

Scheme of Instructions & Syllabi
of
Master of Computer Applications
(Effective from Session 2018-19)

Faculty of Computer Applications

INVERTIS UNIVERSITY
Bareilly-243123 U.P.

M.C.A. (Master of Computer Applications)
Scheme of Instructions
 (Effective from session 2018-19)

2nd YEAR

III Semester				Teaching Scheme			Marks Distribution		
Paper	Code	Subject	Credit	L	T	P	ES M	MSM	Total
Paper 1	MCA 301	OOPs Concepts using Java	4	3	1	0	70	30	100
Paper 2	MCA 302	Web Engineering: Tools & Technologies	4	3	1	0	70	30	100
Paper 3	MCA 303	Data Communication & Computer Network	4	3	1	0	70	30	100
Paper 4	MCA 304	Design and Analysis of Algorithm	4	3	1	0	70	30	100
Paper 5	MCA 305	Software Engineering	4	3	1	0	70	30	100
Paper 6*	MCA 398*	Elementary Mathematics	4	3	1	0	70	30	100
Lab 1	MCA 351	Java Lab	2	0	0	4	35	15	50
Lab 2	MCA 352	Web Tech Lab	2	0	0	4	35	15	50
Total			24	15	5	8	420	180	600
IV Semester									
Paper	Code	Subject	Credit	L	T	P	ES M	MSM	Total
Paper 1	MCA 401	.Net Framework Using C#	4	3	1	0	70	30	100
Paper 2	MCA 402	Computer Graphics	4	3	1	0	70	30	100
Paper 3	MCA 403	Data Warehousing And Data Mining	4	3	1	0	70	30	100
Paper 4		Elective-1	4	3	1	0	70	30	100
Paper 5		Elective-2	4	3	1	0	70	30	100
Paper 6**	MCA498**	Aptitude Course – I	0	4	0	0	35	15	50
Lab 1	MCA 451	Computer Graphics Lab	2	0	0	4	35	15	50
Lab 2	MCA 452	.Net Framework Using C# Lab	2	0	0	4	35	15	50
Total			24	15	5	8	420	180	600
Elective – I			Elective – II						
I.	MCA 411	Advanced Computer Network	I.		MCA 421	Android Programming			
II.	MCA 412	Cryptography And Network Security	II.		MCA 422	Oracle DBA			
III.	MCA 413	Distributed Database System	III.		MCA 424	UNIX and Shell Programming			
IV.	MCA 414	Theory of Computation	IV.		MCA 425	Advanced Java and Internet Programming			

MCA301: OOPS Concepts using Java

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test – 12 Marks

Teachers Assessment – 6 Marks

Attendance – 12 Marks

End Semester Exam – 70 Marks

Prerequisite: C Programming, and OOPs Concepts.

Course Objectives:

1. To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
2. To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
3. Discuss the principles of inheritance, interface and packages and demonstrate through problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
4. To understand importance of Multi-threading & different exception handling mechanisms.
5. To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and AWT that respond to different user events.
6. To understand Java Swings for designing GUI applications based on MVC architecture.

Detailed Syllabus:

Unit-1

Object Modeling: Objects and classes, links and association, generalization and inheritance, aggregation, abstract class, multiple inheritance, Meta data, candidate keys, constraints.

Dynamic Modeling: Events and states, operations, nested state diagrams and concurrency, advanced dynamic modeling concepts, a sample dynamic model.

Unit-2

Functional Modeling: Data flow diagram, specifying operations, constraints, a sample functional model. OMT (object modeling techniques) methodologies, examples and case studies to demonstrate methodologies, comparisons of methodologies, SA/SD, JSD.

Introduction of Java: Features of Java Language, Platform Independency, JVM, Byte-code, Operator, Data type, Variables, Robustness.

Unit-3

OOPS: Object, Class, Classifications, Methods & classes, Inheritance, Static and non Static methods, Overloading, Overriding of methods, Abstraction, Interface, Polymorphism.

Packages and Exception Handling: Data Encapsulation, Concept of Package, Creating package, Importing packages, Child Packages. Exceptions & Errors, Types of Exception, Control Flow in Exceptions, Use of try, catch, finally, throw, throws in Exception Handling. Checked and Un-Checked Exceptions.

Unit-4

I/O and File Handling: Buffered Reader class ,InputStreamReader class, Scanner class, Creating File, Finding File Reading and Writing File (Doc File, Html File, Text File).

