as implemented in contemporary database, management system. Concurrency Control, locking techniques, techniques based on time-stamp ordering, multiple granularity. Crash Recovery: failure classification, recovery concepts, database backup, recovery concepts based on deferred update and on immediate update. Shadow paging, check points, on-line backup during database updates, crash recovery techniques.

Client/Server database: Evolution of client concept, Client/Server environment, characterization of Client/Server computing. Functions of clients server , application partitioning, the two-layer and three-layer architectures, communication between clients and servers.

Unit-3 :

Oracle Database Architecture and Administration: Oracle database architecture, Design, Creation, Migration and Management of Oracle Databases and related database schemes, Data Dictionary views and standard package Maintaining the control, Redo Log files, Managing Tablespaces and Data Files, Storage structure and relationships, Managing rollback segment, Managing tables, Indexes, Managing data Integrity, Managing password security and resources, Managing users, Privileges, roles.

Oracle Backup and Recovery Strategies: Backup and recovery considerations, Oracle recovery structure and processes, Oracle backup and recovery configuration, Physical backup, Complete recovery of an Oracle database, Incomplete recovery of an Oracle database with Archiving, Oracle Export / Import utilities, Oracle standby database.

Unit-4 :

Oracle Tuning and Troubleshooting: Oracle performance tuning methodology, Oracle alert and trace files, Tuning the shared pool, Buffer Cache, Redo Log buffer, Database configuration and I/O issues, Using Oracle Blocks efficiently, Optimizing sort operations, Rollback segment tuning, Monitoring and detecting lock contention, SQL issues and tuning considerations for different application. Integrity, Security: Need for Database Integrity, Integrity Constraints, Non-Procedural and Procedural Integrity Constraints Specifications in SQL, Introduction to Database Security issues, Authorization and use.

Books :

1. Fundamental of Database Systems by R. Elmasri; S. Navate; Benjamin Cummings;
2. Introduction to database systems by C. J .Date
3. Database system concept by Korth
- 4 .DBA Handbook oracle press by Loney

Reference Books:

1. Principles of Database Management by James Martin
2. Relational database design for Micro computers Application by Prentice Hall (Jackson)
3. Database Management Systems by Bipin Desai

M.Sc. (I.T.) Part I
Semester -2

Paper I : Windows Programming using VC++

Hours/Week : 4

Credits : 4

Unit-1 :

Windows, Visual C++, Application Frameworks Fundamentals and MFC Libraries View Class.

Introduction, MFC, ATL and WFC, Windows Programming Model, Components, Application Framework, MFC Library, Event Handling, Mapping Modes and Scrolling Views, Graphic Device Interface, Colors and Fonts, Modal Dialog and Windows Common Control, Modeless Dialog and Windows Common Dialog, ActiveX Controls and Internet Explorer Common Controls, Win32 Memory Management, Bitmaps, Message Processing and Multithreaded Programming.

Unit-2 :

Document View Architecture : Menus, Keyboard Accelerators, Rich Edit Control and Property Sheets, Tool bar and Status Bars, Reusable Frame Window Base Class, Separating the Documents from its View, Reading and Writing Documents- SDI applications, MDI applications, Printing and Print Preview, Splitter Windows and Multiple Views, Context-Sensitive Help, DLL's, MFC Programs without Documents or View Classes

Unit-3 :

Active X: COM, Automation and OLE : Component Object Model, Automation, Uniform Data Transfer- Clipboard Transfer and OLE, Drag and Drop, Structured Storage, OLE Embedded Components and Containers, Introducing the Active Template Library, ATL and ActiveX Controls.

Unit-4 :

Database Management: Database Management with Microsoft ODBC, Database Management with Microsoft Data Access Objects, OLE DB Templates.

Programming for the Internet: TCP/IP, Winsock, WinInet, Programming the Microsoft Internet Information Server, ActiveX document Servers and the Internet, Introducing the Dynamic HTML, Visual C++ for Windows CE.

Books :

1. Programming Microsoft Visual C++ by D. J. Kruglilski, G Shepherd and Scot Wingo
Publication : Microsoft Press Fifth Edition.

Reference Books:

1. Visual C++ 6 From The Ground Up: Mueller: TMH Publication
2. VC++ 6 The Complete Reference: Pappas, TMH Publication

Paper II : Theory of Computation and Compiler Construction

Hours/Week : 4

Credits : 4

Unit-1 :

Finite Automation and Regular Expression : Finite State systems, Basic Definitions, Non - deterministic finite Automata, Finite Automata with moves, Regular Expressions, Two way finite automata, Finite automata with output, Application on Finite Automata.

Properties of Regular Sets : The pumping lemma for Regular Sets, Close properties of Regular sets, Decision Algorithms for Regular Sets.

