

LACHOO MEMORIAL COLLEGE OF SCIENCE & TECHNOLOGY (AUTONOMOUS)
SYLLABUS FOR MCA FROM SESSION 2014-2015

MCA YEAR II SEMESTER III

S. No.	COURSE CODE	SUBJECT	PERIODS			CI A	ESE	Subject Total
			L	T	P			
1.	MCA311	Programming in JAVA	3			20	80	100
2.	MCA312	ASP .NET	3			20	80	100
3.	MCA313	Web Engineering (Ajax)	3			20	80	100
4.	MCA314	Computer Graphics	3			20	80	100
5.	MCA315	Operating System	3			20	80	100
PRACTICALS								
6.	MCA321	Programming in JAVA lab			4	20	80	100
7.	MCA322	ASP .NET lab			4	20	80	100
8.	MCA323	Web Engineering (Ajax) Lab			4	20	80	100
9.	MCA324	Computer Graphics lab			4	20	80	100

In IV and V Semesters, there will be three groups available for the students to choose from.

MCA YEAR II SEMESTER IV

S.No.	COURSE CODE	SUBJECT	PERIODS			CI A	ESE	Subject Total
			L	T	P			
1.	MCA411	Programming in Advance Java	3			20	80	100
2.	MCA412	Artificial Intelligence	3			20	80	100
3.	MCA413	Software Engineering & UML	3			20	80	100
PRACTICALS								
6.	MCA421	Advance Programming Lab			4	20	80	100
7.	MCA422	Colloquium Lab			4	20	80	100
8.	MCA423	System Design Project Lab			4	20	80	100
Group A								
4.	MCA414A	System Programming	3			20	80	100
5.	MCA415A	Discrete Mathematics	3			20	80	100
9.	MCA424A	System Programming Lab			4	20	80	100
Group B								
4.	MCA414B	XML and Its Applications	3			20	80	100
5.	MCA415B	Advanced DBMS	3			20	80	100
9.	MCA424B	XML Lab			4	20	80	100
Group C								
4.	MCA414C	Internet Programming PHP	3			20	80	100
5.	MCA415C	Mobile Operating Systems	3			20	80	100
9.	MCA424C	PHP Programming Lab in Linux environment			4	20	80	100

SEMESTER III**MCA II Year Semester III**

MCA311	PROGRAMMING IN JAVA
UNIT I	Object Oriented Concepts in Java, Java features like security, portability, byte code, java virtual machine, object oriented, robust, multithreading, architectural neutral, distributed and dynamic. Java Source File Structure, Compilation, Execution, Lexical Tokens, Identifiers, Keywords, Literals, Comments, Primitive Datatypes, Operators, Assignments, Command line argument, Control structures.
UNIT II	Class Fundamentals, Object & Object reference, Object Life time & Garbage Collection, Creating and Operating Objects, Constructor & initialization code block, Access Control, Modifiers, Abstract Class, Interfaces, Implementing Interfaces, Defining Methods, Argument Passing Mechanism, Method Overloading, Recursion, Static Members, Finalize() Method, use of this keyword, Modifiers with Classes & Methods, Array, Initializing & Accessing Array, Multi –Dimensional Array.
UNIT III	Inheritance - Benefits of Inheritance in OOP, Types of Inheritance, Inheriting Data Members and Methods, Role of Constructors in inheritance, Overriding Super Class Methods, use of super keyword, Polymorphism in inheritance, Organizing Classes and Interfaces in Packages, Package as Access Protection, Defining Package, CLASSPATH Setting for Packages, Naming Convention For Packages.
UNIT IV	Exception, Exceptions & Errors, Types of Exception, Control Flow in Exceptions, JVM reaction to Exceptions, Use of try, catch, finally, throw, throws in Exception Handling. In-built and User Defined Exceptions, Checked and Un-Checked Exceptions. Threads, Need of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, Synchronizing Threads, Inter Communication of Threads, Input/output Operation in Java (java.io Package), Streams, Classes for Input and Output, Standard Streams.
UNIT V	AWT Classes, Window fundamentals, frame windows, Applets, Execution of applet with different methods, frame window in applet, parameter passing in applet, Graphics class, use of color, fonts and text. Event Handling Mechanisms, Delegation Event Model, Event Class, Event Listener Interfaces, Adapter Classes. JDBC – Basic steps to JDBC, setting up a connection to database, Creating and executing SQL statements, Resultset and Resultset MetaData Object.

