

## MSC I Semester

### Paper I

#### Subject: Digital Computer Architecture & Parallel Processing

Lectures/Unit	Theory		CIA		Practical	
	Max	Min	Max	Min	Max	Min
14	40	16	10	5	25	13

#### UNIT I

**Computer Arithmetic:** Arithmetic Algorithms - Addition & Subtraction (with signed Magnitude data, hardware implementation, Hardware Algorithm, Addition and Subtraction with Signed-2's Complement Data, Multiplication Algorithms -Hardware implementation for signed Magnitude data, Hardware Algorithm, Booth's Algorithm, Array Multiplier, Division algorithm- Hardware implementation for signed Magnitude data, Divide overflow, Hardware Algorithm. Floating point Arithmetic Operations- Register Configuration, Addition, Subtraction, Multiplication and Division.

#### UNIT II

**Introduction to Parallel Processing:** Parallelism in Uni-Processor Systems, Parallel Processing Mechanisms, **Parallel Computer Structures:** Pipeline Computers, Array Computers, Multiprocessors Systems, Performance of Parallel Computers, Dataflow and New Concepts, Architectural Classification Schemes, Applications of Parallel Processing.

#### UNIT III

**Pipeline & Vector Processing:** Principles of pipelining, Arithmetic pipeline, Instruction Pipeline Vector Processing, Matrix multiplication, Memory Interleaving, Supercomputers, Array Processor(Attached Array and SIMD).

#### UNIT IV- ASSEMBLER

Introduction to Assembly Language, Name field, operator field, comment field, program data (Number, Character), variable(Byte, word, array), named constant, Basic instructions (MOV,XCHG,ADD,SUB,INC,DEC). **Program Structure:** memory model, data segment, stack segment, code segment. **Input and output instruction:** INT instruction: INT 21h single key input, display a character, display a string.

#### UNIT V

**Process status and flags register:** Status flag, carry flag, parity flag, auxiliary carry flag, zero flag, sign flag, overflow flag DEBUG program Flow control instruction(conditional jump, branching structure, looping structure, logic and shift instruction, stack application, Procedure(call and RET).

#### Textbooks:

Computer System Architecture, by Morris Mano, PHI.

Computer Architecture & Parallel Processing by Hwang, Briggs, McGraw-Hill.

#### Reference Books:

*Computer Organization and Design*, 3<sup>rd</sup> edition by David Patterson and John Hennessy's ,  
Tanenbaum, A. S. *Structured Computer Organization*, 3<sup>rd</sup> Ed., Prentice Hall, 1990.

**MSC I Semester**  
**Paper II**  
**Subject: Software Engineering**

Lectures/Unit	Theory		CIA	
14	Max	Min	Max	Min
	40	16	10	5

**UNIT I**

**Software Processes:** Processes, projects and products, component software processes, characteristics of a software process, software development process, project management process, software configuration management process, process management process. **Software requirement Analysis and Specification:** Software requirement, need for SRS, requirement process, problem analysis, analysis issues, informal approach, structured analysis, object oriented modeling, other modeling approaches, prototyping, requirement specialization, characteristics of an SRS, component of an SRS, specialization languages, structure of requirement document validation, requirement reviews, other method metrics, size measures, quality metrics.

**Unit II**

**Planning Software Project:** Cost estimation, uncertainties in cost estimation, building cost estimation models, on size estimation, COCOMO model, project scheduling, average Lectures/Unit estimation, project scheduling and milestones, staffing and personnel planning, Raleigh curve, personnel plan, team structure, software configuration management plans, quality assurance plans, verification and validation, project monitoring plans, risk management.

**Unit III**

**Function Oriented Design:** Design principles, coupling, cohesion, design notation and specification, structured design methodology, verification, network metrics, stability metrics, information flow metrics software Testing.

**Unit IV**

**Testing Methods:** Software testing fundamentals, test case design, white box testing, control structure testing, black - box testing, testing for specialized environments. **Software Testing Strategies:** A strategic Approach to software testing, strategic issues, unit testing, validation testing, system testing, the art of debugging.

**Unit V**

**Re-Engineering:** Software re-engineering, software maintenance, software reengineering process model, reverse engineering, reverse engineering user interfaces restructuring, code restructuring, data restructuring, forward engineering the economics of reengineering. **Client / Server software Engineering:** The structure of Client/server systems, software engineering for c/s systems, analysis modeling issues, design for c/s systems, testing issues. **Computer-Aided software Engineering:** What is case, building blocks for case, taxonomy of case tools, integrated case environments, the integration architecture, the case repository.

**Textbooks:**

Software Engineering, A Practitioners Approach Tata Mc Graw hill by Pressman Rogers

**Reference Books:**

An Integrated Approach to Software Engineering by Pankaj Jalote.

Software Engineering Concepts by R.E. Fairly, Mc Graw Hill.