Context Free Grammars : Motivation and Introduction, Context Free Grammar, Derivation Tree, Simplification of context Free Grammars, Chomsky Normal form, Greibach normal form, The existence of inherently ambiguous context free languages.

Properties of Context free languages : The pumping lemma for CFL's , Closure properties of CFL's, Decision Algorithm for CFL's

Unit-2 :

Push Down Automata : Informal description, Definitions, Push – Down Automata & Context free languages.

Turing Machine : Introduction, The Turing Machine Model, Computable languages and functions , Techniques Turing Machine construction, Modification of Turing Machines, Church's Hypothesis, Turing Machine as enumerators, Restricted Turing Machine equivalent to the basic model. Undecidability : Problems, properties of recursive and recursively enumerable problem, Turing Machine and undecidable problem, Rice theorem, Tool for proving CFL undecidable, Greibach's Theorem.

The Chomsky : Regular Grammars, Unrestricted Grammars, Context – Sensitive languages, Relation between classes of languages.

Unit-3 :

Introduction to Compilers :

Compilers and translators, need, the structure of a compiler, Lexical Analysis, Syntax analysis, Intermediate code Generation, Optimization, Code Generation, Book keeping, Error Handling, Compiler writing tools. Basic parsing Techniques: Parsers, Shift-reduce parsing, Operator precedence parsing, Top-down parsing, predictive parsers, automatic construction of efficient parsers : LR parsers the canonical collection of LR (O) items, constructing SLR parsing tables, constructing LALR parsing tables, Ambiguous grammar.

Unit-4 :

Syntax directed translation : syntax directed translation schemes, implementation, intermediate code, postfix notation, parse tree and syntax trees, three- address code, quadruple, triple, translation of Symbol Table: Data Structure, Representation of Scope Information, Code Optimization: The principal source optimization, Loop optimization, The DAG Representation of basic blocks, Value number and algebraic laws, Global data-flow analysis. Code Generation : Object Programmers Problems in code generation, A machine model, a simple code generator, Register Allocation and assignment, Code Generation from DAG's Peephole Optimization.

Books :

1. Introduction to Automata Theory, Languages and Computation: John E. Hopcroft & Jeffrey D. Ullman.
2. Compilers Principles, Techniques and Tools Aho, Ullman, Ravi Sethi, Pearson Education.
3. Theory of Computer Science : E. V. Krishnamoorthy.
4. Theory of computer Science : K. L. P. Mishra.

Reference Books:

1. D. I. A. Cohen : Introduction to Computer Theory (JW)
2. H. R. Lewis & C. H. Papadimitriou : Elements of Theory Of Computation (PHI)
3. J. Carroll and D. Long : Theory of Finite Automata (PHI)
4. M. Davis & Weyukur : Computability, Complexity & Languages.
5. M. Machtey & P. R. Young : An introduction to General Theory of Algorithm (Elsevier).
6. Zivohavi : Switching and Finite Automata Theory (TMH).

Paper III : Network Programming

Hours/Week : 4

Credits : 4

Unit-1 :

Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

Sockets : Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

Unit-2 :

TCP client server : Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.

I/O Multiplexing and socket options: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options.

Unit-3 :

Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP.

Elementary name and Address conversions: DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

Unit-4 :

IPC : Introduction, File and record locking, Pipes, FIFOs streams and messages, Name spaces, system IPC, Message queues, Semaphores.

Remote Login: Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, rlogin Overview, RPC Transparency Issues.

Books :

1. UNIX Network Programming, Vol. I, Sockets API, 2nd Edition. - W.Richard Stevens, Pearson Edn. Asia.
2. UNIX Network Programming, 1st Edition, - W.Richard Stevens. PHI.

Reference Books:

1. UNIX Systems Programming using C++ T CHAN, PHI.
2. UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education
3. Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education

Paper IV : Open source Web Programming using PHP

Hours/Week : 4

Credits : 4

Unit-1 :

Introduction to PHP: What Does PHP Do, A Brief History of PHP, Installing PHP, A Walk Through PHP Language Basics: Lexical Structure, Data Types, Variables, Expressions and Operators, Flow-Control Statements, Including Code, Embedding PHP in Web Pages, Installing and Configuring PHP on Windows and Linux Platforms

Unit-2 :

Functions: Calling a Function, Defining a Function, Variable Scope, Function Parameters, Return Values, Variable Functions, Anonymous Functions, Strings: Quoting String Constants, Printing Strings, Accessing Individual Characters, Cleaning Strings, Encoding and Escaping, Comparing Strings, Manipulating and Searching Strings, Regular Expressions, POSIX-Style Regular Expressions, Perl-Compatible Regular Expressions, **Arrays:** Indexed Versus Associative Arrays, Identifying Elements of an Array, Storing Data in Arrays, Multidimensional Arrays, Extracting Multiple Values, Converting Between Arrays and Variables, Traversing Arrays, Sorting, Acting on Entire Arrays, Using Arrays

