



SCHEME OF EXAMINATION

&

DETAILED SYLLABUS

MCA

(Distance Learning Program)

(w.e.f. 2018-19)

Faculty of Information Technology, JaganNath University

University Campus: NH-12, Chaksu Bypass, Tonk Road, Jaipur-303901

City Campus: Plot No. IP-2,3, Phase-IV, Sitapura Ind. Area,
Opp. Choki Dhani, Jaipur.

*Approved by AC vide resolution no.dated



MCA DLP COURSE STRUCTURE

SEMESTER I

CODE NO.	SUBJECT	Credits
MCA 101	Computer Fundamentals	3
MCA102	Programming Techniques and C Language	3
MCA 103	Introduction to Financial Accounting	3
MCA 104	Introduction to Internet and Multimedia	3
PRACTICALS		
MCA 105	C Programming Lab	2
MCA 106	MS Office Lab	2

SEMESTER II

CODE NO.	SUBJECT	Credits
MCA 201	Software Engineering	3
MCA 202	Discrete Mathematic Structure	3
MCA 203	Data Structure and Algorithm	3
MCA 204	Object Oriented Programming with C++	3
PRACTICALS		
MCA 205	DSA Lab	2
MCA 206	OOPs Lab	2

SEMESTER III

CODE NO.	SUBJECT	Credits
MCA 301	Theory of Computation	3
MCA 302	Computer Graphics	3
MCA 303	C# and .NET Programming	3
MCA 304	Database Management System	3
PRACTICALS		
MCA 305	C# and .NETLab	2
MCA 306	DBMS Lab	2

SEMESTER IV

CODE NO.	SUBJECT	Credits
MCA 401	Advance Java Programming	3
MCA 402	Computer Organization	3
MCA 403	Operating System & Linux Administration	3
MCA 404	PHP	3
PRACTICALS		
MCA 405	Advance Java Lab	2
MCA 406	PHP Lab	2

SEMESTER V

CODE NO.	SUBJECT	Credits
MCA 501	Design and Analysis of Algorithm	3
MCA 502	Artificial Intelligence	3
MCA 503	System Software Engineering	3
MCA 504	Data Communication & Networks	3
PRACTICALS		
MCA 505	Design and Analysis of Algorithm Lab	2
MCA 506	System Software Engineering Lab	2

SEMESTER VI

CODE NO.	SUBJECT	Credits
MCA 601	Cloud Computing	3
MCA 602	Data Mining and Warehousing	3
PRACTICALS		
MCA 603	Major Project	12

*Each theory paper will have 100 marks and 3 credits and practical papers 50 marks and 2 credits.

* Total credits of the program : 98

* Min. Credits required for the award of Degree : 90



Subject Code	Subject Title	Type of Paper (Theory/Practical/Project/Viva/)	Maximum Marks	Internal Evaluation	End Term Evaluation	Min. Pass Marks
I Semester						
MCA 101	Computer Fundamentals	Theory	100	30	70	40
MCA 102	Programming Techniques and C Language	Theory	100	30	70	40
MCA 103	Introduction to Financial Accounting	Theory	100	30	70	40
MCA 104	Introduction to Internet and Multimedia	Theory	100	30	70	40
MCA 105	C Programming Lab	Practical	50	0	50	20
MCA 106	MS Office Lab	Practical	50	0	50	20
II Semester						
MCA 201	Software Engineering	Theory	100	30	70	40
MCA 202	Discrete Mathematic Structure	Theory	100	30	70	40
MCA 203	Data Structure and Algorithm	Theory	100	30	70	40
MCA 204	Object Oriented Programming with C++	Theory	100	30	70	40
MCA 205	DSA Lab	Practical	50	0	50	20
MCA 206	OOPs Lab	Practical	50	0	50	20
III Semester						
MCA 301	Theory of Computation	Theory	100	30	70	40
MCA 302	Computer Graphics	Theory	100	30	70	40
MCA 303	C# and .NET Programming	Theory	100	30	70	40
MCA 304	Database Management System	Theory	100	30	70	40
MCA 305	C# and .NET Lab	Practical	50	0	50	20
MCA 306	DBMS Lab	Practical	50	0	50	20

IV Semester						
MCA 401	Advance Java Programming	Theory	100	30	70	40
MCA 402	Computer Organization	Theory	100	30	70	40
MCA 403	Operating System & Linux Administration	Theory	100	30	70	40
MCA 404	PHP	Theory	100	30	70	40
MCA 405	Advance Java Lab	Practical	50	0	50	20
MCA 406	PHP Lab	Practical	50	0	50	20
V Semester						
MCA 501	Design and Analysis of Algorithm	Theory	100	30	70	40
MCA 502	Artificial Intelligence	Theory	100	30	70	40
MCA 503	System Software Engineering	Theory	100	30	70	40
MCA 504	Data Communication & Networks	Theory	100	30	70	40
MCA 505	Design and Analysis of Algorithm Lab	Practical	50	0	50	20
MCA 506	System Software Engineering Lab	Practical	50	0	50	20
VI Semester						
MCA 601	Cloud Computing	Theory	100	30	70	40
MCA 602	Data Mining and Warehousing	Theory	100	30	70	40
MCA 603	Major Project	Practical	300	100	200	120
<p>Note: The criteria for passing in a subject is that student should secure minimum of 40% marks in the total of Internal Evaluation and End Term Examination and compulsorily with a minimum of 30% marks in the End-Term Examination.</p>						



SEMESTER I

CODE NO.	SUBJECT	Credits
MCA 101	Computer Fundamentals	3
MCA 102	Programming Techniques and C Language	3
MCA 103	Introduction to Financial Accounting	3
MCA 104	Introduction to Internet and Multimedia	3
PRACTICALS		
MCA 105	C Programming Lab	2
MCA 106	MS Office Lab	2

MCA 101: Computer Fundamentals

Course Objectives:

1. To introduce the basic concepts of computers.
2. To understand and operate MS-Office.
3. To learn about the basic concepts of Networking.
4. To familiarize with computer and its applications in the relevant fields and expose them to other related papers of IT.

UNIT-I : BASICS OF COMPUTER & ITS EVOLUTION

History and Evolution, Classification, Definitions, Concepts and Features, Data Representation, Error Detecting Codes.

Hardware, Motherboard, Software, Programming Languages, Machine Language, Assembly Language, High Level Language, Fourth Generation Language, Natural Language, Systems Software, BIOS, Operating System, Utility Software, Application Software.

Data processing: Input, Processing and output, Architecture of Computer System, The Control Unit (CU), The Immediate Access Store (IAS), ALU stands for Arithmetic and Logic Unit, Concepts of Files, Protecting Files, Storing files, File Terminology, Data Capturing, Verification.

