

Ordinance, Scheme & Syllabus for M.C.A.

Course Title: Master of Computer Application
Abbreviation: M.C.A.
Type of Course: Three Year Degree Course
Pattern; Yearly
Award of Degree: Master of Computer Application Degree will be awarded for those successfully complete all the components and declared pass in the who programme after three Years.

M.C.A. Master of Computer Science Teaching and Examination scheme for MCA. (I Year)

Paper Name		LEC	Exam Hours	Max Marks		Total Marks	Min Marks
				Int. Marks	Ext. Marks		
MCA-101	Fundamentals Of Computer & Pc Software	3	3	20	80	100	36
MCA-102	Data Base Management System	3	3	20	80	100	36
MCA-103	Data & File Structure Using C/C++	3	3	20	80	100	36
MCA-104	Operating System	3	3	20	80	100	36
MCA-105	Computer Networks & Internet Concept	3	3	20	80	100	36
MCA-106	Fundamental Mathematics For Computer Application	3	3	20	80	100	36
Total						600	216
PRACTICAL							
MCA-107	Practical Based on : PC Software & DBMS Lab		3	-	-	100	36
MCA-108	Practical Based on II : 'C' & C++ Lab		3	-	-	100	36
						200	72
Total of Theory & Practical Marks=800						288 (36% Aggregate)	

M.C.A. Master of Computer Science
Teaching and Examination scheme for MCA. (II Year)

Paper Name		LEC	Exam Hours	Max Marks		Total Marks	Min Marks
				Int. Marks	Ext. Marks		
MCA-201	Software Engineering	3	3	20	80	100	36
MCA-202	Rdbms (Oracle)	3	3	20	80	100	36
MCA-203	Java	3	3	20	80	100	36
MCA-204	Software Testing & Quality Assurance	3	3	20	80	100	36
MCA-205	Web Technology & XML	3	3	20	80	100	36
MCA-206	Discrete Mathematics and Iterative Methods	3	3	20	80	100	36
Total						600	216
PRACTICAL							
MCA-107	Practical Based on : RDBMS & ASP.Net		3	-	-	100	36
MCA-108	Practical Based on II :JAVA & WEB WEBTECHNOLOGY		3	-	-	100	36
						200	72
Total of Theory & Practical Marks=800							

M.C.A. Master of Computer Science
Teaching and Examination scheme for MCA. (III Year)

Paper Name		LEC	Exam Hours	Max Marks		Total Marks	Min Marks
				Int. Marks	Ext. Marks		
MCA-301	Data Warehousing & Data Mining	3	3	20	80	100	36
MCA-302	Artificial intelligence & Expert Systems	3	3	20	80	100	36
MCA-303	Web Application developments using ASP.NET	3	3	20	80	100	36
MCA-304	Cloud Computing	3	3	20	80	100	36
MCA-305	Project Work					200	72
Total						600	216
PRACTICAL							
MCA-207	Practical Based on : ASP.Net		3	-	-	100	36
MCA-208	Practical Based on II Cloud Computing		3	-	-	100	36
						200	72
Total of Theory & Practical Marks=800						288 (36% Aggregate)	

M.C.A. Master of Computer Science

MCA. (I Year)

MCA-101-Fundamentals Of Computer & Pc Software

Unit I

Introduction to Computer: Introduction, Strengths of computers, Limitations of computers, Fundamental uses of computers, Development of computers, Types of Computers, Generations of Computers

Boolean Algebra and Logic Gates: Introduction, Boolean Algebra, Binary Valued Quantities, And Operator, OR Operator, NOT Operator, Basic Postulates of Boolean Algebra, Theorems of Boolean Algebra, De Morgan's Theorems, Reducing Boolean Expression by their Simplifications, Proving the Equations of Boolean Expressions By Truth Table, Principle of Duality, Standard Forms, Basic Logic Gates, Use of Logic Gates in Circuits, Karnaugh Maps

Number System: Introduction, Digital and Analog Operations, Binary Data, Binary Number System, Decimal Number System, Octal Number System, Hexadecimal Number System, Fractional Conversion, Coding System

Data Representation and Binary Arithmetic: Introduction, Bits, Nibbles, Bytes and Words, Data Representation, Coding system, Binary Arithmetic, Binary Addition, Binary Subtraction, Binary Multiplication, Binary Division, Character Representation, Checking the Result of Binary Arithmetic

Unit II

Input Devices: Introduction, Input Device, Typing Input Devices, Pointing Input Devices, Scanning Input Devices, Audio Visual Input Devices

Output Devices: Introduction, Output Devices, Soft Copy Vs Hard Copy Output, Monitor, Printers, Plotter, Electrostatic Technique, Special Purpose Output Equipment's

Central Processing Unit: Introduction, What is Central Processing Unit, Arithmetic And Logic Unit, Control Unit, Registers, Instruction set, Processor Speed

Storage Devices: Introduction, Storage and its needs, Brain Vs Memory, Storage Evaluation Units, Data Access Methods, Primary Storage, Secondary Storage, Hard Disk Operations, Floppy Disk Drives, Winchester Disk, Optical Disk, VCD, CD-R, CD-RW, DVD, Zip Drive, Flash Drives, Blu Ray Disk, Memory Card, Driving Naming Conventions In a PC

Basics of Software: Introduction, What Does Software Stand For ?, Needs of software, Types of software, Open Source Software, Integrated Development Environment

Unit III (PC SOFTWARE)

Office Packages-Office activities and their software requirement, word Processing, spreadsheet, presentation graphics, database, introduction and comparison of various office suites like MS office, Lotus Office, Star Office, Open Office etc.