Unit-3 :

Classes and Objects: Terminology, Creating an Object, Accessing Properties and Methods, Declaring a Class, Introspection, Serialization, Web Techniques: HTTP Basics, Variables, Server Variables, Server Information, Processing Forms, Setting Response Headers, Session, cookies, files, Maintaining State, SSL, Using PHP to Access a Database: Relational Databases and SQL, Mysql database Basics, Advanced Database Techniques

Unit-4 :

Graphics: Embedding an Image in a Page, The GD Extension, Basic Graphics Concepts, Creating and Drawing Images, Images with Text, Dynamically Generated Buttons, Scaling Images, Color Handling, **PDF:** PDF Extensions, Documents and Pages, Text, Images and Graphics, Navigation, Other PDF Features

XML : Lightning Guide to XML, Generating XML, Parsing XML, Transforming XML with XSLT, Web Services, **Security:** Global Variables and Form Data, Filenames, File Uploads, File Permissions, Concealing PHP Libraries, PHP Code, Shell Commands, Security Redux, Application Techniques, Code Libraries, Templating Systems, Handling Output, Error Handling, Performance Tuning.

Books :

1. PHP 5.1 for beginners by Evan Bayross and Sharman Shah, SPD Publications
2. Programming PHP by Rasmus Lerdorf and Kevin Tatroe, Orilly Publications

**M.Sc. (I.T.) Final
Semester -3**

Paper I : Data Communication and Network

Hours/Week : 4

Credits : 4

Unit-1 :

Introduction: Network structure and architectures and services OSI reference model.

The Physical Layer: theoretical basis for data communication, transmission media. Analog Transmission, Digital Transmission, Transmission and Switching, ISDN.

The Data Link Layer: Design issues, Error detection and correction, Elementary data link protocols, sliding window protocol, protocols performance, protocols specification and verification. Examples of the Data link layer.

Network Layer: Design issues, routing algorithms, Congestion control algorithms, Internet working, Examples of the network layer.

Unit-2 :

The Transport Layer: Design issues, Connection Management.

The session layer: Design issues and remote procedure call.

The Presentation Layer: Design issues, data compression techniques, cryptography.

The Application Layer: Design issues, file transfer, access and management, virtual terminals.

Unit-3 :

Network Security Fundamentals: Introduction, security Vulnerabilities and Threats, Classification of Security Services.

Cryptography: Encryption principles, Conventional Encryption DES, IDEA, Algorithms, CBC, Location of Encryption Devices key Distribution.

Unit-4 :

Message Digests and Checksums, Message Authentication, Message Digests, Hash Functions and SHA, CRCs. Public key Systems: RSA Diffie-Hellman, DSS, Key Management.

Intruders: Intrusion Techniques, Intrusion Detection, Authentication, Password- Based Authentication, Address- Based Authentication, Certificates, Authentication Services, Email Security, Firewalls, Design Principles, Packet Filtering, Access Control, Trusted Systems, Monitoring and Management.

Books :

1. Computer Networks – Andrew S Tanenbum (PHI)
2. Network Security and Essentials: Application and standers
3. Willam Stalling – Pearson Education.
4. Cryptography and network security
5. Willam Stalling – Pearson Education.

Reference Books:

1. Internet Security: Timspeed, Juanita Ellis, Digital Press Publication
2. Internet Security: Jan L. Harington, Morgan Kaufmann Publication
3. Firewall Network System: John R. Vacca, Scott R. Ellis, Digital Press
4. Network Algoritm, George Varghese, Morgan Kaufmann Publication
5. TCP/IP Addressing: Buck Graham, Morgan Kaufmann Publication
6. Data Communication and Networking: Behrouz A. Forouzan, TMH.

Paper II : Software Engineering

Hours/Week : 4

Credits : 4

Unit-1 :

Introduction to Software Engineering : The evolving role of software, Changing Nature of Software, Software myths.

A Generic view of process : Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models : The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

Software Requirements : Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Unit-2 :

Requirements engineering process : Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models : Context Models, Behavioral models, Data models, Object models, structured methods. Modeling with UML .

Design Engineering : Design process and Design quality, Design concepts, the design model.

Creating an architectural design : Software architecture, Data design, Architectural styles and patterns, Architectural Design.

Unit-3 :

Object-Oriented Design : Objects and object classes, An Object-Oriented design process, Design evolution. Performing User interface design : Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

Testing Strategies : A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging. Product metrics : Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Unit-4 :

Metrics for Process and Products : Software Measurement, Metrics for software quality.