Software Project Management by Boyce.

## MSC I Semester

### Paper III

#### Subject: Data Structure and Programming in C++

Lectures/Unit	Theory		CIA		Practical	
	Max	Min	Max	Min	Max	Min
14	40	16	10	5	25	13

#### UNIT I

**Classes and objects:** Class specification, class objects, accessing class members, defining member functions, outside member functions as inline, accessing member function within the class, data hiding, passing and returning objects to and from functions, friend functions and classes, **Pointers-** pointers within a class. **Object initialization and cleanup**(constructors and destructors), **Operator overloading-** overloadable operators, unary operator overloading, operator keyword, operator return values, binary operator overloading, Operators.

#### Unit II

**Inheritance :** Derived Class Declaration, Forms of Assignment, Constructors in Derived Classes, Destructors in Derived Classes, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Multipath Inheritance, Hybrid Inheritance. **Virtual Functions:** Need for Virtual Functions, Pointer to Derived Class Objects, Definition of virtual function, Pure virtual Functions, Abstract Classes, Virtual Destructors.

#### Unit III

Linear data structure and their sequential representation, Non-primitive data structures, storage structure for array, stacks, definition and operation on stacks, application of stack, recursion, polish expression and their manipulation, Queues, operation on queues, priority queues, dynamic storage management, linked storage representation, pointers and linked allocation, linked linear lists, operation on linked lists, circulatory linked list, doubly linked list, application of linked lists.

#### Unit IV

Nonlinear Data Structure: Trees, definitions and concepts of general trees and binary trees, representation of binary trees, binary tree representation of general tree, binary tree traversal, Threaded binary tree, operation on binary trees, application of trees, binary search trees, evaluation of binary search trees, AVL trees, B trees ,B<sup>+</sup> trees, Multi way search trees and B-trees, B\* tree, **Graphs and their representation-** Matrix representation, list structure, other representation of graphs, Breadth first search, Depth first search, application of graphs.

#### Unit V

Sorting and Searching: Notation and concepts, selection sort, bubble sort, merge sort, tree sort, partition exchange sort, radix sort, address calculation method, summery of sorting methods, Searching of Hash-Table method, Hashing functions, Collision resolution techniques, external sorting, mn list sorting, Polyphase sorting, oscillating sorting storing on disks, generating extended initial runs.

#### Text Books:

An Introduction to Data Structures with application by J.P. Trembley & P.G. Sorrenson, Mc-Graw Hill

Data Management and File Processing by E.S Loomis, PHI

#### Reference Books:

Fundamentals of Data structures bh H.W. Sahnis, Comp.Sc.Press

The Art of Computer Programming by D.E. Knuth, Addison Wesley

**MSC I Semester  
Paper IV  
Subject: Management Concepts**

Lectures/Unit	Theory		CIA	
14	Max	Min	Max	Min
	40	16	10	5

**UNIT-I**

Management Concepts: Meaning, Thought, Scope and Importance of Management, Concept of Function of Management, Concept of Organization, Delegation, Types of Organization and Organization chart.

**UNIT-II**

Basic HR Concepts, Business Communication, Practical Application: Letters, Memoranda, Reports, Summaries & Notes, Group Communication, Meeting, Advertising & Public Relation.

**UNIT-III**

Financial Management :Concept of money, Accounting, Double Entry System, Vouchers, Journals, Ledgers, Profit & Loss Account, Balance Sheet. Costing: Direct & Indirect Cost, Marginal Cost, Breakeven Point, Budgetary Control, Zero based Budgeting.

**UNIT-IV**

Marketing Concept: Difference between Sales and Marketing, Customer Satisfaction, Customer Retention, CRM, Market Mix, Product Mix, Product Life Cycle, Distribution.

**UNIT-V**

Organization Behavior: Motivation Techniques, Leadership Skills, Decision Making Skills, Interpersonal Skills, Negotiation, Conflict Resolution, Individual and Group Behavior.

**Suggested Books:**

Communication for Business  
Principle And Practices of Management  
Financial Accounting  
Marketing Management  
Organization Behaviour  
Cost Accounting  
Management- Theory & Practices

By Taylor and Chandra, Pearson Publication  
By Bhalla, Gupta and Sharma  
By Dr. S. M. Shukla  
By Philip Kotler  
By Stephen. P. Robbin  
By M.L. Aggarwal  
By C.B. Gupta

## MSC I Semester

### Paper V

#### Subject: Computer Oriented Statistical & Numerical Analysis

Lectures/Unit	Theory		CIA		Practical	
14	Max	Min	Max	Min	Max	Min
	40	16	10	5	25	13

#### UNIT I

**Probability Distribution & Statistical Inference:** Discrete Probability Distribution, Binomial & Poisson Distribution. Continuous probability Distribution: Exponential and normal distribution (for all probability distribution simple properties and application) testing of hypothesis, testing of single and two mean, z and t test for variables, chi square for independence of two attributes(m x n) table and goodness of fit.