MS Word Basics: Introduction to MS Office; Introduction to MSWord; Features & area of use. Working with MS Word.; Menus & Commands; Toolbars & Buttons; Shortcut Menus, Wizards & Templates; Creating a New Document; Different Page Views and layouts; Applying various Text Enhancements; Working with– Styles, Text Attributes; Paragraph and Page Formatting; Text Editing using various features; Bullets, Numbering, Auto formatting, Printing & various print options

Advanced Features of MS-Word: Spell Check, Thesaurus, Find & Replace; Headers & Footers ; Inserting – Page Numbers, Pictures, Files, Auto texts, Symbols etc.; Working with Columns, Tabs & Indents; Creation & Working with Tables including conversion to and from text; Margins & Space management in Document; Adding References and Graphics; Mail Merge, Envelops & Mailing Labels.

Unit IV

MS Excel: Introduction and area of use; Working with MS Excel.; concepts of Workbook & Worksheets; Using Wizards; Various Data Types; Using different features with Data, Cell and Texts; Inserting, Removing

& Resizing of Columns & Rows; Working with Data & Ranges; Different Views of Worksheets; Column Freezing, Labels, Hiding, Splitting etc.; Using different features with Data and Text; Use of Formulas, Calculations & Functions; Cell Formatting including Borders & Shading; Working with Different Chart Types; Printing of Workbook & Worksheets with various options.

Unit V

MS PowerPoint: Introduction & area of use; Working with MS PowerPoint; Creating a New Presentation; Working with Presentation; Using Wizards; Slides & its different views; Inserting, Deleting and Copying of Slides; Working with Notes, Handouts, Columns & Lists; Adding Graphics, Sounds and Movies to a Slide; Working with PowerPoint Objects; Designing & Presentation of a Slide Show; Printing Presentations, Notes, Handouts with print options.

MCA-102

DATA BASE MANAGEMENT SYSTEM

Unit I

Introduction To DBMS: Operational Data, Introduction to database, Views of data, Three-Level Architecture proposal, Instances and Schemas, Purpose of database system, Advantages of DBMS, Disadvantages of DBMS, Structure of a DBMS, Data Models, Database Languages

Unit II

E-R Model: Entity-Relationship Model, Entity and Entity set, Attributes and Keys, Relationship and relationship set, Mapping constraints, Entity-Relationship diagram, Strong and Weak entities, Generalization, Specialization, Aggregation, Reducing ER diagram to tables

RDBMS Concept And Terminology: Set theory - concepts and fundamentals, Extension and Intention, Attributes and Domains, Relations, Tuple, Concepts of keys, Fundamental integrity rules

Unit III

Normalization: Functional dependencies, Universal Relation, Anomalies in a database, Decomposition, Normalization

Relational Algebra: Select Operation, Project Operation, Join Operation, Division Operation, Cross Product Operation, Set operations, Set operations

Relational Calculus: Introduction, Tuple Relational Calculus, Operators used in TRC, Example queries using TRC, Domain Relational Calculus, Operators used in DRC, Example queries using DRC, Comparison of TRC, DRC, RA

Unit IV

Database Language: Integrity Constraints: entity integrity, referential integrity, Keys constraints, Domain Constraints, **Introduction to SQL:** Characteristics of SQL, Advantage of SQL, SQL Data types and literals, Types of SQL Commands, SQL operators and their procedure, Tables, views and Indexes, Queries and Sub Queries, Aggregate functions, Insert, Update and delete operations, Joins, Unions, Intersections, Minus, Cursors in SQL

Unit V

Database Administration: DBA- Role, Functionality and Importance, Failure classification, The storage hierarchy, RAID, Transaction model, File structure and Storage access, File organization, Organization of records in file, Data dictionary storage

Advanced DBMS: Database system Architectures, Centralized System, Client-Server System, Parallel Database System, Distributed Database System, Overview of Database on Web, Concepts of ODBC, DSN

MCA-103

Paper Name : Data & File Structure Using C/C++

Scheme of Examination

UNIT I

Need of programming languages, Defining problems Flowcharts and algorithm development. Data types, constants, variables, operators and expressions. Input and output statements, Conditional and control statements, Arrays 1-D and 2-D array.

