SCHEME OF EXAMINATION FOR MASTER OF COMPUTER APPLICATIONS (M.C.A.) w.e.f. Academic Session 2014-15

Paper Code	Nomenclature of Paper	Exam Time (hrs.)	External Marks		Internal Marks		Total Marks
			Max	Pass	Max	Pass	
MCA-14-11	PROGRAMMING IN C	3	80	32	20	8	100
MCA-14-12	COMPUTER ORGANIZATION	3	80	32	20	8	100
MCA-14-13	SOFTWARE ENGINEERING	3	80	32	20	8	100
MCA-14-14	DISCRETE MATHEMATICAL STRUCTURES	3	80	32	20	8	100
MCA-14-15	COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS	3	80	32	20	8	100
MCA-14-16	S/W LAB - I BASED ON MCA-14-11	3	100	40			100
MCA-14-17	S/W LAB - II BASED ON MCA-14-15	3	100	40			100
MCA-14-18	SEMINAR				20	8	20
	TOTAL		600		120		720
MCA-14-21	SYSTEM PROGRAMMING	3	80	32	20	8	100
MCA-14-22	OBJECT ORIENTED PROGRAMMING USING C++	3	80	32	20	8	100
MCA-14-23	PRINCIPLES OF PROGRAMMING LANGUAGES	3	80	32	20	8	100
MCA-14-24	DATA STRUCTURES	3	80	32	20	8	100
MCA-14-25	WEB TECHNOLOGIES	3	80	32	20	8	100
MCA-14-26	S/W LAB-III BASED ON MCA-14-22 & MCA-14-24	3	100	40			100
MCA-14-27	S/W LAB-IV BASED ON MCA-14-25	3	100	40			100
MCA-14-28	SEMINAR				20	8	20
	TOTAL		600		120		720

Seminar

Each student shall individually prepare and submit a seminar report within stipulated time. Marks should be distributed considering report writing, presentation, technical content, depth of knowledge, brevity, references and their participation in seminar.

Internal Marks

Internal Marks in each theory paper will be awarded by the concerned teacher on the basis of marks obtained in one class test (of 10 Marks) and evaluation of assignments (of 10 Marks).

Note: Size of Groups for all practical and viva-voce examinations should not be more than thirty.

MCA-14-11 PROGRAMMING IN C

Maximum marks: 100 (External: 80, Internal: 20) **Time: 3 hours**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT - I

Overview of C: Structure & Memory Layout of C Program; Elements of C, Data types; Storage classes in C: auto, extern, register and static storage class; Header files: Using pre-defined and user-defined header files, Operators: Arithmetic, relational, logical, bitwise, unary, assignment and conditional operators, side effects, precedence & associativity of operators.

UNIT - II

Input/output: Unformatted & formatted I/O function in C.

Control statements: Sequencing, Selection: if statement, switch statement; Repetition: for, while, and do-while loop; break, continue, goto statements.

Functions: Definition, prototype, parameters passing techniques, recursion, built-in functions.

UNIT - III

Arrays: Definition, types, initialization, processing an array, passing arrays to functions, returning arrays from functions, String handling.

Pointers: Declaration, operations on pointers, pointers and arrays, dynamic memory allocation, pointers and functions, pointers and strings.

UNIT - IV

Structure & Union: Definition, processing, Structure and pointers, passing structures to functions, use of union.

Data files: Opening and closing a file, I/O operations on files, Error handling during I/O operation, Random access to files.

Preprocessor commands and Macro definitions.

Text Books:

1. Forouzan Behrouz, “Computer Science: A Structured Programming Approach Using C”, Cengage Learning.
2. Balagurusamy E., “Programming in ANSI C”, Tata McGraw-Hill.

Reference Books:

1. Gottfried, Byron S., “Programming with C”, Tata McGraw Hill.
2. Jeri R. Hanly & Elliot P. Koffman, “Problem Solving and Program Design in C”, Pearson Education.
3. Yashwant Kanetker, “Let us C”, BPB Publications.
4. Rajaraman, V., “Computer Programming in C”, Prentice Hall of India Learning.