Risk management : Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management : Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

Books :

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition. McGrawHill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson education.

Reference Books:

1. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
3. Systems Analysis and Design- Shely Cashman Rosenblatt, Thomson Publications.
4. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.

Paper III : Soft Computing

Hours/Week : 4

Credits : 4

Unit-1 :Introduction

Introduction of soft computing, soft computing vs hard computing. Soft computing techniques. Computational Intelligence and applications, problem space and searching: Graph searching, different searching algorithms like breadth first search, depth first search techniques, heuristic searching Techniques like Best first Search, A* algorithm, AO* Algorithms. Game Playing: Minimax search procedure, adding alpha-beta cutoffs, additional refinements, Iterative deepening, Statistical Reasoning: Probability and Bayes theorem, Certainty factors and Rules based systems, Bayesian Networks, Dempster Shafer theorem

Unit-2 : Neural Network

Neural Network: Introduction, Biological neural network: Structure of a brain, Learning methodologies. Artificial Neural Network(ANN): Evolution of, Basic neuron modeling , Difference between ANN and human brain, characteristics, McCulloch-Pitts neuron models, Learning (Supervised & Unsupervised) and activation function, Architecture, Models, Hebbian learning , Single layer Perceptron, Perceptron learning, Windrow-Hoff/ Delta learning rule, winner take all , linear Separability, Multilayer Perceptron, Adaline, Madaline, different activation functions Back propagation network, derivation of EBPA, momentum, limitation, Applications of Neural network.

Unit-3 :

Unsupervised learning

Unsupervised learning in Neural Network: Counter propagation network, architecture, functioning & characteristics of counter Propagation network, Associative memory, hope field network and Bidirectional associative memory. Adaptive Resonance Theory: Architecture, classifications, Implementation and training. Introduction to Support Vector machine, architecture and algorithms, Introduction to Kohanan's Self organization map, architecture and algorithms

Unit-4 :Fuzzy systems

Fuzzy systems: Introduction, Need, classical sets (crisp sets) and operations on classical sets Interval Arithmetics ,Fuzzy set theory and operations, Fuzzy set versus crisp set, Crisp relation & fuzzy relations, Membership functions, Fuzzy rule base system : fuzzy propositions, formation, decomposition & aggregation of fuzzy rules, fuzzy reasoning, fuzzy inference systems, fuzzy decision making & Applications of fuzzy logic, fuzzification and defuzzification. Fuzzy associative memory. Fuzzy Logic Theory, Modeling & Control Systems

Books :

1. S.N. Shivnandam, "Principle of soft computing", Wiley India.
2. David Poole, Alan Mackworth "Computational Intelligence: A logical Approach" Oxford.
3. Russell & Yuhui, "Computational Intelligence: Concepts to Implementations", Elsevier.
4. Eiben and Smith "Introduction to Evolutionary Computing" Springer
5. Janga Reddy Manne; "Swarm Intelligence and Evolutionary Computing"; Lap Lambert Academic Publishing
6. E. Sanchez, T. Shibata, and L. A. Zadeh, Eds., "Genetic Algorithms and Fuzzy Logic Systems: Soft Computing Perspectives, Advances in Fuzzy Systems - Applications and Theory", Vol. 7, River Edge, World Scientific, 1997.

**Paper IV :
Elective-1**

Paper 1.1 : Distributed Databases

Hours/Week : 4

Credits : 4

Unit-1 :

Features of Distributed versus Centralized Databases, Principles Of Distributed Databases, Levels Of Distribution Transparency, Reference Architecture for Distributed Databases , Types of Data Fragmentation, Integrity Constraints in Distributed Databases
Translation of Global Queries to Fragment Queries, Equivalence Transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries

Unit-2 :

Optimization of Access Strategies, A Framework for Query Optimization, Join Queries, General Queries The Management of Distributed Transactions, A Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions

Unit-3 :

Concurrency Control, Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control. Reliability, Basic Concepts, Nonblocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints and Cold Restart, Distributed Database Administration, Catalog Management in Distributed Databases, Authorization and Protection

Unit-4 :

Architectural Issues, Alternative Client/Server Architectures, Cache Consistency Object Management, Object Identifier Management, Pointer Swizzling, Object Migration, Distributed Object Storage, Object Query Processing, Object Query Processor Architectures, Query Processing Issues, Query Execution , Transaction Management, Transaction Management in Object DBMSs , Transactions as Objects
Database Integration, Scheme Translation, Scheme Integration, Query Processing Query Processing Layers in Distributed Multi-DBMSs, Query Optimization Issues Transaction Management Transaction and Computation Model Multidatabase Concurrency Control, Multidatabase Recovery, Object Orientation And Interoperability Object Management Architecture CORBA and Database Interoperability Distributed Component Model COM/OLE and Database Interoperability, PUSH-Based Technologies