Suggested Readings

- Java How to Program, Dietel & Dietel, Pearson
- Herbert Schildt: JAVA 2 - The Complete Reference, TMH, Delhi

MCA312	ASP.NET
UNIT I	Introduction to .NET Framework: Features of .Net, Microsoft Intermediate Language, Meta Data , .Net types and .Net name spaces ,Common Language Runtime, Common Type System ,Comparison of ASP and ASP.NET.
UNIT II	Introducing ASP .NET – Creating the ASP .NET applications, Web forms and Web controls, working with events, Web controls such as Rich web controls, Custom web controls and Validation controls, Application level and Page level Tracing, Debugging ASP .NET pages.
UNIT III	Advanced ASP .NET : ASP .NET configuration ,Creating and using the Business objects , HTTP Handlers ,ASP .NET caching ,ASP .NET security , Deployment projects, Localizing ASP .NET applications
UNIT IV	Web Services: Introduction to web services, Web services Infrastructure, SOAP with HTTP, Building, Deploying and publishing web services, Finding web services, Consuming web services as a consumer.
UNIT V	ADO .NET: Basics of ADO .NET , ADO v/s ADO.NET , Data Table, Data Views, Data Set, Data Relation Type, ADO .NET Managed Providers,OLEDB and SQL Managed Providers ,OleDb Data Adapter Type. XML and ADO.NET, Using XML Reader: Reading XML

	documents using Data Reader, Using Data Set and XML: Loading XML into Data Sets
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Suggested readings

- ASP.NET Bible By Mridula Parihar
- Beginning ASP.NET 1,1 By Chris Ullman , John Kauffman, Chris Hart, David Susmet

MCA313	WEB ENGINEERING (AJAX)
UNIT I	Introduction of HTML: introduction, markup language, editing HTML : common tags, headers, text styles, linking, images, formatting text, horizontal rules and more line breaks, unordered lists, nested and ordered lists, basic HTML tables : intermediate HTML tables and formatting : basic HTML forms, more complex HTML forms, internal linking, creating and using image maps.
UNIT II	Java script – introduction to scripting: introduction- memory concepts- arithmetic- decision making. Java script control structures, Java script functions: introduction – program modules in java script - function definitions, duration of identifiers, scope rules, recursion, java script global functions. Java script arrays: introduction, array-declaring and allocating arrays, references and reference parameters – passing arrays to functions, multiple subscripted arrays. Java script objects: introduction, math, string, data, boolean and number objects.
UNIT III	Dynamic HTML : CSS : introduction – inline styles, creating style sheets with the style element, conflicting styles, linking external style sheets, positioning elements, backgrounds, element dimensions, text flow and the box model, user style sheets. Dynamic HTML: object model and collections: introduction, object referencing, collections all and children, dynamic style, dynamic positioning, using the frames collection, navigator object. Dynamic HTML: event model : introduction, event ON CLICK, event ON LOAD – error handling with ON ERROR, tracking the mouse with event, more DHTML events. Filters and Transitions.
UNIT IV	Introduction to jQuery , install jQuery , jQuery Syntax, selectors , events of jQuery, jQuery Effects- hide/show , fade,slide,animate,stop,callback , chaining, jQuery-HTML: get, set , add , remove , css , dimensions, jQuery examples
UNIT V	Introduction to AJAX , Using XMLHttpRequest , XHR CreateObject , XHR Request , XHR Response, XHR readystate , Ajax examples , Using Ajax with jQuery, jQuery Load, jQuery Get, jQuery Post.