MCA-14-12 COMPUTER ORGANIZATION

Maximum marks: 100 (External: 80, Internal: 20) **Time: 3 hours**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT - I

Digital Logic Fundamentals: Boolean algebra-basic functions, manipulating Boolean functions, K-maps and Quine McCluskey procedures. Combination Logic-multiplexers, decoders, encoders, comparators, adders & subtractors, BCD-to-Seven segment decoder. Basic Sequential Circuits-Flip-flops (RS, JK, T-type and D-Type), Ripple counter, Shift Register.

UNIT - II

Basic Computer Organization: Generic computer organization - system bus, instruction cycle, timing diagram of memory read and write operations, CPU organization, memory subsystem organization and interfacing - types of memory, chip organization, memory subsystem configuration, multibyte data organization, I/O subsystem organization and interfacing, memory subsystem configuration.

Register Transfer Language (RTL): different types of micro-operations, using RTL to specify digital systems - specification of digital components, simple systems, Modulo-6 counter.

UNIT - III

CPU Design: design and implementation of simple CPU-fetching, decoding & executing instruction, establishing required data paths, designing hardwired control unit.

Microsequencer Control Unit Design: microsequencer operations, microinstruction formats, design and implementation of a simple microsequencer, reducing number of microinstructions.

Computer Arithmetic: Hardware implementation of unsigned & signed (addition & subtraction, multiplication, booth's algorithm, division). Floating-point numbers (IEEE 754 standard) - addition, subtraction, multiplication, division.

UNIT - IV

Memory Organization: Hierarchical memory system, associative memory, cache memory - associative, direct and set associative mappings, replacing & writing data in cache, cache performance, virtual memory - paging, segmentation, memory protection.

I/O Organization: Asynchronous data transfer - source and destination - initiated, handshaking, programmed I/O, interrupts, DMA, IOP, serial communication-UART, RS-232C standard, USB standard.

Text Books:

1. John D. Carpinelli, "Computer Systems Organization & Architecture", Pearson Education.
2. Stallings W., "Computer Organization and Architecture", Pearson Education.

Reference Books:

1. Rajaraman, V., Radhakrishanan,T. "An Introduction To Digital Computer Design", PHI Learning.
2. Mano, M. Morris "Digital Logic and Computer Design", Pearson Education.
3. Tanenbaum A.S., Todd Austin, "Structured Computer Organization", PHI Learning.
4. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "Computer Organization", Tata McGraw Hill.

MCA-14-13 SOFTWARE ENGINEERING

Maximum marks: 100 (External: 80, Internal: 20) **Time: 3 hours**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT - I

Introduction: Software Crisis-problem and causes, Software Processes, Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models, Overview of Quality Standards like ISO 9001, SEI-CMM, CMMI, PCMM, Six Sigma.

Software Metrics: Size Metrics like LOC, Token Count, Function Count, Design Metrics, Data Structure Metrics, Information Flow Metrics, cyclomatic complexity, Halstead Complexity measures.

UNIT - II

Software Project Planning: Cost estimation, static, Single and multivariate models, COCOMO model, Putnam Resource Allocation Model, Risk management, project scheduling, personnel planning, team structure, Software configuration management, quality assurance, project monitoring.

Software Requirement Analysis and Specifications: Structured Analysis, Data Flow Diagrams, Data Dictionaries, Entity-Relationship diagrams, Software Requirement and Specifications, Behavioral and non-behavioral requirements.

UNIT - III

Software Design: Design fundamentals, problem partitioning and abstraction, design methodology, Cohesion & Coupling, Function Oriented Design and User Interface Design.

Coding: Programming style, structured programming.

Software reliability: Metric and specification, Musa and JM reliability model, fault avoidance and tolerance, exception handling, defensive programming.

UNIT - IV

Software Testing: Functional testing: Boundary Value Analysis, Equivalence class testing, Cause effect graphing, Structural testing: Control flow based and data flow based testing, loop testing, mutation testing, load, stress and performance testing, software testing strategies: unit testing, integration testing, System testing, Alpha and Beta testing, debugging.