Books :

1. Distributed Database Principles & Systems, Stefano Ceri, Giuseppe Pelagatti McGraw-Hill
2. Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez - Pearson Education

**Paper IV :
Elective-1**

Paper 1.2 : Object Oriented Analysis and Design using UML

Hours/Week : 4

Credits : 4

Unit-1 :

Introduction: Two views of software Developments: SSAD and OOAD, Why Object – Orientation? Object and classes, Abstraction and encapsulation, Methods and Message, Interfaces, Inheritance and Polymorphism, Access Control, The Business case for OO Developments.

Object Oriented Methodologies: Object Oriented Design – Booch, Object Modeling Techniques- Rumbaugh, Object – Oriented Analysis – Coad- Yourdan, Object – Oriented Software Engineering – Ivar Jacobson,

Unit-2 :

Unified Approach: Diagramming and Notational Techniques using the UML, UML Notation, {Analysis Diagramming Techniques.} == Introduction to all (ten) Diagram, {Design Diagramming Techniques}, Generalization / Specialization., Aggregation and composition, Association , Cardinality, Navigability, Icons , relationships and adornments.

Object-Oriented Systems Development Process: Rational Unified Process, Four Major phases: Inception , Elaboration, Construction, Transition, Requirements Engineering: Problem analysis, Understanding Stockholders need, Type of requirements, Use-case Model : Writing Requirements

Unit-3 :

Analysis: Behavioral Analysis, Domain Analysis or Business Object Analysis, Use-case Driven Object Oriented analysis : The UML approach., Develop use-case Model, Use-case Description, Documentation, Activity Diagram, Identify the classes., Introduction to different approaches for identifying classes, “Noun Phrase” approach OR ,“Conman Class Pattern” approach Or , “CRC” approach Or, Usecase Driven Approach. Containment and Composition, Aggregation, Inheritance , Sub Types and IS-A Hierarchies, Association and Link Relationships., Diagramming System Events.

Unit-4 :

Design Phases: Translating Analysis Concept into Design, Optimizing classes and Objects: The Multi-tiered Architecture View, ,Mapping System functions to objects., Object to Object Visibility, Collaboration Diagram, Sequential Diagram, Specification Class Diagram, Specifying Object Interfaces, Designing the Data Access layer, Design User Interface layer, Designing System Interfaces, Controls and Security. **Design Refinement** Designing for Extensibility, Design for reusability, Portioning class space, hecking Completeness and correctness. **Persistent Object and Database Issues:** The Cood Data Management Domain, Object Persistence, Object-oriented Database Management System, Object- Oriented verses Relational Database, Mapping object to Relational Data structure. **Testing:** Introduction to Testing Strategies, Impact of Object Orientation on Testing. Testing Business Process, Design Matrix, Discovering reusable pattern.

Books :

1. Object Oriented Analysis and Design with Applications, Grady Booch., Benjamin / Cummings , 1994.
2. Object –Oriented Modeling and Design. – J Rumbaugh , M Blaha , W .Premerlani
3. Principles of Object- Oriented Software Development , Anton Eliens , Addison Wesley.
4. Applying UML And Pattern - Craig Larman Pearson Education INC
5. UML Distilled - Martin flowler Pearson Education INC

Reference Books:

1. Object Oriented System Development - Ali Bahrami . McGRAW-HILL International Edition.
2. Object-Oriented Software Engineering – Ivar Jacobson Pearson Education INC
3. The Unified Modeling Language User Guide – Grade Booch, James Rumbaugh , Ivar Jacobson. Pearson Education INC
4. The Unified Modeling Language Reference Guide – Grade Booch, James Rumbaugh , Ivar Jacobson. Pearson Education INC
5. Design Object- Oriented Software - Rebecea Wrifs- Brock. Brian Wilkerson, Lauren Wiener ,
6. Object Oriented Analysis and Design – Bennett , Simon McGraw Hill.
7. Designing Flexible Object Oriented System with UML – Charless Richter Techmedia
8. Instant UML – Muller – Apress LP
9. UML Instant – Thomas A Pendar – Wiley Publication
10. UML in Nutshell

**Paper IV :
Elective-1**

Paper 1.3 : CORBA

**Hours/Week : 4
Credits : 4**

Unit-1 :

Introduction of CORBA, Distributed Objects, CORBA Components, Object Management Architecture, CORBA Services, CORBA Business objects. Object Web reference CORBA, CORBA and Java objects, CORBA Java/ IDL Mapping.