UNIT II

Function: Types of functions, function prototype, passing parameters, recursion. Pointers: uses of pointers, pointer arithmetic, pointers and array, pointers and functions, pointer to pointer. Structures and Union. File handling : Opening, closing, creating, processing and unformatted data files, Introduction to Dynamic Memory Allocation,

UNIT III

Data Structure: Definition, Implementation, Analysis of algorithm, Complexity Measures and Notations. Arrays: Representation of arrays (multidimensional), Address calculation using column and row major ordering. Linked Lists: Implementation, Doubly linked list, Circular linked list.

UNIT IV

Stacks: Definition, Implementation, Application (Tower of Hanoi, Function Call and return, Parentheses Matching, Back-tracking, Expression Evaluation) Queues : Definition, deque, enqueue, priority queue, Implementation, Application

UNIT V

Tree: Definition of elements, Binary trees: Types (Full, Complete, Almost complete), Binary Search Tree, Traversal (Pre, In, Post & Level order), AVL Tree, B Tree. Graphs: Elementary definition, Representation (Adjacency Matrix, Adjacency Lists) Traversal (BFS, DFS Application: Spanning Tree (Prim and Kruskal Algorithm), Dijkstra's algorithm and shortest path algorithms. Sorting : Bubble, Selection, Insertion, Quick, Heap, Merge Searching : Simple String Searching, Binary Search

Suggested Readings

1. Let Us C: YashwantKanetkar, BPB Publication
2. Programming in ANSI C: Ebalagurusamy, Tata McGraw hill.
3. Data structures through C language, SamiranChattopadhyay, DebgarataGhoshDastidar, MataginiChattopadhyay, BPB.
4. Data structure using C, Rajani Jindal, Umesh Publications.
5. Data structure and algorithms in C++, Adam Drozex, Vikas Publications.
6. Expert Data Structures with C, R.B. Patel, Khanna Book Publishing Co (P) Ltd. Delhi.

MCA-104

OPERATING SYSTEM

Unit I

Operating System: Introduction of Operating System, Types of Operating System, System Components and it's services, System Calls, System Programs, Structure, Design and , Implementation, Operating System Generation

Process: Concept, Description and Control, Concept of process, Process statemodel, Process description– PCB, Process control, Threads, Threads in Linux

Unit II

Process Scheduling: Types of Scheduler, Scheduling Criteria, Uniprocessor Scheduling, Multiprocessor Scheduling, Algorithm Evaluation, Process Scheduling in Linux

Process Synchronization and Deadlocks: The Critical-Section problem, synchronization hardware, Semaphores, Classicalproblems of synchronization, Critical Regions, Monitors, Deadlocks-System Model, Characterization, Deadlock prevention, Avoidance and Detection, Recoveryfrom deadlocks, Combined approach to deadlock handling.

Unit III

Security and Protection: Protection and Security-Goals of Protection, Domain of Protection, Access Matrix, Implementation ofAccess Matrix, Revocation of access rights, Language Based Protection, The SecurityProblem.Authentication, One Time passwords, Programthreats, Systemthreats, threatsmonitoring, Encryption

Unit IV

Memory Management: Memory Management Requirements, Address Space, Linking and Loading, Swapping, Partitioning, Paging, Segmentation

Virtual Memory: Introduction to VirtualMemory, Demand Paging, Page Replacement, Thrashing, Demand Segmentation, Solved Problems

Unit V

Input Output Systems: Input - Output Devices, Hardware Support for I/o, I/O Communication Techniques, I/O Software Device Drivers, Performance Consideration

Disk Structure: Introduction to Disks, Disk Scheduling, Disk Management, Disk Reliability, Swap Space Management, Stable Storage Implementation, Solved Problems

MCA-105

COMPUTER NETWORKS & INTERNET CONCEPT

Unit I

Introduction to Networking: Introduction to Network, Network, Computer Networks, Need of Network , Uses of Computer Network, Applications of networks, Network Criteria, Network Hardware and Software, network types : client, server & peers, Various Types of Servers

Transmission Technology: Transmission technology, Data can be analog or digital, Analog and Digital Transmission, Asynchronous & synchronous transmission, Types of Communication Modes, Base Band and Broadband Transmission, Comparison of Base band and Broadband Signaling

Unit II

OSI Model: Open System Interconnection model (OSI), Layered Architecture of the OSI, Reference Model, Functions of the ISO/OSI Layers, Summary of OSI Layer functions

Real World Networks: Ethernet ,Fast Ethernet, FDDI (Fiber Distributed Data Interface), Network Operation, ATM (Asynchronous Transfer Mode), ATM Service Categories, ARCNET, AppleTalk

IEEE 802 Standards: An Introduction, IEEE 802 standards, IEEE 802.3 (CSMA/CD), IEEE 802.4 (Token Bus), IEEE 802.5 [Token Ring], IEEE 802.5 cable standards, Comparison between IEEE 802.3,802.4 and 802.5, Compare Token Passing with CSMA/CD

