

**M.Sc. Computer Science (Semester System)**  
**SCHEME OF EXAMINATION**

**ELIGIBILITY FOR ADMISSION**

Graduates possessing 50% marks in any faculty of any statutory university shall be eligible for admission to the M.Sc. Computer Science Course (Relaxation to SC/ST etc. as per Prevailing Rules)

**PASS CRITERIA**

For passing in the examination, a candidate is required to obtain at least 25% in each paper and 36% marks in the total aggregate in theory at the Previous and Final Examination separately and 36% marks in practical separately.

**CLASSIFICATION OF SUCCESSFUL CANDIDATE**

<b>Class</b>	<b>Total Marks</b>
First Class	60% and above
Second class	48% and above
Pass Class	36% and above
Fail	Below 36%

**.Teaching and Examination scheme for**  
**M.Sc. Computer Science**  
**Session 2015-16**  
**Semester I**

		<b>Exam Hours</b>	<b>Internal</b>	<b>External</b>
MCS 101	Computer Organization	3	25	75
MCS 102	Programming with C++	3	25	75
MCS 103	Relational Database Management System	3	25	75
MCS 104	Operating System	3	25	75
			<b>100</b>	<b>300</b>
<b>Total of Theory</b>				<b>400</b>
<b>Paper Name(Practical)</b>				
MCS 105	Lab MCS 102	3	25	75
MCS 106	Lab MCS 103	3	25	75
			<b>50</b>	<b>150</b>
<b>Total of Practical</b>				<b>200</b>
<b>Grand Total(Theory+ Practical)</b>				<b>600</b>

**Teaching and Examination scheme for  
M.Sc. Computer Science  
Session 2015-16**

**Semester II**

<b>Paper Name(Theory)</b>		<b>Exam Hours</b>	<b>Internal</b>	<b>Max Marks</b>
MCS 201	Data Communication and Networking	3	25	75
MCS 202	Software Engineering	3	25	75
MCS 203	Visual Basic	3	25	75
MCS 204	Data and File Structure using C/C++	3	25	75
			<b>100</b>	<b>300</b>
<b>Total of Theory</b>				<b>400</b>
<b>Paper Name(Practical)</b>				
MCS 205	Lab MCS 203	3	25	75
MCS 206	Lab MCS 204	3	25	75
			<b>50</b>	<b>150</b>
<b>Total of Practical</b>				<b>200</b>
<b>Grand Total(Theory+ Practical)</b>				<b>600</b>

**. . Teaching and Examination scheme for  
M.Sc. Computer Science  
Session 2016-2017**

**Semester III**

<b>Paper Name(Theory)</b>		<b>Exam Hours</b>	<b>Internal</b>	<b>Max Marks</b>
MCS 301	Linux	3	25	75
MCS 302	Discrete Mathematics	3	25	75
MCS 303	Internet & Web Programming	3	25	75
MCS 304	JAVA	3	25	75
			<b>100</b>	<b>300</b>
<b>Total of Theory</b>				<b>400</b>
<b>Paper Name(Practical)</b>				
MCS 305	Lab MCS 303	3	25	75
MCS 306	Lab MCS 301 & MCS 304	3	25	75
			<b>50</b>	<b>150</b>
<b>Total of Practical</b>				<b>200</b>
<b>Grand Total(Theory+ Practical)</b>				<b>600</b>

**Teaching and Examination scheme for  
M.Sc. Computer Science  
Session 2016-2017**

**Semester IV**

<b>Paper Name(Theory)</b>		<b>Exam Hours</b>	<b>Internal</b>	<b>Max Marks</b>
MCS 401	Advance Java Programming	3	25	75
MCS 402	Computer Graphics	3	25	75
MCS 403	(a) Artificial Intelligence (b) Current Trends & Technologies (c) Cyber Security	3	25	75
<b>Total of Theory</b>				<b>300</b>
<b>Paper Name(Practical)</b>				
MCS 405	Lab MCS 401& 402	3	25	75
MCS 406	Project & Dissertation	3	25	75
<b>Total of Practical</b>				
<b>Grand Total(Theory+ Practical)</b>				<b>600</b>

**Note:**

- Student has option to choose one paper from MCS 403(a), MCS 403(b), and MCS 403(c) in M.Sc. Computer Science IV Semester.
- Each practical exam is to be conducted by two examiners one External and one Internal. External examiner should be senior lecturer from jurisdiction of other universities. Marks distribution for Practical of 100 marks is as under
 

a) Practical Examination exercise of 3 questions	45 marks
b) Viva-Voce	15 marks
c) Laboratory Exercise File	15 marks
- Marks distribution for Project of 100 marks is as under
 

a. External Evaluation-	
i. Project Dissertation	45 marks
ii. Presentation	15 marks
iii. External Viva Voce	15 marks
b. Internal Evaluation- Dissertation	
	25 Marks
- The student has to complete two months career oriented summer training from any firm/organization. If the student does not get chance to go for training, he/she can chose a research topic and can complete dissertation under the supervision of any of the faculty in his college.
- The student who has opt training, has to provide a signed certificate from the firm/organization authority stating that the student has spent two months as a trainee in his organization/firm. The student who have opt dissertation, has to submit his/her dissertation report with a certificate from his supervisor.
- In both the cases student has to present his work in front of all the faculty members and fellow students at the starting of the next session.