Suggested readings

- Internet & World Wide Web How to Program, Dietel & Dietel, Pearson.
- Web Programming, Bai wt.al, Thomson

MCA314	COMPUTER GRAPHICS
UNIT I	Introduction: mathematical elements of graphic system: point and line, graphics coordinate system, display adapters, concepts of video memory & frame buffer. Algorithms: Line drawing algorithms- DDA Algorithm, Bresenham’s Line Algorithm, Circle and Eclipse generating algorithms, Midpoint Circle Algorithm. Scan-line polygon fill algorithm, Graphics Primitives: Primitive Operations, The display file interpreter-Normalized Device Coordinates, Display- File structure. Display – file algorithm.
UNIT II	Polygons: polygon representation; absolute and relative, inside-outside test, polygon drawing algorithms. polygon filling algorithms, Scan Line fill - Boundary fill Algorithm, Flood fill Algorithm. Curve -Curve Generation, Interpolation, B-Splines, Bezier Curves. 2-D Viewing- The viewing pipeline. Viewing co-ordinate, Reference Frame. Window to viewports co-ordinate transformation
UNIT III	Geometric Transformations: Matrices. Translation, Scaling Transformations. Sine and Cos Rotation. Homogeneous Co-ordinates. Composite Transformation. Rotation and scaling about an arbitrary point. Inverse Transformations, Transformations Routines 2-D Viewing functions. Clipping operations point clipping, Cohen- Sutherland Line Clipping algorithm, Sutherland Hodgmann polygon clipping algorithm
UNIT IV	Segments-Segment Table, Segment Creation, Closing a Segment, Deleting a Segment,

	Renaming a segment Introduction to 3D Geometry-3D geometry,3D primitives,3D transformations, Projections-Parallel and Perspective,3D viewing Transformation
UNIT V	Visible line and surface identification. Surface rendering. Three Dimensional Object representations. Bezier curves and surfaces. B-Spline curves and surfaces. Visibility , Image and object precision Z- buffer algorithm. Floating horizons. Computer Animation: Design of Animation Sequences. General Computer Animation Functions-Raster Animations. Key Frame Systems. Morphing Simulating Accelerations. Motion Specifications. Kinematics and Dynamics.

Suggested readings

- Madasu Hanmandlu ,PBP publications.
- Herrington ,Tata McGraw-Hill Education private Limited,New Delhi.
- Gautam Roy,Khanna publications.
- Donald D Hearn, M. Pauline Baker, Pearson Education
- Fundamentals of Computer Graphics & Multimedia, D. P. Mukherje
- S Gokul: Multimedia Magic, BPB Publication.
- Jeffcoate : Multimedia in Practice, Pretice-Hall.
- Bufford: Multimedia Systems, Addison Wesley.

MCA315	OPERATING SYSTEM
UNIT I	BASICS OF OS :Architecture of Operating System ,Objectives and functions of OS, Evaluation of OS (Batch, Multiprogramming, Multitasking, Multiuser, Parallal, Ditributed and Real time operating systems), System calls : read ,write, open, close, abort ,System components and services , system programs , virtual machine.
UNIT II	CPU scheduling Concepts : Process definition ,Process Life cycle,Process block table, Threads, criteria of cpu scheduling, cpu scheduling algorithms,Multiprocessor scheduling, Real time scheduling and algorithm evaluation : deterministic modelling, quning model.
UNIT III	Process communication , synchronization and Deadlock : Concurrency : Principals of concurrency ,Mutual Exclusion,H/Wsupport,s/wapproaches,semaphore and mutex,message passing , monitors , classical problems of synchronisation. Deadlock :principals of deadlocks , prevention , avoidance , detection and different methods of recovery from deadlocks.
UNIT IV	Memory Management: Memory management requirments, memory partitioning:fixed, dynamic partitioning, buddy system memory allocation technique(first fit, best fit, worst fit, next fit)Fragmentation, swapping, segmentation, paging, virtual memory, demand paging, page replacement policies(LRU,OPTIMAL,FIFO,CLOCK), Thrasing, working set model.
UNIT V	Protection and Security: Goals of Protection, Domain of Protection, Access matrix, Implementation of access matrix, revocation of access rights, language based protection, The security Problem, Authentication. One time password, program threats, system threats, threats monitoring .encryption.

