

**M.G.S. UNIVERSITY
BIKANER**

SYLLABUS

**SCHEME OF EXAMINATION AND
COURSES OF STUDY**

FACULTY OF COMPUTER SCIENCE

**M.Sc. (Computer Science) (SEMESTER)
M.Sc. COMPUTER SCIENCE (Previous) - 2018
M.Sc. COMPUTER SCIENCE (Final) - 2019**



सूर्य प्रकाशन मन्दिर

दाऊजी रोड़ (नेहरू मार्ग), बीकानेर 5 (राज.)

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For M.G.S. University, Bikaner

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

Class	Total Marks
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****Examination - 2017****Session 2017-18****Semester I**

		Exam Hr	Internal	External
MCS 101	Mathematic for Comp. Sc.	3	10	40
MCS 102	Internet Programming	3	10	40
MCS 103	Compute Organization	3	10	40
MCS 104	C++ Programming	3	10	40
			40	160
	Total of Theory			200
Paper Name(Practical)				
MCS 105	Internet Programming Lab	2	10	40
MCS 106	C++ Lab	2	10	40
			20	80
	Total of Practical			100
	Grand Total(Theory + Practical)			300

**Teaching and Examination scheme for
M.Sc. Computer Science
Session 2017-18 Exam - 2018**

Semester II

Paper	Name(Theory)	Exam Hr	Internal	Max Marks
MCS 201	Database Management System	3	10	40
MCS 202	Data Communication and Networking	3	10	40
MCS 203	Operating System	3	10	40
MCS 204	PHP	3	10	40
			40	160
Total of Theory				200
Paper Name	(Practical)			
MCS 205	DBMS Lab	3	10	40
MCS 206	PHP Lab	3	10	40
			20	80
Total of Practical				100
Grand Total(Theory+ Practical)				300

**Teaching and Examination scheme for
M.Sc. Computer Science
Session 2018-2019
Exam - 2018**

Semester III

Paper	Name(Theory)	Exam Hr.	Internal	Max Marks
MCS 301	Data Structure	3	10	40
MCS 302	Java	3	10	40
MCS 303	Software Engineering & Research Methodology	3	10	40
MCS 304	Computer Graphics & Multimedia	3	10	40
			40	160
Total of Theory				200
Paper Name	(Practical)			
MCS 305	JAVA Lab	3	10	40
MCS 306	Data Structure Lab	3	10	40
			20	80
Total of Practical				100
Grand Total(Theory+ Practical)				300

**Teaching and Examination scheme for
M.Sc. Computer Science
Session 2018-2019
Exam - 2019**

Semester IV

Paper	Name(Theory)	Exam Hr.	Internal	Max Marks
MCS 401	A. Search Engine Optimization B. Data Mining C. Python	3	10	40
MCS 402	A. Android Programming B. Advanced Web Programming C. Advanced Java	3	10	40
MCS 403	A. Artificial Intelligence B. Cloud Computing C. Internet of Things	3	10	40
MCS 404	Project	3	10	40
Total of Theory			40	160
Total of Practical				200
Paper Name(Practical)				
MCS 405	SEO/Python/Data Mining Lab	3	10	40
MCS 406	Android/Advanced Web Programming/Advanced Java Lab	3	10	40
Total of Practical			20	80
Grand Total(Theory+ Practical)				100
Grand Total(Theory+ Practical)				300

Note:

1. Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

2. 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 external practical of 40 marks is as under

- | | |
|--|----------|
| a) Practical Examination exercise of 3 questions | 30 marks |
| b) Viva-Voce | 5 marks |
| c) Laboratory Exercise File | 5 marks |

3. Marks distribution for External Project report of 40 marks is as under

- a. External Evaluation-
 - i Project Dissertation 25 marks
 - ii Presentation 10 marks
 - iii External Viva Voce 5 marks
- b. Internal Evaluation- Dissertation 10 Marks

4. 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.

5. 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.

6. 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.

7. At least 3 hours for lectures and one hour for tutorial should be allotted per week for each theory paper.

8. A slot of 2 hours per week should be allotted for each practical paper.

9. * An Academic/ Industrial Tour shall be organized by the college in every session. A Tour Report shall be prepared and submitted by the students after a study tour to industries/academic institutions of repute.

Semester I

Duration: 3 Hours

MM: 100

MCS-101 Mathematics for Computer Science

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section – I

Sets, different types of sets, set operations; Basic Counting Principles, Pigeonhole Principle ,Binomial Coefficients, Binomial Theorem, Permutations, Combinations; Matrices: addition, multiplication; Vectors: Position vector, addition, subtraction and products of vectors.

