

**MSc I Semester**

<b>Subject code</b>	<b>Subject name</b>	<b>Max. Marks</b>	<b>Min. Marks</b>	<b>Practical</b>	<b>Sessional</b>
1MSC1	Digital Computer Architecture & Parallel Processing	40	16		10
1MSC2	Software Engineering	40	16		10
1MSC3	Data structure and Programming in C++	40	16	25	10
1MSC4	Management Concepts	40	16	25	10
1MSC5	Computer Oriented Statistical & Numerical Analysis	40	16	25	10

**MSc II Semester**

<b>Subject code</b>	<b>Subject name</b>	<b>Max. Marks</b>	<b>Min. Marks</b>	<b>Practical</b>	<b>Sessional</b>
2MSC1	Compiler Design	40	16		10
2MSC2	Operational Research	40	16		10
2MSC3	Computer Graphics with Multimedia	40	16	25	10
2MSC4	System Programming using Linux	40	16	25	10
2MSC5-Oops	Core Java and GUI	40	16	25	10

**Semester I**  
**Paper I: 1MSC1**

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

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**UNIT I:**

**10 Lectures**

**Central Processing Unit:** General Register organization, Stack Organization, Register stack , Memory stack , Reverse Polish Notation Evaluation of Arithmetic Expression, Instructions Formats , Addressing modes, Data transfer and Manipulation , Program Control , Subroutine Call and Return , Program Interrupt , Types of Interrupts, Reduced Instruction Set Computer (RISC), Characteristics of RISC/CISC.

**UNIT II:**

**10 Lectures**

**Computer Arithmetic:** Arithmetic algorithms - addition & Subtraction (with signed Magnitude data, hardware implementation , hardware algorithm with 2's complement data) multiplication algorithm -(hardware implementation for signed Magnitude data , hardware algorithm , booth's algorithm , array multiplier) division algorithm (hardware implementation for signed Magnitude data , Divide overflow , H/W Algorithm), Floating point Arithmetic Operations-(Register Configuration , Addition and Subtraction , Multiplication, Division)

**UNIT III:**

**10 Lectures**

**Introduction to Parallel Processing:** Parallel Processing Mechanisms , parallelism in Uni- Processors system , Parallel Computer Structures : Pipeline Computers, Array Computers , Multiprocessors Systems , Performance of Parallel Computers , Dataflow and New Concepts , Architectural Classification Schemes , Application of Parallel Processing

**UNIT IV:**

**10 Lectures**

**Pipeline & Vector Processing:** Principles of linear pipelining, general consideration in pipelining, arithmetic pipeline, Instruction Pipeline & RISC pipeline with examples, Vector Processing, Matrix multiplication, memory Interleaving, Supercomputers, attached array processor and SIMD array processor.

**UNIT V:**

**10 Lectures**

**Multiprocessors:** Characteristics of Multiprocessors, Multiprocessor Architecture and programming Functional Structure, Interconnection Networks (Time shared or common bus, crossbar switch, multiport memory, multistage switching network, hypercube interconnection), Interprocessor Arbitration, Interprocessor Communication and Synchronization, Mutual Exclusion with semaphore, cache coherence.

**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.

**Websites:-**

[www.amazon.com/Structured-Computer-Organization](http://www.amazon.com/Structured-Computer-Organization),  
[http://www.llnl.gov/computing/tutorials/parallel\\_comp/](http://www.llnl.gov/computing/tutorials/parallel_comp/) .

**Semester I**  
**Paper II: 1MSC2**  
**Subject: Software Engineering**

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**10 Lectures**

**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**

**10 Lectures**

**Planning Software Project:** Cost estimation, uncertainties in cost estimation, building cost estimation models, on size estimation, COCOMO model, project scheduling, average duration 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**

**10 Lectures**

**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**

**10 Lectures**

**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**

**10 Lectures**

**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

**Websites:-**

[www.bleading-edge.com/Publications/C++Journal/Cpjour2.htm](http://www.bleading-edge.com/Publications/C++Journal/Cpjour2.htm) ,

[www.sei.cmu.edu/](http://www.sei.cmu.edu/)

[www.stickyminds.com/bettersoftware/](http://www.stickyminds.com/bettersoftware/)

**Semester I**

**Paper III: 1MSC3**

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

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**10 Lectures**

**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**

**10 Lectures**

**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**

**10 Lectures**

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, simulation, priority queues, linked storage representation, pointers and linked allocation, linked linear lists, operation on linked lists, circulatory linked list, doubly linked list, application of linked lists, polynomial manipulation, linked dictionary, multiple precision arithmetic.