Multi Threading: Understanding Threads, Needs of Multi-Threaded Programming, Solution of Producer consumer problem by Multi Thread, Thread Life-Cycle, Thread Priorities, Synchronization of Thread.

Unit-5

GUI Application Development: Introduction to AWT, AWT controls Java Applet Layout Managers, Menus, Images, Graphics.

Event Handling, Swing, Containers, Panes, Frames, Dialogue boxes, working with image controls.

JDBC: The connectivity Model, JDBC/ODBC Bridge, Java, SQL package, connectivity to remote database, navigating through multiple rows retrieved from a table/ multiple tables of a database.

Unit-6

Web Application Development using Java: Http protocols, client server terminology, Introduction to client side and server side programming. Servlet, Session management, Introduction to JSP. Application of Servlets and JSP with JDBC.

Suggested Readings:

1. The Complete Reference: Java, Herbert Schildt, TMH, 7th Edition 2006
2. Programming in JAVA, E. Balagurusamy, TMH, 2nd Edition 2007
3. Object Oriented Modeling and Design, James Rumbaugh et al, PHI, 4th Edition 2003
4. Object Oriented Analysis & Design with Application, Booch Grady, Pearson Education, New Delhi, 3rd Edition, 2006.

Course Outcomes:

After completing the course, students will be able to:

1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem
3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
4. Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events
6. Identify, Design & develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture.

MCA 302: Web Engineering: Tools and Technologies

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Course Objectives:

1. To give an over view of Internet application development.
2. To understand web technology and its uses on current IT market.
3. To introduce with tools of web engineering where students can developed their project.
4. To interact with various automated designed framework for web development

Detailed Syllabus

UNIT I (6 Hours)

Introduction: Introduction to web, protocols governing the web, web development strategies, Web applications, web project, web team.

UNIT II (10 Hours)

Web Page Designing using HTML: Structure of HTML page, link, list, table, images, frames, forms, CSS; DHTML

UNIT III (10 Hours)

XML: DTD, XML schemes, presenting and using XML.

UNIT IV (10 Hours)

Java script: Introduction, documents, forms, statements, functions, objects; event and event handling; introduction to AJAX, VB Script

UNIT VI (10 Hours)

PHP (Hypertext Preprocessor): Introduction, syntax, variables, strings, operators, if-else, loop, switch, array, function, form ,mail, file upload, session, error, exception, filter, PHP-ODBC.

UNIT V (10 Hours)

Server Side Programming: Introduction to active server pages (ASP), ASP.NET, java server pages (JSP), JSP application design, tomcat server, JSP objects, declaring variables, and methods, debugging, sharing data between JSP pages, Session, Application: data base action , development of java beans in JSP, introduction to COM/DCOM.

Text and Reference Books

1. Heywood J.B., "Internal combustion Engine Fundamentals", McGraw Hill, 1988
2. Obert E.F., "Internal combustion Engine and Air Pollution", Intext Educational Pub, 1974 Ganesan V., "Internal combustion Engines", 6 th Ed. Tata Mc Graw Hill Publishing Co. Domkundwar V.M. "Internal Combustion Engines"-
3. Mathur M.C., Sharma R.D., "Internal combustion engines", 8th Ed.; Dhanpat Rai publication., 2003 Pulkrabek W, "Engineering Fundamentals Of Internal Combustion Engine", Prentice Hall, 1997

Course Outcomes:

After completing the course, students will be able to:

1. Understand various types of Web engineering.
2. Analyze the effect of various framework of web development
3. Identify tools to operate in applications and software's.
4. Understand designing of dynamic and statics applications.
5. Evaluate performance of web pages on various browsers.

MCA303: Data Communication and Computer Network

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Pre-requisites: Data Communication and Computer Network, INTERNET, Router

Course Objectives:

1. To discuss and explain about basics of data communication and networking concepts
2. Explain how the data link layer prepares data for transmission and list the component parts of a Layer
3. To discuss the medium access control and to create a logical design and physical design of a simple Ethernet LAN
4. Describe how routers use next-hop addresses to determine the path that packets need to take to reach their destinations and describe the IP addressing structure
5. Explain the difference between TCP and UDP and describe how TCP and UDP functions are worked
6. Describe and application layer for using end user application such as DNS, SMTP and Telnet etc

Detailed Syllabus

Unit-1

Introduction: Introduction to Data Communication and Computer Network, Network Topologies, Network Types, OSI Reference Model, TCP/IP Protocol Suite.