#### UNIT II

**Correlation and Regression Analysis:** Objectives, Correlation and Regression, coefficients and lines, partial correlation coefficient, polynomial curve fitting, fitting of a regression plane.

#### UNIT III

**Analysis of Variance and Time Series Analysis:** Basic principles of design of experiments, analysis of variance of one way(equal and unequal observation for treatment) and two way classified data (one observation per cell), time series analysis trend and seasonal variation.

#### UNIT IV

Representation of numbers, Errors, **Iterative Solutions of Algebraic Equations**- Newton Raphson method, Bisection Methods, False Position Method. **Interpolation**- Newton & Lagrange methods.

#### UNIT V

**Numerical Differentiation**- Higher Order Derivatives, Differentiating Tabulated Functions. **Numerical Integration**- Newton Cotes Method: Trapezoidal Rule and Simpson 1/3 Rule and Simpson 3/8.

#### Textbooks

B. S. Garewal numerical analysis

M.K. Jain, S R K Iyenger and R.K. Jain, Numerical Methods for scientific and engineering computation.

#### Reference Books

E.V. Krishnamurthy and S.K. Sen: numerical algorithms

Gupta S.C. & Kapoor Mathematical Statistics. Chand and Company Limited

E.Balagurusamy :Numerical Methods, Tata McGraw Hill Computer science & application. Ltd.

**MSC II SEMESTER  
SUBJECT- COMPUTER SCIENCE  
PAPER I- COMPILER DESIGN**

Lectures	Theory		CIA	
10	Max	Min	Max	Min
	40	16	10	5

**UNIT-I**

Mathematical Preliminaries- sets, Function and Relation, Graphs and Trees, Languages, Grammar, Finite Automata: DFA (Deterministic Finite Automata), Regular Languages, NFSA (Non-Deterministic Finite State Automata), Equivalence of Deterministic and Non-Deterministic Finite State Automata, Reduction of Number of states in Finite Automata, Regular Expression, Properties of Regular Languages.

**UNIT-II**

Context Free grammar, Left and Right Derivation, Derivation Tree, Parse Tree, Ambiguity in CFG, removing useless Production, Removing Unit production. Normal Form – Chomsky Normal Form, Greibach Normal Form

**UNIT-III**

Non-Deterministic Pushdown Automata, Turing Machine – The Standard Turing Machine, Formal Definition of Turing Machine, Turing Machine as Language Accepters, Turing Machine as Transducers.

**UNIT-IV**

Compilers and translator, Structure of a compiler, High level programming languages: syntax, semantics. Lexical and syntactic structure of a language: tokens, data elements, identifiers and operators, Lexical analysis: need for lexical analysis, A simple Approach to design of Lexical Analyzer, Implementation of Transition diagram.

**UNIT-V**

Syntax Analysis - Role of parser, Basic parsing Technique: parsers, Representation of parse tree, Shift reduce parsing: handles, Handle Pruning, Operator- Precedence Parsing, Top down parsing, Recursive Descent Parsing, Predictive Parsing, LR Parsers.

**Text books:**

An Introduction to Formal Languages and Automata, Fourth Edition, Peter Linz [unit I, II, III]  
Principles of Compiler Design, Alfred V. Aho, Jeffrey D. Ullman [Unit IV & V]

**Reference Books:**

Introduction to Automata theory languages and computation by Ulman & Hopcroft.  
Introduction Computer Theory by Daniel. A. Cohen.  
Compilers: Principals techniques and tools by Aho, Ravi Sethi, Ulman.

**MSC II SEMSTER**  
**SUBJECT- COMPUTER SCIENCE**  
**PAPER II- OPERATIONAL RESEARCH**

Lectures	Theory		CIA	
10	Max	Min	Max	Min
	40	16	10	5

**UNIT-I**

Linear programming – Mathematical formulation of problems, graphical solution, simplex method, two phase method, Big M method, concept of duality, dual simplex method, degeneracy and its resolution, sensitivity analysis.

**UNIT– II**

Assignment problems – Mathematical formulation, Hungarian method for solution, unbalanced assignment problem, infeasible assignment, Crew based problems, transportation problems – Vogel’s approximation method, optimal solution by stepping stone method and modified distribution method, degeneracy in transportation problems, transshipment problems.

**UNIT– III**

Game theory, two persons zero sum game, minimax (maximin) criterion, solution of games with saddle point and without saddle point, equivalence of the rectangular game and linear programming and solution by simplex method, concept of dominance, graphical method for 2 x n and m x 2 games, algebraic method for a general game, iterative method, sequencing problems of n jobs through 2 machines, 3 machines, and n jobs through m machines.