Section - II

Mathematical Induction; Logic: Propositions and logical operations, Conditional statements, Tautologies and Contradictions, Logical Equivalence, quantifiers.

Section- III

Relations: Representation of Relations, Properties of relations, transitive closure; Ordered Sets: poset, Properties, Hasse Diagram, Extremal elements of posets ; Functions: Types of Functions, Asymptotic notations; Co-ordinate Systems: representation of points, straight lines, standard equation of circles.

Suggested Readings-

1. Discrete Mathematics and its applications by K.H. Rosen, seventh edition
2. Discrete Mathematical Structures by Kolman, Busby and Ross, Sixth Edition, PHI.
3. *Schaum's Outline Of Theory and Problems of Discrete Mathematics*, Third Edition. SEYMOUR LIPSCHUTZ
4. NCERT Mathematics textbook for class XI and XII
5. Elements of Discrete Mathematics, TMH, C L Liu
6. Foundation Mathematics for Computer Science: A Visual Approach, John Vince, Springer
7. Calculus and Analytic Geometry, George B. Thomas and Ross L. Finney, Addison Wesley

Duration: 3 Hours

MM: 50

MCS-102 Internet Programming

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section I

Internet Basics: Evolution of Internet, Basic internet terms and applications. ISP, Anatomy of an e-mail Message, basic of sending and receiving, E-mail Protocol; Mailing List- Subscribing, Unsubscribing. Introduction to World Wide Web and its work, Web Browsers, Search Engine, Downloading, Hyper Text Transfer Protocol (HTTP), URL, Web Servers, FTP, Web publishing- Domain Name Registration, Space on Host Server for Web Site, Maintain and Updating.

Section - II

HTML: Elements of HTML & Syntax, Comments, Headings, Paragraph, Span, Pre Tags, Backgrounds, Formatting tags, Images, Hyperlinks, div tag, List Type and its Tags, Table Layout, div, frame, Use of Forms in Web Pages. CSS: Introduction to Cascading Style Sheets, Types of Style Sheets (Inline, Internal and External), using Id and Classes, CSS properties: Type Properties, Background Properties, Block Properties, Box Model Properties, Margin, Padding, List Properties, Border Properties, Positioning Properties,

Section - III

Java Script: Introduction to Client Side Scripting, Introduction to Java Script, Comments, Variables in JS, Global Variables, Data types, Operators in JS, Conditions Statements (If, If Else, Switch), Java Script Loops (For Loop, While Loop, Do While Loop), JS Popup Boxes (Alert, Prompt, Confirm), JS Events, Onload, Onunload, Onsubmit, Onfocus, Onchange Event, Onblur Event, Onmouseover, Onclick, Ondblclick Events, JS Arrays, Working with Arrays, JS Objects, Browser object, Window object, Document object, JS Functions, getElementById, getElementsByName, getElementsByTagName, innerHTML property, innerText property, form validation, email validation.

Suggested Readings-

1. Thomas A. Powell , "HTML: The Complete Reference", Osborne/McGraw-Hill
2. Deitel, Deitel and Nieto : Internet & WWW. How to program, 2nd Edition, Pearson Education Asia.
3. E Stephen Mack, Janan Platt : HTML 4.0 , No Experience Required, 1998, BPB Publications.
4. "HTML Complete" by Sybex, BPB Publications, 2001.
5. Internet and Web Page Designing By V.K Jain (BPB)
6. Web Enabled Commercial Application Development Using HTML, DHTML , java script, Perl CGI By Ivan Bayross (BPB)

Duration: 3 Hours

MM: 50

MCS-103 Computer Organization

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section I

Components of a Computer: Processor, Memory, Input-Output Unit, Difference between Organization and Architecture, Hardware Software Interaction. **Number System:** Concept of Bit and Byte, types and conversion. **Complements:** 1's complement, 2's complement. **Binary Arithmetic:** Addition, overflow, subtraction, multiplication (Booth's algorithm) and division algorithm. **Logic gates:** Boolean Algebra, Map Simplification.

Section II

Combinational circuits: Half Adder, Full Adder, Decoders, Multiplexers. **Sequential circuits:** Flip Flops- SR, JK, D, T Flip-Flop, Excitation Tables, State Diagram, State Table, Registers, Counters. **Input Output Organization:** Peripheral devices, I/O Interface, Asynchronous Data Transfer, Modes of Data Transfer, Priority Interrupt, Direct Memory Access, I/O Processor.