## **Scheme of Examinations**

1. English shall be the medium of instructions and examination.
2. Examinations shall be conducted at the end of each Semester as per the Academic Calendar notified by the Maharaja Ganga Singh University of Bikaner.
3. The system of evaluation shall be as follows:
  - 3.1 Each theory and practical paper will carry 100 marks (75 marks external + 25 marks internal). The evaluation scheme shall comprise external evaluation of 75 marks and internal evaluation of 25 marks in theory as well as in practical's. Any student who fails to participate in classes, Seminar, practical and laboratory work will be debarred from appearing in the end semester examination
  - 3.2 The duration of written examination for each paper shall be of three hours and Practical examination shall be for 3 hours duration in total.
  - 3.3 The minimum attendance required by a candidate will be as per university rules.
4. As regards Project Work/Dissertation, the scheme of evaluation shall be as follows:
  - 4.1 The candidate has to submit dissertation and project report in a bound form in three copies at the end of semester 4. Project report will be evaluated by an external examiner. Total marks for project shall be 100 (75 external + 25 internal marks).
5. Regular as well as Ex-Students shall be permitted to appear/reappear/improve in courses of odd semesters only at the end of odd semesters and for even semester with the even and as per Maharaja Ganga Singh University rules.
6. Pass percentage, award of degree, scope for improvement – as per Maharaja Ganga Singh University rules and regulations.

## **Instructions for Paper Setters**

The question paper will consist of three parts. Candidate will be required to attempt all the parts.

Part A (10 Marks): It will consist of 10 questions, with at least three questions from each section of syllabi. Candidates will be required to attempt all the questions carrying one mark. Answer to any of the questions should not exceed 20 words.

Part B (20 Marks): It will consist of six questions (two questions from each section of syllabi). Candidates will be required to attempt any four questions. Each question carries five marks. Answer to any of the questions should not exceed 50 words.

Part C (45 Marks): It will consist of three questions with A and B parts (One question to be set from each section of syllabi). Candidates will be required to attempt all the three questions selecting either part A or B. Each question carries fifteen marks. Answer to any of the questions should not exceed 400 words.

### **Semester I**

Duration: 3 Hours

MM: 100

## **MCS-101 Computer Organization**

### **Section I**

Digital computer, Data Type, Number System, Complements, Logic gate, Boolean Algebra, Map Simplification, Combinational circuit, Sequential circuit, Decoders, Multiplexers, Flip Flops , Registers, Counters. Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

### **Section II**

Input- Output organization: Input-Output Interface, Asynchronous Data Transfer, Mode of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor (IOP), Serial Communication. Central Processing Unit: Stack Organization, Instruction formats, Addressing Modes, Data Transfer and manipulation, program Control, Reduced Instruction Set Computer (RISC), CISC Characteristics, RISC Characteristics. Control Design-hardwired Control, Micro-Programmed.

### **Section III**

Microprocessor Architecture: Introduction, Intel 8085- ALU, Timing and Control Unit, Register, Data and Address Bus, Pin Configuration, Intel 8085 Instruction, Opcode and Operand Instruction Word Size , Instruction Cycle.

### **Reference:**

1. Computer System Architecture, By M. Morris Mano (Pearson, Prentice Hall)
2. Fundamentals of Microprocessor and Microcomputes By B.Ram (Danpat Rai Publications)
3. Microprocessor Architecture, Programming, and Application With the 8085 By Ramesh Gaonkar (PENRAM)
4. Computer Architecture by J.P. Hayes, TMH

### **Section I**

**Object Oriented System** Object Oriented Paradigm: Need, Characteristics, Applications. Basics of C++, Branching, looping and jump Statements. Functions – need, types, passing arguments by value and reference, recursive function, pointers and functions. Array: need, types, array and function, array and pointers.

### **Section II**

Structures: need, structures and Pointers, Class: Basics, static data members, Inline Function, Constructors and Destructors: need, types, usage, Inheritance - need, usage, types, compile time and run time polymorphism, overloading and overriding, virtual function, friend function, abstract class. Operator overloading: need, rules, through member function and through friend function.