**UNIT– IV**

Replacement problems – replacement of items that deteriorate with time, money value and present work factor, replacement policy when money value changes, replacement of items that are failed completely, group replacement of items, integer programming, nonlinear programming problem, Kuhn Tucker conditions, graphical solution, quadratic programming, solution by Wolf’s method.

**UNIT– V**

Dynamic programming – minimum path problems, problems on single additive constraint additive separable return, single multiplicative constraint additive separable return, single additive constraint multiplicative separable return, serial multistage model. Development of CPM/PERT technique, constraint of network diagram, determination of critical path, probability of completing the project by scheduled date.

**Text Books:**

Operations Research: S.D.Sharma

**Reference Books:**

Introduction to Operation research: A Computer Oriented Algorithmic Approach Gillett Billy E  
Tata Mc-Graw Hill Publishing Company Ltd., New Delhi.

Fundamentals of Operation Research. A Ckoff, R.L. and Sasieni, M.W, Wiley, 1968. Linear Programming, Hadley G. Oxford and IBH Publishing Co. Ltd., New-Delhi.

**MSC II SEMESTER**  
**SUBJECT- COMPUTER SCIENCE**  
**PAPER III- COMPUTER GRAPHICS WITH MULTIMEDIA**

Lectures	Theory		CIA		Practical	
10	Max	Min	Max	Min	Max	Min
	40	16	10	5	25	13

**UNIT-I**

A brief background about applications of Computer Graphics. Overview of graphic systems, video display devices, refresh cathode ray tubes, raster and random screen display, color CRT monitors, flat panel displays, LCD's. Design and architecture of raster scan and random scan display systems. A brief introduction to input devices and hardcopy devices. Output primitives, DDA and Bresenham's 2D line drawing algorithms, parallel line algorithms.

**UNIT-II**

Midpoint circle generating algorithm, Ellipse generating algorithm, other curves, filled area primitives, scan line polygon fill algorithm, inside outside test, boundary fill algorithms, flood fill algorithm, character generation, attributes of output primitive, line and curve attributes, character attributes.

**UNIT-III**

Anti-aliasing, two dimensional geometric transformations, composite transformations. General composite transformations and computational efficiency, other transformations, affined transformation, two-dimensional viewing, window to view port coordinate transformations.

**UNIT-IV**

Clipping operations, Cohen Sutherland line clipping, Liang Barsky line clipping, Nicholl-Lee-Nicholl line clipping, polygon clipping, Sutherland Hodgeman and Weiler Atherton polygon clipping, text and curve clipping. Three dimensional concepts, display methods, polygon surfaces, quadric surfaces and super quadrics.

**UNIT-V**

Three dimensional geometric and modeling transformations, general three-dimensional rotation. Three-dimensional viewing, pipeline projections, parallel and perspective projections, view volume and general projective transformations. Visible surface detection methods, Back Face detection, Depth Buffer Method, A buffer method, Depth sorting method.

**Text Book:**

Donald Hearn and M. Pauline Baker, Second Edition, PHI 1997.

**Reference Books:**

J. D. Foley, A van Dam, S. K. Feiner, J. F. Hughes, Addison Wesley Publ. Company, 1997

Jim Blinn, Jim Blinn's Corner : A trip down the graphics pipeline, Morgan Kaufman, 2000.

Computer Graphics by schaum's outlines

Computer Graphics by Desai Computer Graphics by Foley



**MSC II SEMESTER**  
**SUBJECT- COMPUTER SCIENCE**  
**PAPER IV- SYSTEM PROGRAMMING (USING LINUX)**

Lectures	Theory		CIA		Practical	
10	Max	Min	Max	Min	Max	Min
	40	16	10	5	25	13

**UNIT I**

Language processor, language processing activities, language processing, toy compiler, language specification, classification of grammars, binding, language processor development tools.  
Assemblers, assembly scheme, design of a two-pass assembler, Macros and Macros Processors.

**UNIT-II**

Linkers: relocation and linking schemes, design of a linker, linking for overlays. Loaders: schemes, dynamic loading, design of an absolute loader.

**UNIT-III**

Linux: getting started, file management, directories, file permission. Environment, basic utilities, pipes and filters, processes, communication, vi editor.

**UNIT-IV**

Shell, variables, special variables, arrays, basic operators, decision making, shell loops, loop control, shell substitutions, quoting mechanisms, IO redirections, shell functions.

**UNIT V**

Regular expressions, file system basics, user administration, system performance, system logging, signal and traps.