Static Testing: Formal Technical Reviews, Walk Through, Code Inspection.

Software Maintenance: Types of Maintenance, Maintenance Process, Maintenance characteristics, Reverse Engineering, Software Re-engineering.

Text Books:

1. Pressman R. S. , "Software Engineering - A practitioner's approach", Tata McGraw Hill.
2. Sommerville, "Software Engineering", Pearson Education.

Reference Books:

1. Pfleeger, "Software Engineering: Theory and Practice", Pearson Education.
2. P. Jalote, "An Integrated approach to Software Engineering", Narosa Publications.
3. R. Fairley, "Software Engineering Concepts", Tata McGraw Hill.
4. James Peter, W Pedrycz, "Software Engineering", Wiley India Pvt. Ltd.

MCA-14-14 DISCRETE MATHEMATICAL STRUCTURES

Maximum marks: 100 (External: 80, Internal: 20) **Time: 3 hours**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT - I

Set Theory: Basic Set Theory, Operations on Sets, Algebra of sets, Venn Diagrams.

Relations: Binary Relations, Complement of relations, Inverse of relations, Composite relations, Properties, Equivalence, Partial Order and Total order relations.

Functions: Functions on Set, Domain, Co-domain, Representation of Functions, Types, Identity and Inverse Functions, Composition of Functions, Applications

UNIT -II

Propositional Calculus: Propositional logic, Equivalences, Predicates , Quantifiers, Nested Quantifiers, Rules of Inference, Normal Forms, Proofs: Methods, Strategy.

Counting: Pigeonhole Principle, Inclusion-Exclusion Principle, Permutations and Combinations, Binomial Coefficients, Counting Principles, Applications.

UNIT -III

Advanced Counting Techniques: Recurrence Relations, Solving Recurrence Relations, Divide and Conquer Algorithms and Recurrence Relations, Solution of Recurrence Relations by the method of Generating Function..

Latices and boolean algebra: Lattices, Hasse Diagram, Principle of Duality, Types of Lattices, Special Lattices, Boolean Expression, Equivalent circuits, Dual, Normal Forms.

UNIT -IV

Graphs: Introduction, Terminology, Types of Graphs, Representation of Graphs, Paths and Circuits, Cut-set and Cut - Vertices, Graph Isomorphism, Homomorphism, Connectivity, Bipartite Graphs, Subgraphs, Operations on Graphs, Euler and Hamiltonian Paths, Shortest Path Problem, Planar & Dual Graphs, Coloring Covering and Partitioning.

Tree: Tree Notations, Properties of tree, Types of Tree, Minimum Spanning Tree (MST).

Text Books:

1. Kenneth G. Rosen, “Discrete Mathematics And Its Applications”, Tata McGraw Hill.
2. Koshy T., “Discrete Mathematics with Applications”, Elsevier India.

Reference Books:

1. Eric Gosett, “Discrete Mathematics with proof”, Wiley India Pvt. Ltd.
2. Seymour Lipshutz, “Schaum Outlines of Discrete Mathematics”, Tata McGraw-Hill.
3. Olympia Nicodemy, “Discrete Mathematics”, CBS Publisher

MCA-14-15 COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS

Maximum marks: 100 (External: 80, Internal: 20) **Time: 3 hours**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT - I

Iterative Methods: Bisection, False position, Newton-Raphson methods, Discussion of convergences.

Solution of Simultaneous Linear Equations and ordinary Differential Equations: Gauss elimination method, Ill-conditioned equations, Gauss-Seidal iterative method.

Interpolation: Polynomial interpolation, Difference tables, Inverse interpolation.

UNIT - II

Ordinary Differential Equations: Euler method, Euler's Modified Method, Taylor-Series Method, Runge-Kutta method, Predictor-Corrector methods.

Numerical Differentiation and Integration: Differentiation formulae based on polynomial fit, Pitfalls in differentiation, Trapezoidal, Simpson's rules.

Curve Fitting: Polynomial fitting and other curve fitting.