### **Section III**

String handling, String class, Templates, Searching and Sorting: Searching: Linear Search, Binary Search. Sorting: Insertion Sort, Selection Sort, Quick Sort, Bubble Sort, Heap Sort, Shell Sort, Merge sort, Radix Sort, Counting Sort, Bucket Sort.

### **References:**

1. Object Oriented Programming With C++ By E. Balagurusamy (Tata Mcgraw Hill)
2. C++ The Complete Reference By Herbert Schildt (Tata Mcgraw Hill)
3. Object Oriented Programming With C++ By Schaum Series (Tata Mcgraw Hill)
4. How to Program by Dietel and Dietel

### **Section I**

Introduction to DBMS, Components, Structure, Different Views of Data, Advantage, Data Models : Hierarchical, Network, Relational, Object Relational Models, Codd's Rules, E-R Model : Entities, Attributes, Associations, Relationship, Keys, Normalization, E-R Diagram, Set Theoretical Operations Relational Calculus: Structure of Relational Database, Relational Algebra, Modification of a Database: Deletion, Insertion, Updation, Selection, View, Tuple Relational Calculus, Domain Relational Calculus

### **Section II**

Concurrency Control, Locking Scheme, Dead Lock and Its Resolution, Atomicity, Recovery: Reliability, Transactions, Reflecting Update to the Database and Recovery, Buffer Management, Virtual Memory and Recovery, Disaster Recovery. Concurrency Management: Serializability, Concurrency and Recovery.

### **Section III**

Introduction to SQL, DDL, DML, DCL, Data Types, Table: Constraint, Domain, Entity, Referential Integrity, Create, Alter, Drop Table, Commands: Insert, Update, Delete With Where, Queries and SQL Functions, Sequence, View, Index, Locks, Granting Privilege. Introduction to PL/SQL, Advantages, Character Set, Data Types, Control Structure, Transaction, Cursor, Locks, Error Handling Database, Procedure and Function, Triggers.

### **References:**

1. Database System Concepts By Korth, Silberschatz, Sudarshan (Mcgraw Hill)
2. An Introduction to Database Systems By Bipin C. Desai (Galgotia Publication.)
3. SQL, PL/SQL Programming By Ivan Bayross (BPB)
4. Commercial Application Development Using Oracle Developer 2000 By Ivan Bayross (BPB)

### **Section I**

Introduction to Operating System, Structure, Functions, Types. Process: Concept, Process Control Block (PCB), Process States and Relationship, Process Switch, Threads, System call, Process Scheduling: CPU Scheduling, Pre-Emptive Scheduling, Scheduling Criteria, CPU Utilization, Throughput, Turnaround Time, Waiting Time, Response Time, Scheduling Algorithms- FCFS, SJF, Priority Scheduling, Round Robin Scheduling, MLQ Scheduling, MLQ With Feedback

### **Section II**

Process Co-Ordination: Synchronization, Critical Section Problem, Semaphores, Deadlock and Starvation, Readers and Writers Problem, Deadlock: Characterization, Prevention, Avoidance, Banker's Algorithm, Recovery from Deadlock

### **Section III**

Memory Management: Swapping, Paging, Structure of the Page Table, Segmentation Virtual Memory Management – Demand Paging, Page Replacement- Basic Page Replacement, FIFO), LRU, Optimal. Concurrency Control

### **References:**

1. Operating System Principals By Abraham Silberschatz, Peter Baer Galvin (John Wiley And Sons Inc.)
2. Operating System Concepts And Design By Milan Milen Kovic (Tata Mcgraw Hill)
3. Modern Operating System Andrew S. Tanenbaum, Herbert Bos



### Section I

Data Communication, Networks, Protocol and Standards, Topology, **Transmission Mode** : Simplex, Half Duplex, Full Duplex, LAN, MAN, WAN, the OSI Model, TCP/IP Protocol, Analog and Digital Transmission, **Transmission Impairment**: Attenuation, Distortions, Noise-Performance-Throughput, Propagation Speed, Propagation Time.