Memory Organization: Types and capacity of Memory, Memory Hierarchy, Associative Memory, Buffer, Cache Memory, Virtual Memory.

Section III

Intel 8085 Microprocessor: Introduction, ALU, Timing and Control Unit, Register Set, Data and Address Bus, Addressing modes, Complete Intel 8085 Instruction set, Instruction format, Opcode and Operand, Word Size, Instruction Cycle, Pin Configuration, Intel 8085 programs.

Suggested Readings-

1. Computer System Architecture, By M. Morris Mano (Pearson, Prentice Hall)
2. J.P. Hayes, "Computer Architecture & Organization", Tata McGraw Hill
3. Digital Computer Electronics By Malvino Leach, Jerald A. Brown (McGraw Hill)
4. Microprocessor Architecture, Programming, and Application With the 8085 By Ramesh Gaonkar (PENRAM)
5. Fundamentals of Microprocessor and Microcomputes By B.Ram (Danpat Rai Publications)

Duration: 3 Hours

MM: 50

MCS-104 C++ Programming Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are

required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

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.

Suggested Readings

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)

SEMESTER - II

Duration: 3 Hours

MM: 50

MCS-201 Database Management System

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section I

Introduction: Characteristics of database approach, Advantages, Database system architecture, Overview of different types of Data

Models and data independence, Schemas and instances, Database languages and interfaces; E-R Model : Entities, Attributes, keys, Relationships, Roles, Dependencies, E-R Diagram; Normalization: Definition, Functional dependencies and inference rules, 1NF, 2NF, 3NF and BCNF.

Section II

Introduction to Relational model, Constraints: Domain, Key, Entity integrity, Referential integrity; Keys: Primary, Super, Candidate, Foreign; Relational algebra: select, project, union, intersection, minus, cross product, different types of join, division operations; aggregate functions and grouping; SQL: Data Types, statements: select, insert, update, delete, create, alter, drop; views, SQL algebraic operations, nested queries; Stored procedures: Advantages, Variables, creating and calling procedures, if and case statements, loops, Cursors, Functions, Triggers.

Section III

Transactions processing: Definition, desirable properties of transactions, serial and non-serial schedules, concept of serializability, conflict-serializable schedules; Concurrency Control: Two-phase locking techniques, dealing with Deadlock and starvation, deadlock prevention protocols, basic timestamp ordering algorithm; Overview of database recovery techniques; concept of data warehousing.

Suggested Readings:

1. Fundamentals of Database Systems, Ramez A. Elmasri, Shamkant Navathe, 5th Ed (Pearson)
2. Database System Concepts By Korth, Silberschatz, Sudarshan (Mcgraw Hill)
3. An Introduction to Database Systems By Bipin C. Desai (Galgotia Publication.)
4. SQL, PL/SQL Programming By Ivan Bayross (BPB)
5. Commercial Application Development Using Oracle Developer 2000 By Ivan Bayross (BPB)
6. <http://www.mysqltutorial.org/mysql-stored-procedure-tutorial.aspx>

Duration: 3 Hours

MM: 50

MCS-202 Data Communication and Networking

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section - I

Data Communication and Networking: Overview, Network Types, LAN Technologies, Topologies, Models- OSI Model, TCP/IP Stack, Security

Physical Layer: Introduction, Impairments, Performance, Digital Transmission, modes, digital to digital, analog to digital, Analog Transmission, digital to analog, analog to analog, Transmission media, Wireless Transmission, Multiplexing, FDM, TDM, CDM, WDM, **Switching techniques:** Circuit Switching, Packet switching, Datagram, Virtual circuit and Permanent Virtual Circuit, Connectionless and connection oriented communication, Message switching,

Section - II

Data Link Layer: Introduction, Error detection and Correction, Data Link Control: Line Discipline- Enq/Ack, Poll/Select, **Flow Control** : Stop And Wait, Sliding Window, **Error Control** : ARQ, Stop and Wait ARQ, Sliding Window ARQ.

Network Layer: Introduction, Network Addressing, Routing, Internetworking, Tunneling, Packet Fragmentation, Network Layer Protocols, ARP, ICMP, IPv4, IPv6

Transport Layer: Introduction, Function, End to end communication, Transmission Control Protocol, User Datagram Protocol

Application Layer: Introduction, Client-Server Model, Application Protocols, Network Services

Section- III

Cyber Security: definition, cybercrime and information security, cybercriminals, classification of cybercrime. Cyber offences: categories of cybercrime.