UNIT - III

Approximation of functions: Approximation of functions by Taylor series and Chebyshev polynomials.

Statistics: Frequency distributions, Measures of central tendency, dispersion, moments, skewness and kurtosis. Binomial, Poisson and Normal distributions.

Correlation and Regression.

UNIT - IV

Statistical methods: Sample distributions, Test of Significance: Chi-Square Test, T and F test.

Analysis of Variance: One-way classification, ANOVA Table, Two-way classification (with one observation per cell).

Time Series Analysis: Components and Analysis of Time Series, Measurement of Trend, Seasonal fluctuations and cyclic movement.

Text Books:

1. Rajaraman V., "Computer Oriented Numerical Methods", PHI.
2. Gupta S.P. and Kapoor V.K., "Fundamentals of Mathematical statistics", Sultan Chand & Sons.

Reference Books:

1. Gupta S.P. and Kapoor V.K., "Fundamentals of Applied Statistics", Sultan Chand & Sons.
2. Graybill, "Introduction to Statistics", Tata McGraw Hill.
3. Anderson, "Statistical Modelling", Tata McGraw Hill.

MCA-14-21 SYSTEM PROGRAMMING

Maximum marks: 100 (External: 80, Internal: 20) **Time: 3 hours**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT - I

System Software: Definition, Goals of System Software, Program Development and Production Environments, Software Portability, Programs as components, Quick and Dirty Programming, User-Centric and System-Centric view of System Software.

Language Processors: Types of Language Processors, Program Generation, Program Execution, Program Translation and Interpretation, Fundamentals of Language Processing, Symbol Tables.

UNIT - II

Assemblers: Elements of Assembly language Programming, Pass Structure of Assemblers, Design of Two-pass assembler, Intermediate code forms, Program Listing and Error reporting, Organizational and Design issues in assemblers.

Macros and Macro Preprocessors: Macro Definition and Call, Macro expansion, Nested Macro calls, Design of a Macro preprocessor, Processing of Macro definitions, Use of Stack in expansion of macro calls, Design of a macro assembler

UNIT - III

Linkers and Loaders: Linking & Relocation, Design of a Linker, Self-Relocating, Dynamic Linking, Linking for program overlays, Loaders, Absolute and Relocating loaders.

Scanning and Parsing: Chomsky hierarchy of formal languages, Ambiguous grammars, Scanning, Parsing: Top-down and Bottom-up Parsing.

UNIT - IV

Compilers and Interpreters: Binding and Binding times, Data Structures of compilers, Scoping rules, Memory allocation, Static and dynamic memory allocation and deallocation, Recursion, Compilation of expressions, Postfix notations, Expression trees, Compilation of Control structures, Code Optimization, Local and Global optimization, Overview and benefits of interpretation, Pure and impure interpreters.

Text books:

1. Dhamdhere D.M, “System programming”, Tata McGraw-Hill.
2. Beck L. Leland, “System Software”, Pearson Education.

Reference Books:

1. Aho, Sethi, & Ullman, “Compilers Principles, Techniques and Tools”, Pearson Education.
2. Donovan J. John, “System Programming”, Tata McGraw Hill.

MCA-14-22 OBJECT ORIENTED PROGRAMMING USING C++

Maximum marks: 100 (External: 80, Internal: 20) **Time: 3 hours**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction: Object-Oriented features of C++, Comparison of C with C++, Class and Objects, Inline functions, Static data members and member functions, Read-Only objects, Pointers, Dynamic memory allocation and deallocation, constructors and destructors, Dynamic objects, array of pointers to object, local and global class, nested and empty class, preprocessor directives, Header files and namespaces. Console I/O: Hierarchy of console stream classes, unformatted and formatted I/O operations, Manipulators.

UNIT – II

Compile-time Polymorphism: Operator Overloading-overloading unary and binary arithmetic and relational operators, overloading subscript, insertion, extraction, new and delete operators; function overloading

Friend Function and Friend Class: Friend function, overloading operators by friend function, friend class

Type Conversion: Basic type conversion, conversion between Objects and Basic Types, conversion between objects of different classes.