UNIT-II : INPUT & OUTPUT DEVICE

Components, Input Devices, Keyboard, Pointing Devices, Pen Input Devices, Video Input Devices, Central Processing Unit, Arithmetic Logic Unit (ALU), Control Unit (CU), Primary Memory, Output Devices, Data Storage, Auxiliary Storage/Secondary Storage, Magnetic Disk, Optical Disks, Flash Memory, USB Drives, Removable Hard Drives, Smart Cards, Optical Cards.

Unit-III : Communication and Networks

Computer Networks, Goals of Networks, Communication Channels, Wired Channels, Wireless Channels, Transmission Technology, Broadcast Networks, Point-to-Point or Switched Networks, Bandwidth, Network Configuration, Client-Server Network, Peer-to-peer Network, Network Models, Network Topologies, Types of Networks.

UNIT-IV : INTRODUCTION TO OPERATING SYSTEMS

History of Operating System, Disk Operating System, UNIX, Batch Files, Batch System, Time Sharing Systems, Multiprogramming, Spooling, Essential Properties of the Operating System Batch, Time Sharing, Interactive, Real time system, Distributed.

Introduction to MS-Word: Introduction to Word processing, Features of Word Processors, Getting started with MS-Word, Starting MS-Word, Contents of the Word Window, Formatting Documents, List, Tabs and Tables, Finding, Replacing and proofing Text, Mail Merge, Printing and Getting Help.

UNIT-V : INTRODUCTION TO MS-EXCEL

Introduction to Electronic Spreadsheets, Applications of Electronic Spreadsheets, Types of Spreadsheets, Features of MS-Excel, Contents of the MS-Excel Window, cell Referencing, Ranges and Functions, Formatting Worksheets and Creating Charts, Data Forms and Printing.

Introduction to MS-Power Point: Introduction to MS-PowerPoint, What is a Presentations? Slides, Working with Slides, Slides Show and Printing Presentation.

Text/ Reference Books:

1. Sinha, Kr. Pradeep and PreetiSinha; Foundations of Computing, BPB Publication.
2. Special edition using Ms-Office 2007 by Ed.Bott, WoodyLeonhard, Pearson education
3. Leon and Leon: Introduction to Information Technology, Leon Tech World.
4. Microsoft Office-2007 by Greg Perry, SAMS Teach yourself Techmedia.publication

MCA 102: Programming Techniques and C Language

Course Objectives:

1. To gain experience about structured programming.
2. To help students to understand the implementation of C language.
3. To understand various features in C.

Unit-I 'C' Fundamentals

Introduction to 'C', Low Level Languages, High Level Languages, Identifier and Keywords, Data Types and Constants, Basic Data Types, Type Qualifiers, Variables, Operators and Expressions, Arithmetic, Rational, Logical, Comma, Conditional, Bitwise, Assignment, Increment and Decrement Operators, Preprocessor Directives.

Getchar Functions, Puchar Function, Scanf() Function, Printf() Function, Gets () and Puts () Functions.

Unit-II Control Statements

Loops, The Break Statement, Continue Statement, 'If' Statement, 'If Else' Statement, SwitchStatement, 'If Else If Ladder', Nested If, Iteration Statement, Nested For, Goto Statement, Conditional Goto, Unconditional Goto.

Unit-III Arrays and Strings

Declaration of An Array, Initialisation of Array, Drawbacks of Initialising An Array, Dimensions of An Array, Single Dimensional Arrays, Declaration of Single Dimensional Arrays, Initialisation of One-Dimensional Array, Two Dimensional Arrays, Elements of Multidimensional Array, Strings, Passing Array to Functions.

Unit-IV Functions and Structures

Elements of User Defined Functions, Scope and Lifetime of Variables, Return Values, Function Categories, Recursion, Introduction to Structure, Array of Structures, Additional Features of Structures, Uses of Structures, Unions.

Pointers

Pointer Declaration, Reference Operator, Dereference Operator, Pointer Arithmetic, Pointers with Function, Function Pointer Syntax, Initialising Function Pointer, Using Function Pointer, Arrays and Pointer, Array of Pointers, Pointers with Structures, Pointers on Pointer.

Unit-V Dynamic Memory Allocation

Stack and Heap, Sizeof, Malloc(), Managing Strings with Malloc(), Freeing Memory, Working with Memory Segments, Calloc() and Realloc().

File Input and Output

Bits and Bytes, Fields, Records and Files, File Streams, Opening and Closing Files, Reading Data, Writing Data, Appending Data, GotoandError Handling, A Brief History of Goto, Usage of Goto.

Text/ Reference Books:

1. Balaguruswamy E., "Programming in ANSI C", Third Edition, Tata McGraw Hill Publishing Company Limited.
2. YashwantKanetkar, "Let us C", BPB Publications, 2002.
3. B. Kernighan and D. Ritchie, "The ANSI C Programming Language", PHI., 2000
4. Herbert Schildt, Turbo C: The Complete Reference, Mc Graw-Hill,1998,ISBN: 9780078813467

MCA 103: Introduction to Financial Accounting

Course Objectives

The primary objective of the course is to familiarize the students with the basic accounting principles and technique of preparing and presenting the accounts for user of accounting for user of accounting information.

Unit-I : Meaning and Scope of Accounting

Need, Development and Definition of Accounting; Book-keeping and Accounting Persons interested in Accounting; Disclosures; Branches of Accounting; Objectives of Accounting.

Unit-II : Accounting Principles & Accounting Transactions

International Accounting Standards (Only Outline): Accounting Principles; Accounting Standards in India. Accounting Cycle; Journal; Rules of Debit and Credit; Compound Journal Entry: Opening Entry: Relationship between Journal and Ledger, Rules Regarding Posting; Trial Balance Sub Division of Journal.

Unit-III : Capital and Revenue

Classification of Income; Classification of Expenditure; Classification Receipts. Accounting Concept of Income; Accounting Concepts and Income Measurement Expired Cost and Income Measurement.

Final Accounts: Profit and Loss Account; Balance Sheet: Adjustment Entries.

Rectification of Errors; Classification of Errors; Location of Errors; Suspense Account: Effect on Profit.

Unit-IV : Depreciation Provisions and Reserves

Concept of Depreciation; Causes of Depreciation; Depreciation, Depletion, Amortization and Dilapidation, Depreciation Accounting; Methods of Recording Depreciation; Methods for Providing Depreciation; Depreciation of Different Assets; Depreciation of Replacement Cost; Depreciation Policy as per Accounting Standard; Depreciation Accounting; Provisions and Reserves.

Unit-V : Accounts of Non-Trading Institutions

Not for Profit Organisation, Financial Statements, Income and Expenditure Account Balance Sheet.