Suggested readings

- Stallings Williams , ”Operating Systems “
- Silberschatz A , Galvin P, Gagne G ”Operating System concepts 8e”
- Milan MilenKovic “Operating system concept and design “

MCA Syllabus
MCA II Year Semester IV

MCA411	PROGRAMMING IN ADVANCE JAVA
UNIT I	Network programming in Java, Sockets - TCP Sockets, UDP Sockets. Ports - IP Address, Network Classes in JDK, Working with URLs - Connecting to URLs, Reading Directly from URLs, InetAddress Class, Serving Multiple Clients, Half Close, Interruptible Sockets, Sending Email.
UNIT II	Introduction to Java Enterprise, J2EE Technologies, client server technology, web server technology, JNDI, Web Applications in J2EE. JDBC – JDBC Drivers, Products, JDBC Design considerations, Two Tier and Three Tier client server model, J2EE multi-tier architecture, Introduction to Data Source and Connection pooling.
UNIT III	Servlets - Static and Dynamic contents, Servlet life Cycle and Life cycle methods, Servlet Request and Response Model, Deploying a Servlet, Servlet State Transitions, ServletConfig and ServletContext, Servlet Redirection and Request Dispatch, Servlet Synchronization and Thread Model.
UNIT IV	Reading and writing data from client using Servlets, Maintaining Client State - Cookies, URL rewriting, hidden form fields, Session Tracking. Inter servlet communications –JDBC connection pool, servlet security and different packages of servlets.
UNIT V	JSP fundamentals, JSP architecture, lifecycle of a JSP, Model View Controller (MVC) architecture, JSP tags and JSP expressions, data sharing among servlets & JSP. JSP implicit objects, request application, session and page scope, JSP standard actions, JSP errors.

Suggested readings

- David flangan, Jim Farley, W Crawford and Kris Magnusson, Java enterprise in a Nutshell, Shroff Publishers, Calcutta.
- Developing Java Servlets, by James Goodwill, SAMS.

MCA412	ARTIFICIAL INTELLIGENCE
UNIT I	Artificial Intelligence (AI) Introduction, Definitions, Basic elements of AI, AI's Application areas, Turing test. Concepts of AI:-Clausal form, Resolution, Unification, Inference mechanisms. Concepts of Expert System (ES), need, components and architecture of ES. Sub-shells/stages in the development of an ES.
UNIT II	Problems, Problems spaces and Search : Problem characteristics, Production system characteristics, state space, Production rules, Depth first, Breadth first search methods and their analysis, Heuristic search method, generate and test, hill climbing, best first method, graph search, AND OR search methods, constraint satisfaction and backtracking.
UNIT III	Concept of knowledge, Knowledge acquisition, rote learning, discovery, analogy. Monotonic reasoning, logical reasoning, induction and natural deduction. Characteristics and representation schemes, Logic, propositional and predicate calculus, resolution, semantic nets, frames, conceptual dependency, scripts.
UNIT IV	Non-monotonic reasoning- default reasoning, minimalist reasoning, statistical reasoning - Baye's theorem, certainty factors, Concepts of Dempster Shafer theory and Fuzzy logic. Neural Network, Concepts of Genetic Algorithms.
UNIT V	Introduction to Prolog, Objects and relationships, Natural language processing: syntactic processing, semantic analysis, Morphological, discourse and pragmatic processing.