Unit-2:

Static CORBA, Mapping CORBA IDL to Java, ORBlets and Applets, CORBA-enabled Applet, Java ORB and C++ ORB. Dynamic CORBA: CORBA Naming services, CORBA Object naming. Client/ Server naming scenario, creating namespace, finding objects.

Unit-3 :

Dynamic Invocations, Dynamic Invocation interfaces, CORBA Case studies with a) Socket vs CORBA/ Java ORB, Java sockets, java streams, Datagram socket, buffered socket, Data stream socket, b) HTTP/CGI versus CORBA/Java ORB, c) Servlet versus CORBA/Java ORB, d)RMI versus CORBA/Java ORB.

Unit-4 :

DOM versus CORBA/ Java ORB: Looking DCOM through CORBA, DCOM style interfaces, DCOM and Java, CORBA Initialization interfaces, Server side of CORBA: CORBA::BOA interface, CORBA::POA interface, Object activation, POA Interfaces, Metadata: CORBA IDL, CORBA interface repository, CORBA IDL to Java
Mapping: CORBA Modules, Exceptions, Parameter and Holder Classes, Helper Classes, AttributeCORBA constant, CORBA Primitive types, CORBA Constructed types, interfaces, sequences, arrays, structures, enums, unions, typedefs, CORBA Serverside mapping: Inheritance, Delegations, CORBA pseudo objects: CORBA::ORB mapping, CORBA::Object mapping, CORBA::NamedValue Mapping, CORBA::NVList Mapping, CORBA::Request Mapping, CORBA:: ServerRequest and DSI mapping, CORBA::TypeCodes

Books :

1. Client /Server Programming with Java and CORBA (Paperback) by Dan Harkey and Robert Orfali, John Wiley and Sons
2. Advance CORBA Programming with C++ by Michi Henning, Addison Wesley Professional Computing Series

**M.Sc. (I.T.) Final
Semester -4**

Paper I : Data Warehousing And Data Mining

Hours/Week : 4

Credits : 4

Unit-1 :

Introduction : Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining.

Data Preprocessing : Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining.

Unit-2 :

Data Mining Primitives, Languages, and System Architectures : Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on a Data Mining Query Language Architectures of Data Mining Systems.

Concepts Description : Characterization and Comparison : Data Generalization and Summarization- Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.

Unit-3 :

Mining Association Rules in Large Databases : Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

Classification and Prediction : Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Backpropagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction, Classifier Accuracy.

Unit-4 :

Cluster Analysis Introduction : Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

Mining Complex Types of Data : Multidimensional Analysis and Descriptive Mining of Complex, Data Objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Time-Series and Sequence Data, Mining Text Databases, Mining the World Wide Web.

Books :

1. Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber
Harcourt India.

Reference Books:

1. Data Mining Introductory and advanced topics –Margaret H Dunham, Pearson Education
2. Data Mining Techniques – Arun K Pujari, University Press.
3. Data Warehousing in the Real World – Sam Anahory & Dennis Murray. Pearson Edn Asia.
- 4 Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley Student Edition.
5. The Data Warehouse Life cycle Tool kit – Ralph Kimball Wiley Student Edition.

Paper II : Artificial Intelligence & Expert System

Hours/Week :4

Credits : 4

Unit-1 :

AI problems, AI Techniques, Tic-tac-toe, Question Answering, Problem as a state space search, A water jug problem, production system, Control strategies, Heuristic Search, Problem Characteristics, Production system characteristics, Design of search programs
AI Search techniques :- Depth-first, Breadth-first search, Generate-and-test, Hill climbing, Best-frist search, Constraint satisfaction, Mean-ends-analysis, A* Algorithm, AO* algorithm.

Unit-2 :

Knowledge Representation:- Representations and mappings, Knowledge Representations, Issues in Knowledge Representation, Predicate Logic:- Representing Instance and Isa Relationships, Computable Functions and predicates, Resolution, Natural Deduction, Logic programming, Forward versus Backward Reasoning, Matching, Control knowledge, Expert System.

Unit-3 :

Games playing : Minimax search procedure , adding alpha-beta cutoffs, additional refinements,
Planning :- Component of a planning system, Goal task planning, Nonlinear planning, Hierarchical Planning.

Unit-4 :

Understanding, Understanding as Constraint satisfaction, Natural Language Processing, Syntactic Processing, Unification grammars, Semantic Analysis, Introduction to pattern recognition, Parallel and Distributed AI, Psychological Modeling, Distributed Reasoning Systems,

Books :

1. Artificial Intelligence by Elaine Rich, Mcgrawhill Inc.
2. Artificial Intelligence and Expert Systems – Jankiraman, Sarukes (M)

Reference Books:

1. Expert System : Theory and Practice- Ermine (PHI)
2. Lisp Programming – Rajeo Sangal – (TMH)
3. Rule based Expert System – M.Sasikumar (Narosa)
4. Artificial intelligence – Russell-Pearson- Ist Text book.
5. Principles of AI- Nils Nilson
6. A.I. by R.J.Winston - Pearson
7. ES : Theory and Practice- Ermine – PHI.
8. Int. ti Expert System – Jackson – Pearson.

