

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

SYLLABUS

**SCHEME OF EXAMINATION AND
COURSES OF STUDY**

FACULTY OF COMPUTER

M.Sc. (C.S.)

M.Sc. COMPUTER SCIENCE (Previous) - 2016

M.Sc. COMPUTER SCIENCE (Final) - 2017



सूर्य प्रकाशन मन्दिर

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

NOTICE

1. The Ordinances Governing the examination in the Faculties of Arts, Fine Arts, Social Sciences, Science, Commerce, Management, Engineering, Education and Law are contained in separate booklet. The students are advised to the same.
2. Changes in Statutes / Ordinances / Rules/ Regulations / Syllabus and Books may from time to time, be made by amendment or remaking, and a candidate shall, except in so far as the University determines otherwise comply with any changes that applies to years he has not completed at the time of change.
3. In each paper, 10 questions will be set, 2 questions from each unit. Candidates have to answer five questions in all taking at least one question from each unit.
4. The syllabus is given in both the languages i.e. Hindi & English, if there is any discrepancy, English version will be authentic.
5. The list of text books/ Recommended books/Reference Books as approved by the various B.O.S. are printed along with the English version only.

Note : The decision taken by the Academic Council shall be final.

सूचना

1. कला, इतिकला, सामाजिक विज्ञान, विज्ञान, वाणिज्य, प्रबन्ध अभियान्त्रिकी, शिक्षा एवं विधि संकाय की परीक्षाओं से सम्बद्ध अध्यादेश (आर्डर्नेस) पृथक पुस्तिकाओं में संकलित हैं। छात्रों को सलाह दी जाती है कि उनको देखें।
 2. समय-समय पर संशोधन या पुननिर्माण कर अधिनियमों, अध्यादेशों, नियमों, विनियमों, पाठ्यक्रमों व पुस्तकों में परिवर्तन कर अधिनियमों, अध्यादेशों, नियमों, विनियमों, पाठ्यक्रमों व पुस्तकों में परिवर्तन किया जा सकता है तथा किसी भी परिवर्तन को, छात्र को मानना होगा जो पाठ्यक्रम के उन वर्गों के लिए लागू हो जिसे परिवर्तन के समय पूरा नहीं किया हो, बशर्ते कि विश्वविद्यालय ने अन्यथा प्रकार से छूट न दे दी हो।
 3. प्रत्येक प्रश्न-पत्र में 9 प्रश्न होंगे। पाँच खण्डों में से प्रत्येक में 3 प्रश्न होंगे। छात्र को 4 प्रश्नों के उत्तर देना होगा। परन्तु प्रत्येक खण्ड में से एक प्रश्न का उत्तर अनिवार्यतः देना होगा।
 4. पाठ्यक्रम हिन्दी एवं अंग्रेजी दोनों भाषाओं में दिया हुआ है। यदि कोई विसंगति प्रतीत होती है तो अंग्रेजी पाठ्यक्रम को ही प्रामाणिक माना जाय।
 5. विभिन्न पाठ्यक्रम मंडलों द्वारा स्वीकृत पाठ्यपुस्तकों, संस्तुत पुस्तकों, संदर्भ पुस्तकों की सूची अंग्रेजी पाठ्यक्रम में उपलब्ध है।
- नोट : विद्या परिषद् द्वारा लिये गये निर्णय अन्तिम होंगे।

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For M.G.S. University, Bikaner

M.Sc. Computer Science

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	36%

BACKLOG

Two theory Papers can be carried to the next year.

Teaching and Examination scheme for M.Sc. (Pre.) Computer Science

Paper	Name(Theory)	Lecture Per Week	Tut	Exam	Max Marks
MCS 101	Computer Organization	3	1	3	100
MCS 102	Programming with C++	3	1	3	100
MCS 103	Relational Database Management System	3	1	3	100
MCS 104	Operating System	3	1	3	100
MCS 105	Data Communication and Networking	3	1	3	100
MCS 106	Software Engineering and GUI Programming	3	1	3	100
Total of Theory					600
Paper Name (Practical)					
MCS 107	Programming with C++				100
MCS 108	Relational Database Management System				100
MCS 109	GUI Programming				100
Total					300
Grand Total (Theory + Practical)					900