Suggested readings

- E. Rich and K. Knight, " Artificial Intelligence", Tata McGraw Hill.
- E. Charnaik and D. McDermott, " Introduction to artificial Intelligence", Addison-Wesley Publishing Company.

MCA413	SOFTWARE ENGINEERING AND UML
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UNIT I	An overview - Object basics - Object state and properties, Behavior, Methods, Messages. Object Oriented system development life cycle. Benefits of OO Methodology. Overview of Prominent OO Methodologies: The Rumbaugh OMT, The Booch methodology, Unified Process. Introduction to UML : Important views & diagram to be modelled for system by UML, Factional view(models): Use case diagram : Building blocks of Use Case diagram - actors, use case guidelines for use case models, Relationships between use cases, Activity diagram: Elements of Activity Diagram, Guidelines for Creating Activity Diagrams.
UNIT II	Static structural view (Models): Classes, values and attributes, operations and methods, responsibilities for classes, abstract classes, access specification(visibility of attributes and operations), Relationships among classes, Dependency relationships among classes, notations, Object diagram notations and modeling, relations among objects (links), Class Modelling and Design Approaches.
UNIT III	Behavioral (Dynamic structural view): • State diagram : State Diagram Notations, events, State Diagram states (composite states, parallel states, History states), transition and condition, state diagram behavior(activity effect, do-activity, entry and exit activity), completion transition, sending signals. Interaction diagrams: Sequence diagram - Sequence diagram notations and examples, iterations, conditional messaging, branching, object creation and destruction, time constraints, origin of links, Activations in sequence diagram. Collaboration diagram - Collaboration diagram notations and examples.
UNIT IV	Approaches for developing dynamic systems: a. Top - down approach for dynamic systems. b. Bottom - up approach for dynamic systems. c. Flexibility Guidelines for Behavioral Design - guidelines for allocating and designing behaviors that lead to more flexible design. Architectural view: Logical architecture: dependency, class visibility, sub systems. Hardware architecture: deployment diagram notations, nodes, object migration between node Process architecture: what are process and threads and their notations in UML, object synchronization, invocation schemes for threads Implementation architecture: component diagram notations and examples.
UNIT V	Reuse: Libraries, Frame works components and Patterns: Reuse of classes. Reuse of components. Reuse of frameworks, black box framework, white box frame. Reuse of patterns: Architectural pattern and Design pattern.

Suggested readings

- Designing Flexible Object Oriented systems with UML - Charles Ritcher
- Object Oriented Analysis & Design, Sat/.inger. Jackson, Burd Thomson
- Object oriented Modeling and Design with UML - James Rumbaugh. Micheal Blaha (second edition)
- The Unified Modeling Language User Guide - Grady Booch, James Rumbaugh, Ivar Jacobson.
- Object Oriented Modeling and Design - James Rumbaugh
- Teach Yourself UML in 24 Hours - Joseph Schmuilers
- Object-Oriented Analysis and Design: using UML Mike O'Docherty Wiley Publication

GROUP A

MCA414A	SYSTEM PROGRAMMING
UNIT I	Systems Programming – What is systems programming, Difference between systems programming and application programming –on hardware – System software and Machine architecture. Introduction to IBM 360/370.
UNIT II	Assemblers – Basic assembler functions – machine dependent assembler features –machine independent assembler features – assembler design options – one pass assembler, multi pass assembler – assembler implementation – MASM, SPARC assemblers.
UNIT III	Macro processors – Basic Macro Processor functions – machine dependent and machine independent macro processor architectures– Implementation examples – MASM, ANSI C macro processors. Introduction to Text Editors – Overview of the Editing Process – User Interface, Editor Structure. Debuggers – Debugging functions and capabilities, relationship with other parts of the system – User Interface criteria.
UNIT IV	Introduction to Loaders and Linkers, functions of a loader, types of Loaders, databases used in Loaders, loader schemes – ‘Compile - and - Go’ loaders, general loader, scheme, absolute loaders, subroutine linkages, relocating loaders, Design of direct-linking loaders.
UNIT V	Software tools: Software tools for program development, editors, Debug monitors, Programming environments, User Interfaces. Introduction to translators. Introduction to Compilers