Paper III : Design and Analysis of Algorithm

Hours/Week : 4

Credits : 4

Unit-1 :

Elementary Algorithmics: Introduction- Problems and Instances- The Efficiency of algorithms- Average and worst case Analysis. Asymptotic Notation: A notation for the order of – Other asymptotic notation- Conditional asymptotic notation- Asymptotic notation with several parameters- Operations on asymptotic notation.

Analysis of Algorithms: Introduction- Analyzing control structures- Average case analysis- Amortized Analysis- Solving recurrences.

Unit-2 :

Greedy Algorithms: Making change- General Characteristics of Greedy algorithms- Minimum spanning trees and shortest paths- Knapsack Problems- Scheduling.

Divide and Conquer: Introduction- Multiplying large numbers- The general template- binary search- sorting- Finding the median- Matrix multiplication- Introduction to cryptography.

Unit-3 :

Dynamic Programming: The Principle of Optimality- making change the knapsack problem- shortest paths- Chained matrix multiplication- approaches using recursion- Memory functions.

Unit-4 :

Back tracking & Branch Bound: Traversing trees- Depth first search of directed and undirected graph- Breadth first search- Back tracking- Branch and bound- The minimax principle, Introduction to NP- Completeness; Classes P and NP- Polynomial reductions- NP- Complete Problems NP- Hard problems- Non- Deterministic algorithms.

Books :

1. Fundamentals of Algorithms - Gilles Brassard & Paul Bratley. Prentice-Hall (India)Ltd.

Reference Books:

1. Fundamentals of Computer Algorithms by Ellis Horowitz & Sartaj Sahani. Galgotia Publication.
2. Computer Algorithms: Introduction to Design & Analysis. Sara Baase & Alien Van Gelder. Addison Wesley Publishing Company.

**Paper IV :
Elective-2**

Paper 2.1 : Cloud Computing

Hours/Week : 4

Credits : 4

Unit-1 :

Introduction to Cloud Computing, The Evolution of Cloud Computing, Hardware Evolution, Internet Software Evolution, Server Virtualization, Web Services Deliver from the Cloud, Communication-as-a-Service, Infrastructure-as-a-Service, Monitoring-as-a-Service, Platform-as-a-Service, Software-as-a-Service, Building Cloud Network

Unit-2 :

Federation in the Cloud, Presence in the Cloud, Privacy and its Relation to Cloud-Based Information Systems, Security in the Cloud, Common Standards in the Cloud, End-User Access to the Cloud Computing

Unit-3 :

Introduction, Advancing towards a Utility Model, Evolving IT infrastructure, Evolving Software Applications, Continuum of Utilities, Standards and Working Groups, Standards Bodies and Working Groups, Service Oriented Architecture, Business Process Execution Language, Interoperability Standards for Data Center Management, Utility Computing Technology, Virtualization, Hyper Threading, Blade Servers, Automated Provisioning, Policy Based Automation, Application Management, Evaluating Utility Management Technology, Virtual Test and development Environment, Data Center Challenges and Solutions, Automating the Data Center

Unit-4 :

Software Utility Application Architecture, Characteristics of an SaaS, Software Utility Applications, Cost Versus Value, Software Application Services Framework, Common Enablers, Conceptual view to Reality, Business Profits, - Implementing Database Systems for Multitenant Architecture

Books:

1. John W. Rittinghouse and James F. Ransome, "Cloud Computing Implementation, Management and Security", 2010, CRC Press, Taylor & Francis Group, Boca Raton London New York. [Unit -11 and Unit II]
2. Alfredo Mendoza, "Utility Computing Technologies, Standards, and Strategies", Artech House INC, 2007. [Unit -11I to Unit V]
3. Bunker and Darren Thomson, "Delivering Utility Computing", 2006, John Wiley & Sons Ltd.
4. George Reese, "Cloud Application Architectures", O'Reilly Publications, 2009.