Tools and methods used in cybercrime: phishing, types of phishing, types and techniques of ID theft, password cracking, keyloggers and spywares, backdoors, steganography, DoS, SQL Injection.

Cybercrime on mobile and wireless devices: attacks on wireless networks, Authentication security service, attacks on mobile phones. Cyber Law, The Indian IT Act, Digital Signatures, Anti- Cybercrime Strategies, Cyberterrorism, Indian ITA 2000.

Suggested Readings:

1. Cyber Security by Nina Godbole & sunit Belapure
2. Data Communication and Networking By Forozan (Tata McGraw Hill)
3. Data Communication And Computer Networks By Dr. Madhulika Jain, Satish Jain (BPB)

4. William Stallings, "Data and Computer Communications", Pearson Education, 2008.

5. A. S. Tanenbaum, "Computer Networks", Fourth Edition, Pearson Education.

Duration: 3 Hours

MM: 50

**MCS-203 Operating System
Instructions to Paper Setters**

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section I

Introduction to Operating System, layered Structure, Functions, Types; Process: Concept, Process States, PCB; Threads, System calls; Process Scheduling: types of schedulers, context switch, 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

Synchronization: Critical Section Problem, Requirements for a solution to the critical section problem; Semaphores, simple solution to Readers-Writers Problem. Deadlock: Characterization, Prevention, Avoidance, Banker's Algorithm, Recovery from Deadlock. Memory Management: Physical and virtual address space, Paging, Overview of Segmentation; Virtual Memory Management: Concept, Page Replacement techniques- FIFO, LRU, Optimal

Section III

Linux: features of Linux, steps of Installation, Shell and kernel, Directory structure, Users and groups, file permissions, commands- ls, cat, cd, pwd, chmod, mkdir, rm, rmdir, mv, cp, man, apt, cal, uname, history etc. ; Installing packages; Shell scripts: writing and executing a shell script, shell variables, read and expr, decision making (if else, case), for and while loops.

Suggested Readings:

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
4. Linux in easy steps, Mike McGrath, in easy steps limited
5. Unix concepts and applications , TMH, Sumitabha Das

Duration: 3 Hours

MM: 50

MCS-204 PHP

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section – I

PHP: Versions of PHP, Installation of PHP, Php.ini basics. Testing Installation. **Building Blocks of PHP:** Variables, data types, Operators & Expressions, Constants, Switching, Flow, Loops, Code Blocks and Browser Output. **Functions:** Meaning, Calling, Defining a function. Return value from user defined function. Saving state with 'static' function. **Arrays:** Creating arrays, Array related functions. **Working with String, Date & Time:** Formatting String with PHP, Using Date and time Functions with PHP. Working with file and Directories. **Forms:** Creating simple input Form. Accessing Form input with user defined arrays, HTML and PHP Code on a single page. Redirecting User. Working with File Upload. Uploading & Downloading.

Section – II

State management: Using query string(URL rewriting), Using Hidden field, Using cookies, Using session. **String matching with regular expression:** What is regular expression, Pattern matching in Php, Replacing text, Splitting a string with a Regular Expression. **Basics of computer Graphics:** Creating Image, Manipulating Image, Using text in Image. **Email:** Sending Email, Headers, Reviewing SMTP, PHP Mailer, Building Notifications. **Introduction to OOPS:** Introduction, Objects, Declaring a class, The new keyword and constructor, Destructor, Access method and properties using \$this variable, Public ,private, protected properties and methods, Static properties and method, Class constant, Inheritance & code reusability, Polymorphism, Parent:: & self:: keyword, Instanceof operator, Abstract method and class, Interface, Final. **Exception Handling:** Understanding Exception and error, Try, catch, throw

Section – III

Connecting to the MYSQL: Selecting a database, Adding data to a table, Displaying returned data on Web pages, Inserting data, Deleting data, Entering and updating data, Executing multiple queries, executing stored procedures. **AJAX:** Introduction to Ajax, **XMLHttpRequest:** XHR Create Object, XHR Request, XHR Response, XHR readyState. **AJAX with PHP:** Parameter passing, Error Handling, **AJAX with MySql:** Database Creation, Data Manipulation, Database Creation. Query Execution. **AJAX with XML:** Calls with XMLHttpRequest and XML, Error Handling, Structure Creation. AJAX Form Validation

Suggested readings-

Teach Yourself PHP, MYSQL & Apache By Meloni, Pearson Education.