Suggested readings

- Systems Programming, Donovan, Tata Mc Graw Hill
- System Programming, Dhamdhare (IInd Revised Edition), Tata Mc Graw Hill
- System Software, Leland. L. Beck, Pearson Education.
- System Programming with C and Unix, Adam Hoover, Pearson Education, 2010

MCA415A	DISCRETE MATHEMATICS
UNIT I	Introduction to Discrete Mathematical Structures, Formal Methods: Induction and Analogy, Abstraction. Sets, sequences, empty set, power set, operations on sets, Venn diagram, ordered pair, principle of inclusion and exclusion. Counting and Combinatorics.
UNIT II	Introduction to mathematical logic, statements and notations, well-formed formulas, tautologies, tautological implications, normal forms, the theory of Inference for statement calculus, predicate logic. Graph Terminology, Degrees of Nodes, Isomorphic Graphs, Dijkstra’s Shortest Path Algorithm, Planar Graphs, Eulerian Graphs, Hamiltonian Graphs, Traveling Salesman Problem.
UNIT III	Trees, Introduction, Rooted and Other Trees, Representation of Prefix Codes, representation of Arithmetic Expression, Representation of Prefix Codes, Spanning Trees, Traversing Binary Trees, Binary Search Trees.
UNIT IV	Relations, matrix and graph representation of relation, properties of relations, partitions. Equivalence Relations, Compatibility Relations, Composition of Binary Relations, Transitive and symmetric closures, partially ordered set, lattices. Recurrence relations.
UNIT V	Functions, Matrix representation of functions, composition of function, inverse function. Algebraic Structures, General properties of algebraic systems, groupoids, semigroup, monoids, group, rings. Applications of algebra to control structure of a program. Homomorphism, congruences, admissible partitions. Groups and their graphs.

Suggested readings

- Discrete Mathematical Structure : Chowdhary K R , Printice Hall India, Edition
- Discrete Mathematical Structure : Tremblay and Manohar, McGraw Hill
- Discrete Mathematical Structure : Kolman, Busby and Ross, Printice Hall India, Edition 3
- Elements of Discrete Structures : C.L. Liu

GROUP B

MCA414B	XML AND ITS APPLICATIONS
UNIT I	Introduction and need of XML, Extending and Adopting Markup Languages from SGML to XML and HTML, benefits and Drawbacks of XML, representing mixed data and context with XML. Creating an XML Document, Defining Structure, Rules for Well-Formed and Valid XML, Changing XML Documents XML Syntax : Tag Attributes and Naming Rules, Empty and Non-Empty Elements, Processing Instructions for XML, Accessing Data from XML Elements. XML Namespaces : Need of XML Namespaces, Prefixes and Declarations, Default and Multiple Namespaces.
UNIT II	XML Document Type Definition (DTD), XML DTD as an XML Schema, Creating a DTD, Element Conditions and Quantifiers, Referencing DTD Declarations, Validating DTD Compliance, XML Schema Definition (XSD): Element and Attribute Declarations, Simple, Complex, and Built-in Types Named and Anonymous Types, Associating XML with a Schema, Validating XSD Compliance
UNIT III	XQuery and XPath: Need of XQuery and XPath, XPath Nodes and Syntax, Seven Node Types, Node Paths and Predicates, Node Axes and Functions, XQuery Structure and Usage, XPath and XSD in XQuery, Terms and Syntax, Selecting and Filtering Elements. Publishing XML: Stylesheet Languages, Using Style Sheets with XML, Page Layout with Cascading Style Sheets (CSS), CSS Syntax and Classes.
UNIT IV	Introduction to XSL and XSLT , XSLT transformations, XSLT Elements : template, value-of, for-each, sort, if, choose, when, apply, attribute, copy, import, include, key, number, output, param, sort, stylesheet, template, text, transform, variable, XSLT Functions : current, document, element available, format-number, function available, generate-id, key.
UNIT V	XForms: Need of XML Forms, XForms Structure and Syntax, Selecting and Controlling XForms Input. XML Document Object Model (DOM) : Introduction to DOM, node, node tree, node properties, methods, node list, DOM parser, accessing node, traversing nodes, load function, Manipulating nodes: get values, change node, remove node, replace node, create node, add nodes, clone nodes.