Unit-2

Data Link Layer: Error Detection and Correction Techniques, LRC, VRC, CRC and Hamming Code. Flow Control and Error Control Techniques: Stop and Wait, Sliding Window, Go Back N, Selective Repeat Protocol.

Unit-3

MAC Sub layer: Aloha, S-Aloha, CSMA, CSMA/CD, CSMA/CA and CDMA Protocol. LANs: Ethernet, Fast Ethernet, Gigabit Ethernet, Token Ring, FDDI and Wireless LAN.

Unit-4

Network Layer: IP Protocol, IP Addresses, And Introduction to IPv6 Routing Protocols: Distance Vector Routing, Link State Routing and Path Vector Routing.

Unit-5

Transport Layer: UDP and TCP Protocol, TCP Connection Establishment and Release, Congestion Control and Quality of Service. .

Unit-6

Application Layer: DNS, FTP and HTTP, Network Management and SNMP Multimedia and Data Compression.

Text and Reference Books

1. Data Communication and Networking, Behrouz A Frouzan, TMH, 4th Edition 2004.
2. Data and Computer Communications, William Stallings, Prentice Hall, 9th Edition, 2010.
3. Computer Networks, Andrew S. Tannenbaum, Pearson Education, 4th Edition 2003.
4. Computer and Communication Network, Nadernd Mir, Prentice Hall, 1st Edition 2006.
5. Data Networks, Bertsekas and Gallagar, PHI, 2nd Edition 1992.

Course Outcomes:

After completing the course, students will be able to:

1. Recognize and Describe about the working of Computer Networks and Illustrate reference models with layers, protocols and interfaces.
2. Illustrate data link layer for using different error Control techniques
3. Examine problems of a computer networks related techniques for CSMA/CD, Aloha, Ethernet and WLAN
4. Students will understand for network layer internetworking technologies, Routing, IP Addressing and routing protocol for using shortest path for destination
5. Students will understand TCP/IP implementation
6. Students will understand the end user application for such domain name system , HTTP, UDP ,Telnet and SMTP etc

MCA304: Design and Analysis of Algorithm

Teaching Scheme Lectures: 4 hrs/Week Lab: 3 hrs/Week Credits : 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: - C Programming Concepts, Data Structure Concepts, Discrete Mathematics concepts.

Course Objectives:

1. To analyze the asymptotic performance of algorithms.
2. To analyze of Advanced Data Structure Concepts.
3. To analyze Greedy and Dynamic Programming Concepts and its application
4. To analyze concepts of Graphs.
5. To analyze Branch and Bound and Backtracking Concepts and its applications.
6. To analyze Deterministic and Non deterministic Problem.

Detailed Syllabus

UNIT I Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis Of algorithm-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Recurrences and their solutions, Amortized analysis. Divide and Conquer: General method, applications-Binary search, Quick sort, Merge sort, Heap Sort, Strassen's matrix multiplication.
UNIT II Advanced Data Structure: Red Black Tree, Binomial Heap, B tree, Fibonacci Heap. Disjoint Sets: disjoint set operations, union and find algorithms, spanning trees, connected components and biconnected components.
UNIT III Greedy method: General method, applications-Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem. Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem.
UNIT IV Graph Algorithm: Graph Algorithms, BFS, DFS, Minimum Spanning Tree, Kruskal's Algorithms, Prim's Algorithms, Single Source Shortest Path, All pair Shortest Path, Maximum flow. Membership, Pumping lemma for CFLs.
UNIT V Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles. Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.
UNIT VI NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem.

Text and Reference Books:

1. Introduction to Algorithms, Thomas H Cormen, Charles E. Leiserson et al, PHI, 2nd Edition 2001
2. Computer Algorithms: Introduction to Design and Analysis, Sara Baase and Allen Van Gelder, Pearson Education, 3rd Edition 2000
3. Algorithm Design, Jon Kleinberg and Eva Tardos, Pearson Education, 1st Edition 2005
4. The Design and analysis of Algorithms, A V Aho et al, Pearson Education, 3rd Edition 2007
5. Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj Sahni and Rajasekharam, Galgotia Publications, 2009

Course Outcomes:

After completing the course, students will be able to:

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| 1. Understand Asymptotic Notation. |
| 2. Understand Advanced Data Structure Concepts and searching concepts. |
| 3. Understand the Concepts of Greedy Methods and Dynamic Programming methods and solve problem related with its. |
| 4. Understand the concepts of Graph. |
| 5. Understand the concepts of Backtracking and Branch and bound Concepts and solve problem related with its. |
| 6. Understand the Concepts of NP hard and NFA DFA Concepts. |

MCA 305: Software Engineering

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: -

1. Familiarity with the fundamentals of system analysis and design
2. Basic terminologies used in software development.

Course Objectives:

1. It aims to develop a broad understanding of the discipline of software engineering.
2. It seeks to complement this with a detailed knowledge of techniques for the analysis and design of complex software intensive systems.
3. It aims to set these techniques in an appropriate engineering and management context..

Detailed Syllabus

UNIT I (10 Hours)

Introduction to Software and Software Engineering: Software Characteristics and Applications, Software Engineering a Layered Technology, Software Process.

UNIT II (10 Hours)

Software Life Cycle Models: Classical Waterfall Model, Iterative Waterfall Model, Prototyping Model, Evolutionary Model, RAD Model, Spiral Model, Agile Software Development Model, Comparison of different Life Cycle Models.

UNIT III (10 Hours)

Software Project Management: Project Planning, Project size estimation-LOC and FP Metric, Project Estimation Technique-COCOMO Model, Project Scheduling-WBS, Gantt chart, PERT Chart, Activity Network and Critical Path Method, Risk Management, Software Configuration Management.

UNIT IV (10 Hours)

Requirement Engineering: Requirement Gathering, Requirement Analysis-ERD, DFD, Data Dictionary, Decision Tree, Decision Table, SRS Document, Characteristics of good SRS Document, SRS Verification and Validation.

UNIT V (6 Hours)

Software Design: Characteristics of good Software Design, Cohesion and Coupling. Function Oriented Design: Structured Analysis. Object Oriented Design: OOPS Concepts, UML and USE Case Model.

UNIT VI (10 Hours)

Testing and Implementation: What is Testing and Debugging, Design of Test Cases, Unit Testing, Integration Testing, White Box and Black Box Testing, System Testing, McCabe's Cyclomatic Complexity, System Testing. Software Reliability Models, SQA, SEI/CMM, CASE. Software Maintenance Models.

Text and Reference Books

1. Software Engineering, Roger S Pressman, Tata McGraw Hill, 6th Edition 2005
2. Fundamentals of Software Engineering, Rajib Mall, PHI, 3rd Edition 1997
3. Software Engineering, I. Sommerville, Pearson Education, 8th Edition 2007
4. Software Engineering Concepts, R Fairley, Tata McGraw Hill, 4th Edition 1997

Course Outcomes:

1. Be employed in industry, government, or entrepreneurial endeavors to demonstrate professional advancement through significant technical achievements and expanded leadership responsibility.
2. Demonstrate the ability to work effectively as a team member and/or leader in an ever-changing professional environment.
3. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
4. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

MCA 398: Elementary Mathematics

Teaching Scheme

Lectures: 3 hrs/Week
Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks
Teachers Assessment - 6Marks
Attendance – 12 Marks
End Semester Exam – 70 marks

Course Objectives:

1. Recognize that mathematics permeates the world around us
2. Appreciate the usefulness, power and beauty of calculus.
3. Enjoy algebra and develop patience and persistence when solving problems
4. Understand and be able to use the integral calculus.
5. Develop curiosity in vector calculus and use inductive and deductive reasoning when solving problems
6. Become confident in using coordinate geometry to analyze and solve problems both in university and in real-life situations

Detailed Syllabus

UNIT: 1

MATRICES: Introduction of matrices, Matrix, types of matrix, Operation on matrices, Transpose of a matrix, Symmetric and skew-symmetric matrices, transformation of matrix, Invertible matrices.

UNIT: 2

DIFFERENTIAL CALCULAS: Limit and Continuity of the function, Definition and formulation of differential calculus, Rules of standard form of differential calculus, Chain Rule, Parametric rule.

UNIT: 3

INTEGRAL CALCULAS: Standard form of Integral calculus, Integration using partial fraction, Integration of trigonometric function. Definite Integral, properties of definite integral.

UNIT: 4

VECTOR CALCULUS: Vectors, Dot product and cross product of two vectors. Differentiation and partial differentiation of vector functions, derivative of sum, gradient, divergence and curl.