Unit III

TCP/IP Reference Model: Overview of TCP/IP, reference model, Introduction to TCP/IP, TCP/IP Protocols, User Datagram Protocol, The Internet Control Message Protocol (ICMP), The Address resolution Protocol (ARP), Reverse Address Resolution Protocol (RARP), Simple Mail Transfer Protocol (SMTP), File Transfer Protocol, Dynamic Host Configuration Protocol (DHCP), Remote Login (rlogin), The Network File System (NFS)

IP Addressing & Subnet: Introduction to IP, Domain Name System (DNS), URL(Uniform Resource Locator), Electronic Mail, E-mail address, Subnet & Subnet masks

Unit IV

Network Security: Concept, The Need for Security, common threats, security barriers in network pathways, Attacks, Classification of Attacks, Specific Attacks, Approaches to Network Security, Levels of Security, Approaches to network security, Security Services

Viruses & Security Threats: Virus & Threats, Malicious Programs, Types of Viruses, Virus Countermeasures, Antivirus Approach, Advanced Antivirus Techniques, Distributed Denial of Service Attacks, DDoS Attack Description

Firewalls: Firewalls, Firewall Design Principles, Types of Firewalls, Firewall Configurations, Demilitarized Zone (DMZ) Networks, VLAN

Encryption & Decryption: Encryption & Decryption – Cryptography, Terminology, Classification of Cryptography, Substitution Ciphers, Security of algorithms, Steganography, Steganography vs Cryptography, Public key encryption, Comparison of Symmetric and Asymmetric Key Cryptography ,Public Key Cryptanalysis

Unit V

Digital Signature: Digital Signature, Requirements of Digital Signature, Direct Digital Signature , Arbitrated Digital Signature, Authentication Protocols, Symmetric Encryption Approach, Public-Key Encryption Approach, Digital Signature Standard, RSA and Digital Signature, DSS Approach, The Digital Signature Algorithm

Applications of Computers and Information Technology: Introduction, Business And Computer, E-Mail, E-Commerce, Project management, Computers in Personnel Administration, Accounting, Computers in Cost and Budget Control, Marketing, Manufacturing, Materials management, Banking, Insurance And Stock broking, Purchasing, Computers in warehousing.

MCA-106

Fundamental Mathematics for Computer Application

UNIT I

Matrices: Basic Definitions, Matrix Operations – Transpose, Adjoint And Inverse of a Matrix, Determinates of Matrix, Some Special Matrix Definitions – Orthogonal, Hermetian, Skew Hermetian,

Unitary, Rank of a Matrix, Elementary Transformations, Homogeneous System of Equations, Solution of Linear Equation Using Matrices as Determinates by Cramer's Rule.

Unit II

Limit, Continuity, Differentiability, Differentiation – The Derivative, Higher Derivatives of Second and Third Order, Application of Differentiation Maxima and Minima.

Unit III

Integration: Theory of the Integral, Properties of the Definite Integral, Methods of Integration By Substitution, By Parts, By Partial Fractions,

Unit IV

Co-Ordinates System: Rectangular Co-Ordinates in a Plane, Distance Between Two Points, Rectangular Co-Ordinates in Space, Elementary Co-Ordinate Geometry, The Straight Line, General equation of a Circle, Standard equation of a Circle.

Unit V

Vectors and Solid Geometry-Concept of Vector, Addition and Subtraction of a Vector, Resolution of a Vector, Scalar or Dot Product of two Vector, Vector or Cross Product of two Vectors, Equation of Lines and Planes.

References:

1. Mathematics Volume I By R.D. Sharma (DanpatRai Publication).

M.C.A. Master of Computer Science MCA. (II Year)

MCA-201 SOFTWARE ENGINEERING

Software engineering: introduction, reusable software components, what is wellengineered software ?, programming and software, engineering, what is software engineering goals of software engineering, software processes, software process models, process iteration, other important software models

Software project management: project management, management activities, project planning, project scheduling, risk management, selecting staff , metrics used for measuring the software cost, cocomo model

Software process and project metrics: software quality, metrics for the analysis model, metrics for the design model, metrics for source code, metrics for testing

Software project planning: introduction, software project planning, other palnningactivities, organisation of the software project, management plan(spmp) document

Software cost estimation:introduction, software cost factors, programmer's ability, product complexity, product size, required level of reliability, level of technology, decomposition technique, empiricalestimation models, the structure of estimation models

Software project requirements:software requirements, functional and non-functional, requirements, user requirements, system requirements, software requirements document

Requirements engineering process:requirements engineering process, feasibility study, requirements elicitation and analysis, scenarios, requirements specification, ethnography, requirements validation, requirements management

Software prototyping:software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping

Analysis concept and modeling:analysis modeling, context model, data modeling concepts, cardinality and modality, flow oriented diagram, data dictionary

Design concepts and principles:introduction, designwithinthe context of software, engineering , design process and design quality, design concepts, information hiding, functional independence, design classes, the designmodel, software patterns

Software architecture:software architecture, data design, architectural styles and patterns, analyzing alternative architecturaldesigns, mapping the requirementsinto a software architecture, architecturaldesign

Designing the user interface:user interface, input design, end-user considerations for input design, output design, designprinciples, screens, forms, menu, messages, importance of code, data codification schemes, designing code less systems

Softwarequalitymanagement:software quality management, role of a software quality manager, iso quality model, quality assurance standards, quality planning, quality control, software reviews, software reliability

Verification and validation:verification and validation, software testing, verification and validation planning, software inspections, automated static analysis, cleanroom software development

Software testing models: software testing fundamentals ,black-box and white-box testing, white-box testing, basis path testing, control structure testing, black-box testing, object-oriented testing methods

Software testing strategies:the strategic approach, the software testing strategy, strategic issues, unit testing, integration testing, validation testing, systemtesting, test automation

Computer aided software engineering (case):computer aided software, engineering (case), case workbenches, integrating case environment, need of software reuse:, types of reuse, reuse process.