**Text Books & Website:**

1. System Programming and Operating System: S. M. Dhamdhere, Tata McGraw Hill [unit I, unit II-linkers]
2. System Programming, J. J. Donowan, Tata McGraw-Hill Publishing [unit II- Loaders]
3. <https://www.tutorialspoint.com/unix/index.htm> [unit III, IV, V]
4. Concepts and Application, Sumitabha Das, McGraw Hill

**Reference Books:**

1. Beginning Red Hat Linux 9: Sandeep Bhattacharya, Simon Whiting
2. Beginning Shell Scripting: Eric Foster-Johnson, John C. Welch
3. Unix Shell programming, Yashwant Kanetkar, BPB Publication

**MSC II SEMESTER  
SUBJECT- COMPUTER SCIENCE  
PAPER V- CORE JAVA AND GUI**

Lectures	Theory		CIA		Practical	
10	Max	Min	Max	Min	Max	Min
	40	16	10	5	25	13

**UNIT-I**

An Overview of Java: A short history of Java, Java as a Programming Tool, Advantages of Java, Java Byte Code, The Java “White paper” Buzzword, Java and the Internet. Fundamental Programming Structure in Java: Data Types, Variables, Constants and Arrays, Operators: Assignments and Initialization, Comments and Strings, Control Statements and Strings.

**UNIT-II**

Classes, Objects and Methods: Using Existing Classes, building your Classes, Static fields and Methods, Method parameters, Object Construction, Packages: Using Packages. Inheritance: Extending Classes, Object: The Cosmic Super Class, Interfaces and Inner Classes: Interfaces, Object Cloning, Inner Classes. Multithreading: What are Threads? Interrupting Threads, thread life cycle, Thread States, and Thread Properties, Inter thread communication and synchronization.

**UNIT-III**

AWT: The Applet Class: Applet Basics, Applet Architecture, Life Cycle of an Applet, The Applet HTML Tags and Attributes, Event Handling: Event Handling Mechanism, the Delegation Event Model, Event Classes, Sources of Events, Event Listener Interfaces, Adapter Classes, Using AWT for Windows, Graphics and Text, Using AWT controls, Layout Managers and Menus.

**UNIT-IV**

Swings: JApplet icon and labels, Text fields, buttons, combo boxes, tabbed panes, scroll panes, trees, tables, exploring swing.

**UNIT-V**

Database Programming: The Design of JDBC, Basic JDBC Programming Concepts, Query Execution, Scrollable and Updatable resultsets, RowSets, Transactions.

**Text Books:**

The Complete Reference: Java 2 – 5Ed, Herbert Schildt, Tata McGraw-Hill Publishing Company Limited.

Core Java 2, Vol. I – Fundamentals 7Ed, Cay S. Horstmann and Gary Cornell, (LPE) Pearson Education, Sun Microsystems.

**Reference Books:**

Java Examples in a Nutshell - by David Flanagan

The Java AWT Reference by John Zukowski Publisher: O'Reilly & Associates, Inc.

The Java Class Libraries: An Annotated Reference by Patrick Chan, Rosanna Lee Publisher: Addison-Wesley

Designing Better Apps and Applets with Java by Peter Coad, Mark Mayfield

## MSC III Semester

### Paper I

#### Subject: Computer Networks and Distributed Processing

Lectures/Unit	Theory		CIA	
	Max	Min	Max	Min
14	40	16	10	5

#### UNIT I

Users of computer Network, Network Hardware, Network Software, Protocol Hierarchies, Design issue for the layers, Interfaces and services, connection oriented and connection-less services, service primitives, the relationship of services to protocols, Reference Models, comparison of OSI and TCP/IP Reference models, Data communication services, SMDS, X.25, Frame Relay, Broadband ISDN, ATM and comparison of services.

#### Unit II

Physical layer, Theoretical Basis for data communication, Bandwidth-limited signals. Maximum data rate of a channel, Transmission media, Magnetic media, Wireless Transmission, The telephone system, Narrowband and Broadband ISDN and ATM, communication satellites.

#### Unit III

Data Link Layer, Design Issues, Services provided to the Network layer, error detection and correction, elementary data link protocols, sliding window protocols, Protocol specification and verification, Case studies, HDLC and DataLink Layer in the internet.

#### Unit IV

Network layer design issues, routing algorithms, the optimality principle, shortest path routing, Flooding, Flow-based Routing, Distance vector and link state routing broadcast and multicast routing, congestion control algorithms, general principles of congestion control, Traffic shaping, choke packets, load shedding, jitter control.

#### Unit V

The Transport Layer, The Transport services, Quality at service, Transport service primitives, addressing establishing a connection, Releasing a connection, Flow-control and Buffering, Multiplexing, crash recovery, The internet Transport protocols, TCP service model, TCP segment header, TCP connection management, TCP transmission policy, TCP congestion control, TCP timer management UDP.

#### Text Book:

Computer Networks, 3<sup>rd</sup> edition, 1997, by A.S Tanenbaum. PHI.