Open Source Development with LAMP: Using Linux, Apache, MySQL, Perl & PHP By James Lee, Pearson Education.

PHP: A Beginner's Guide By Vaswani, Vikram Tata Mc-Graw Hill.

SEMESTER - III

Duration: 3 Hours

MM: 50

MCS-301 Data Structures

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

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.

Suggested Readings:

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)

Duration: 3 Hours

MM: 50

MCS-302 Java

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section I

Introduction to java: evolution, features, comparison with C and C++; Java program structure; tokens, keywords, constants, variables, data types, type casting, statements, Operators and Expression; Conditional Statements and Loop Statements. **Class:** syntax, instance variable, class variables, methods, constructors, overloading of constructors and methods.

Section II

Inheritance: types of inheritance, use of super, method overriding, final class, abstract class, wrapper classes.

Arrays, Strings and Vectors, Packages and Interfaces, visibility controls

Section III

Errors and Exceptions: Types of errors, Exception classes, Exception handling in java, use of try, catch, finally, throw and throws. Taking user input, Command line arguments.

Multithreaded Programming: Creating Threads, Life cycle of thread, Thread priority, Thread synchronization, Inter-thread communication, Implementing the Runnable Interface; **Applet:** Applet Life Cycle, Applet Tag, Adding Applet to HTML File; Passing Parameters to Applets, Getting Input From User.

Suggested readings-

1. The Complete reference Java Ninth Edition By Herbert Schildt (Tata McGraw Hill)
2. Beginning Programming with Java For Dummies by Burd, For Dummies; 3 edition
3. 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)
4. JAVA 2 programming Black Book By Steven Holzner et al. (Dreamtech Press)
5. Programming in JAVA By E. Balagurusamy (TMH)

Duration: 3 Hours

MM: 50

MCS-303 Software Engineering & Research Methodology

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

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

Research Methodology: Meaning of Research, Objective of Research, Types of Research, Research Approaches, Significance of research, Research Methods versus Methodology, Research Process, Criteria of Good Research, , What is Research Problem, Selecting the problem, Necessity of defining the problem, Technique involved in defining a problem.

Suggested Readings:

1. Software Engineering: A Practitioner's Approach By Roger S. Pressman, McGraw Hill.
2. Software Engineering: A Precise Approach by Pankaj Jalote, Wiley Precise textbook Series
3. Research Methodology Methods and Techniques by C. R. Kothari, New Age International Publisher

Duration: 3 Hours

MM: 50

MCS-304 Computer Graphics & Multimedia

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section I

Basic elements of Computer Graphics, Graphics display devices, Applications of Computer Graphics, Raster and random scan; Color Models :RGB, CMY, HSV; Graphics Standard : OpenGL; Scan Conversion: DDA line algorithm, Mid-point circle Algorithm. 2D Transformation: Translation, Rotation, Scaling, Homogenous Coordinates and Matrix Representation of 2D Transformation, Composite Transformation.

Section II

3D Graphics: Matrix Representation of 3D transformations, Translation, Rotation, Scaling, Composite Transformation. Overview of concepts: Clipping, orthographic and parallel projection, hidden surface removal, lighting, transparency, modelling and texturing, rendering; Animations : Principles of animations, keyframing, concept of 2D and 3D animation.

Section III

Blender: GUI Interface, Selecting, rotating and Translating Objects, Using Snap to move objects precisely, Creating mesh primitives and extrusions, Subdividing meshes, Creating a simple creature, Joining mesh objects and stitching vertices, Organizing a scene with layers, groups, and hierarchies, Assigning glossy and reflective materials to objects, Creating bump maps, Creating sky and ambient light, Understanding ambient occlusion, Adding motion blur and depth of field, Editing animation in the Graph Editor, Building and animating a simple character.

Suggested Readings:

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, Prentice 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)
6. Web Resource - Animation
7. Web Resource – Blender
8. Web Resource- A Beginners Guide to Blender
9. Web Resource- Blender
10. Web Resource- Introduction to Blender
11. Web Resource- Blender Basics
12. Web Resource- Blender Manual

Semester - IV

Duration: 3 Hours

MM: 50

MCS-401(a) Search Engine Optimization

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section – I

Basics for SEO: What is Domain, Basic Knowledge of World Wide Web, Difference between Portal and Search Engines, What is SEO, Types of SEO Techniques, Black hat techniques, White Hat techniques, How Search Engine works. **SEO Research & Analysis:** Market Research, Keyword Research and Analysis, Keyword opportunity, Competitors Website Analysis, SWOT Analysis of Website, How to Choose Best Keywords, Tools available for Keyword Research. **Website Design SEO Guidelines:** Content Research, Content Guidelines, Content Optimization, Design & Layout, XML Sitemap / URL List Sitemap.