**Unit IV**

**10 Lectures**

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, dynamic storage management.

**Unit V**

**10 Lectures**

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

**Web Sites:**

[http://www.forumsci.co.il/HPLC/Getting\\_Started\\_MassLynx1.pdf](http://www.forumsci.co.il/HPLC/Getting_Started_MassLynx1.pdf)  
[http://en.wikipedia.org/wiki/Data\\_structure](http://en.wikipedia.org/wiki/Data_structure)

**Semester I**

**Paper IV: 1MSC4**

**Subject: Management Concepts**

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**10 Lectures**

**UNIT I**

Management concepts , Meaning, thought , scope and importance of management, MBO, Management by Exception, Concept of Organization and Office , delegation , line & staff concepts, different organization and organization charts. Manpower planning, recruitment, selection & training

**Unit-II**

**10 Lectures**

**Financial Management** : Concepts of money, Accounting, Double entry system, Vouchers, Journals, ledgers, profit & loss accounts, balance sheet, Costing, direct & indirect cost, marginal costing, break & even point, Budgetary control, zero –based budgeting, Legal environment , Companies act, Indian contract act, sale of goods act and negotiable instruments act.

**Unit-III**

**10 Lectures**

Marketing concepts: difference between sales and markets, customer satisfaction, customer retention, CRM, market mix, product mix, product life cycle, distribution, SCM.

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**Unit-IV**

**10 Lectures**

**Business Communication Skills:-** Basic concepts, Mind & communication, communication within firms, external communication, Resources (Language , Improving English, equipments, Yourself, style in writing), Practical Application( Letters, Memoranda , reports, summaries & notes, communication & groups, Meetings, Advertising & public relations)

**Unit-V**

**10 Lectures**

**Leadership Skills: communication,** develop reading, writing, listening, speaking & nonverbal communication skills, **Interpersonal:** develop effective leadership, team work, relationship management, conflict resolution, & work place skills,

**Personal:** develop an ability to understand and manage self, adapt to change, enhance wellness, learn effectively, framework for aesthetic responsiveness, **Thinking & Problem Solving:** Develop skills for analysis , synthesis, Evaluation, decision making, critical and creative thinking, & creative process .

**Textbooks:-**

**Business Communication** by Robert H. Sheldon , Peter Andrew Publishing Company

**Reference books:**

**Current management concepts** by Ruth Bryant, Denise Nix

**Knowledge Management: Concepts, Methodologies, tools and applications** by Murray E. Jennex

**Websites:**

**Semester I**

**Paper V: 1MSC5**

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

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**UNIT I**

**10 Lectures**

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**

**10 Lectures**

Correlation and regression analysis: objectives, correlation and regression, coefficients and lines, reliability of estimates and predictions, partial correlation coefficient, polynomial curve fitting, fitting of a regression plane.

**UNIT III**

**10 Lectures**

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**

**10 Lectures**

Floating point arithmetic: Computer representation of floating point, Errors, solution of algebraic equations, Newton Raphson method, Bisection Methods, false position method, interpolation: Newton & Lagrange interpolation, difference operators, interpolating polynomials using finite differences.

**UNIT V**

**10 Lectures**

NUMERICAL DIFFERENTIATION Methods based on interpolation, finite difference operators, numerical integration based on Newton cotes method, trapezoidal rule and Simpson's rule- Simpson 1/3 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.

### Websites

[en.wikipedia.org/wiki/List\\_of\\_numerical\\_analysis\\_software](http://en.wikipedia.org/wiki/List_of_numerical_analysis_software)  
[www.tau.ac.il/exact\\_sciences/math.html](http://www.tau.ac.il/exact_sciences/math.html)

### Scheme of Practical Examination M.Sc. I Sem

#### Marks Distribution

Time- 3 Hrs.	Max. Marks- 25
Practical	15
Record	03
Viva- Voce           05	
Observation Copy	02
<b>Total</b>	<b>25</b>

### List of Practicals

#### 1MSc1- Digital Computer Architecture & Parallel Processing

1. Program related to basic instruction like ADD,SUB etc.
2. Program related to DOS interrupt and other interrupt.
2. Program related to input and output through standard devices.
3. Program related to Strings.
4. Program related Numbers.
5. Program related to jumping.
6. Program related to conditional jumping.
7. Program related to iteration.
8. Program related to procedure.
9. Program related to macros.