MCA-202 RDBMS (Oracle)

Introduction to DBMS & RDBMS: Introduction to database, Introduction DBMS, Different database models, Structure of DBMS, RDBMS an introduction, Cod's law for RDBMS, Components of rdbms (kernel/data dictionary)

Introduction to Oracle RDBMS and Client/Server Computing: Introduction to Oracle, The Features of Oracle 9i, The oracle product details, An introduction to client/server computing, Oracle and client/ server computing

Overview of Oracle Architecture: Oracle Architecture, Oracle Files, System and User Processes, Oracle Memory, System Database Object, Protecting Data

Introduction to SQL*PLUS: Introduction to SQL, Features of SQL, Components of SQL, Introduction to SQL*PLUS, Features of SQL*PLUS, Execution of SQL*PLUS, Important commands used in SQL*PLUS, Oracle Data-Types

Working with Tables: Tables - An Introduction, Use of Table In SQL, Viewing The Stored Data In Tables, Filtering Table Data, Updating Data, Deleting Data From Tables, Modifying The Structure Of Tables, Destroying A Table, A Few Other SQL Statements

Data Constraints: Data Constraints, The Use of Data Constraints, The Types of Data Constraints, Defining Integrity Constraints By 'Alter Table', Removing Integrity Constraints, 'Null' Value Concept, 'Not Null' Constraint, Default Value Concept, 'User Constraints' Table

Data Manipulation in SQL: Oracle Operators, Range Searching, Pattern Matching, LIKE 'IN' and 'NOT IN' Predicates, An Introduction to 'DUAL' Table, An Introduction to 'SYSDATE'

Oracle Functions: Oracle Function, Function Types, Group Function, Scalar Function, Working With 'Date' in SQL, Grouping Of Data Of Different Tables In SQL

Joins, Sub-Queries & Views: TYPES OF JOINS, USE OF SUB-QUERY, 'UNION' AND CLAUSE, 'Intersect' Clause, Minus Clause, Concept of View, Types of View, Use of View

User Accounts Management & Indexing: Creation of User Account, User Account Management, Granting Privileges, Revoking Privileges, Modifying Password, Closing User Account, Concept of Index, Creation of Index, Types of Index, Use of Index, Deleting Index,

Introduction to PL/SQL Programming: Introduction to PL/SQL, Advantages of PL/SQL, Differences between SQL and PL/SQL, PL/SQL Block Structure, PL/SQL Character set, Variable, Constant and Data type, Assignment Operator and the use of 'SELECT...INTO', PL/SQL Program Control Structure, The use of 'IF...THEN...ELSE...ENDIF', Iteration Control (The use of LOOP, WHILE, FOR), The use of 'GOTO Statement

Cursor: Cursor an Introduction, Types of Cursor, Features of Cursor, Implicit Cursor, Explicit Cursor, Application of for Loop with Cursor

Exception Handling in PL/SQL: Exception Handling in PL/SQL, Built in Exception Handling, User Defined Exception Handling, The Raise Application-error Procedure

Oracle Transaction: Oracle Transaction, Commit Statement, Rollback Statement, Save point statement, Concept of lock, Types of locks, Levels of Locks, 'SELECT...FOR UPDATE' Statement, Removing the Lock

Procedures and Functions: Concept of Procedures and Functions, Advantages of Procedure and Function, Creation of Procedure and Function, Deleting Procedure and Function

Database Triggers: Concept of Triggers, Types of Triggers, Creation of Triggers, Application of Triggers, Deleting Triggers

Oracle Database Administrator: Oracle Database Administrator, The Functions of Database Administrator, The Security and Privileges of The Administrator, The Authentication of the Administrator, Creating a Secret Word File

DBA Utilities: Management the User, Creating Tablespace, Import/Export, Backup and Recovery

Oracle Advanced Security Features: Oracle Advanced Security Arrangements, Introduction, Applications, Administrative Tools, Oracle Net Manager.