Section - II

n-page Optimization: The Page Title, Meta Descriptions & Meta Keywords, Headings, Bold Text, Domain Names & Suggestions, Canonical Tag, Meta Tags, Images and Alt Text, Internal Link Building,

The Sitemap, Invisible Text, Server and Hosting Check, Robots Meta Tag, Doorway Pages, 301 Redirects, 404 Error, Duplicate content.

Section – III

Off-page Optimization: Page Rank, Link Popularity, Link Building in Detail, Directory Submission, Social Bookmark Submission, Blog Submission, Articles, Links Exchange, Reciprocal Linking, Posting to Forums, Submission to Search Engine, RSS Feeds Submissions, Press Release Submissions, Forum Link Building, Competitor Link Analysis. **Analytics:** Google Analytics, Advanced Reporting, Webmaster Central & Bing/Yahoo, Open Site Explorer, Website Analysis using various SEO Tools available. **SEO Tools:** Keyword Density Analyzer Tools, Google Tools, Yahoo / Bing Tools, Rich Snippet Text Tools, Comparison Tools, Link Popularity Tools, Search Engines Tools, Site Tools, Miscellaneous Tools.

Suggested readings -

The Art of SEO (Theory in Practice) - Eric Enge, Stephen Spencer, Jessie Stricchiola, and Rand Fishkin (O'REILLY)
Search Engine Optimization All-in-One For Dummies by Bruce Clay
SEO Step-by-Step by Caimin Jones

Duration: 3 Hours

MM: 50

MCS-401(b) Data Mining

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section I

Data mining Introduction: Definition, Data mining tasks, Data mining as a step of Knowledge discovery process, Applications of Data mining; Data objects and types of attributes, Recalling mean, median, mode and weighted arithmetic mean, Data quality, overview of data preprocessing.

Section II

Classification analysis- definition, Overview of various classification techniques; Decision tree induction- working, examples, specifying attribute test conditions, Measures of node impurity, measures for selecting best split; Evaluating the performance of a classifier- Holdout method, Random subsampling, cross-validation, Bootstrap.

Section III

Association analysis: support, confidence, association rules ,Frequent Item sets; Frequent itemset generation - Apriori principle , Apriori algorithm and examples, FP growth algorithm and examples; Closed and maximal frequent itemsets. Cluster analysis: Definition , overview of basic clustering methods, Density based methods-DBSCAN.

Suggested books:

1. Data Mining: Concepts and Techniques, 3rd edition, Jiawei Han and Micheline Kamber
2. Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Pearson Education.
3. Data Mining: A Tutorial Based Primer, Richard Roiger, Michael Geatz, Pearson Education 2003.
4. Introduction to Data Mining with Case Studies, G.K. Gupta, PHI 2006
5. Insight into Data mining: Theory and Practice, Soman K. P., DiwakarShyam, Ajay V., PHI 2006
6. Data Mining:: Practical Machine Learning Tools and Techniques (Morgan Kaufmann Series in Data Management Systems) by Witten, Frank, Hall

Duration: 3 Hours

MM: 50

MCS-401(c) Python

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section I

Overview of Programming : Structure of a Python Program, Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators(Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).

Section II

Creating Python Programs : Input and Output Statements, Control statements(Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions,

default arguments, Errors and Exceptions. Iteration and Recursion: Conditional execution, Alternative execution, Nested conditionals, The return statement, Recursion, Stack diagrams for recursive functions, Multiple assignment, The while statement, Tables, Two-dimensional tables.

Section III

Strings and Lists: String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, find function, Looping and counting, List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists . Object Oriented Programming: Introduction to Classes, Objects and Methods, Standard Libraries. Overview of sets, stacks and queues.

Suggested Readings:

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Web Resource - Python
3. Web Resource – Python
4. Web Resource- Think Python
5. Web Resource - Python tutorial

Duration: 3 Hours

MM: 50

MCS-402(a) Android Programming

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section - I

java (Exception handling & Packages & interfaces & JVM & .jar file extension & Multi threading. Database(DML&DDL) , What is Android & Setting up development environment & various editors. Application Structure (AndroidManifest.xml , uses-permission & uses-sdk , Resources & R.java , Assets & Layouts & Drawable Resources , Activities and Activity lifecycle.