#### 1MSc3- Data Structure and Programming in C++

1. Program related to encapsulation implementation (Class, Objects etc).
2. Program related to initialization of objects and destroy of objects.
3. Program related to multiple constructors in a class.

4. Program related to Function Overloading.
5. Show the Utility of Static members.
6. Implementation of Operator Overloading.
7. Implementation of Type Conversion.
8. Implementation of Inheritance.
9. Implementation of Virtual Functions.
10. Implementation of Templates.

### **1MSc5-Computer Oriented Statistical & Numerical Analysis**

1. Program related to probability distribution and statistical interface.
2. Correlations and Regression Analysis.
3. Analysis of Variance & Time Series Analysis.
4. Floating point Arithmetic.
  5. Program related to Numerical Differentiation.
  - 6.

**semester II**  
**Paper I: 2MSC1**  
**Subject: Compiler Design**

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**UNIT I:**

**10 Lectures**

Introduction to Automata Theory : Mathematical Preliminaries : Sets and relations, Graphs languages; alphabets, strings, recursive definitions, regular expressions, Finite automaton (FA) non deterministic FA, FA with null strings, Transition graphs, FA with outputs Conversations of FA and regular expressions, Regular languages and their closure properties pumping lemma for regular languages, Non regular languages.

**Unit II**

**10 Lectures**

Push down Automata Theory: Context free grammars, context free languages (CFL), Deviation trees, Chomsky normal form ambiguity in CFG, Pushdown Automata (PDA), PDA and CFL equivalence, pumping lemma for CFL, non CFL, closure properties of CFL.

**Unit III**

**10 Lectures**

Finite Automata and Lexical analysis, Intermediate code generation, The role of the lexical analyzer, regular expression, finite automata, from regular expression to finite automata, minimizing the number of states of a DFA, A language for specifying lexical analyzer, implementation of lexical analyzer using lexical analyzer, implementation of lexical analyzer using lex.

**Unit IV**

**10 Lectures**

Context – free grammars, derivation of parse trees, capabilities of CFGs, Parsers, shift-reduce parsing, operators precedence parsing, top-down parsing, predictive parsing, LR parsers, the canonical collection of LR (0) items, constructing SLR parsing tables, simple parsing exercises using yacc.

**Unit V**

**10 Lectures**

Syntax-directed translations schemes, implementation of syntax-directed translators, intermediate code, postfix notation, parse trees and syntax trees, three-address code, quadruples and triples, translations of assignment statements, Boolean expressions, statements that alter the flow of control, cost fix translations, translations with the top-down parser, Symbol tables, the contents of symbol tables, data structures for symbol tables, representing scope information, run time storage administration, implementation of bloc structured languages, storage for block-structured languages.

**Text Books:**

Introduction Computer Theory by Daniel A Cohen,  
Principles of Compiler Design by Alfred V. Aho, Jeffrey D. Ulman.

**Reference Books:-**

Introduction to Automata theory languages and computation by Ulman & Hopcroft,  
Compilers: Principals techniques and tools by Aho, Ravi Sethi, Ulman,  
Lex and Yacc by John R. Levine, Mason,  
Elements of Theory of Computations by Lewis and Popadimitriou

**Websites**

[www.cs.vu.nl/~dick/MCD.html](http://www.cs.vu.nl/~dick/MCD.html)

[www.onesmartclick.com/engineering/compiler-design.html](http://www.onesmartclick.com/engineering/compiler-design.html)

**Semester II**  
**Paper II: 2MSC2**  
**Subject: Operational Research**

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**UNIT I**

**10 Lectures**

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**

**10 Lectures**

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**

**10 Lectures**

Game theory, two person 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  $2 \times n$  and  $m \times 2$  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**

**10 Lectures**

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**

**10 Lectures**

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.