Text Books/Reference Books

1. Introduction to Accounting T. S. Grewal ,S. Chand& Co.
2. Advanced Accountancy S.N. Maheshwari
3. Accountancy Shukla&Shukla . S. Chand & Co
4. Financial Accounting , Shah, Oxford Press
5. Financial Accounting Needles, Powar, Cengage learning

MCA 104 : Introduction to Internet & Multimedia

Course Objectives:

The main objective of the course is to introduce the Basic Internet Concepts as well as whole range of web technologies starting from HTML, DHTML, Java Script, VBScript, and Dreamweaver. It also gives a brief description on Internet. Through the various examples the course will describe how to design specific page, dynamic web page, forms and frames. It also focuses on the practical aspects of these technologies. It also covers basics of MS-office tool.

UNIT I : INTRODUCTION TO INTERNET & WEB DESIGN

Introduction to Internet, History of Internet, Internet Standards, Practical uses of Internet. Introduction to Intranet, Difference B/W Internet & intranet. Networking Hardware and Software Components: Network Interface Cards, Network Cables, Network Connecting Devices etc. Component of the Internet: Connection requirements and options, Internet addressing, Internet standards, Web browser basics.

Basics of Web Designing

What is Web Designing, Web Design Basics, Elements of Good Design , The Elements of Design , The Principles of Design , The Web is Not Print.

Objectives, Introduction , Methodology, Getting Started with Web Designing , STEP 1: HTML, Step 2: WYSIWYG Editors, Recommendations for Software and Tool for Designing Web, Step 3: Hosting , Free Host Servers , Paid Host Servers, Step 4: Publish (Upload)

UNIT II : INTRODUCTION TO MULTIMEDIA

Objectives, Introduction , Elements of Multimedia System , Text , Graphics , Audio , Video , Animation, Features of Multimedia, Applications of Multimedia, Stages of Multimedia Application Development, Multimedia on the Web, Plugins, Media Players, and Multimedia Types

Text and Image

Objectives, Introduction, Multimedia Building Blocks, Text in Multimedia , Fonts and Faces , Selecting Text Fonts , Computers and Text ,Character Set and Alphabets, Font Editing and Design Tools, Digital Image., Digital Image Format, Captured Image Format, Stored Image Format, Capturing and Editing Images, How Vector Drawing Works

UNIT III : DOCUMENT, HYPERTEXT AND HYPERMEDIA

Objectives, Introduction, Documents , Document Architecture , Document Architecture – SGML, SGML and Multimedia, Open Document Architecture ODA, Hypertext , Hypermedia, Hypertext and Hypermedia, Hypertext, Hypermedia and Multimedia, Hypertext System, Multimedia System, Hypermedia System, Hypertext and the World Wide Web.

UNIT-IV : AUTHORIZING TOOLS AND MULTIMEDIA WORKSTATION

Objectives, Authoring , Authoring Tools , Card Based Authoring Tool , Page Based Authoring Tool , Icon Based Authoring Tool , Time Based Authoring Tool , Object Oriented Authoring Tool, Multimedia System, Communication Architecture, Hybrid Systems , Integrated Device Control , Integrated Transmission , Control , Integrated Transmission, Digital Systems, Multimedia Workstation , Bus , Multimedia Devices , Primary Storage , Secondary Storage , Processor , Operating System, Preference of Operating System for Workstation, The Macintosh Platform , The Windows Platform , Networking Macintosh and Windows Computers

UNIT-V : BASIC TOOLS FOR MULTIMEDIA OBJECTS

Objectives, Introduction, Text Editing and Word Processing Tools, OCR Software, Image-Editing Tools, Painting and Drawing Tools, Sound Editing Tools, Animation, Video and Digital Movie Tools , Video Formats , Common Organisation of Video Formats , QuickTime , Linking Multimedia Objects , OLE , DDE , Net DDE.

Multimedia Operating System

Objectives, Learning outcome, Introduction, Multimedia Operating System, Real Time Process , Characteristics of Real Time Systems , Real Time and Multimedia , Resource Management , Resources, Requirements , Components of the Resources , Phases of the Resource Reservation and Management Process , Resource Allocation Scheme.

Text Books/ Reference Books:

1. Internet Complete Reference by TataMcgrawhil
2. MS-Office, by Nellie Kankan. Office 2007
3. Word 2003, 2004 by David Rivers,



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SEMESTER II

CODE NO.	SUBJECT	Credits
MCA 201	Software Engineering	3
MCA 202	Discrete Mathematic Structure	3
MCA 203	Data Structure and Algorithm	3
MCA 204	Object Oriented Programming with C++	3
PRACTICALS		
MCA 205	DSA Lab	2
MCA 206	OOPs Lab	2

MCA 201: Software Engineering

Course Objective:

Course is intended to help students to develop skills that will enable them to construct software of high quality – software that is reliable, and that is reasonably easy to understand, modify and maintain. The concept covered in syllabus are:

- The software development process.
- Software requirements and specifications.
- Software design techniques.
- Techniques for developing large software systems.
- CASE tools and software development environments.
- Software testing, documentation and maintenance.

UNIT-I : INTRODUCTION

Introduction to software engineering, Importance of software, The evolving role of the software, Software characteristics, Software components, Software application, Software crisis, Software engineering problems, Software development life cycle, Software process.

UNIT-II : SOFTWARE REQUIREMENT SPECIFICATION

Analysis principles, Water fall model, The incremental model, Prototyping, Spiral model, Role of management in software development, Role of matrices, and measurement, Problem analysis, Requirement specification, Monitoring and Control.

Software Design: Design principles, Problem portioning, Abstraction, Top down and Bottom up-Design, Structured approach, Functional versus object-oriented approach, Design specification and Verification, Monitoring and control, Cohesiveness, Coupling, Forth generation techniques, Functional independences, Software architecture, Transaction and Transform mapping, Component-Level Design, Forth generation techniques.

UNIT-III : CODING

Top-Down and Bottom-Up programming, Structured programming, Information hiding, Programming style and internal documentation.

Testing: Testing principles, Levels of testing, Functional testing, Structural testing, test plane, test case specification, Reliability assessment, Software testing strategies, Verification and Validation testing, Integration testing, Alpha & Beta testing, System testing and debugging.

UNIT-IV : SOFTWARE PROJECT MANAGEMENT

The management spectrum (The people, the product, the process, the project), Cost estimation, Project scheduling, Staffing, Software configuration management, Structured Vs Unstructured maintenance, Quality assurance, Project monitoring risk management.

UNIT-V : SOFTWARE RELIABILITY & QUALITY ASSURANCE

Reliability issues, Reliability metrics, Reliability growth modelling, Software quality, ISO 9000 certification for software industry, SEI capability maturity model, Comparison between ISO & SEI CMM.

Text Books/ Reference Books:

1. R. S. Pressman, Software Engineering: A Practitioners Approach, McGraw Hill.
2. Ian Sommerville, Software Engineering, Addison Wesley.
3. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.