Suggested readings

- Beginning XML, David Hunter, Jeff Rafter, Joe Fawcett, Wiley India Pvt. Ltd., Fourth Edition.
- The Complete Reference XML, Heather Williamson, TMH.

MCA415B	ADVANCED DBMS
UNIT I	Query Processing & Evaluation: Query Interpretation, Equivalence of Expressions : Selection Operation, Natural Join Operations, Projection Operations, Estimation of Query-Processing Costs, Estimation Of Costs of Access Using Indices, Structure of Query Optimizer.
UNIT II	Transaction Management & Recovery: Transaction: Properties, Transaction Management with SQL, Transaction Log, Types of Transaction Log Records, Concurrency Control : Concurrency control with Locking Methods, Types of Locks Two-Phase Locking to Ensure Serializability, Deadlocks, Concurrency Control with Time Stamping Methods, Concurrency Control with Optimistic Methods : Optimistic Concurrency Control phases, Database Recovery Management.
UNIT III	Database Security & Authorization: Security and Integrity Violations, Authorization & Views, Integrity Constraints, Encryption, Statistical Databases.
UNIT IV	Distributed Databases: Distributed Databases, Structure of Distributed Databases , Trade-offs in Distributing the database : Advantages, Disadvantages , Design of Distributed Databases : Data Replication, Data Fragmentation, Data Replication and Fragmentation, Replication and Fragmentation Transparency, Location Transparency, Complete Naming Scheme, Transparency and Update to Replicated Data, Distributed Query Processing : Replication and Fragmentation, Simple Join Processing, Join Strategies, Semi join Strategies, Recovery in

	Distributed Systems: System Structure, Robustness, Commit Protocols, Concurrency Control Locking Protocols, Time Stamping, Deadlock Handling : Centralized Approach, Fully Distributed Approach.
UNIT V	Object Orientated Database: Features of an Object-Orientated DBMS, Object-Oriented Database Design, How OO Concept has Influenced the Relational Model, Object Oriented Languages, Persistent Programming Languages, Nested Relations, Complex Types, Inheritance, Reference Types, Querying with Complex Types, Object-oriented data model.

Suggested readings

- Elmasri R and Navathe SB, Fundamentals of Database Systems, 3rd Edition, Addison Wesley, 2000.
- Connolly T, Begg C and Strachan A, Database Systems, 2nd
- Ceri Pelagatti , Distributed Database: Principles and System - (McGraw Hill)Edition, Addison Wesley, 1999
- Simon AR, Strategic Database Technology: Management for the Year 2000, Morgan Kaufmann, 1995
- Gray J and Reuter A, Transaction Processing: Concepts and Techniques, Morgan Kaufmann, 1993