**Paper IV :
Elective-2**

Paper 2.2 : Mobile Computing

Hours/Week : 4

Credits : 4

Unit-1 :

Mobile Communications: An Overview: Mobile Communication, Mobile Computing, Mobile Computing Architecture, Mobile Devices, Mobile System Networks, Data Dissemination, Mobility Management, Security Mobile Devices and Systems: Mobile Phones, Digital Music Players, Handheld Pocket Computers, Handheld Devices: Operating Systems, Smart Systems, Limitations of Mobile Devices, Automotive Systems GSM and Similar Architectures: GSM-Services and System, Architecture, Radio Interfaces, Protocols, Localization, Calling Handover, Security, New Data Services, General Packet Radio Service, High-speed Circuit Switched Data, DECT

Unit-2 :

Wireless Medium Access Control and CDMA based Communication: Medium Access Control, Introduction to CDMA-based Systems, Spread Spectrum in CDMA Systems, Coding Methods in CDMA, IS-95 cdmaOne System, IMT- 2000i - mode , OFDM , Mobile IP Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunnelling and Encapsulation Route Optimization, Dynamic Host Configuration Protocol, Mobile Transport Layer, Conventional TCP/IP Transport, Layer Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Methods of TCP-layer Transmission for Mobile Networks, TCP Over 2.5G/3G Mobile Networks

Unit-3 :

Databases: Database Hoarding Techniques, Data Caching, Client-Server Computing and Adaptation, Transactional Models, Query Processing, Data Recovery Process, Issues relating to Quality of Service, Data Dissemination and Broadcasting Systems: Communication Asymmetry, Classification of Data-Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Techniques, Digital Audio Broadcasting, Digital Video Broadcasting, Data Synchronization in Mobile Computing Systems: Synchronization, Synchronization Software for Mobile Devices, Synchronization Protocols, SyncML Synchronization Language for Mobile Computing, Sync4J (Funambol), Synchronized Multimedia , Markup Language (SMIL)

Unit-4 :

Mobile Devices Server and Management: Mobile Agent, Application Server, Gateways, Portals, Service Discovery, Device Management, Mobile File Systems, Security, Mobile Adhoc and Sensor Networks: Introduction to Mobile Ad-hoc Network, MANET, Wireless Sensor Networks, Applications Wireless LAN, Mobile Internet Connectivity, and Personal Area Network: Wireless LAN (WiFi) Architecture and Protocol Layers, WAP 1.1 and WAP 2.0, Architectures, XHTML-MP (Extensible Hypertext Markup Language Mobile Profile), Bluetooth-enabled Devices Network, Layers in Bluetooth Protocol, Security in Bluetooth Protocol, IrDA, ZigBee Mobile Application Languages XML, Java, J2ME, and JavaCard: Introduction, XML, JAVA, Java 2 Micro Edition (J2ME), JavaCard, Mobile Operating Systems : Operating System PalmOS, Windows CE, Symbian OS, Linux for Mobile Devices 530

Books :

1. Mobile Computing, Raj Kamal, Oxford University Press

Reference Books:

1. Mobile Communications Jochen Schiller, Addison-Wesley.
2. Handbook of Wireless Networks and Mobile Computing, Stojmenovic and Cacute, Wiley,
3. Mobile Computing Principles: Designing and Developing Mobile
4. Applications with UML and XML, Reza Behravanfar, Cambridge University Press,

**Paper IV :
Elective-2**

Paper 2.3 : Enterprise Computing

**Hours/Week : 4
Credits : 4**

Unit-1 :

Enterprise Foundations

Enterprise Architectural overview - object oriented software development for enterprise - Component Based software development for enterprise. Java Enterprise System. Enterprise Data - Basis of JDBC - interfaces -drivers. Advanced JDBC features.

Unit-2 :

Distributed Enterprise Communications Enabling

Distributed Enterprise Communications Basis - RMI Communication – CORBA communication - DCOM Communication – Software Development for RMI Communication

Unit-3 :

Services For Distributed Enterprise Systems

Naming Services, Directory and Trading services, Activation Services, Message Services, Transaction Services, Security Services and High assurance Enterprise applications.
Web Browsers and Web Servers in Enterprise. Web Programming, XML. Java Servlets - Java Server pages.

Unit-4 :

Interoperability and Multitier Enterprise Computing

Java Beans, EJB, Enterprise Application Integration, Interoperability between various computing technologies - Tools For Enterprise Computing - Patterns –Frame work

Books:

1. Paul J Perrone, Venkata S.R. Krishna R and Chayanti, " Building Java Enterprise Systems with J2EE", Techmedia , New Delhi, 2000.
2. George Reese, " Database programming, with JDBC and Java" Second Edition, O'Reilly Publishers , New Delhi, 2000.
3. Dustin R. Callaway - "Inside Servlets " - Addison Wesley Longman Inc, New Delhi, 2001.
4. Tom Valesky - "Enterprise Java Beans" - Addison Wesley Longman Inc. New Delhi, 2000.
5. Ed Roman - "Mastering EJB" - John Wiley & Sons, New Delhi, 2001