MCA 202: Discrete Mathematics Structure

Course Objectives:

This course covered the mathematical topics most directly related to computer science. Learning Outcome of this course is to prepare students to take courses related with Data Structure, Algorithm analysis and Cryptography. This course develops ability to write independent mathematical Proofs.

Course Contents

UNIT-I : FUNCTIONS

Types of Function, Composite, Even and Odd, Inverse.

Mathematical Induction and Recurrence

Principle of Mathematical Induction, Induction Example, Recursive Definitions, Recurrence, Solving Recurrence, Linear Recurrence.

Relation

Properties of Relation, Diagraphs, Using Digraphs to Model Information, Cartesian Product.

UNIT-II : SET THEORY

Types of Set, Venn Diagrams, Set Operation, Set Identities.

UNIT-III : BOOLEAN ALGEBRA AND LOGIC GATES

Boolean Algebra, Basic Logical Operations (Logic Variables), NOT Operator (Inversion), AND Operator, OR Operator, Logic Gates, Universal Gates, Constructing Gates, Fundamentals of Boolean Algebra, Boolean Operators, Laws of Boolean Algebra, Commutative Laws, Associative Laws, Distributive Laws, Switches and Inverter, Boolean Algebra Rules.

UNIT-IV : GRAPHS

Terminologies, Representation, Uses of Graphs, Some Important Graphs, Degree Sequence, Graphical Degree Sequence, Isomorphism in Graphs, Isomorphism by Using Adjacency Matrix, Applicability of Graphs.

Connected and Disconnected Graphs

Connected and Disconnected Graph, Walk, Trail, Path, Cycle (Circuit), Connected Graph, Weight Graph, Connectivity.

UNIT-V : LOGIC

Statement/Proposition, Truth Value, Venn Diagrams, Compound Statements and Logical Connectives, Truth Tables, Tautology, Contradiction and Contingency, Logical Equivalence, Negation of a Compound Statement, Some Standard Equivalent Statements in Logic, The Use of Logic in Circuits, Quantifiers.

Text/ Reference Books:

1. Kenneth Bogart Clifford and Stein Robert Drysdale, "Discrete Mathematics for computer science" Springer, 2006.
2. J. P. Tremblay and R. Manohar, "Discrete Mathematical Structure with Application to Computer Science", TMH, New Delhi, 2000.
3. David J. Hunter "Essentials of Discrete Mathematics" Johns and Bertlett, 2008.
4. Kolman, Busby and Ross "Discrete Mathematical Structures" PHI/Pearson., 6th Ed., 2009.
5. D. S. Malik and M. K. Sen, "Discrete Mathematical Structures", Cengage Publication, 2006.
6. Swapan Kumar Sarkar, "Discrete Mathematics", S. Chand, 4th Ed., 2006.
7. Kenneth H. Rosen, "Discrete Mathematics & Applications", TMH, 6th Ed., 2007.

MCA 203: Data Structure & Algorithms

Objective

In this course student will become familiar with Algorithm analysis: Trees, Graphs, searching and sorting and files.

Course Contents

UNIT-I

Characteristics of a Good Program, Techniques of a Problem Solving, Structured Programming, Modular Programming, Top-Down Programming, Bottom-Up Programming.

Concept of Data Types and Data Structures

Concept of Data, Data Types, Data Structure, Primitive Data Type, Logical Versus Physical Representation, Primitive and Data Structures, Operations on the Data Structures.

UNIT-II CONCEPTS OF POINTERS

Declaring and Initializing a Pointer, Accessing a Variable Using Pointer, Static Variable.

UNIT-III ARRAYS, STACKS, QUEUES AND LINKED LIST

Arrays, One-Dimensional Array, Two-Dimensional Arrays, Records, Defining a Structure, Stack, Stack as an Array, Operation on Stack, Stack as a Limited List, Recursion, Queue, Operation on Queue, Queue as an Array, Linked Implementation of a Queue, Implementation of a Queue as a Circular Linked List, Dequeue, Priority Queue, Linked List, Advantages of Linked List Over Arrays, Types of Linked List, Operations on Singly Linked List, Circular Linked List, Application on Linear Linked List, Doubly Linked List or Two Chains, Operation on a Doubly Linked List.

UNIT-IV TREES

General Trees, Binary Tree, Properties of Binary Trees, Implementation of Binary Trees, Binary Tree Traversal, Methods, Binary Tree Traversal Algorithms using Stacks, Binary Search Tree.

UNIT-V SEARCHING AND SORTING

Searching, Algorithm for Linear Search in an Unsorted Array, Algorithm for Linear Search in a Sorted Array, Algorithm Binary Search on Array given in Ascending Order, Sorting, Algorithm Insertion Sort, Algorithm Selection Sort for Ascending Order, Algorithm Bubble Sort for Ascending Order.

Text/ Reference Books:

1. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia Publication Pvt. Ltd., New Delhi.
2. R. Kruse et al, "Data Structures and Program Design in C", Pearson Education Asia, Delhi-2002
3. A. M. Tenenbaum, "Data Structures using C & C++", Prentice-Hall of India Pvt. Ltd., New Delhi.
4. K Loudon, "Mastering Algorithms With C", Shroff Publisher & Distributors Pvt. Ltd.

MCA 204 :Object Oriented Programming using C++

Course Objectives

1. To familiarize with Programming paradigms
2. To introduce the basic concepts of Object Oriented Languages like class, object, data hiding, encapsulation, and abstraction.
3. To understand and implement concepts like message passing, inheritance, polymorphism, exception handling and generic programming.

UNIT-I

OOP paradigm, advantages of OOP, Comparison between functional programming and OOP approach, characteristics of Object-oriented Language objects, Class, Inheritance, Polymorphism, and abstraction, encapsulation, Dynamic Binding, Message passing. Introduction to C++, Identifier and Keywords, constants, C++ Operators, Type conversion, variable declaration, Statement, expressions, User defined data types, Conditional expression (For, While, Do-while) loop statements, breaking control statements (Break, Continue).

UNIT-II

Defining a function, types of functions, inline functions, Call by value and Call by reference, Pre-processor, Header file and standard functions, Structures, Pointers and structures, Unions, Enumeration.

UNIT-III

Classes, Member functions, Objects, Array of objects, Nested classes, Constructors, Copy constructors, Destructors, Inline member functions, Static class member, friend functions, Dynamic memory allocation.

UNIT-IV

Inheritance: Single inheritance, Multi-level inheritance, Hierarchical, Virtual base class, Abstract classes, Constructors in Derived classes, Nesting of classes.

UNIT-V

Function overloading, Operator overloading, Polymorphism, Early binding, Polymorphism with pointers, Virtual functions, Late binding, Pure virtual functions, Opening and closing of files, Stream member functions, Binary file operations. Structures and file operations, classes and file operations, Random access file processing.