**Websites**

[www.maths.ed.ac.uk/ormsc](http://www.maths.ed.ac.uk/ormsc)

[www.scienceofbetter.org](http://www.scienceofbetter.org)

**Semester II  
Paper III: 2MSC3**

**Subject: Computer Graphics with Multimedia**

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**Unit I**

**10 Lectures**

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**

**10 Lectures**

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**

**10 Lectures**

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**

**10 Lectures**

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**

**10 Lectures**

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

**Websites:**

[www.cc.gatech.edu/gvu/multimedia/nsfmmmedia/cware/graphics/.toc.html](http://www.cc.gatech.edu/gvu/multimedia/nsfmmmedia/cware/graphics/.toc.html)

[www.fit.vutbr.cz/study/branch-l.php?id=3](http://www.fit.vutbr.cz/study/branch-l.php?id=3)

**Semester II**  
**Paper IV: 2MSC4**

**Subject: System Programming (Using Linux)**

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**UNIT I**

**10 Lectures**

What is System Software, Components of system software, Evolution of system software, Translation and Loaders, Assemblers, Assembly process, Design of a Two-Pass Assembler, Macros and Macros Processors.

**UNIT II**

**10 Lectures**

Loading, Linking and Relocation, Linking and Loading Schemes, Program Relocatability, Overview of Linkage Editing, Program Linking Schemes, a Linkage Editor for IBM PC, Object Module Format, Design of Linkage Editor, Linking for Program Overlay.

**UNIT III**

**10 Lectures**

Historical Background of Linux, Structure of Linux, Different Flavors of Linux, Linux Philosophy, Features of Linux, Linux Commands, Internal and External Commands, General Purpose Utilities, the Environment Vi-Editor, Command Relating to File System, pwd, cd, mkdir, ls, cat, cp, rm, mv, lp, wc, od, split, cmp, comm, diff, ps, Running Jobs in Background, kill, nice, at, cron.

**UNIT IV**

**10 Lectures**

Linux Shell, Shell Meta Characters, Shell Variables, System Shell Variables, Export, Profile File and Login File, Shell scripts, Shell Script Arguments, Positional Parameters, Set, Script, Pipes and Redirection, Special Command Line Characters, Special Shell Variables, Conditional Parameter Substitutions, Shifting Positional Parameters.

**UNIT V**

**10 Lectures**

Creation of Shell Scripts, For Loop, Case Statement, While and Until, If Statement, Test Command, Error Checking, Exit Command, Sleep, Wait, Trap Signals, Simple Exercises of Shell Scripts.

**Lab:** Linux Commands and Linux Shell Scripts.

**Text Books:**

1. System Programming and Operating System: S. M. Dhamdhere, Tata McGraw Hill

**Reference Books:**

1. Beginning Red Hat Linux 9: Sandeep Bhattacharya, Simon Whiting
2. Beginning Shell Scripting: Eric Foster-Johnson, John C. Welch

**Websites:**

1. [scorponcity.com/xprog.html](http://scorponcity.com/xprog.html)
2. [www.linuxhotbox.com/howto/HOWTO-INDEX/programming.html](http://www.linuxhotbox.com/howto/HOWTO-INDEX/programming.html)

**Semester II**  
**Paper V: 2MSC5-Oops**  
**Subject: Core Java and GUI**

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**UNIT I**

**10 Lectures**

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**

**10 Lectures**

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.

**UNIT III**

**10 Lectures**

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**

**10 Lectures**

Swings: JApplet, Icon and Labels, Text Fields, Buttons, Combo Boxes, Tabbed Panes, Scroll Panes, Trees, Tables, Exploring Swing.

**UNIT V**

**10 Lectures**

Graphics Programming and Image Processing: File Format, Image Fundamentals, ImageObserver, Double Buffering, MediaTracker, ImageProducer, ImageConsumer, ImageFilter, Cell Animation, Additional Imaging Classes.

**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

**Web Sites:**

[java.sun.com/cgi-bin/java-ports.cgi](http://java.sun.com/cgi-bin/java-ports.cgi)

[www.exampledepot.com](http://www.exampledepot.com)

[www.java2s.com](http://www.java2s.com)

**Scheme of Practical Examination**  
**M.Sc. II Sem**  
**Marks Distribution**

<b>Time- 3 Hrs.</b>		<b>Max. Marks- 25</b>
Practical		15
Record		03
Viva- Voce	05	
Observation Copy		02
<b>Total</b>		<b>25</b>