**Teaching and Examination scheme for
M.Sc. (Pre.) Computer Science**

Paper	Name(Theory)	Lecture Per Week	Tut	Exam	Max Marks
MCS 201	Data and File Structure using C/C++	3	1	3	100
MCS 202	Computer Graphics	3	1	3	100
MCS 203	JAVA 3 1	3			100
MCS 204	Discrete Mathematics	3	1	3	100
MCS 205	Web Application Development	3	1	3	100
MCS 206(A)	Artificial Intelligence	3	1	3	100
MCS 206(B)	Current Trends & Technologies	3	1	3	100
MCS 206(C)	Cyber Security	3	1	3	100
Total of Theory					600
Paper Name(Practical)					
MCS 207	Data and File Structure using C/C++ and Computer Graphics				100
MCS 208	JAVA and Web Application Development				100
MCS 209	Project				50
MCS 210	Dissertation/Training				50
Total					300
Grand Total(Theory+ Practical)					900

Note:

1. Ten questions will be set in all papers taking two questions from each unit. Students will have to attempt one question from each unit.
2. Student has option to choose one paper from MCS 205(A), MCS 205(B), and MCS 205(C) in M.Sc. Computer Science final.
3. 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. External examiner will prepare question paper of Practical Examination. Students have to perform exercise on computer. Exercise must be written in answer books in proper documentation. Marks distribution for Practical of 100 marks is as under

a) Four Exercise of 15 marks each (Logic 06, Execution 05, Documentation 04)	60 Marks
b) Viva-Voce	20 Marks
c) Laboratory Exercise File	20 marks
4. Marks distribution for Project of 50 marks is as under

a) Project Dissertation and Presentation	35 marks
b) External Viva Voce	15 marks
5. 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.
6. 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.
7. 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.
8. The marks distribution for summer training/dissertation is as under-

a. Dissertation	30 marks
b. Presentation	20 marks

M.Sc. (Pre.) Computer Science

Examination 2016

Duration: 3 Hours

MM: 100

MCS-101 Computer Organization

Unit I

Digital computer: Data Type, Number System, Complements, Fixed-Point Representation, Floating Point representation, Gray Code, BCD code, ASCII Codes, Unicode, Error Detection codes, Logic gate, Boolean Algebra, Map Simplification, Combinational circuit, Sequential circuit, Decoders, Multiplexers, Flip Flops, Registers, Counters.

Unit II

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, and Memory Management Hardware.

Unit III

Input- Output organization: Input-Output Interface, Asynchronous Data Transfer, Mode of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor (IOP), Serial Communication.

Unit IV

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.

Unit V

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. Instruction Set of Intel 8085: Introduction, Instruction and Data Formats, Addressing Modes, Status Flags, Symbols and Abbreviations, Intel 8085 Instruction.

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)

Duration: 3 Hours

MM: 100

MCS-102 Programming with C++

Unit I

Object Oriented System: Difference Between Procedural and Object Oriented Languages, Object Oriented Paradigm, Inheritance, Polymorphism, Abstraction, Encapsulation, Benefits and Application of

Oops. **Introduction to C++:** Character Set, Token, Constants, Variables and Data Types, Enumeration Types, Operators, Expressions, Operator Precedence and Associativity, Integer Overflow and Underflow, Input, Output, Conditional Statements, Scope of Variables, Type Conversion.

Unit II

Iteration : while, do while, for, Break, Continue, goto; **Pointers:** Introduction, implementation advantage and disadvantage. **Functions -** Standard and User-Defined Function, Recursive Function, Passing By Value And Reference, Function Overloading Pointer and Function: Function Returning Pointer, Passing pointer as argument, Reference and Functions. Structures and Pointers.

Unit III

Array: introduction, advantage, One, Two and Multidimensional, Passing Array to a Function, **Array and Pointers :** Pointer to One and Two Dimensional Arrays, Array of Pointers. Dynamic Arrays, String Processing. **Class:** Introduction to Class and Object, Declaring Members and Methods in a class, declaring objects.

Unit IV

Functions and objects: Calling member functions, Passing objects as arguments, Functions Returning Objects. Inline Function, Friend Functions and Its Usage, Abstract Class, Function Overriding. **Constructor and Destructor-** Needs and Its Usage, Types of Constructors, Destructor, Pointer to Objects, Pointers to Members, Dynamic Class and Objects, Static Data Members and Methods. **Inheritance -** Need of Inheritance, Types of Inheritance and its implementation.