### Section II

**Transmission of Digital Data**: Asynchronous and Synchronous Transmission, Switching-Circuit Switching, Packet Switching, Message Switching. **Transmission Media**: Guided, Unguided. **Encoding and Modulating**: Digital to Digital Conversion, Analog to Digital, Digital to Analog, Analog To Analog. **Data Link Control**: Line Discipline-Enquiry Acknowledge, Poll/Select, **Flow Control** : Stop And Wait, Sliding Window, **Error Control** : Automatic Repeat Request (ARQ), Stop and Wait ARQ, Sliding Window ARQ. **Medium Access Control** : IEEE 802.3, IEEE 802.4, IEEE 802.5, FDDI (Fiber Distributed Data Interface),

### Section III

**Bridges** : Simple, Multiport, Transparent, Spanning Tree Algorithm, Source Routing. **Routers**: Routing Concepts, Routing Algorithm, Distance Vector Routing, Link State Routing, Flooding, Dijkstra Algorithm. Congestion Control, Congestion Avoidance, Discarding, Leaky Bucket Algorithm, **Firewall**: Benefit and Type of Firewall. **Internet** : Overview of TCP/IP, Network Layer – IP Addressing, Subnetting, Masking, IPV6 (Internet Working Protocol Version 6). **Transport Layer** : End to End Delivery Addressing, Reliable Delivery, Flow Control, Multiplexing

### References:

1. Data Communication and Networking By Forozan (Tata McGraw Hill)
2. Data Communication And Computer Networks By Dr. Madhulika Jain, Satish Jain (BPB)
3. Network Essentials By James Chellis, Charles Perkins,Matthew Strebe (BPB)

### Section I

**Software** : Software Characteristics, Software Process, Process Characteristics, **Software Process Model** : Linear Sequential Model, Prototyping Model, Spiral Model, Software Quality, McCall's Quality Factors, **Software Requirement Analysis and Specification (SRS)** : Need Characteristics and Components.

### Section II

**Planning a Software Project:** COCOMO Model, Project Monitoring Plan and Risk Management. **Design Principle** : Abstraction, Modularity, Cohesion and Coupling, **Software Management** : Size Oriented Matrices, Function Oriented Matrices. **Testing** : Testing Fundamental, Functional Testing (Black Box), Structural Testing (White Box), Alpha And Beta Testing, **Testing Process** : Comparison of Different Testing, Level of Testing.

### Section III

**SCM** : Need for SCM, **Version control** : Introduction to SCM process – Software configuration items. Concept of Software Re-engineering and Object Oriented Software Development.

#### Reference:

1. "An Integrated Approach to Software Engineering", Pankaj Jalote, IIIrd Edition, Narosa Publishing House.
2. "Software Engineering: Principles and Practices", Waman S. Jawadkar, Tata McGraw-Hill.
3. "Software Engineering: A Practitioner's approach", Roger S. Pressman, McGraw-Hill.
4. "Software Engineering:", Ian Sommerville, Pearson Education.
5. "Fundamentals of Software Engineering", Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, PHI.
6. S. L. Pfleeger, Software Engineering: Theory and Practice, Pearson Education.

### Section I

**Visual Basic:** Integrated Development Environment of Visual Basic, Event Driven Programming, Controls and Events, Data Types, Variables, Constants, Control Flow Statements, Loop Statements Exit Statements, Arrays, Controls Array, Collections, procedures, Function, Recursive Functions, Working with Forms

### Section II

**Controls:** Textbox, List Box, Combo Box, Options Button, Check Box, Timer, Scroll Bar, Slider, Progress Bar, Tool Bar, Status Bar. **Designing menus:** Menu Bar, ContextMenu, access & shortcut keys; Common Dialogs Control: Open, Save, Print, Color, Font, Help, MsgBox & Inputbox. Multiple File Selection, Tree and List View Controls, Drawing: Graphics Controls, Co-ordinate Systems, Graphics Methods. Manipulating Color and Pixels with VB

### Section III

Modules, Testing And Debugging Techniques. **Database programming:** Data controls, Data Aware Controls, Data Manager, **DAO (Direct Access Objects):** Methods and Connectivity, ADO (ActiveX Data Objects), Connectivity with Oracle, Advantages of ADO over DAO, ODBC, Reports Writing: Data Report, Crystal Reports.

#### References:

1. Mastering Visual Basic 6 By Evangelos Petroustos (BPB)
2. Visual Basic 6 programming- Black Book By Steven Holzner (Dream Tech Press)
3. Beginners Guide to Visual Basic 6 By Reeta Sahoo and G.B. Sahoo (Khana Publication House)

### Section I

**Algorithm:** Efficiency & Analysis Algorithm: Time and Space complexity of Algorithm.  
**Abstract Data Type: Linked List-** Linear, Circular, Two Way List, Basic Operation on Linked Lists, Application of Linked List.

### Section II

**Stack :** primitive operations, stack Application- Infix, postfix, prefix and Recursion Array and Linked Representation of Stack. **Queue:** Primitive operation, Circular Queue, Priority Queue, D-queue, Array and Linked Representation of Queue.