UNIT: 5

COORDINATE GEOMETRY: Straight lines, standard equations and properties of Circle, Parabola, Ellipse and Hyperbola.

Suggested Books:

1. E. Kreyzig, "Engineering Mathematics".
2. B.S. Grewal, "Higher Engineering Mathematics"
3. Shanti Narayan, "Differential Calculus"
4. K.P. Gupta. "Vector Calculus"
5. R.K.Shukla, "Vector Calculus Illustrated"

Course Outcomes:

After completing the course, students will be able to:

1. Students will simplify and evaluate the concept and problems of matrix also understand the practical approach and real time problems related to matrix.
2. Students will understand the concept of differentiation, its application in differential calculus.
3. Students will understand the concepts of integration and its importance and real world applications.
4. Students will understand concept of scalar and vector, also their advancement in mathematical theory.
5. Students will understand the concept of coordinates and understand and apply in different shapes like circle, parabola etc

MCA401: .NET Framework using C#

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test – 12 Marks

Teachers Assessment – 6 Marks

Attendance – 12 Marks

End Semester Exam – 70 Marks

Prerequisite: HTML and CSS.

Course Objectives:

1. Learn about MS.NET framework developed by Microsoft.
2. You will be able to using XML in C#.NET specifically ADO.NET and SQL server
3. Be able to understand use of C# basics, Objects and Types, Inheritance
4. To develop, implement and creating Applications with C#.
5. To develop, implement, and demonstrate Component Services, Threading, Remoting, Windows services, web
6. To understand and be able to explain Security in the .NET framework and Deployment in the .NET.
7. To develop Assemblies and Deployment in .NET, Mobile Application Development.

Detailed Syllabus:

Unit-1

The .Net framework: Introduction, The Origin of .Net Technology, Common Language Runtime (CLR), Common Type System (CTS), Common Language Specification (CLS), Microsoft Intermediate Language (MSIL), Just-In-Time Compilation, Framework Base Classes.

Programming Language C#: Declaring implicit and explicit variables, Unicode characters and strings, creating Object and Classes, The Main method specification.

Unit-2

Object oriented programming with C#: Inheritance, Method Overloading and method overriding, Polymorphism, Operator Overloading, Abstract Class, Inner Class, Interface. Delegates, Partial Classes, Exception Handling, Creating Name-Space, Input-Output and File Handling, Multithreading, **Windows Application:** Introduction of windows form, Linking Window Form, Creating Properties, window form controls, MDI form.

Unit-3

Containers and its Event Handling: Flow Layout Panel, Group Box, Panel, Split Container, Tab Control, Table Layout Panel. Navigation Control and Its Event Handling: Context Menu Strip, Tool Strip, Status Strip, Tool Strip Container.

Dialog Boxes and its Event Handling: Message Dialog Boxes, Color Dialog, Folder Browser Dialog, Font Dialog, Open File Dialog, Save File Dialog, Data Grid View, Dataset.

Unit-4

Introduction to ASP.NET with C#: Introduction of web application, web site, A Review of Classic ASP, ASP.NET Web Applications, Rendering HTML with Server Controls.

Working with Web Forms Controls and C#: Introduction to Web Forms Controls, Simple Input Controls, Hyperlinks, Button Controls and List Controls. Dropdown List Control, Overview of ASP.NET Validation Controls, Client-Side Validation, Server-Side Validation, File Upload controls, Wizard controls. Master Page, Ad Rotator Control, Login Controls, Session Management using Cookies, Session.

Unit-5

ADO.Net: Overview of ADO.NET, ADO. NET Classes, Connected and Disconnected Architecture and different operation with database.

Using the Data List and Repeater, Data grid Controls: Overview of List-Bound Controls , Creating a Repeater Control, Creating a Data List Control , Introduction to the Data Grid , , Using Advanced Data Grid Features.

Unit-6

Working with XML: Data handling using XML, Creating web Services, Net Assemblies features and Structure.

Configuring and Deploying ASP.NET Applications: Creating Setup of Web Application, Configuring IIS and the .NET Framework, Deploying ASP.NET Applications.