Unit V

Operator Overloading: Need and Rules of Operator Overloading, Overloading Through Member Function and Friend Function. **Type Conversion-** Basic to Class, Class to Basic, One Class to Another Class. **Compile Time and Run Time Polymorphism-** Virtual Function and virtual class. String Class, Stream Classes in C++, Manipulators, Templates and File Handling,

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)

Duration: 3 Hours

MM: 100

MCS-103 Relational Database Management System

Unit 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, E-R Diagram. **Normalization** : 1NF, 2NF, 3NF, 4NF, BCNF.

Unit II

Relational Database: Structure of Relational Database, **Modification of a Database:** Deletion, Insertion, Updation, Selection, View, **Relational Algebra.** Set Theoretical Operations : Selection, Projection, Join Division, Cartesian Product, Referential Integrity. **Relational Calculus:** Tuple Relational Calculus, Domain Relational Calculus. **File Organization:** Heap, Serial, Sequential, Index Sequential, Hash-Indexing, B-Tree File Organization.

Unit 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, Granting Privilege, Report Writing.

Unit IV

Introduction to PL/SQL: Advantages, Character Set, Data Types, Control Structure, Transaction, Cursor, Locks, Error Handling, Procedure and Function, Triggers. **Recovery:** Reliability, Transactions, Reflecting Update to the Database and Recovery, Buffer Management, Virtual Memory and Recovery, Disaster Recovery.

Unit V

Concurrency Management: Serializability, Concurrency Control, Locking Scheme. Dead Lock and Its Resolution, Atomicity, Concurrency and Recovery. **Database Security Integrity and Control:** Security and Integrity Threats, Defence Mechanism.

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)

Duration: 3 Hours

MM: 100

MCS-104 Operating System

Unit I

Introduction, **Operating System Structure** : CPU Management, File Management, Memory Management, I/O Management, **Types of Operating System** : Simple Batch Operating System, Multiprogramming Batch Mode Operating System, Time-Sharing System, Parallel System, Distributed System, Real Time System, **Network System, Distributed System.**

Unit II

Process : Process Concept, Process Control Block (PCB), Process States and Relationship, Process Switch, Threads. **Process Communication & Scheduling**: CPU – I/O Burst Cycle, CPU Scheduler, Pre-Emptive Scheduling, Scheduling Criteria, CPU Utilization, Throughput, Turnaround Time Waiting Time, Response Time, **Scheduling Algorithm** : FCFS(First Come First Serve), SJF(Shortest Job First), Priority Scheduling, RR(Round Robin) Scheduling, MLQ(Multi Level Queue) Scheduling, MLQ With Feedback.

Unit III

Memory Management: Swapping, Paging, Structure of the Page Table, Segmentation. **Virtual Memory Management** : Demand Paging, **Page Replacement** : Basic Page Replacement, FIFO (First In First Out), LRU (Least Recently Used), Optimal. **File System** : File Concept, Access Method, Directory Structure, Protection.

Unit IV

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

Unit V

Linux/ Unix: Introduction, File System, Inode and Block Storage, File and Directory Structure and Permissions, File Related Commands, Shell and Kernel, Process- Init, Getty and Login Process, Killing, Changing Priority. Backup and restore files, installing and removing packages with yum rpm command, VI Editor. System administration: Managing user accounts-adding & deleting users, changing permissions and ownerships. **Shell Script**: Variables, Shell Programming- Decision Making, Loop Structure, Input and Output.

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. Teach Yourself UNIX By Kevin Reichard, Eric F Johnson (BPB)
4. Using UNIX By Philiplaplante (Jaico Publishing House)
5. Unix Concept By Yashwant Kanetkar (BPB Publication)

Duration: 3 Hours

MM: 100

MCS-105 Data Communication and Networking

Unit 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.

Unit 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.

Unit III

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), **Bridges** : Simple, Multiport, Transparent, Spanning Tree Algorithm, Source Routing.

Unit IV

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).

Unit V

Transport Layer : End to End Delivery Addressing, Reliable Delivery, Flow Control, Multiplexing, **Connection** : Establishment, Termination, **Network Security** : Privacy, Authentication, Integrity, Non-Repudiation. **Cellular Telephony**: Frequency Reuse Principal, Transmission, Receiving, Handoff, Roaming, First Generation, Second Generation, Third Generation.

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)

Duration: 3 Hours

MM: 100

MCS-106 Software Engineering and GUI Programming

Unit 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. **Planning a Software Project:** COCOMO Model, Project Monitoring Plan and Risk Management.

Unit II

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. **SCM** : Need for SCM, **Version control** : Introduction to SCM process – Software configuration items.