### Section III

**Trees :** Basic terminology, **Binary Tree :** Representation as Array and link List, Basic operation, **Tree Traversal :** Inorder, Preorder, Postorder, Application of Binary Tree. B-tree, Height Balance Tree(AVL Tree) **Graph :** Basic Terminology, Directed, Undirected, Weighted, Representation of Graphs, **Graph Traversal :** Depth First Traversal, Breadth First Search.

### References:

1. Expert Data Structure with 'C' By R.B Patel (Khana Book Publishing Co.(P))
2. Data structure By Lipschutz (Tata McGraw Hill)
3. Data Structure By Yashvant Kanitkar (BPB)
4. An Introduction to Data Structures with Applications By Jean-Paul Tremblay, Paul G.Sarerson (Tata McGraw Hill)
5. Data Structure Using C and C++ By Yedidyah Langsam, Moshe J.Augenstein, Arora M. Tenenbaum (Prentice- Hall India)

### **Section I**

LINUX: Introduction File System, File and Directory Structure, Inode and Block Storage. LINUX commands, File Permission, File Related Commands, Shell and Kernel. Process- Init, Getty and Login Process, Killing, Changing Priority. Partitioning the Hard drive for Linux, Installing the Linux system.

### **Section II**

System administration: Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes. Creating and mounting file system, checking and monitoring system performance file security & Permissions, becoming super user using su.

### **Section III**

Getting system information with uname, host name. Backup and restore files, installing and removing packages with yum rpm command. VI Editor. Shell Script: Variables, File Name Expansions, Shell Commands, Looping and Making Decisions.

### **References**

1. Teach yourself unix By Kevin Reichard, Eric F Johnson (BPB)
2. Using unix By Philip Laplante (Jaico Publishing House)
3. Unix concept By Yashwant Kanetkar (BPB Publication)

### Section I

**Set Theory:** Sets and Elements, Universal Set, Empty Sets and Sub Set, Venn Diagrams, Set Operation, Algebra of Sets and Duality, Finite and Infinite Sets and Counting Principle, Classes of Sets, Power Sets, Partition, Mathematical Induction, Multi Sets, Logic and Propositional Calculus- Propositions and Compound Propositions, Basic logic operation, Truth Tables, Tautologies and Contradictions, Logical Equivalence, Algebra of Propositions, Logical Implication, Normal Forms. **Relations:** Product Set, Relation, Pictorial Representation of Relations, Matrix Representations, Type of Relations. Closure Properties, Equivalence Relations

### Section II

**Order Sets:** Properties, Hasse Diagram, Consistent Enumeration, Supremum and Infimum, Isomorphic Order Sets, Well Order Sets. Boolean Algebra- Basic Definition, Duality, Basic Theorems, Sum of Products Form, Logic Gates and Circuits, Karnaugh Map. **Counting:** Basic Counting Principle, Factorial Notations, Binomial Coefficients Pascals's Triangle, Binomial Theorem, Permutations, Combinations, Pigeonhole Principle, Ordered and Unordered Partitions.

### Section III

**Graph:** Directed and Undirected graph, multigraph, Sub Graph , Isomorphic & Homomorphic Graph Hamilton Graphs, Complete, Regular and Bipartite Graphs, Tree Graphs. Basic Definitions, Sequential Representation of Directed Graph, Digraph and Relations, Adjacency Matrix, Warshall's Algorithm. Linked Representation of Directed Graph, Depth First Search(DFS) and Breath First Search(BFS), Binary Tree , Rooted Tree , Spanning Tree , Kruskal's and Prims Algorithms.

### References:

1. Discrete Mathematics, Schaum's Series By Seymour LipSchutz, Marc Lipson, (Tata McGraw Hill)
2. Discrete Mathematics By Vinay Kumar (BPB)
3. Discrete Mathematical Structure By Dr. K.C.Jain, Dr. M.L. Rawat(College Book Centre)

### **Section I**

Internet Basics: Evolution of Internet, Basic internet terms ( Client, Server, MODEM, Web site, Search engine, Browser, URL, ISP, Web server, Download & Upload, Online & Offline etc), Internet applications (Remote login, VoIP, Video Conferencing, Audio-Video streaming, Chatting etc).FTP and its Usages; Types of wireless communication ( Mobile, WiFi, WiMAX, Bluetooth, Infrared ), Anatomy of an e-mail Message, basic of sending and receiving, E-mail Protocol;

### **Section II**

Introduction to World Wide Web: Working of Web Browsers, Its functions, category, Hyper Text Transfer Protocol (HTTP); Component of Web Publishing, Domain Name Registration, Space on Host Server for Web Site, HTML: Designed Tools, HTML Editors, Issue in Web Site Creations and Maintenance, Elements of HTML & Syntax, Building HTML Documents, Backgrounds, Formatting tags, Images, Hyperlinks, div tag, List Type and its Tags, Table Layout, , Use of Frames and Forms in Web Pages.