Text/ Reference Books:

1. K R Venugopal, Rajkumar, T Ravishankar, Mastering C++, Tata McGraw Hill.
2. E. Balagurusamy, Object Oriented programming, Tata McGraw Hill.
3. C. Thomas Wu, An Introduction to OOP with Java, McGraw Hill.



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SEMESTER III

CODE NO.	SUBJECT	Credits
MCA 301	Theory of Computation	3
MCA 302	Computer Graphics	3
MCA 303	C# and .NET Programming	3
MCA 304	Database Management System	3
PRACTICALS		
MCA 305	C# and .NET Lab	2
MCA 306	DBMS Lab	2

MCA 301: Theory of Computation

Objectives

The learning objectives of this course are to: introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability.

UNIT- I : AUTOMATA THEORY

Basic Concepts of finite state system, Deterministic finite Automata (DFA) & Nondeterministic finite Automata (NFA), Equivalence of NFA and DFA, Minimization of Finite Automata, Moore and Mealy machine and their equivalence.

Formal Languages Overview: Definition of a Grammar, Derivations and the Language Generated by a Grammar, Chomsky Classification of Languages.

UNIT-II : FINITE AUTOMATA & REGULAR GRAMMARS

Regular Expressions, Kleen's Theorem, Arden's Theorem, NFA and Regular Expressions- Construction of FA equivalent to a Regular Expression, Application of Pumping Lemma for Regular Language, Closure properties of Regular Languages, Construction of a Regular Grammar for a given DFA and vice versa.

UNIT-III : PDA AND CONTEXT FREE GRAMMAR

Context free grammar, Derivation trees, Ambiguity in grammar and its removal, Simplification of Context Free grammar, Normal forms for CFGs: Chomsky Normal Form & Greibach Normal Form, Pumping Lemma for Context Free languages, Push Down Automata (PDA)-Basic Definitions, PDA and Context-free Languages.

UNIT-IV : TURING MACHINES AND RECURSIVELY ENUMERABLE LANGUAGES

Turing Machine Model, Representation of Turing Machines, Design of Turing Machines, Multiple Track and Multitape Turing Machine, Turing Church's Thesis, Recursive and recursively enumerable languages-Decidability- Undecidable problems.

UNIT-V : LINEAR BOUNDED AUTOMATA AND CONTEXT SENSITIVE LANGUAGE

Basic Definition, Descriptions of LBA, Context-Sensitive Languages, Properties of context-sensitive languages, Relation between LBA and context-sensitive languages

Text/ Reference Books:

1. K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science, PHI
2. Martin J. C., "Introduction to Languages and Theory of Computations", TMH
3. Hopcroft, Ullman, "Introduction to Automata Theory, Language and Computation", Nerosa Publishing House, 3rd Edition.

MCA 302: Computer Graphics

Objectives

Computer graphics is used in diverse applications from the visualization of complex scientific data to the special effects in computer games. The objective of this course is to introduce the programming principles of computer graphics. The course will cover Practical programming through C, and mathematical and theoretical foundations.

Course Contents

UNIT-I : GRAPHICS PRIMITIVES, INPUT DEVICES AND TECHNIQUES

Graphics Primitives, Display Devices, Input Devices, Input Techniques Pointing and Selection.

UNIT-II : MATHEMATICS FOR COMPUTER GRAPHICS AND ITS OPERATIONS

Mathematics for Computer Graphics, Point Representation, Vector Representation, Matrices and Operation Related to Matrices, Vector Addition and Subtraction, Vector Multiplication, Line Drawing Algorithms, Segment and Display Files, Graphics Operations, Filling.

UNIT-III : CONICS, CURVES AND SURFACES

Conics, Curves, Quadric Surfaces, Super quadrics Spline and Bezier Representations

UNIT-IV : TRANSFORMATION AND GRAPHICS

Transformation, 2D Transformation, Basic Transformation, Composite Transformations, 3D Graphics, 3D-Transformation, Parallel Projection, Perspective Projection, Visible Lines and Surfaces Identification, Hidden Surface Removal.

UNIT-V : ANIMATION

Computer Animation, Principles of Animation, Types of Animation, Types of Animation Systems Animation Tools, Software, GIF Animator, GKS, GKS Workstation and Metafile

Text/ Reference Books:

1. Foley James D, "Computer Graphics", AW 2nd Ed.
2. Rogers, "Procedural Element of Computer Graphics", McGraw Hill.
3. Donald Hearn and M. Pauline Baker, "Computer Graphics", PHI.

MCA 303: C# and .NET Programming

Objective:

In this course student will become familiar with and with C# language. This course will help to develop real life projects.

UNIT-I : THE .NET FRAMEWORK

Introduction, Common Language Runtime, Common Type System, Common Language Specification, The Base Class Library, The .NET class library Intermediate language, Just-in-Time compilation, garbage collection, Application installation & Assemblies, Web Services, Unified classes.

UNIT-II : C# BASICS

Introduction, Data Types. Identifiers, variables & constants, C# statements, Object Oriented Concept, Object and Classes. Arrays and Strings, System Collections, Delegates and Events, Indexes Attributes, versioning.

UNIT-III : C# USING LIBRARIES

Namespace-System, Input Output. Multithreading. Networking and Sockets, Data Handling, Windows Forms, C# in Web application, Error Handling.

UNIT-IV : ADVANCED SERVICES USING C#

Web Services, Windows services, messaging, Reflection, COM and C#, Localization.

UNIT-V : ADVANCED FEATURES USING C#

Distributed Application in C#, XML and C#, Unsafe Mode, Graphical Device Interface with C#. Case Study (Messenger Application)

Text Books/ Reference Books:

1. Jesse Liberty and Donald Xie , “Programming C# 3.0”, O’REILLY.
2. J.G.R. Sathiaselan, N Sasikaladevi, “Programming with C# .net”, PHI, 2009.
3. E. Balagurusamy, “Programming in C#”, Tata McGraw-Hill,
4. Robinson et al, “Professional C#”, 2nd ed., Wrox Press,

MCA 304: Data Base Management Systems

Objectives :

The purpose of this course is to enable the students know about the fundamental concepts necessary for designing, using and implementing database systems and applications. It also covers advanced techniques and technologies.

Course Contents

UNIT-I : INTRODUCTION

Purpose of database, data abstraction, data model.instance& schemas, data independence, data definition language, data manipulation language, database manager. Database administration.

UNIT-II : ENTITY RELATIONSHIP MODEL

Entity & Entity set, relationship set, mapping constraints, candidate & primary key, entity relationship diagram, reducing E-R diagram to tables.

UNIT-III : RELATIONAL MODEL

Concepts of relational model, integrity constraints, extension & intension, relational algebra, relational calculus, commercial query language, modifying the database, comments on relational model.