Suggested Readings:

1. Beginning Visual C# 2008, Wiley, Wrox Publication, 2nd Edition 2008
2. Programming with C#, E. Balagurusamy, TMH, 2nd Edition 1999
3. Microsoft .Net for Programmers, Fergal Grimes, SPI Edition,

Course Outcomes:

After completing the course, students will be able to:

1. Learn to develop applications using C# and VB.NET.
2. Learn to apply these languages to develop server-side applications which make use of ADO.NET, ASP.NET, and Web Services etc.
3. Understand use of C# basics, Objects and Types, Inheritance
4. Develop, implement and creating Applications with C#.
5. Develop, implement, and demonstrate Component Services, Threading, Remoting, Windows services, web.
6. Understand and be able to explain Security in the .NET framework and Deployment in the .NET.

MCA402: Computer Graphics

Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test – 12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
	Attendance – 12 Marks
Credits: 4	End Semester Exam – 70 Marks

Prerequisite: Linear Algebra, Matrix, and C-Programming.

Course Objectives:

Students will try to learn:

1. To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.
2. To learn the basic principles of 2- dimensional and 3- dimensional computer graphics.
3. Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
4. Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.
5. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
6. To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles, and applications.

Detailed Syllabus:

Unit-1 Introduction: Definition of computer graphics, Types of computer graphics, applications Graphic Displays- CRT, Random scan displays, Raster scan displays, Color CRT, LCD, DVST, Plasma Display panel, Frame buffer and video controller.
Unit-2 Output Primitives: Points and lines, Line drawing algorithms, Circle generating algorithms, Midpoint circle generating algorithm, conic sections, parallel version of these algorithms.Character generation: Stroke Method, Dot matrix method
Unit-3 Ant aliasing: Post filtering and pre filtering. Transformations: Basic transformation, Matrix representations and homogenous coordinates, Composite transformations, Reflections and shearing. Polygon: Representation, Inside outside Test, Filling polygon- Scan line, Boundary fill, Flood Fill algorithms
Unit-4 2D Viewing: Viewing pipeline, Viewing transformations Windowing and Clipping: Point clipping, 2D Line Clipping algorithms-Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Nicholl Lee Nicholl algorithm, Line clipping against non rectangular clip windows; Polygon clipping: Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping.
Unit-5 Three Dimensional: 3-D Display methods, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.

Unit-6

Curves and Surfaces: Quadric surfaces, Spheres, Ellipsoid, Blobby objects, Introductory concepts of Spline, Bspline and Bezier curves and surfaces. Hidden Lines and Surfaces: Back Face Detection algorithm, Depth buffer method, A- buffer method, Scan line method, basic illumination models – Ambient light, Diffuse reflection, Specular reflection and Phong model, Combined approach, Warn model, Intensity Attenuation, Color consideration, Transparency and Shadows.

Suggested Readings:

1. Computer Graphics C Version, Donald Hearn and M Pauline Baker, Pearson Education, 2007.
2. Computer graphics, Schaum's outline, TMH, 2006.
3. Computer Graphics, Amrendra N Sinha and Arun D Udai, TMH, 2008
4. Computer Graphics: A Programming Approach, Steven Harrington, TMH, 1984
5. Computer Graphics Principles and Practice, James D Foley, PEARSON, 2004

Course Outcomes:

After completing the course, students will be able to:

1. Have a knowledge and understanding of the structure of an interactive computer graphics system, and the separation of system components.
2. Have a knowledge and understanding of geometrical transformations and 3D viewing.
3. Have a knowledge and understanding of techniques for representing 3D geometrical objects.
4. Have a knowledge and understanding of interaction techniques.
5. Create interactive graphics applications.
6. Use C builds functions or equivalent graphics tools.
7. Perform simple 2D graphics with lines, curves and can implement algorithms to rasterizing simple shapes, fill and clip polygons and have a basic grasp of anti-aliasing techniques.

MCA 403: Data Warehousing and Data Mining

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: -

1. Familiarity with the data base management system
2. Knowledge of repository system.

Course Objectives:

1. Be familiar with mathematical foundations of data mining tools.
2. Understand and implement classical models and algorithms in data warehouses and data mining
3. Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
4. To explain the stages and process different data mining techniques. E. To learn mining and warehouse techniques through the use of different tools (e.g. ORACLE)

Detailed Syllabus

UNIT I (10 Hours)

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining. **Data Pre-processing:** Needs, Pre-processing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II (10 Hours)

Introduction: Data Warehouse and OLAP Technology for Data Mining, Data Warehouse Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining. Data Mining Primitives, Data Mining Query Languages.

UNIT III (10 Hours)

Concepts Description: Characterization and Comparison, Data Generalization and Summarization-Based Characterization. Analytical Characterization, Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.