### **Section III**

CSS: Elements of Style Sheets, Using Embedded Style Sheets and Linked Style Sheets, Inline Style Sheets, using Classes, Style Sheet Precedence, Div and Span. Java Script: Working with Variables, Operators, Control Structures, Build-in functions. Outputting to the browser, images, rollovers, handling events. Uses of Client side; Java Script and Server Side java script; VB Script : Working with Variables, Operators, Control Structures, Built-in Functions.

### **References**

1. Internet and Web Page Designing By V.K Jain (BPB)
2. Web Enabled Commercial Application Development Using HTML, DHTML, Java script, Perl CGI By Ivan Bayross (BPB)

### **Section I**

C++ v/s Java, Java, Internet and www, Java Support System, Java Environment, Java Virtual Machine, Java Program Structure, Tokens, Constant and Variables, Data Types, Scope of Variables, Type Casting, Operators and Expression; Conditional Statements and Loop Statements. Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Method Overloading, Static Member, Nesting of Methods, Inheritance: Extending a Class, Overriding Methods, Final Variables and Methods, Abstract Methods and Classes, Visibility Control.

### **Section II**

Arrays: One Dimensional and Two Dimensional, Strings, Vectors, Wrapper Classes, Defining Interface, Extending Interface, Implementing Interface, Accessing Interface Variables, System Packages, Adding a Class to a Package, Using System Package, Adding a Class Into Packages, Hiding Class.

### **Section III**

Creating Threads, Extending the Threads Class, Stopping and Blocking a Thread, Life Cycle Of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the Runnable Interface; Local and Remote Applets V/s. Applications, Applet Life Cycle, Applet Tag, Adding Applet to HTML File; Passing Parameters to Applets, Getting Input From User.

### **References**

1. The Complete reference Java Ninth Edition By Herbert Schildt (Tata McGraw Hill)
2. Introduction to Java Programming, Comprehensive Version (9th Edition) by Y. Daniel Liang, Prentice Hall
3. Core Java Volume I--Fundamentals (9th Edition) by Cay S. Horstmann, Gary Cornell, Prentice Hall
4. Beginning Programming with Java For Dummies by Burd, For Dummies; 3 edition
5. Effective Java by Joshua Bloch, Second Edition,
6. Java: A Beginner's Guide, Sixth Edition: A Beginner's Guide by Herbert Schildt, McGraw-Hill Osborne MediaProgramming in JAVA By E. Balagurusamy (TMH)
7. JAVA 2 programming Black Book By Steven Holzner et al. (Dreamtech Press)
8. AspectJ in Action By Ramnivas Laddad (Manning) (Willey DreamTech India New Delhi)



### Section I

**AWT** : AWT Classes, Working With Frame Windows, Working With Graphics, Working With Colour, Adding And Removing Controls, Responding To Controls, Labels, Buttons, Checkbox, Checkbox Group, Choice Control, Lists, Scroll Bars, Text Field, Text Area. Menus, Dialog Box Handling Events. **Swings** : Icons and Labels, Text Field, Buttons, Combo box.

### Section II

**JDBC** : Class Methods, JDBC Components, Driver, Connecting to Database, Processing Results. Limitations of OOP; Servlet fundamentals : architecture, life cycle of a Servlet, initialization, Servlet and HTML, retrieving data in Servlet, GET and POST methods; Basics of networking using Java.

### Section III

**Java Beans**: Beans Architecture; **Problem in Modularization of cross cutting concerns**: scattering and Tangling, Introduction to Aspect-Oriented Programming(AOP), Separation of cross cutting concerns, Concept of Aspect, Introduction of AspectJ, Advantages of AOP Methodology.

### References

1. The Complete reference Java Ninth Edition By Herbert Schildt (Tata McGraw Hill)
2. Introduction to Java Programming, Comprehensive Version (9th Edition) by Y. Daniel Liang, Prentice Hall
3. Core Java Volume I--Fundamentals (9th Edition) by Cay S. Horstmann, Gary Cornell, Prentice Hall
4. Beginning Programming with Java For Dummies by Burd, For Dummies; 3 edition
5. Effective Java by Joshua Bloch, Second Edition,
6. Java: A Beginner's Guide, Sixth Edition: A Beginner's Guide by Herbert Schildt, McGraw-Hill Osborne Media Programming in JAVA By E. Balagurusamy (TMH)
7. JAVA 2 programming Black Book By Steven Holzner et al. (Dreamtech Press)
8. AspectJ in Action By Ramnivas Laddad (Manning) (Wiley DreamTech India New Delhi)

### **Section I**

Interactive graphics, Passive graphics, advantage of interactive graphics, Introduction to Computer Graphics: hardware and software requirement of computer graphics, Input and Output Devices of Computer Graphics. Graphics Standards : GKS, PHIGS and requirements of Graphics software Standards, Color Models (RGB, CMY, HSV).  
Scan Conversion, Point, Line, Circle, Ellipse, Representation of Various Line Drawing Algorithm, Circle Drawing Algorithm, Ellipses and Polygon Drawing Algorithm.