UNIT-IV : DBMS BASED ON RELATIONAL MODEL

Introduction, the mapping operation, data manipulation facility, data definition facility, data control facility.

UNIT-V : NORMALIZATION & ORACLE INGRESS OR SYBASE

Introduction to functional dependence, normalization-1NF, 2NF,3NF, BCNF, 4NF, 5NF.Creation of tables, modification of tables, DDL command for RDBMS, SQL command for RDBMS, command language.

Text Books/ Reference Books:

1. Elmsari and Navathe, "Fundamentals of Database Systems", Pearson Education, 5th Ed., 2006.
2. Desai, B., "An Introduction to Database Concepts", Galgotia.
3. Microsoft Office-2007 by Greg Perry , SAMS Teach yourself Techmedia.publications
4. Date C. J., "An Introduction to Database Systems", Narosa Publishing, 7th Ed., 2005.
5. S. K. Singh, "Database Systems: Concept, Design, and Applications", Pearson's Education, 1st Ed., 2008.



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SEMESTER IV

CODE NO.	SUBJECT	Credits
MCA 401	Advance Java Programming	3
MCA 402	Computer Organization	3
MCA 403	Operating System & Linux Administration	3
MCA 404	PHP	3
PRACTICALS		
MCA 405	Advance Java Lab	2
MCA 406	PHP Lab	2

MCA 401 : Advance Java Programming

Course Objectives:

1. To practice the concepts of Java Programming like package, interface, exception handling etc.
2. To familiarize with Multithreading, Applets and String Handling.
3. To introduce concepts like AWT, Swings, Servlet and Java Beans.

UNIT-I : INTRODUCTION

Purpose of database, data abstraction, data model, instance & schemas, data independence, data definition language, data manipulation language, database manager. Database administration.

UNIT-II : ENTITY RELATIONSHIP MODEL

Entity & Entity set, relationship set, mapping constraints, candidate & primary key, entity relationship diagram, reducing E-R diagram to tables.

UNIT-III : RELATIONAL MODEL

Concepts of relational model, integrity constraints, extension & intension, relational algebra, relational calculus, commercial query language, modifying the database, comments on relational model.

UNIT-IV : DBMS BASED ON RELATIONAL MODEL

Introduction, the mapping operation, data manipulation facility, data definition facility, data control facility.

UNIT-V : NORMALIZATION & ORACLE INGRESS OR SYBASE

Introduction to functional dependence, normalization-1NF, 2NF, 3NF, BCNF, 4NF, 5NF. Creation of tables, modification of tables, DDL command for RDBMS, SQL command for RDBMS, command language.

Text/ Reference Books:

1. Java The Complete Reference- by Herbert Schildt Tata McGraw-Hill
2. Mastering Java2 J2SE1.4- by John Zukowski PBP Publication
3. Java™ How to Program sixth Edition- By H.M Deitel, P.J. Deitel
4. JAVA 2, J2SE 1.4 Complete, BPB Publication.

MCA402: Computer Organization

Course Objective:

1. To conceptualize the basics of organizational and architectural issues of a digital computer.
2. To analyze performance issues in processor and memory design of a digital computer.
3. To understand various data transfer techniques in digital computer.
4. To analyze processor performance improvement using instruction level parallelism

UNIT-I: NUMBER SYSTEMS AND LOGIC GATES

Number system, Binary arithmetic, Gray code, BCD, Logic Gates, Boolean Algebra, K-Map simplification, SOP forms, POS forms.

UNIT-II: LOGIC CIRCUIT AND CPU ORGANISATION

Half adder, Full adder, Flip-Flops (SR, JK, D & T), Counters, Registers. Basic computer architecture, Functional Organisation, Register organization, Arithmetic and logic unit, Pipeline. Central processing unit Instruction formats.

UNIT-III: ADDRESSING MODES, PIPELINING AND RTL

Addressing modes, Data transfer and manipulation, Interrupts, RISC CISC architecture. Register transfer and micro-operations, Register transfer language (RTL), Arithmetic, Logic and Shift micro operations.

UNIT-IV: MEMORY AND I/O ORGANISATION

Micro-program Control Organisation; Control memory, Address sequencing. Micro-program sequencer, Processor Vs Memory speed, High-speed memories; Cache memory, Direct mapping Set Associative Mapping, Fully Associative Mapping.

UNIT-V INPUT/OUTPUT ORGANISATION

Peripheral devices, I/O interface, Asynchronous Data Transfer : Strobe control, Handshaking Data transfer schemes (Programmed, Interrupt Initiated, DMA transfer), I/O Processor.

Text Books/ Reference books

1. Computer Organization and Architecture -John P. Hayes (McGraw-Hill)
2. Computer Organization and Architecture - William Stallings (Pearson Education Asia)
3. Computer System Architecture-M. Morris Mano (PHI)

MCA 403 :Operating Systems and Linux Administration

Course Objectives:

The main objective of this course is to provide Students

- A comprehensive overview of the Linux operating system along with Shell commands and shell scripting
- Implementation of Linux System programmes through GCC compiler.
- Understanding of basic concept of Socket programming (TCP and UDP)

UNIT-I : OPERATING SYSTEM FUNDAMENTALS

Introduction Concepts: Operating system function and characteristics, historical evolution of operating Real time systems, Distributed systems, Methodologies for implementation of O/S service, system calls, system programs, Interrupt mechanisms.

UNIT-II : I/O SYSTEM, FILE MANAGEMENT AND PROCESS SCHEDULING

File System: Function of the system, File access and allocation methods, Directory structure, file protection mechanisms, implementation issue, hierarchy of file, disk scheduling policies.

UNIT-III : PROCESS SCHEDULING

Process, PCB, state transition, Level of Scheduling Comparative study of scheduling algorithms

UNIT-IV

Feature of UNIX, directory structure of UNIX, File structure of UNIX, concept of inodes. Logging into Unix, format of UNIX components, basis operations on files, filters and pipelines mail and communication commands.

UNIT-V

Shell Script Types of shells, control structure for shells and for shells. Use of Editors, VI, EX & Ed.

Text Books/ Reference books

1. A.S.Tanenbaum-Modern Operating Systems, Pearson Education Asia.
2. Achyutgodble -Operating Systems, Tata Mc-Graw Hills.
3. Stallings-Operating System, Pearson.

MCA404: PHP

Course Objectives:

The main objective of the course is to introduce the open source language PHP as well as whole range of web technologies starting from HTML, DHTML, Java Script, VBScript, and Dreamweaver. It also gives a brief description on Internet. Through the various examples the course will describe how to design specific page, dynamic web page, forms and frames. It also focuses on the practical aspects of these technologies in today's industrial needs.