Unit III

GUI Programming: Integrated Development Environment, 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, **Controls:** Textbox, List Box, Combo Box, Options Button, Check Box, Timer, Scroll Bar, Slider, Progress Bar, Tool Bar, Status Bar.

Unit IV

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, Modules, Testing And Debugging Techniques.

Unit V

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.

Reference:

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)

4. Software Engineering: A Practitioner's Approach by Roger S. Pressman, McGraw Hill.

M.Sc. (Final) Computer Science

Examination 2016

Duration: 3 Hours

MM: 100

MCS-201 Data and File Structure using C/C++

Unit 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.

Unit 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.

Unit III

Searching : Linear Search, Binary Search; **Sorting:** Insertion Sort, Selection Sort, Quick Sort, Bubble Sort, Heap Sort, Shell Sort, Merge sort, Radix Sort, Comparison of sorting Methods.

Unit IV

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).

Unit V

Graph : Basic Terminology, Directed, Undirected, Weighted, Representation of Graphs, **Graph Traversal :** Depth First Traversal, Breadth First Search. **Files:** Definition and Concept, **File Organization :** Sequential, Relative, Index sequential and Multi key File Organization.

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)

Duration: 3 Hours

MM: 100

MCS-202 Computer Graphics

Unit I

Introduction : Interactive graphics, Passive graphics, advantage of interactive graphics, classification of application, hardware and software requirement of computer graphics, Input and Output Devices of Computer

Graphics, Working Characteristics of CRT, Raster Scan Display, Random Scan Display, Frame Buffer and Other Display Devices

Unit II

Scan Conversion : Point, Line, Circle, Ellipse, Representation of Various Line Drawing Algorithm, Circle Drawing Algorithm, Ellipses and Polygon Drawing Algorithm, Implementation of Algorithm using C++.

Unit III

2D Transformation : Translation, Rotation, Scaling, Homogenous Coordinates and Matrix Representation of 2D Transformation, Composite Transformation, **Clipping** : Method of Line Clipping, Polygon Clipping, and Exterior Clipping, **Curves** : Bezier and B-Spline Curve.

Unit IV

3D Graphics : Matrix Representation of 3D transformations, Translation, Rotation, Scaling, Composite Transformation, **Projection** : Perspective and Parallel Projection, **Visible Surface Detection Methods** : Back-face Deletion, Depth Buffer method, Scan-Line method, Depth Sorting method, Area subdivision method.

Unit V

Shading Modelling : Shading Model for Polygons, Surface details, Shadows, Transparency, **Graphics Standards** : GKS, PHIGS and requirements of Graphics software Standards, Color Models (RGB, CMY, HSV). **Solid Modeling** : Regularized Boolean set Operation, Primitive Instancing, Boundary Representation.

Reference:

1. Computer Graphics By Hearn and Baker (Prentice Hall India)
2. Introduction to Computer Graphics By Krihsnamurthy N (Tata McGraw Hill)
3. Theory and Problems of Computer Graphics (Schaum's Outline) By Zhigang X. and Plastock Ra. (Tata McGraw Hill)

Duration: 3 Hours

MM: 100

MCS-203 JAVA

Unit I

Java Basics : History, Characteristics, JAVA Virtual machine, Data Types, Token: Variables and its scope, Operators, Control Statements. Arrays; Classes: Class Fundamental, Methods, Constructors, this keyword, Garbage collection, finalize method. Inheritance: Method Overriding, Abstract class, Using final with inheritance.

Unit II

Packages and Interfaces, Exception Handling, Multithreading programming, Arrays, String Handling, String Buffer, Utility Classes, Vector, Stack, Wrapper Class. Applet : Building Applet Code, Applet Life Cycle, Adding Applet to HTML file, Passing parameter to Applet, Getting input from user.

Unit III

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.

Unit IV

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.

Unit V

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 2 By Patrick Naughton, Herbert Schildt (Tata McGraw Hill)
2. Programming in JAVA By E. Balagurusamy (TMH)
3. JAVA 2 programming Black Book By Steven Holzner et al. (Dreamtech Press)
4. AspectJ in Action By Ramnivas Laddad (Manning) (Willey DreamTech India New Delhi)

Duration: 3 Hours

MM: 100

MCS-204 Discrete Mathematics

Unit 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.

Unit II

Relations: Product Set, Relation, Pictorial Representation of Relations, Matrix Representations, Type of Relations. Closure Properties, Equivalence Relations, **Functions and Algorithm** : Function, Mapping,

Recursively Defined Function, Cardinality, Algorithm and Functions, Complexity of Algorithms.