### **Section II**

2D Transformation, Translation, Rotation, Scaling, Homogenous Co-ordinates and Matrix Representation of 2D Transformation, Composite Transformation, Clipping, Method of Line Clipping, Polygon Clipping, and Exterior Clipping, Bezier and B-Spline Curve.  
3D Graphics, Matrix Representation of 3D transformations, Translation, Rotation, Scaling, Composite Transformation.

### **Section III**

Projection, Perspective and Parallel Projection, Visible Surface Detection Methods. Back-face Deletion, Depth Buffer method, Scan-Line method, Depth Sorting method, Area subdivision method. Shading Modelling, Shading Model for Polygons, Surface details, Shadows, Transparency. Solid Modeling- Regularized Boolean set Operation, Primitive Instancing, Boundary Representation.

### **References:**

1. Computer Graphics (Principles and Practice) by Foley, van Dam, Feiner and Hughes, Addison Wesley (Indian Edition)
2. Computer Graphics by D Hearn and P M Baker, Printice Hall of India (Indian Edition).
3. Mathematical Elements for Computer Graphics by D F Roger.
4. Introduction to Computer Graphics By Krihsnamurthy N (Tata McGraw Hill
5. Theory and Problems of Computer Graphics (Schaum's Outline) By Zhigang X. and Plastock Ra. (Tata McGraw Hill)

Duration: 3 Hours

MM: 50

**MCS-403(a)** Artificial Intelligence

### **Section I**

**Overview of Artificial intelligence:** Defining the problem as a state and space search, Production system, Control Strategies, Knowledge Representation: Using Predicate Logic, computable Function and Predicates, Resolution. **Knowledge :** Procedure V/S Declarative Knowledge, Matching, Control Knowledge, Probability and Byes Theorem, Certainty factors, and Rule based System, Frames, Frames, Scripts, and Semantic Nets.

### **Section II**

**Search and control strategies :** Preliminary concept, Uniform and Blind search, breadth first search, depth first Search, A, A\*, AO\*, Performance Comparison of various search techniques. **Introduction to PROLOG programming :** Syntax for Predicate calculus programming. Abstract Data Types (ADT) in PROLOG. Meta-predicates, Types and Unification, Meta Interpreters, Semantic Nets and Frames in PROLOG.

### **Section III**

**Expert System :** Introduction, Features Applications Expert System Shells, Rule Based System Architecture, Non-Production System Architecture, Frame Architecture, Decision Tree Architecture, Black Board System Architecture, Knowledge System Building Tools.

### **References:**

1. Artificial Intelligence By Rich And Knight (Tata McGraw Hill)
2. A Stubble Field Artificial Intelligence By George F. Luger William (The Benjamin/Cummings Publishing Company, Inc.)
3. Introduction to Artificial Intelligence and Expert Systems By Patterson (Prentice-Hall India)

### Section I

**Parallel Computing:** Parallel virtual machine (PVM) and message passing interface (MPI), Libraries and calls, advanced architectures, today's fastest computers. **Mobile Computing:** Mobile connectivity cells, Framework, Wireless delivery technology and switching methods, mobile information access devices, mobile data internetworking standards, Cellular data communication protocols, mobile computing applications, mobile database- protocols, scope, tools and technology, M-Business

### Section II

**E-commerce:** Framework, Media Convergence of applications, Consumer Applications, organization Applications. **Electronic Payment System:** Digital Token, Smart Cards, Credit cards, Risks in Electronic Payment System, Designing Electronic Payment System. **Electronic Data Interchange (EDI):** Concepts, Applications, (Legal Security and Privacy issues, EDI & Electronic Commerce, Standardization and EDI, EDI software implementation, EDI Envelope for message Transport, Internet Based EDI

### Section III

**Data Warehousing:** Data Warehouse environment, architecture of a Data Warehouse methodology, Analysis, Design, Construction and administration, Corporate Data Warehouses. **Data Mining:** Extracting models and patterns from large databases, data mining techniques, classification, regression, clustering, and summarization. Dependency modeling, link analysis, sequencing analysis, mining scientific and business data.