UNIT-I

Introduction of web applications. Introduction to web designing with HTML and Cascaded Style Sheets. Concept of Client-Side Scripting and Server-Side Scripting. Static website vs Dynamic website development. Web Servers: Local Servers and Remote Servers.

UNIT II

Introduction to PHP, Installing Web servers, PHP configuration in IIS & Apache Web server. Data types in PHP, Variables, Constants, operators and Expressions. PHP Operator: Conditional Structure - if, switch case & Looping Structure - for, while, do while, foreach

UNIT III

Introduction to Arrays: Initialization of an array, Iterating through an array, Sorting arrays, Array Functions, Functions: Defining and Calling Functions, Passing by Value and passing By references, Inbuilt Functions: String Function, Math Function, Date Function and Miscellaneous Function.

UNIT IV

Working with Forms: Get and Post Methods, Query strings, HTML form controls and PHP, Maintaining User State: Cookies, Sessions and Application State. Working with Files: Opening and Closing Files, Reading and Writing to Files, Getting Information on Files

UNIT V

PHP Database Connectivity: Introduction to MySQL, Creating database and other operations on database, connecting to a database, Use a particular database, Sending query to database, Parsing of the query results, Checking data errors.

Text/ Reference Books:

1. Steven Holzner "PHP: The Complete Reference"
2. Tim Converse, Joyce Park "PHP Bible", 2nd Edition
3. Dave W. Mercer, Allan Kent, Steven D. Nowicki, David Mercer, Dan Squier, Wankyu Choi with HeowEide-Goodman, Ed Lecky-Thompson, Clark Morgan "Beginning PHP5"



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SEMESTER V

CODE NO.	SUBJECT	Credits
MCA 501	Design and Analysis of Algorithm	3
MCA 502	Artificial Intelligence	3
MCA 503	System Software Engineering	3
MCA 504	Data Communication & Networks	3
PRACTICALS		
MCA 505	Design and Analysis of Algorithm Lab	2
MCA 506	System Software Engineering Lab	2

MCA 501: Design and Analysis of Algorithms

Course Objectives:

In this course, students will learn how:

- To design new algorithms based on standard algorithm-design strategies.
- To analyze the time and space usage and correctness of new algorithms based on standard algorithm-analysis techniques.
- To apply and adapt fundamental algorithms (sorting, searching, order statistics, graph algorithms) to new situations.
- To solve problems and to express your solutions using the language and concepts of algorithms and its mathematical tools.

Course Contents

UNIT-I INTRODUCTION:

Algorithms, Analysis of Algorithms, Design of Algorithms and Complexity of Algorithms, Asymptotic Notation, Growth of function, Recurrences Sorting in polynomial Time: Insertion sort, Merge sort. Heap sort and Quick sort sorting in Linear Time: Counting sort, Radix Sort, Bucket Sort Medians and order statistics.

UNIT II : ELEMENTARY DATA STRUCTURES:

Stacks, Queues Linked list, Binary Search Tree, Hash Table

Advanced Data Structures: Red Black Trees, Splay Trees, Augmenting Data Structure Binomial Heap, Tree, Fibonacci Heap, and Data Structures for Disjoint Sets Union-find Algorithm, Dictionaries and priority Queues, mergeable heaps, concatenable queues.

UNIT III : ADVANCED DESIGN AND ANALYSIS TECHNIQUES:

Dynamic programming, Greedy Algorithm, Backtracking, Branch-and-Bound, Amortized Analysis.

UNIT IV : GRAPH ALGORITHMS:

Elementary Graph Algorithms, Breadth First Search, Depth First Search, Minimum Spanning Tree, Kruskal's Algorithm. Prim's Algorithms, Single Source Shortest Path, All pair Shortest Path, Maximum flow and Travelling Salesman Problem.

UNIT V

Randomized Algorithms, String Matching. NP-Hard and NP-Completeness Approximation Algorithms, Sorting Network, Matrix Operations, Polynomials and the FFT Number Theoretic Algorithms, Computational Geometr OR.

Text/ Reference Books:

1. Jon Kleinberg and Eva Tardos, "Algorithm Design", Pearson Edition, 2006.
2. Richard Neapolitan and KumarssNaimipour, "Foundations of Algorithms", Jones & Bartlett, 2004.
3. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms" PHI, 3rd Ed., 2009.

MCA 502: Artificial Intelligence

OBJECTIVE:

This course covers the issues and techniques involved in the creation of computer systems that engage in intelligent behaviour. Students will explore problem-solving paradigms, logic and theorem proving, search and control methods, and learning.

Learning outcome of this course is

- Introducing students to the basic concepts and techniques of Artificial Intelligence.
- Learning AI by doing it, i.e. developing skills of using AI algorithms for solving Practical problems.

Course Contents

UNIT-I : AI AND ITS IMPORTANCE

History of AI application areas, problem representation, State space representation, problem-reduction representation, productions system.

UNIT-II : LOGIC

Propositional logic syntax and semantics. First order predicate logic (FOPL). Syntax and semantics conversion to clausal form inference rules unification and the resolution principle.

UNIT-III : STRUCTURE KNOWLEDGE

Associative networks. Frame structures. Conceptual dependencies and scripts.
Object-oriented representation Overview of object-oriented systems, objects classes, message and methods.

UNIT-IV : RULE BASE KNOWLEDGE REPRESENTATION

Procedural and declarative knowledge, forward and backward reasoning matching control knowledge.

Search and control strategies Data driven and goal drive search. Uninformed search, depth first and breadth first search, heuristic search, admissibility, monotonicity and informedness, using heuristic in games.

Learning Type of learning. Learning a induction, failure-drive learning being told learning exploration.

UNIT-V : EXPERT SYSTEM

Architecture, Rule based architecture, Non-production system architecture, Stages of expert system development, Expert system applications, Knowledge acquisition and validation, Knowledge system build in tools.

Text/ Reference Books:

1. E.Rich,K Knight-Artificial Intelligence,Tata McGraw Hills.
2. S.Russell,P.Norving-Artificial Intelligence-A Modern Approach,PearsonEducation,Asia.
3. Thomas Dean-Artificial Intelligence-Theory &Practice,PearsonEducation,Asia.
4. Alison Caursey - The Essence of Artificial Intelligence, Pearson Education, Asia.

MCA503: SYSTEM SOFTWARE ENGINEERING

Course Objective: To view some of the major tasks of the system software of a computer system, focusing on internal working of the hardware and software interface of a typical system.

UNIT I

System software introduction, Evolution of Components of a Programming System, General Machine Structure - Memory, Registers, Data and Instructions. Machine Language - No Looping, Address modification using instruction as Data and Index registers, Looping. Assembly Language Program using Literals and pseudo -ops.

UNIT II

Introduction to Assemblers - General design procedure, Design of Assembler- Statement of Problem, Data Structures, Format of Databases, Algorithm (2-pass assembler) in brief with flowchart.