**List of Practical**

**Paper III: Computer Graphics with Multimedia**

1. Line Drawing Algorithm: Line-DDA, Line-Bresenham's
2. Circle generation
3. Ellipse generation
4. Filling algorithm: Boundary Fill, Flood Fill
5. Generation of a Character: Bitmap Methods
6. Clipping Algorithm: Cohen Sutherland, Liang-barsky
7. Transformation of an object: rotation, Translation, scaling
8. Projections: parallel, perspective

**Paper IV-System Programming (Using Linux)**

1. Arithmetic operations (menu driven)
2. Looping statements
3. Decision statements (if, if-else)
4. Case statements
5. Menu driven: list the file current date, current day
6. Quit from Linux
7. Check if file is ordinary and readable

**Paper V: Core Java and GUI**

1. Programs using classes
2. Programs for creating Packages
3. Programs for Inheritance- Extending Classes
4. Programs for Interfaces and Inner Classes
5. Programs for creating the Applet with HTML Tags and Attributes, Event Handling-Event Listener, Graphics and Text, Using AWT controls, Layout Managers and Menus.
6. Programs for Swings: Icon and Labels, Text Fields, Buttons, Combo Boxes, Tabbed Panes, Scroll Panes, Trees, Tables.
7. Graphics Programming

**M.Sc. III Sem**

**Semester IV  
 Paper I: 4MSC1  
 Subject: Major Project**

**Scheme of Examination**

<b>Subject code</b>	<b>Subject name</b>	<b>Max. Marks</b>	<b>Min. Marks</b>	<b>Practical</b>	<b>Sessional</b>
<b>3MSC1</b>	<b>Computer Networks And Distributed Processing</b>	<b>40</b>	<b>16</b>		<b>10</b>
<b>3MSC2</b>	<b>Relational Database Management System(SQL Programming using Oracle)</b>	<b>40</b>	<b>16</b>	<b>25</b>	<b>10</b>
<b>3MSC3</b>	<b>Artificial intelligence</b>	<b>40</b>	<b>16</b>	<b>25</b>	<b>10</b>
<b>3MSC4-Oops</b>	<b>Subject: Object Oriented Modeling and Design with UML</b>	<b>40</b>	<b>16</b>		<b>10</b>

<b>Semester</b>	<b>Major Project</b>	<b>Maximum Marks/Paper</b>
<b>IV</b>	<b>Valuation</b>	
	<b>1. Synopsis</b> Need & Objective Database Used Environment Outline of Project	<b>50</b>
	<b>2. Modules</b>	<b>50</b>
	<b>3. Project Report</b>	<b>25</b>
	<b>4. Presentation</b>	<b>50</b>
	<b>Viva Voce</b>	<b>100</b>
	<b>Cost Analysis</b>	<b>50</b>
	<b>Total</b>	<b>325</b>

**Semester III**  
**Paper I: 3MSC1**

**Subject: Computer Networks and Distributed Processing**

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**UNIT I**

**10 Lectures**

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**

**10 Lectures**

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**

**10 Lectures**

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**

**10 Lectures**

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**

**10 Lectures**

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

**Web Site:**

[www.wikipedia.org/wiki/Computer\\_network](http://www.wikipedia.org/wiki/Computer_network)

[www.amazon.com/Computer-Networks-Andrew-S-Tanenbaum/dp/0133499456](http://www.amazon.com/Computer-Networks-Andrew-S-Tanenbaum/dp/0133499456)

**Semester III**  
**Paper II: 3MSC2**

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

**Duration: 3 Hours**

**Max:40**

**Min: 16**

**UNIT I**

**10 Lectures**

**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**

**10 Lectures**

**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**

**10 Lectures**

**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**

**10 Lectures**

**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**

**10 Lectures**

**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

**Web Sites:**

[www.psoug.org/reference/operator.html](http://www.psoug.org/reference/operator.html)

<http://www.csee.umbc.edu/help/oracle8/server.815/a67779/ch1.htm>

**Semester III**  
**Paper III: 3MSC3**  
**Paper III: Artificial Intelligence**

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**Unit I**

**10 Lectures**

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**

**10 Lectures**

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**

**10 Lectures**

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**

**10 Lectures**

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

**Unit V**

**10 Lectures**

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

**Websites**

[www.formal.stanford.edu/jmc/whatisai](http://www.formal.stanford.edu/jmc/whatisai)

[library.thinkquest.org/2705/](http://library.thinkquest.org/2705/)