#### Reference Book:

Data and Computer Communication, 1996, William Stallings, PHI

Data Communication and Networking 2<sup>nd</sup> edition by Behrouz A. Forouzan, at McGraw- Hill

## MSC III Semester

### Paper II

#### Subject: Relational Database Management System (SQL Programming using Oracle)

Lectures/Unit	Theory		CIA		Practical	
	Max	Min	Max	Min	Max	Min
14	40	16	10	5	25	13

#### UNIT I

**Introduction:** Advantages of DBMS approach, various views of data, data independence, schema & sub- schema, Primary concepts of data models, Database languages, transaction management, database administrator, & uses, data dictionary, overall system architecture. **ER Model:** Basic concepts, design issues, mapping constraints, keys, ER diagram, weak & strong entity sets, specialization & generalization, aggregation, inheritance, design of ER schema, reduction of ER schema to tables.

#### Unit II

**Domain Relation & Keys:** Domains, relations, kinds of relation, relational databases, various types of keys, candidate, primary, alternate & foreign keys. **Relation algebra & SQL:** The structure, relation algebra with extended operations, modification of database, idea of relational calculus, basic structure of SQL, set operation, aggregate function, null values, nested sub queries, derived relations, views, modification of database, join relations, DDL & SQL.

#### Unit III

**Functional dependencies & Normalization:** Base definition, trivial and nontrivial dependencies, closure set of dependencies, & of attributes, irreducible set of dependencies, introduction to normalization, non-loss decomposition, FD diagram, I,II & III NF, dependencies prevention, BCNF, multivalued dependencies, preventions, BCNF, Multivalued dependencies & 4NF, Join dependencies & 4NF. **Database Integrity:** General idea, Integrity rule, domain rules, attributes, relation, rules, database rule, assertions, triggers, integrity & SQL.

#### Unit IV

**Distributed databases:** Basic idea, distributed, data storage, data replication, data fragmentation, horizontal, vertical, & mixed fragmentation. **Emerging field in DBMS:** Object- Oriented database- basic idea

& the model object structures Object, class, inheritance, multiple object identify, data warehousing terminology, definitions, characteristics, data mining & its overview, database on WWW, multimedia database difference with conventional DBMS, issues, similarity based retrieval continuous media data, multimedia data formats, video servers.

#### Unit V

**Network & Hierarchical model:** Basic idea, data structure diagram, DBTG model, implementation, tree structure diagram, implementation techniques, comparison of three models.

**Transaction concurrency & recovery:** Basic concept, ACID properties, transaction state, implementation of atomicity and durability, concurrent execution. Basic idea of serializability, basic idea of concurrency control, basic idea of deadlock, failure classification, storage structure- types, stable storage implementation, data access. **Recovery & Atomicity:** Log based recovery, deferred database modifications, immediate database modification, check points.

#### Text Books:

Data base concepts by Henry F. Korth, MGH

An Introduction to database system by Bipin C. Desai, Galgotia Pub.

#### Reference Books:

Database Management system by Arun K. Majumdar & P. Bhattacharya, TMH Pub.

Principles of Database system by Jeffrey O. Ullman, Galgotia Pub, Co. Ltd.

Principles of Database Management system by James Martin, PHI

**MSC III Semester  
Paper III  
Subject: Artificial Intelligence**

Lectures/Unit	Theory		CIA		Practical	
	Max	Min	Max	Min	Max	Min
14	40	16	10	5	25	13

**Unit I**

What is Artificial Intelligence, what is an AI technique, criteria for success, Problems, Problem spaces and search, Production system, Problem characteristics, Hill-climbing, Best-First search, AO algorithm, constraint satisfaction.

**Unit II**

Natural language Processing, Introduction, overview of Linguistics, Grammars and language, Basic Parsing techniques, Semantic analysis and representation, structure, Natural Language generation, Natural Language Systems.

**Unit III**

Knowledge Representation Issues, Approaches to knowledge Representation, Representing simple facts in logic, computable functions and predicates, Procedural vs. Declarative knowledge, forward vs. Backward Reasoning matching, control knowledge.

**Unit IV**

Expert systems, Rule-Based system architecture, Non-productive system Architecture, dealing with uncertainty, knowledge acquisition and validation, knowledge system building tools.

**Unit V**

Pattern Recognition, Recognition and classification process, learning classification patterns, Recognizing and understanding speech.

**Text Books:**

Artificial Intelligence by Rich and Knight

**Reference Books:**

Introduction to AI and expert system by Patterson

Principles of AI by Nilson

**MSC III Semester  
Paper IV**

**Subject: Object Oriented Modeling and Design with UML**

Lectures/Unit	Theory		CIA	
	Max	Min	Max	Min
14	40	16	10	5

**UNIT I**

Object orientation, OO Development, Modeling Concepts- Modeling as a Design Technique- Modeling, Abstraction, the three models, Class Modeling- Object and class concepts, Link and association concepts, generalization and inheritance, Advanced class modeling- Concepts, association ends, N-ary associations, aggregation, abstract classes, multiple inheritance.