Unit III

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.

Unit IV

Counting: Basic Counting Principle, Factorial Notations, Binomial Coefficients Pascals's Triangle, Binomial Theorem, Permutations, Combinations, Pigeonhole Principle, Ordered and Unordered Partitions.

Unit V

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)

Duration: 3 Hours

MM: 100

MCS- 205 Web Application Development

Unit 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;

Unit 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. CSS Style Sheets, Forms, Tables.

Unit 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, Built-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.

Unit IV

Basics of ASP.NET: Introducing ASP .NET, Creating ASP .NET applications, Web forms, Web controls, server controls, client controls, working with events, Rich web controls, Custom web controls, Validation controls client / server side; Calendar Control, Ad Rotator Control; Debugging ASP .NET pages. Advanced ASP .NET: ASP .NET configuration, State Management: Query String, Session, Cache, Cookies.

Unit V

Architecture Of ADO.NET, Create Connection Using ADO.NET Object Model, Connection Class, Command Class, Data adapter Class, Dataset Class. Display Data on Data Bound Controls and Data Grid. Database Accessing on Web Applications: Data Binding Concept With Web, Creating Data Grid, Web Services: Introduction, Remote Method Call Using XML, SOAP, Web Service Description Language, Building & Consuming a Web Service, Web Application Deployment.

References :

1. Web Enabled Commercial Application Development Using HTML, DHTML , Java Script, Perl CGI By Ivan Bayross (BPB)
2. Internet and Web Page Designing By V.K Jain (BPB)
3. ASP.NET 2.0 Black Book By Rudraksh Batra, Charul Shukla (Dream Tech Press)
4. ASP. NET Bible By Mridula Parihar and et al. (Hungry Minds, New York)

Duration: 3 Hours

MM: 100

MCS-206 (A) Artificial Intelligence

Unit 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.

Unit II

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.

Unit III

Search and control strategies : Preliminary concept, Uniform and Blind search, breadth first search, depth first Search, A, A*, AO*, Performance Comparison of various search technique.

Unit IV

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.

Unit V

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)

Duration: 3 Hours

MM: 100

MCS-206 (b) Current trends & Technologies

Unit I

Parallel Computing: Parallel virtual machine (PVM) and message passing interface (MDI), Libraries and calls, advanced architectures, today's fastest computers.

Broadband telecommunications: Concepts, Frame Relay, Cell Relay, Switched Multimegabit Data Service, Asynchronous Transfer Mode.

Unit II

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

Unit III

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.

Software Agents: Characteristics and Properties of Agents, Technology behind software Agents (Applets, Browsers and software agents)

Unit IV

Electronic Data Interchange (EDI): Concepts, Applications, (Legal Security and Privacy issues, EDI & Electronic Commerce, Standardization and EDI, EDI software implementation, EDII Envelope for message Transport, Internet Based EDI.

Geographical Information System : Main Concepts on Geographical Information System, E-cash, E-business, ERP packages. **Digital Libraries:** Concepts, Types of Digital documents, Issues behind document infrastructure.

Unit V

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 Sustrms", 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.

Duration: 3 Hours

MM: 100

MCS-206 (c) Cyber Security

Unit I

Cyber Security: definition, cybercrime and information security, cybercriminals, classification of cybercrime, cybercrime Era. Cyberoffences: categories of cybercrime, how criminals plan the attack, cyberstalking, cybercafe and cybercrime, botnets and cybercrime, Cloud Computing and cybercrime.

Unit II

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.

Unit III

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.

Unit IV

Cybercrime and Cyber Security: Cyber Law, The Indian IT Act, Digital Signatures and IT Act, Cyber security and organizational implications, Cyber crisis management, Anti- Cybercrime Strategies, Cybercrime and Cyberterrorism. cybercrime and Indian ITA 2000.

Unit V

Computer forensics: introduction, computer forensics and digital evidence, digital forensics life cycle, computer forensics and steganography, Relevance of the OSI 7 Layer model to computer forensics, Anti forensics.

References :

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

MCS-209 PROJECT

MM: 50

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

o Team Structure

o Development Schedule

o Programming language and Development Tools

IX). Requirement Specification

X). Design

o Detailed DFD's and Structure Diagram

o Data structure, Database and File Specification

XI). Project Legacy

o Current Status of project

o Remaining Areas of concern

o Technical and Managerial Lessons Learnt

o Future Recommendations

XII). Nomenclature and Abbreviations.

XIII). Bibliography

XIV). Source Code.