GROUP C

MCA414C	INTERNET PROGRAMMING IN PHP
UNIT I	Works with the web server, Hardware and software requirements, Benefits of PHP as a server side languages. Basic PHP syntax, PHP Delimiters, Creating User Defined Variable, Assigning values to scalar variable, Data type with PHP, Displaying type information, Testing for specific data type, Operators. Use of HTML for web design purpose, HTML scripts and Form's element, Embedding PHP code into HTML pages, Retrieving form data with \$_POST, \$_GET and \$_REQUEST arrays, Validating retrieved data, Strategies for handling invalid input, Redirecting web pages, Adding dynamic content.
UNIT II	Introduction to Arrays in PHP, Numerically and Non-Numerically Indexed arrays, Array operators, Multidimensional arrays, Array sorting, Array Functions, Converting Arrays to Scalar Variables. Creating and Deleting a file, Reading and Writing text files, Working with directories in PHP, Checking for existence of file, Determining file size, Opening a file for writing, reading or appending, Using other useful file functions.
UNIT III	Joining and Splitting String, Comparing Strings, Matching and replacing substrings, Introduction to Regular Expressions, Character sets and classes, Subexpressions, Counted Subexpressions, Matching Literal Special Characters, Matching and replacing substring with Regular Expressions, Splitting string with Regular expressions. Introducing Functions, Using parameters and Returning Values, Call by value and call by reference, Using require () and include().
UNIT IV	Object Oriented Programming in PHP, Object oriented concepts, Classes, objects and operations. Abstract class, Inheritance, Using Final keyword, Exception Handling, User defined exception. Introduction to Session Control, Session Functionality, Setting Cookies with PHP, Using Cookies with Sessions, Deleting Cookies, Registering Session variables, Session Variables, Destroying the variables and Session.
UNIT V	MySQL Architecture, Defining a Database, Creating Tables and Fields in MySQL, Overview of Data Types in MySQL, Working with PHP-MySQL Environment, Using PhpMyAdmin. Connecting to MySQL Server, Selecting Databases, Insert Update and Delete records, Checking for Errors, Closing the MySQL Server Connection. Library function : Math functions, File Upload/Download, PHP configuration file, Error tracking and debugging, Generating PDF.

Suggested readings

- Beginning PHP5(Author) David Mercer, Allan Kent , Steven Nowicki, Clark Morgan, Wankyu Choi.

- PHP Bible, (Author) Tim Converse ,Joyce Park.

MCA415C	MOBILE OPERATING SYSTEM
UNIT I	Introducing Cloud Computing: Fundamentals, Computing on the Cloud, Defining the Cloud, Comparing Cloud Providers with Traditional IT Service Providers, Addressing Problems, Discovering the Business Drivers for Consuming Cloud Services. Modeling Services. Deciding on a strategy for organization, Coping with governance issues, Monitoring business processes, Managing IT costs, Administering Cloud Services, Technical Interface, Managing Cloud Resources.
UNIT II	Understanding the Nature of the Cloud: Advantages of the Highly Scaled Data Center: Comparing Financial Damage: Traditional versus Cloud, Scaling the Cloud, Comparing Traditional and Cloud Data Center Costs. Exploring the Technical Foundation for Scaling Computer Systems: Server-ing Up Some Hardware,Economies of Scale.
UNIT III	Managing Data: Declaring Data Types, Securing Data in the Cloud, Data, Scalability, and Cloud Services. Private and Hybrid Clouds: Privacy, Economics of the Private Cloud, Key Vendors.
UNIT IV	The Cloud Elements: Infrastructure as a Service: Tracing IaaS to ISP, IaaS-Enabling Technology. Platform as a Service: The Integrated Lifecycle Platform, Anchored Lifecycle Platform as a Service, Enabling Technologies as a Platform. Software as a Service: Approach to Evolving Software as a Service, Characterizing Software as a Service, Examining Types of SaaS Platforms.
UNIT V	Managing the Cloud: Securing Cloud Services: Understanding Security Risks, Reducing Cloud Security Breaches, Identity Management, Encrypting Data, Creating a Cloud Security Strategy. Governing the Cloud: IT Governance, Knowing the Risks of Running in the Cloud, Virtualization and the Cloud: Managing Virtualization, Virtualization and Cloud. Service Oriented Architecture and the Cloud: Loosening Up on Coupling, Understanding Services in the Cloud.

Suggested readings

- Cloud Computing for Dummies, Judith Hurwitz, Robin Bloor, Marcia Kaufman, and Dr. Fern Halper, Wiley Publishing.
- Michael Miller, Cloud Computing : Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.