**UNIT II**

State Modeling- Events, states, transitions and conditions, state diagrams, Advanced state modeling- nested state diagrams, nested states, concurrency, Interaction Modeling- use case models, sequence models, activity models.

**UNIT III**

Analysis and Design- Process overview- Development stages, development life cycle, Domain analysis- overview of analysis, domain class model, domain state model, domain interaction model, iterating the analysis, Application analysis- Application Interaction Model, application state model, System Design- Estimating performance, making a reuse plan, breaking a system into subsystems, identifying concurrency, allocation of subsystems, management of data storage, handling global resources, common architectural styles.

**UNIT IV**

Class Design- Bridging the gap, realizing use cases, designing algorithms, recursing downward, design optimization, adjustment of inheritance, organizing a class design, process summary, Implementing Modeling- fine-tuning classes, fine-tuning generalization, realizing associations, testing.

**UNIT V**

Databases- Implementing structure-basic, implementing structure-advanced, implementing functionality, Programming Style: Object-Oriented Style, Reusability, Extensibility, Robustness, Programming – in –the Large, Software Engineering- Iterative Development, Managing Models.

**Text Books:**

Object-Oriented Modeling and Design with UML by Michael Blaha, James Rumbaugh, Pearson Prentice Hall Pub.

**Reference Books:**

Object Oriented Analysis & Design with Application by Grady Booch, Pearson Prentice Hall Pub. He UML User Guide by G. Booch, J Rumbaugh, Ivar Jacobson, Pearson Education

**MSC III Semester  
Paper V  
Subject: Advance Java**

Lectures/Unit	Theory		CIA		Practical	
	Max	Min	Max	Min	Max	Min
14	40	16	10	5	25	13

### UNIT I

Introduction to Java script- Variables, Expressions and Evaluation, Data type conversion, operators, decisions and loops, control structures, functions, arrays, Window properties and Methods- window.status property, window.alert() method, window.confirm() method, window.prompt() method, Document object- document.forms[] property, document.title property, document.write() method, form controls as objects, button object, checkbox object, radio object, select object, Strings, Math and Dates, What is a Java Bean?, Advantages of Java Beans, Jar Files.

### Unit II

**JSP Overview:** Why use JSP?, Advantages of JSP, JSP Environment Setup: Setting up Java Development Kit, Setting up Web Server: Tomcat, Setting up CLASSPATH. **JSP Architecture, JSP- Life Cycle:** JSP Compilation, JSP Initialization, JSP Execution, JSP Cleanup. **JSP Syntax:** The Scriptlet, JSP Declarations, JSP Expression, JSP Comments, JSP Directives, JSP Actions, JSP Implicit Objects, Control Flow Statements, Decision Making Statements, Loop Statements, JSP Operators, JSP Literals. **JSP Directives:** The page Directive, Attributes, The include Directive, The taglib Directive. **JSP- Client Request:** The HttpServletRequest Object, HTTP Header Request Example. **JSP- Server Response:** The HttpServletResponse Object, HTTP Header Response Example. **JSP Form Processing:** GET method, POST method, Reading Form Data using JSP, GET Method Example Using URL.

### Unit III

Servlet Programming Fundamentals: Servlet and Web Application Development: Internet Fundamentals, An Introduction to Servlets, Web Application Development, Scripting Option, The Power of Servlets, Creating Servlet. The Servlet Life Cycle: Basic Servlet Architecture, GET and Post Requests, The Servlet Life Cycle, Essential Classes in the Servlet Package. Handling HTTP: An Overview of HTTP and SSL, HTTP Request Headers, HTTP Response Headers.

### Unit IV

Cookies and Session Management: Understanding Sessions, Session Management Methods, Session Management with Cookies, Cookie Support in the Servlet API, Session tracking with HTTP session, Data Access with Servlets: Evolution of Database Systems, JDBC Concepts, Connecting to a Database, Retrieving Data.

### Unit V

Networking: Socket Overview, Client/Server, TC/I Client Sockets and TC/I Server Sockets. RMI: Stub and Parameter Marshalling, Dynamic Class loading, Setup for RMI. Remote Procedure Calls, Remote Method Invocation, Locating Remote Objects, Up and running with RMI, Security Issues when dealing with RMI.

**Text Books:**

Java Servlet Programming Bible, S. Rajagopalan, R. Rajamani, R. Krishnaswamy, and S. Vijendran, WILEY

– dreamtech India Pvt. Lmt.

The Complete Reference: Java 2 – 5Ed, Herbert Schildt, Tata McGraw – Hill Publishing Company

Limited. Core Java 2 Vol. II – Advance Features 7Ed, Cay S. Horstmann and Gary Cornell, (LPE) Pearson Education, Sun Microsystems.

JavaScript Bible 4th Edition by Danny Goodman, Wiley dreamtech Pub

**Reference Books:**

OOPS with C++- E Balaguruswamy.