UNIT – III

Inheritance: Base and Derived Classes, Protected Members, Casting Base-Class Pointers to Derived-Class Pointers, Using Member Functions, Overriding Base-Class Members in a Derived Class, Public, Protected and Private Inheritance, Using Constructors and Destructors in derived Classes, Implicit Derived-Class Object To Base-Class Object Conversion, Composition Vs. Inheritance.

Virtual Functions & Derivations: Virtual functions and their needs, Pure virtual function, virtual destructor, virtual derivation, abstract class.

UNIT – IV

Generic Programming: Function Templates, Overloading Template Functions, Class Template, Class Templates and Non-Type Parameters.

Exception Handling: Try, Throw, Catch, Throwing an Exception, Catching an Exception, Re-throwing an Exception.

File Handling: Hierarchy of File Stream classes, Opening and Closing files, File modes, testing for errors, File pointers and their manipulations, ASCII & Binary files, Sequential and Random access files.

Text Books:

1. Bjarne Stroustrup, “The C++ Programming Language”, Pearson Education.
2. Balaguruswami, E., “Object Oriented Programming In C++”, Tata McGraw-Hill.

Reference Books:

1. Herbert Shildt, “C++: The Complete Reference”, Tata McGraw-Hill.
2. Joyce Farrel., “Object Oriented Programming Using C++”, Cengage Learning.
3. Forouzan, Gilberg, “Computer Science: A Structured Programming Approach Using C++”, Cengage Learning.
4. Robert Lafore, “Object Oriented Programming in C++”, Techmedia SAMS.
5. Bhave M.P., Patekar S.A., “Object Oriented Programming with C++”, Pearson Education.

MCA-14-23 PRINCIPLES OF PROGRAMMING LANGUAGES

Maximum marks: 100 (External: 80, Internal: 20) **Time: 3 hours**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT - I

Preliminaries: History, Impact of Programming Paradigms, Role of Programming Languages, Good Language, Effects of Programming Environment, Translators and virtual architectures, Binding and Binding time, Language Syntax, Analysis of Program, Synthesis of Object program, Formal translation models: BNF Grammars, General parsing, Language translation, Recursive descent parsing.

UNIT - II

Formal languages and automata: The Chomsky hierarchy of formal languages, regular grammars, Regular expressions, Finite State Automata, Context-free grammars, Pushdown automata, Ambiguous grammars.
Language Semantics: Attribute grammars, Denotational semantics, Program verification and validation, Data objects, variables, constants, data types, declaration, type checking, type casting, type promotion, Enumerators, Composite data types.

UNIT - III

Object Orientated concepts: Structured data types, Abstract data types, Information hiding, Subprogram concepts, Good program design, Type definitions, Type equivalence, Inheritance, Derived classes, Abstract classes, Polymorphism, Inheritance and software reuse.
Sequence control: Implicit and explicit sequence control, Sequence control within arithmetic expressions, sequence control between statements, sequencing with non-arithmetic expressions, Subprogram Sequence control.

UNIT - IV

Miscellaneous topics: Parameter passing techniques, Static & Dynamic Scoping, Storage of variables, Static storage, Heap Storage management, Distributed Processing, Exceptions and Exception handlers, Coroutines, Scheduled subprograms, Parallel programming, Processor design, Hardware and Software architectures, Network Programming, Evolution of scripting languages, Applets, XML.

Text Books:

1. Pratt T.W., Zelkowitz M.V., Gopal T.V., "Programming Languages Design and Implementation", Pearson Education.
2. Sebesta W. Robert, "Concepts of Programming Languages", Pearson Education.

Reference Books:

1. Appleby Doris & VandeKopple J. Julius, "Programming languages-Paradigm and practice", Tata McGraw Hill.
2. Sethi Ravi, "Programming languages", Pearson Education
3. Scott M., "Programming Language Pragmatics", Elsevier India.