MCA-203 PROGRAMMING IN JAVA

Overview Of Java: Introduction, Programming paradigm, OOPS Concepts, Evolution of Java, Features of Java, C++ Vs Java, Java and Internet, Java and WWW, Java support systems, Java Environment

Key Features Of Java: Introduction, Java Program Structure, Simple Java Program, Tokens, Java Statements, Java Virtual Machine, Constants and Variables, Declaration of Variables, Scope of Variables, Data types, Symbolic Constants, Type Casting, Command line arguments

Operators: Operators, Arithmetic Operators, Relational Operators, Logical Operators, Bitwise Operators, Increment and Decrement, Conditional Operators, Special Operators, Assignment Operators, Expression & its evaluation

Control Statements: Introduction, Control Statements, Sequence Control Statement, Decision Control Statement, Case Control Statement, Iteration Control Statement, Jump in loops, Labelled Loops

Arrays And Strings: Introduction, ARRAY , Need of Array, Types of Array, One dimensional Array, Two-Dimensional Array, Multidimensional Array, Strings , Concatenation of Strings, Methods for String Comparison, Methods for searching Strings, Changing the case of characters, String Buffer

Classes: Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class members, Call by value and call by reference, Recursion, Access Control, Constructors, Method overloading, Constructor Overloading, Garbage Collection, finalize() method, this keyword, Static Members, Nesting of Methods

Inheritance: Inheritance, Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Using Super, Constructor -Order of Execution in Inheritance, Overriding methods, Final variables and methods, Final Classes, Abstract methods and Classes, Containership, Visibility Control

Wrapper Classes And Vectors: Introduction, Wrapper Classes, Number Class, Byte class, Short class, Integer class, Long class, Converting Numbers to and from Strings, Float class, Double class, Character class, Boolean class, Vectors, Creating a vector

Interface & Packages: Introduction, Interfaces, Defining interface, Implementing interface, Accessing interface method, Accessing interface variable, Extending interfaces, Packages, System packages, Using system packages, User defined packages, Adding class to a package, Accessing and using package

Exception Handling: Introduction, Exceptions, Using try & catch, Multiple catch clauses, Finally, Throw, Throws

Multithreading: Introduction, The Main Thread, Creating Threads, Life cycle of Thread, Using Threads Methods, Thread Priorities, Stopping and Blocking a thread, Thread Exceptions, Using is Alive() and join(), Synchronization

Applets: Introduction, Local & remote applets, Applet vs applications, Writing applets, Life cycle of an applet, Creating source code of applet, Creating an executable applet, Creating applet tag, Adding applet tag to html, Running the applet, Detailed form of applet tag, Passing parameters to applet, Aligning the display, Html tags, Getting input from user

Input-Output Streams And File Management: Introduction, Stream, Stream Classes, Byte Stream Classes, Character Stream Classes, System Class, Reading Console Input, Writing Console Output, Using the File Class, Random Access File
Paper Code: MCA-204-Software Testing & Quality Assurance

Paper Name :204 Software Testing & Quality Assurance

Scheme of Examination

Maximum Marks: 100

Duration: 3 Hours

Minimum Passing Marks: 36

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).

The word

Unit I

Software Testing: Introduction, Meaning, What is Bug? Reasons of Bugs, Cost of Bugs, Software Tester Task. Introduction to Software Development Models Software Testing: Testing Axioms, Terms & Definitions

Testing Fundamentals: Types, Black Box, White Box, Static & Dynamic Testing. Static Black Box Testing. Dynamic Black Box Testing: Test to Pass & Test to Fail, Equivalence Partitioning, Data Testing, State Testing, , Other Black Box Testing Techniques.

Unit II

Static White Box Testing: Formal Reviews, Peer Reviews, Coding Standards and Guidelines. Review Check List Dynamic White Box Testing: Comparison with Debugging, Testing Pieces: Unit & Integration Testing. Data Coverage & Code Coverage.

Unit III

Configuration Testing: Overview, Software and Hardware Devices. Deciding Hardware Configurations. Compatibility Testing: Overview, Backward and Forward Compatibility. Testing Multiple versions. Data Sharing Compatibility User Interface Testing: Effective UI, Testing for Disabled.

Documentation Testing: Types of Documentation, Importance of Documentation Testing. Security Testing: Threat Modeling, Buffer Overrun, Safe String Functions, Computer Forensics

Unit IV

Web Site Testing: Web Page Fundamentals, Black Box Testing: Text, Hyperlinks, graphics, Forms. Gray Box Testing & White Box Testing, Configuration and Compatibility Testing

Testing Tools: Benefits of Automation and Tools. Test Tools, Software Test Automation. Random Testing: Monkeys & Gorillas. Bug Bashes & Beta Testing: Test Sharing, Beta Testing, Outsourcing.

Unit V

Planning Testing: Goals, Test phases, Strategy, Resource Requirements, Schedule, Test Cases, Bug Reporting, Metrics. Test Cases: Test Case Planning, Design, Cases, Procedures, Organization and Tracking. Bug Life Cycle and Tracking System.

Software Quality Assurance: What is Quality? Testing and Quality Assurance in Workplace. Test Management 10. Organisational Structures: CMM Capability Maturity Model, ISO 9000

Web Technology & XML

Paper Code: MCA-205

Paper Name 205 :Web Technology & XML

Scheme of Examination

Maximum Marks: 100

Duration: 3 Hours

Minimum Passing Marks: 36

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).