#### References:

1. Introduction to Parallel Computing: Design and Analysis of Parallel Algorithms by Vipin Kumar (Author), Ananth Grama, Anshul Gupta, Benjamin-Cummings Pub Co
2. Mobile Computing by Asoke Talukder, Roopa Yavagal, McGraw Hill Professionals.
3. Sam Anahory, Dennis Murray, "Data Warehousing", Pearson Education pub.
4. Michel A. Berry, Gordon S. Linoff, "Mastering Data Mining", Wiley Publishing.
5. Mallach G, Fredn E, "Decision Support System and Data Warehouse Susters", TMH
6. John Poole, Dan Chang, Dauglas Talbert, "Common Warehouse Metadata Developer's Guide", Wiley pub.
7. Introduction to E-Commerce By: Jeffrey F. Rayport, Bernard J. Jaworski, McGraw hill.

### **Section I**

**Cyber Security:** Introduction, Cyberoffences: categories of cybercrime, how criminals plan the attack, cyberstalking, cybercafe and cybercrime, botnets and cybercrime, Cloud Computing and cybercrime. **Tools and methods used in cybercrime:** phishing and Identity theft; methods of phishing, spear phishing, types of phishing scams, phishing toolkits, and spy phishing, Personally Identifiable Information, types and techniques of ID theft, password cracking, keyloggers and spywares, backdoors, steganography, DoS and DoS attacks, SQL Injection, Buffer Overflow.

### **Section II**

**Cybercrime on mobile and wireless devices:** Security challenges posed by mobile devices, attacks on wireless networks, credit card frauds mobile and wireless era. Authentication security service, attacks on mobile phones; mobile phone theft, mobile virus, mishing, vishing, smishing, hacking Bluetooth.

### **Section III**

Cyberlaw: The Indian Context, The Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment, Cyberlaw, Technology and Students: Indian Scenario. Background of Cyberforensics, Digital Forensics Science. The Need for Computer Forensics, Cyberforensics and Digital Evidence, Forensics Analysis of Email, Security/Privacy Threats.

### **References :**

1. Cyber Security by Nina Godbole & sunit Belapure
2. Computer Forensics by Marie- Helen Maras

## **Practical Training and Project Work:**

1. Project Work may be done individually or in groups in case of bigger projects. However if project is done in group each student must be given a responsibility for a distinct module and care should be taken to monitor the individual student.
2. Project Work can be carried out in the college or outside with prior permission of college.
3. The Student must submit a synopsis of the project report to the college for approval. The Project Guide can accept the project or suggest modification for resubmission. Only on acceptance of draft project report the student should make the final copies.

### **Submission Copy:**

The Student should submit spiral bound copy of the project report.

### **Format of the Project:**

#### **(a) Paper:**

The Report shall be typed on White Paper of A4 size.

#### **(b) Final Submission:**

The Report to be submitted must be original.

#### **(c) Typing:**

**Font:-** Times New Roman

**Heading:-** 16 pt., Bold

**Subheading:-** 14 pt, Bold

**Content:-** 12 pt.

**Line Spacing:-** 1.5 line.

**Typing Side :-** One Side

**Font Color:-** Black.

#### **(d) Margins:**

The typing must be done in the following margin:

**Left :** 0.75”

**Right:** 0.75”

**Top:** 1”

**Bottom:** 1”

**Left Gutter:** 0.5”

#### **(e) Binding:**

The report shall be Spiral Bound.

#### **(f) Title Cover:**

The Title cover should contain the following details:

**Top:** Project Title in block capitals of 16pt.

**Centre:** Name of project developer's and Guide name.

**Bottom:** Name of the university, Year of submission all in block capitals of 14pt letters on separate lines with proper spacing and centering.

#### **(g) Blank sheets:**

At the beginning and end of the report, two white blank papers should be provided, one for the Purpose of Binding and other to be left blank.

#### **(h) Content:**

**I).** Acknowledgement

**II).** Institute/College/Organization certificate where the project is being developed.

**III).** Table of contents

**IV).** A brief overview of project

**V).** Profiles of problem assigned

- VI).** Study of Existing System
- VII).** System Requirement
- VIII).** Project plan
  - Team Structure
  - Development Schedule
  - Programming language and Development Tools
- IX).** Requirement Specification
- X).** Design
  - Detailed DFD's and Structure Diagram
  - Data structure, Database and File Specification
- XI).** Project Legacy
  - Current Status of project
  - Remaining Areas of concern
  - Technical and Managerial Lessons Learnt
  - Future Recommendations
- XII).** Nomenclature and Abbreviations.
- XIII).** Bibliography
- XIV).** Source Code.