MCA-14-24 DATA STRUCTURES

Maximum marks: 100 (External: 80, Internal: 20) **Time: 3 hours**

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UNIT - I

Introduction to Data Structures: Classification of Data Structures, Complexity of Algorithms, Asymptotic Notations, Abstract Data Types, Arrays, Representation of Arrays in memory, Operations on Array, Strings, Pointers, Sparse Matrices, Applications.

UNIT - II

Stacks & Queues: Representation of Stacks, Stack Operations, Applications, Queues, Operations on Queues, Circular Queues, Dequeue, Priority Queues, Applications.

Linked Lists: Introduction, Types, Operations (Insertion, Deletion, Traversal, Searching, Sorting), Applications, Dynamic Memory Management, Implementation of Linked Representations.

UNIT - III

Trees: Definition and Basic Terminologies, Representation of Trees, Binary Trees, Types of Tree, Representation of Binary Trees, Binary Tree Traversals, Threaded Binary Trees, Binary Search Trees and Operations, Minimum Spanning Tree, AVL Trees, Heap, m-way Search Trees, B-Trees, B^+ Trees, Applications.

Advanced Trees: Introduction to 2-3 Tree, Red-black Tree, Splay Trees.

UNIT - IV

Graphs: Definitions and Basic Terminologies, Representation of Graphs, Graph Traversals, Shortest Path Problem, Applications.

Sorting and Searching: Recursive Binary Search, Types of Sorting, Implementation of Different Sorting Techniques: Selection Sort, Insertion Sort, Merge Sort, Radix Sort.

Hashing & Collision handling.

Text Books:

1. G.A.V Pai, "Data Structures and Algorithms", Tata McGraw-Hill, New Delhi.
2. Drozdek, "Data Structure and Algorithms in C++", Cengage Learning.

Reference Books:

1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Tata McGraw- Hill.
2. Seymour Lipschutz, "Data Structures", Tata McGraw-Hill, Schaum's Outlines, New Delhi.
3. Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education.
4. Goodrich, "Data Structures & Algorithms in C++", Wiley India Pvt. Ltd.

MCA-14-25 WEB TECHNOLOGIES

Maximum marks: 100 (External: 80, Internal: 20) **Time: 3 hours**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT - I

Introduction to Web Engineering: Categories and Characteristics of Web Applications, Web Applications Vs Conventional Software, Need for an Engineering Approach.

Web Essentials: The Internet, Basic Internet Protocols, WWW, HTTP (Structure of Request and Response Messages), Web Browser and its functions, URL, Web Servers and their features, Defining Virtual Hosts, Secure Servers.

UNIT - II

MarkUp Languages: Introduction to HTML, Characteristics, XHTML Syntax and Semantics, Fundamental HTML Elements, Lists, Tables, Frames, Forms, XHTML Abstract Syntax, Creating HTML Pages.

Cascading Style Sheets: Features, Core Syntax, Types, Style Sheets and HTML, Style Rule Cascading and Inheritance, Text Properties, CSS Box Model, Normal Flow Box Layout, Positioning and other useful Style Properties.

UNIT - III

Client-Side Programming: Introduction to JavaScript, Perspective, Basic Syntax, Variables and Data types, Statements, Operators, Literals, Functions, Objects, Arrays, Built-in Objects, Debuggers.

Server-Side Programming: Servlet Architecture, Generating Dynamic Content, Servlet Life Cycle, Sessions, Cookies, URL Rewriting, Servlet Capabilities, Servlets and Concurrency.

UNIT - IV

XML: Relation between XML, HTML, SGML, Goals of XML, Structure and Syntax of XML, Well Formed XML, DTD and its Structure, Namespaces and Data Typing in XML, Transforming XML Documents, XPATH, Template based Transformations, Linking with XML, Displaying XML documents in Browsers.

Text Books:

1. Andrew King, “Website Optimization”, Shroff Publishers, India.
2. Achyut Godbole, “Web Technologies”, Tata McGraw Hill, India.

Reference Books:

1. Jeffrey C. Jackson, “Web Technologies”, Pearson Education, India.
2. Thomas Powell, “The Complete Reference HTML”, Tata McGraw Hill, India.
3. William Pardi, “XML in Action”, IT Professional, New York, USA.