The word Internet – current state, hardware and software requirement, ISP, an internet account, web home page, URL, browser, security on web, searching tools, search engines, FTP, Gopher, Telnet, emails, TFTP

Web browser architecture, web page and multimedia, static dynamic and active web page, simple mail transfer protocol, simple network management protocol, hypertext transfer protocol

Basics of PHP: Introduction to PHP, what does PHP do? ,history of PHP , language basics ,data types , variables , expressions and operators , flow control statements , including code , embedding PHP in web pages.

Functions & Strings: Calling a function, defining a function, variable scope, function parameters, return values, variable functions, anonymous functions. Strings: Accessing individual characters, cleaning strings, encoding and escaping, comparing strings, manipulating and searching strings, regular expressions.

Arrays & Objects: Indexed vs. associative arrays, identifying elements of an array, storing data in arrays, multidimensional arrays, extracting multiple values, converting between arrays and variables, traversing arrays, sorting. Objects: Creating an object, accessing properties and methods, declaring a class, introspection.

MySQL Overview: Introduction, connecting to and disconnecting from the server , Entering queries , Creating and using a database , Creating and selecting a database , creating a table , loading data into

a table , Retrieving information from a table , selecting all data , selecting particular rows , selecting particular columns , sorting rows , date calculations , working with NULL values , pattern matching , counting rows , using more than one tables. MySQL databases in PHP: Introduction, connecting to a MySQL database, querying the database, Retrieving and displaying the results, modifying data, deleting data.

JavaScript - JavaScript Introduction , Variable, If-Else, Switch, Operators, Popups, Functions, Iterator functions, Loops, Forms, Events, and Event Handling, Try-Catch, Introduction to JavaScript Objects, JS Built-in Objects: Array, String , Date , window, document, navigator, status, history, location. Event handling .DOM, dynamically adding, removing and replacing DOM.

XML TECHNOLOGY - XML - Name Spaces - Structuring With Schemas and DTD - Presentation Techniques - Transformation - XML Infrastructure. SOAP, Overview Of SOAP - HTTP - XML-RPC - SOAP: Protocol - Message Structure - Intermediaries - Actors - Design Patterns And Faults - SOAP With Attachments.

WEB SERVICES: Overview - Architecture - Key Technologies - UDDI - WSDL - ebXML - SOAP And Web Services In E-Com - Overview Of .NET And J2EE. XML SECURITY: Security Overview - Canonicalization - XML Security Framework - XML Encryption - XML Digital Signature - XKMS Structure - Guidelines For Signing XML Documents - XML In Practice.

Paper Code: MCA-206

Paper Name : Discrete Mathematics and Iterative Methods

Scheme of Examination

Maximum Marks: 100

Duration: 3 Hours

Minimum Passing Marks: 36

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).

The word

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.

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

Unit IV

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.

Unit V

Iterative methods: Newton-Raphson method. Solutions of linear system by Gaussian, Gauss- Jordan, Jacobi and Gauss-Seidel methods. Inverse of a matrix by Gauss-Jordan method, Eigenvalue of a

matrix by Power methods. Interpolation: Newton's divided difference formula. Newton's forward and backward difference formulae, Cubic Spline Interpolation. Numerical Differentiation and Integration: Numerical differentiation with interpolating polynomials, Numerical integration by Trapezoidal and Simpson's 1/3rd rule. Double integrals using Trapezoidal and Simpson's rules. Runge-Kutta method of order four for first and second order differential equations.

Suggested Readings

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)
4. Balagurusamy, E., "Numerical methods", Tata McGraw-Hill, New Delhi, 2002.
5. SankaraRao, K., "Numerical methods for scientists and Engineers", Prentice-Hall of India, New Delhi, 2001.

**M.C.A. Master of Computer Science
MCA. (III Year)**

Paper Code: MCA-301

Paper Name : Data Warehousing and Data Mining

Scheme of Examination

Maximum Marks: 100

Duration: 3 Hours

Minimum Passing Marks: 36

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).

The word

UNIT I

Introduction to Data Warehouse, Data warehouse uses, Data Warehouse Planning stages and Designing approaches. Delivery Process-Data Warehouse Delivery Methods. System Processes; data in Flow Process, Extract and load process, Clean and transform Process, Backup and Archive process and Query Management Process. Process Architecture - Load manager, Warehouse manager, Query manager.

UNIT II

Database Schema-Star flake schema, Identifying facts and dimensions, Designing fact tables and dimension tables, Design Star flake schema, Multi-dimension schemas. Horizontal and vertical partitioning, Hardware partitioning. Aggregations and aggregation summary table Data Marts, Designing Data Marts. Metadata-Data transformation and load Managers.

UNIT III

Hardware architecture-Process, Server, Network and Client hardware. Physical Layout-Parallel technology Disk technology, Contents of data warehouse database, Database structures and layout and file systems. Security- Security requirements, impact of security on design and performance, Backup strategies and disaster recovery. Service agreement and operations of Warehouse.