Section - II

Eclipse editor :(Menu , Option menu , Context menu , Sub menu , menu from xml , menu by code). SQLite Programming , SQLiteOpenHelper , SQLiteDatabase. Adapters and Widgtes (Adapters:- a. ArrayAdapter b. BaseAdapters , ListView and ListActivity , Custom listview , GridView using adapters , Gallery using adapters).

Section - III

Notifications (Broadcast Receivers , Services and notifications , Toast , Alarms). Advanced o Live Folders (Using sdcards , XML Parsing , JSON Parsing , Maps, GPS, Location based Services, Accessing Phone services :(Call, SMS, MMS)).

Suggested readings-

Android Programming for Beginners by John Horton Publisher: Packt Publishing

Learn Java for Android Development (2nd edition) by Jeff Friesen Publisher: Apress

Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

Beginning Android Programming with Android Studio, Fourth Edition by Jerome F. DiMarzio Publisher: John Wiley & Sons

Android Programming: The Big Nerd Ranch Guide by Kristin Marsicano , Chris Stewart , Bill Phillips Publisher: Big Nerd Ranch Guides

Duration: 3 Hours

MM: 50

MCS-402(b) Advanced Web Programming

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section-I

Basic of the .net framework: .net Architecture, managed code, assemblies, clr, execution of assemblies code, il, jit, net framework class library, common type system, common language specification. Overview C#, similarities and differences from JAVA, Structure of C# program. Language features- Type system, boxing and Unboxing, flow controls, Classes, Properties, Indexers, Constructors, Inheritance, Interfaces, Delegates.

Section-II

Understanding ASP.NET Controls: Web forms, Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box etc. Running a web Application, creating a multiform web project, Form Validation Controls- Required Field, Compare, Range. Calendar Control, Ad Rotator Control, State Management-View State, Session State, Application State.

Section-III

Architecture Of ADO.NET, Connected and Disconnected Database, Create Connection Using ADO.NET Object Model, Connection Class, Command Class, DataReader Class, Data adapter Class, Dataset Class. Display Data on Bound Controls and Gridview. Database Accessing on Web Applications: Insert records in database, delete and update records from database, Display a particular record and all records on web form.

Suggested Readings:

ASP.NET 2.0 Black Book By RudrakshBatra, CharulShukla (Dream Tech Press)

ASP. NET Bible By MridulaParihar and et al. (Hungry Minds, New York)

Andrew Troelsen – “C# and the .Net Platform” – Apress – 2001.(Unit I and II)

Alex Homer et. al. – “Professional ASP .NET 1.1” – Wiley-dreamtech India Pvt. Ltd. – 2004.

ASP.NET Developer's Guide By G Buezek (TMH)

.NET Framework Essentials 3rd Edition (O'Reilly)

Duration: 3 Hours

MM: 50

MCS-402(c) Advanced Java

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

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, Insert, delete and update records in database, Processing Results.

Section III

Servlet: architecture, life cycle of a Servlet, initialization, Servlet and HTML, retrieving data in Servlet, GET and POST methods;

JavaServer Pages (JSP): Introduction, JavaServer Pages Overview, A First JavaServer Page Example, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries

Suggested Readings

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. Effective Java by Joshua Bloch, Second Edition,
4. JAVA 2 programming Black Book By Steven Holzner et al. (Dreamtech Press)

Duration: 3 Hours

MM: 50

MCS-403(a) Artificial Intelligence

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section I

Definition, History, Agents and environment, Defining the problem as a state and space search, What is Intelligence? Types of Intelligence, Difference between Human and Machine Intelligence, The Structure of Intelligent Agents. Solving problems by searching: Uninformed search strategies- Brute-Force, Breadth-First, Uniform-cost search Depth-First, Depth-limited search, depth-first search, Bidirectional search. Informed (heuristic) search strategies- Greedy best-first search, A*, AO* Memory-bounded heuristic search.

Section II

Heuristic functions, local search algorithms- Hill-climbing search, Simulated annealing, Local beam search. Knowledge Based System: Knowledge, Procedure V/S Declarative Knowledge, Knowledge Representation: Using Procedural and Predicate Logic, Inference in First order logic: Unification and Lifting, Forward Chaining, Backward Chaining, Resolution. Rule based System, Frames, Frames, Scripts, and Semantic Nets.