**Semester III**  
**Paper IV: 3MSC4-Oops**  
**Subject: Object Oriented Modeling and Design with UML**

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**UNIT I**

**10 Lectures**

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**

**10 Lectures**

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**

**10 Lectures**

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**

**10 Lectures**

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**

**10 Lectures**

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

**Web Sites:**

[http://en.wikipedia.org/wiki/Object-oriented\\_analysis\\_and\\_design](http://en.wikipedia.org/wiki/Object-oriented_analysis_and_design)

<http://www.ratio.co.uk/W1.html>

<http://burks.bton.ac.uk/burks/pcinfo/progdocs/occourse/ocnotes.htm>

**Semester III**  
**Paper V: 3MSC5-Oops**  
**Subject: Advance Java**

**Duration: 3 Hours**

**Max: 40**

**Min: 16**

**10 Lectures**

**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**

**10 Lectures**

Multithreading: What are Threads?, Interrupting Threads, thread life cycle, Thread States, and Thread Properties, Inter thread communication and synchronization, Database Programming: The Design of JDBC, Basic JDBC Programming Concepts, Query Execution, Scrollable and Updatable result sets, Row Sets, Transactions.

**Unit III**

**10 Lectures**

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**

**10 Lectures**

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**

**10 Lectures**

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

**Web Sites:**

**Scheme of Practical Examination**  
**M.Sc. III Sem**

**Marks Distribution**

<b>Time- 3 Hrs.</b>	<b>Max. Marks- 25</b>
Practical	15
Record	03
Viva- Voce	05
Observation Copy	02
<b>Total</b>	<b>25</b>

**List of Practicals**

**Paper II: Relational Database Management System (SQL Programming using Oracle)**

- Creation of table
- Deletion of rows and table
- Insertion of records
- Selection of tuples with criteria
- Updation of records and table
- Renaming columns
- Range searching
- Pattern matching
- Oracle functions
- Views
- Joins
- Granting & Revoking Permission.

**Paper III: Artificial Intelligence**

1. WAP for finding all ancestors of a child.
2. Find the relation:
  - (i) Offspring
  - (ii) Grand parent
  - (iii) Predecessor
  - (iv) Sister
  - (v) Mother
3. Relation between:
  - (i) Uncle
  - (ii) Sibling
  - (iii) Cousin
4. Find a capital of country and state.
5. Likes regarding-
  - (i) Food
  - (ii) Actor
6. Conversion of read number 1-5 into word.
7. Finding the relation:
  - (i) Parent
  - (ii) Husband
  - (iii) Father-in-Law
8. Displaying of animals with features.
  - (i) Dark and Big
  - (ii) Dark and Small
  - (iii) Light and Big

- (iv) Light and Small
- 9. Finding the relation between:
  - (i) Daughter
  - (ii) Happy
  - (iii) Unhappy
- 10. Find the following enquiry of guest:
  - (i) Room
  - (ii) Surname
  - (iii) Checkindates

**Paper V: Advance Java**

1. Develop an application in java to insert the record in the existing database.
2. Develop an application in java to update the existing record & display the set of record.
3. Develop an application in java to read records from two different relation & merger records in the separate relation (table).
4. Develop an application to create event driven calculator in javascript.
5. Create an application in javascript having following format :

Name

Address

Comment

Hobbies

Submit	Cancel
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Submit the record in database by using submit button.

6. Create an application for RMI client & RMI server.
7. Create an application for TCP/IP communication between client & server.
8. Develop an application which handles httpServlet request & response in javaservlet.
9. Write an application using java servlet to transfer the record from the form to the database.
10. Write an application using cookies management.
11. Develop a program to find the factorial of number in javascript.
12. Develop a program to find the prime number.

**Semester IV**  
**Paper I: 4MSC**  
**Subject: Major Project**

Semester	Major Project	Maximum Marks/Paper
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<b>IV</b>	<b>Valuation</b>	
	<b>1. Synopsis</b> Need & Objective Database Used Environment Outline of Project	<b>50</b>
	<b>2. Modules</b>	<b>50</b>
	<b>3. Project Report</b>	<b>25</b>
	<b>4. Presentation</b>	<b>50</b>
	<b>Viva Voce</b>	<b>100</b>
	<b>Cost Analysis</b>	<b>50</b>
	<b>Total</b>	<b>325</b>