UNIT III

Macro Language and the Macro Processor: Macro instructions, Features of Macro facility - Macro instruction argument, Conditional Macro expansions, Macro call within Macros and Implementation- Two-Pass macro processor with flowchart.

UNIT IV

Loaders and Linkers: - Loader Schemes, Compile and Go Loader, General Loader scheme, Absolute Loaders, Subroutine Linkages, Relocating Loaders, Direct-Linking Loaders, Binders, Linking loaders, Overlays, Dynamic Binders. Design of an Absolute Loader.

UNIT V

Introduction to Compilers: Different phases- Lexical Phase, Syntax Phase, Interpretation Phase, Optimization Phase, Storage Assignment Phase, Code Generation Phase and Assembly phase.

Text/ Reference Books:

1. D. M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw-Hill, 1999
2. Leland L. Beck, "System Software – An Introduction to Systems Programming", 3rd Edition, Pearson Education Asia, 2000.
3. M. Joseph "System Software", Laxmi Publications First edition, 2007

MCA 504: Data Communications and Networking

OBJECTIVE: This course covers theory and practice of data communication between computing devices. Topics include network architecture and topology, Basics of networking and protocols, OSI network layered models and Application layer protocols.

Course Contents

UNIT I

Introduction: Overview of computer network, seven-layer architecture, TCP/IP suite of protocol, etc. Mac protocols for high-speed LANS, MANS & WIRELESS LANS. (For example, FDDI, DQDB, HIPPI, Gigabit Ethernet, Wireless Ethernet etc.) Fast access technologies. (For example, ADSL, Cable Modem, etc).

UNIT II

IPV6: why IPv6 basic protocol, extension & Option, support for Qos, security, etc, neighbour discovery, autoconfiguration, routing. Change to other protocols. Application programming interface for Ipv6. 6bone.

UNIT III

Mobility in network. Mobile Security related issues. IP Multicasting. Multicasting routing protocols, address assignments, session discovery, etc.

UNIT IV

TCP extensions for high-speed networks, transaction-oriented application, other new option in TCP.

UNIT V

Network Security at various layers. Secure-HTTP, SSL, ESP, Authentication header, Key distribution protocols. Digital signatures, digital certificates.

Text/ Reference Books:

1. Forouzan, "Data Communication and Networking", TMH, 4th Edition.
2. A.S. Tanenbaum, "Computer Networks", PHI, 4th Edition.
3. W. Stallings, "Data and Computer Communication", Macmillan Press.
4. Comer, "Computer Networks and Internet", PHI.
5. Comer, "Internetworking with TCP/IP", PHI.



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SEMESTER VI

CODE NO.	SUBJECT	Credits
MCA 601	Cloud Computing	3
MCA 602	Data Mining and Warehousing	3
PRACTICALS		
MCA 603	Major Project	12

MCA 601: CLOUD COMPUTING

Course Objectives

1. To introduce the concepts IT technology with high international standard of service
2. To Implementation service with a quality control from project imitation to production

UNIT-I

Evolution of computing paradigms, Introduction to virtualization and virtual machine, Virtualization in fabric/cluster/grid context, Virtual network, Information model & data model for virtual machine, Software as a Service (SaaS), SOA, On Demand Computing.

UNIT-II

Cloud Computing: History; An introduction to characteristics, service models, deployment models, benefits, and challenges; Cloud software architecture issues, Cloud Computing with Titans: Google App Engine, Microsoft Windows Azure, Comparison of Google App Engine and Windows Azure; Cloud Infrastructure Models & Cloud Scale.

UNIT-III

Migrating to the Cloud, Software Licenses, Cloud Cost Model, Service Levels for Cloud Applications; Security: Disaster Recovery, Web Application Design, Machine Image Design, Privacy Design, Database Management, Data Security, Network Security, Host Security.

UNIT-IV

Service Models: Storage-as-a-Service, Database-as-a-Service, Information-as-a-Service, Process-as-a-Service, Application-as-a-Service, Platform-as-a-Service, Integration-as-a-Service, Security-as-a-Service, Management/Governance-as-a-Service, Testing-as-a-Service, Infrastructure-as-a-Service.

UNIT-V

Cloud Disaster Management: Disaster Recovery, Planning; Types of Clouds, Cloud Centres, Comparing approaches: Xen, OpenNebula, Eucalyptus, Amazon, Nimbus.

Text/ Reference Books:

1. Cloud Computing: A Practical Approach – **Toby Velte**, McGraw Hill.
2. Cloud Computing: Web Based Applications That Change the way you Work and Collaborate Online – **Michael Miller**, Pearson Education.
3. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud (Theory in Practice) - **George Reese**, 1st Edition, O'Reilly Media.

MCA 602 : Data Mining and Warehousing

Course Objectives

1. To introduce the concepts of Data Mining and Warehousing.
2. To familiarize with Data Preprocessing, Association Rule Mining, Classification, Prediction and Clustering
3. To understand and differentiate between OLTP and OLAP; applications and social impacts of data mining.

UNIT-I

Dss-Uses, definition, Operational Database. Introduction to DATA Warehousing.Data-Mart, Concept of Data Warehousing, Multi-Dimensional Database Structures.Client/Server Computing Model & Data Warehousing.Parallel Processors & Cluster Systems.Distributed DBMS implementations.

UNIT-II

DATA Warehousing Data Warehousing Components. Building a Data Warehouse.Warehouse Database.Mapping the Data Warehouse to a Multiprocessor Architecture.DBMS Schemas for Decision Support.Data Extraction, Clean-up & Transformation Tools.Metadata.

UNIT-III

Business Analysis. Reporting & Query Tools & Applications. On line Analytical Processing(OLAP), Patterns & Models. Statistics.Artificial Intelligence.

UNIT-IV

Knowledge Discovery, Data Mining. Introduction to Data-Mining.Techniques of Data-Mining Decision Trees.Neural Networks.Nearest Neighbor & Clustering.Genetic Algorithms. Rule Introduction Selecting & Using the Right Technique.

UNIT-V

Multimedia Data-Mining, Multimedia-Databases, Mining Multimedia Data, Data Mining and the World Wide Web, Web Data-Mining, Mining and Meta-Data. Data Visualization & Overall Perspective.Data Visualization.Applications of Data Mining.

Text/ Reference Books:

1. J. Han &MichelizeKamber, “Data mining-Concepts & techniques”, Morgan Kaufman Publisher.
2. Sam Anahory& Dennis Murray, “Datawarehousing”, Pearson Education.
3. Micheal J.A. Berry, Gordan S. Linoff, “Mastering Data Mining” , John Willey & Sons.
4. ClandeSeidman, “Data Mining with Microsoft SQL server 2000”, Prentice Hall India.