Section III

Probabilistic Reasoning, Probability and Bayes Theorem, represent knowledge in uncertain domain, Certainty factors, Bayesian Networks, Dempster–Shafer theory, introduction to Fuzzy logic. Learning: types of learning, decision trees. **Expert System: types, architecture.** **Introduction to Artificial Neural Networks, Reinforcement learning, Natural Language Processing, Pattern Recognition and Perception.**

Suggested Readings

1. Artificial Intelligence By Rich And Knight (Tata McGraw Hill)
2. Introduction to Artificial Intelligence and Expert Systems By Patterson (Prentice-Hall India)
3. Artificial Intelligence A Modern Approach by Russell and Norvig, Prentice Hall

Duration: 3 Hours

MM: 50

MCS-403(b) Cloud Computing

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section I

Introduction to Cloud Computing, Services provided by cloud-SaaS, PaaS, IaaS, DaaS etc. Functioning of cloud computing, Advantages, Disadvantages, Applications, Cloud Service Providers- Amazon AWS, Google App Engine, Microsoft, VMware. Virtualization concepts, Objectives, Types of Virtualization & its benefits, Introduction to Various Virtualization OS (Hypervisor). Virtualization for Enterprises

Section II

Designing and Implementing a Data Center-Based Cloud, Industry and International Standards for Cloud Implementation, Building private cloud using open source tools, Integration of Public and Private Cloud. Private, Public & Hybrid Clouds, their Advantages & Disadvantages, On Premises and Off Premises Cloud services, installing a Cloud service.

Section III

Cloud Security issues - Infrastructure Security, Network level security, Host level security, Application level security, Data privacy and security Issues, Jurisdictional issues raised by Data location, Access Control, Trust, Reputation, Risk and Authentication in cloud computing

Suggested Readings:

1. Cloud Computing Concepts Technology and Architecture by Thomas Erl, Prentice Hall
2. Cloud Computing principles and paradigms by Rajkumar Buyya, James Broberg and Andrzej Goscinski, John Wiley and Sons, Inc. Publication
3. Cloud Computing Theory and Practice by Dan C. Marinescu, Morgan Kaufman Publication

Duration: 3 Hours

MM: 50

MCS-403(c) Internet of Things

Instructions to Paper Setters

The paper is divided into three sections. The question paper will consist of A, B and C sections. A part will consist of nine compulsory questions of 1 mark each (three questions from each section). B part will consist of six questions (two questions from each section) and students are required to attempt five questions (5 marks each). C part will consist of three questions from each section and students are required to attempt any two questions (8 marks each).

Section I

M2M to IoT : Introduction, Market Perspective, Architectural Overview. M2M to IOT Technology- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, IoT analytics, Knowledge management, IOT Architecture, Architecture Reference Model, Real world design constraints.

Section II

IOT Use Cases- Asset Management, **Industrial Automation-** Service-oriented architecture-based device integration, SOCRADES: realizing the enterprise integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things, **Commercial Building Automation-** Introduction, Case study: phase one-commercial building automation today, Case study: phase two- commercial building automation in the future.

Section III

Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, IOT and Smart Cities, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security

Suggested Readings:

1. From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence by Jan Holler, Vlasios

Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, 1st Edition, Academic Press, 2014.

2. Internet of Things (A Hands-on-Approach) by Vijay Madiseti and Arshdeep Bahga, 1st Edition, VPT, 2014.

3. Rethinking the Internet of Things: A Scalable Approach to Connecting Everything by Francis daCosta, 1st Edition, Apress Publications, 2013

4. Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally

5. Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems by Dr. Ovidiu Vermesan, Dr. Peter Friess, River Publishers

6. Internet of Things (A Hands-on-Approach) , Vijay Madiseti , Arshdeep Bahga

7. Building the internet of things with ipv6 and mipv6, The Evolving World of M2M Communications, Daniel Minoli John Wiley & Sons

Duration: 3 Hours

MM: 50

MCS-404 Project

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.

4. Project Report should be hand written.

Submission Copy:

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

Format of the Project:

1. **Paper:**

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

2. **Final Submission:**

The Report to be submitted must be original.

3. **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.

4. Margins:

The typing must be done in the following margin:

Left : 0.75"

Right: 0.75"

Top: 1"

Bottom: 1"

Left Gutter: 0.5"

5. Binding:

The report shall be Spiral Bound.

6. 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.

7. 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.

8. 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