Complete Reference C++ by Herbert Schield, BPB Pub.

Java Servlet Programming Bible

JavaScript Bible 4th Edition by Danny Goodman,

Database Programming with JDBC and Java - by George Reese



**MSC IV SEMESTER  
SUBJECT- COMPUTER SCIENCE  
PAPER I- DATA MINING**

Lectures	Theory		CIA		Practical	
10	Max	Min	Max	Min	Max	Min
	40	16	10	5	25	13

**UNIT-I**

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining, 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-II**

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

**UNIT-III**

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

**UNIT-IV**

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.

**UNIT-V**

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.

**TEXT BOOKS:**

Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER Harcourt, India.

Building the DataWarehouse- W. H. Inmon, Wiley Dreamtech India Pvt. Ltd.

**REFERENCE BOOKS:**

The Data Warehouse Life Cycle Tool kit – RALPH KIMBALL WILEY STUDENT EDITION  
Data Mining Introductory and advanced topics –MARGARET H DUNHAM, PEARSON  
EDUCATION

**MSC IV SEMESTER  
SUBJECT- COMPUTER SCIENCE**

**PAPER II- ADVANCED NETWORKING**

Lectures	Theory		CIA	
10	Max	Min	Max	Min
	40	16	10	5

**UNIT-I**

**Circuit & Packet Switching**-Switched Communication Networks, Circuit Switching Networks, **Circuit Switching Concepts**-Space Division Switching, Time Division Switching, **Soft switching Architecture, Packet Switching Principles**-Switching Technique, Packet Size, Comparison of Circuit Switching and Packet Switching, Routing in Packet Switching Networks- Characteristics, performance criteria, decision, time and place, network information and update timing. Routing strategies- fixed, flooding, random and adaptive.

**UNIT-II**

IPv4 Addresses. Classes, Classes and Blocks, Class full Addressing Two Level Addressing, Masking, Three- Level Addressing - Subnetting, Classless Addressing-Two Level Addressing, **Unicast Routing Protocols**- Routing Information Protocol (**RIP**)-RIP Message Format, Timer in RIP, Open Shortest Path First (**OSPF**)Types of Links, Types of OSPF Packets, OSPF Common Header, Border Gateway Protocol (**BGP**)-External and Internal BGP,Types of BGP Message.

**UNIT-III**

Network Administration: Managing Network accounts- user account, group account, managing resources. Managing network performance- potential network performance problems, tools and techniques.

**UNIT-IV**

Network security- introduction, attacks, services and mechanisms, security attacks, security services. Public-key cryptography principles, the RSA public-key encryption algorithm, Kerberos IP security overview and architecture. Intruders and viruses- intruders, viruses and related threats. Firewalls- design principles.

**UNIT-V**

Mobile IP- addressing, agents, three phase, inefficiency in mobile IP. IPv6 addressing.

**TextBooks**

Data and Computer Communication ,8<sup>th</sup> Edition, William Stallings Peter Norton's Complete Guide to Networking,SAMS Techmedia.

Network Security Essentials Application and Standards William Stallings.

Douglas Comer, Internetworking with TCP/IP – Volume 1, Volume 2, Prentice-Hall of India, New Delhi

Forouzan, TCP/IP Protocol Suite, TMH

**MSC IV SEMESTER**  
**SUBJECT- COMPUTER SCIENCE**  
**PAPER III- SOFTWARE PROJECT MANAGEMENT**

Lectures	Theory		CIA	
10	Max	Min	Max	Min
	40	16	10	5

**UNIT – I**

**Conventional Software Management:** The waterfall model, conventional software Management performance. **Evolution of Software Economics:** Software Economics, pragmatic software cost estimation. **Improving Software Economics:** Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

**UNIT – II**

**The old way and the new:** The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process. **Life cycle phases:** Engineering and production stages, inception, Elaboration, construction, transition phases. **Artifacts of the process:** The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

**UNIT – III**

**Model based software architectures:** A Management perspective and technical perspective. **Work Flows of the process:** Software process work flows, Iteration workflows, **Checkpoints of the process:** Major mile stones, Minor Milestones, Periodic status assessments. **Iterative Process Planning:** Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, pragmatic planning.

**UNIT-IV**

**Project Organizations and responsibilities:** Line of business organizations, project Organizations, evolution of Organizations. **Process Automation:** Automation Building blocks, The Project Environment. **Project Control and Process instrumentation:** The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, metrics automation.

**UNIT-V**

**Tailoring the Process:** Process discriminants. Future Software Project Management: Modern project profiles, next generation software economics, modern project transitions. Case study: the command center processing and display system-replacement(CCPDS-R).

**TEXT BOOKS:**

Software Project Management, Walker Royce: Pearson Education, 2005.

**REFERENCE BOOKS:**

Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.

Software Project Management, Joel Henry, Pearson Education. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005