UNIT IV

Capacity Planning (Process Estimate load), Tuning the data warehouse (Aggregate performance, data load and queries). Testing data warehouse-Develop test plan Testing backup recovery, Testing operational environment, testing database, testing of the application. Data warehouse futures.

UNIT V

Data Meaning concepts, Business Technical and Social context for Data mining.Data Mining approaches, Data mining methodologies. Data mining techniques (Automatic cluster detection, Decision tree), Building good effective models, Working with model set, multiple models. Case studies of data mining mode for an online bank, Wireless communication corporation.

Suggested Readings

1. Sam Anahory, Dennis Murray, "Data Warehousing", Pearson Education pub.
2. Michel A. Berry, Gordon S. Linoff, " Mastering Data Mining", Wiley Publishing.
3. Mallach G, Fredn E, "Decision Support System and Data Warehouse Systems", TMH
4. John Poole, Dan Chang, DauglasTalbert,"CommonWarehouse Metadata Developer's Guide", Wiley pub.

Paper Code:-MCA-302

Paper Name: Artificial intelligence & Expert Systems

Scheme of Examination

Maximum Marks: 100

Duration: 3 Hours

Minimum Passing Marks: 36

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).

The word

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.

Suggested Readings

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)

Paper Code:-MCA-303

Paper Name : Web Application Development using ASP.Net

Scheme of Examination

Maximum Marks: 100

Duration: 3 Hours

Minimum Passing Marks: 36

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).

The word

UNIT I

Introduction to Web Application Development: Life Cycle of Web Application. Introduction to .NET Framework, Features of .Net, .Net Versions, Microsoft Intermediate Language – Meta Data, .Net types and .Net name spaces, Common Language Runtime, Common Type System, Common Language Specification, .Net Applications using command line compiler and visual studio .Net IDE.

UNIT II

Basics of ASP.NET: Introducing ASP .NET, Creating ASP .NET applications, Web forms, Web controls, working with events, Rich web controls, Custom web controls, Validation controls, Debugging ASP .NET pages. Advanced ASP .NET: ASP .NET configuration, Business objects, State Management: Query String, Session, Cache, Cookies.

UNIT III

ASP .NET security: Authentication and authorization, Deployment projects. Basics of ADO .NET, ADO vs. ADO.NET, ADO.NET Namespaces, ADO .NET Providers – OLEDB & SQL, Connected

and Disconnected Mode, Dataset, Data Adapter, Command Object's Method, Programming with ADO.NET

UNIT IV

Web Services: Introduction to Web Services, Web services Infrastructure, Building a web service, Deploying and publishing web services, finding web services, Consuming web services.

UNIT V

Cyber Security: definition, cybercrime and information security, classification of cybercrime, cybercriminals, phishing, password cracking, keyloggers steganography, DoS and DoS attacks, SQL Injection, Cyber Law, The Indian IT Act, Digital Signatures and IT Act, Cyber security and organizational implications, Cyber crisis management.

Suggested Readings

1. Asp.net with C# by Chirs Hart, John Kauffman, Chris UllmanWorx Publication
2. ASP.NET 2.0 Black Book ByRudrakshBatra, CharulShukla (Dream Tech Press)
3. ASP. NET Bible ByMridulaParihar and et al. (Hungry Minds, New York)
4. Cyber Security by Nina Godbole&sunitBelapure
5. Computer Forensics by Marie- Helen Maras

Paper Code:-MCA-304

Paper Name : cloud Computing

Scheme of Examination

Maximum Marks: 100

Duration: 3 Hours

Minimum Passing Marks: 36

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).

The word

Unit I

Cloud Computing Introduction: Business and IT perspective, Cloud and virtualization, Cloud services requirements, cloud and dynamic infrastructure, cloud computing characteristics, cloud adoption.

Unit II

Cloud models: Cloud characteristics, Measured Service, Cloud models, security in a public cloud, public verses private clouds, cloud infrastructure self-service. Cloud at a service: Gamut of cloud solutions, principal technologies, cloud strategy, cloud design and implementation using SOA, Conceptual cloud model, cloud service demand.

Unit III

Cloud solutions: Cloud ecosystem, cloud business process management, cloud service management, cloud stack, computing on demand, cloud sourcing. Cloud offerings: Cloud analytics, Testing under cloud, information security, virtual desktop infrastructure, Storage cloud. Cloud management: Resiliency, Provisioning, Asset management, cloud governance, high availability and disaster recovery, charging models, usage reporting, billing and metering.

Unit IV

Cloud virtualization technology: Virtualization defined, virtualization benefits, server virtualization, Hypervisor management software, Logical partitioning, VIO server, Virtual infrastructure requirements. Storage virtualization, storage area networks, network attached storage, cloud server virtualization, virtualized data center.

Unit V

Cloud and SOA: SOA journey to infrastructure, SOA and cloud, SOA defined, SOA defined, SOA and IAAS, SOA based cloud infrastructure steps, SOA business and IT services.