UNIT IV (10 Hours)

Mining Association Rules in Databases: Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis.

UNIT V (6 Hours)

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back-propagation, Classification Based on Association Rule Mining, Other Classification Methods, Prediction, and Classifier Accuracy.

UNIT VI (10 Hours)

Cluster Analysis Introduction: Types of Data in Cluster Analysis, a Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Outlier Analysis. **Mining Complex Types of Data:** Multidimensional Analysis and Descriptive Mining of Complex, Data Objects, Mining-Spatial Databases, Multimedia Databases, Time-Series and Sequence Data, Text Databases, World Wide Web.

Text and Reference Books

1. Data Mining -Concepts and Techniques, Han, Kamber, Harcourt India, 2006.
2. Data Mining Introductory and advanced topics, Margaret H Dunham, Pearson, 2002.
3. Data Mining Techniques, Arjun K. Pujari, University Press, 2001.

Course Outcomes:

After completing the course, students will be able to:

1. The candidate will get knowledge of - Data preprocessing and data quality..
2. Modeling and design of data warehouses
3. Algorithms for data mining.
4. Be able to design data warehouses.
5. Ability to apply acquired knowledge for understanding data and select suitable methods for data analysis

MCA 411: Advanced Computer Network

Teaching Scheme

Lectures: 3 hrs/Week
Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks
Teachers Assessment - 6Marks
Attendance – 12 Marks
End Semester Exam – 70 marks

Prerequisite: -

1. Familiarity with the Data Communication
2. Knowledge of internet networking.

Course Objectives:

1. To understand the state-of-the-art in network protocols, architectures and applications.
2. Analyze existing network protocols and networks.
3. Develop new protocols in networking
4. To understand how networking research is done
5. To investigate novel ideas in the area of Networking via term-long research projects.

Detailed Syllabus

UNIT I (10 Hours)

Introduction: A Brief History of ARPANET, MILNET, CSNET, NSFNET, The Internet Today, Protocols and Standards, Standards Organizations, Internet Standards, Internet Administration.

UNIT II (10 Hours)

Network Models: The OSI Model, Layers in the OSI Model, TCP/IP Protocol Suite, Addressing, TCP/IP Versions. **Underlying Technologies:** LANs, Point to Point WANs, Switched WANs, Connecting Devices .

UNIT III (10 Hours)

IP Protocol: IP Datagram, Fragmentation, Options, Checksum, IP Package. **ARP & RARP:** ARP, ARP Package, RARP. **IP Addresses:** Classful Addressing, Other Issues. **Subnetting and Supernetting:** Subnetting, Supernetting, Classless Addressing.

UNIT IV (10 Hours)

Delivery and Routing: Connection Oriented Vs Connectionless Services, Direct Vs Indirect Delivery, Routing Methods, Static Vs Dynamic Routing, Routing Table and Routing Module.

Classless Addressing: CIDR. **Unicast Routing Protocol:** Interior and Exterior Routing, RIP, OSPF, BGP. **Multicast Routing Protocol:** Multicast Routing, Multicast Trees, DVMRP, MOSPF, CBT, PIM, MBONE.

UNIT V (6 Hours)

UDP & TCP: UDP, Checksum, UDP Operation, Use of UDP, UDP Packages. TCP Services, Numbering Bytes, Flow and Error Control, Silly Window Syndrome, TCP Timers, Congestion Control, Option, Checksum, Connection Control, State Transition Diagram, TCP Operation, TCP Packages.

Socket Interface: Definitions, Byte Ordering, Address Transformation, Byte Manipulation Function, Information about Remote Host, Socket System Calls, Connectionless Iterative Server, UDP Client/Server Programs, Connection Oriented Concurrent Servers, TCP Client/Server Program.

UNIT VI (10 Hours)

Application Layer Protocols: BOOTP & DHCP, DNS, TELNET & Rlogin, FTP, TFTP, SMTP, HTTP, WWW, RTP.

Next Generation IPv6: IPv6, IPv6 Addressing, IPv6, Packet Format, Transition from IPv4 to IPv6.

Text and Reference Books

1. . Behrouz A Frouzan: TCP/IP Protocol Suite, 4th Edition,2010, TMH
2. Douglas E Comar: TCP/IP Protocol, 6th Edition,2008, Pearson Education
3. Behrouz A Frouzan: Data Communication and Networking, 4th Edition,2006, TMH
4. Richard Stevens: TCP/IP Illustrated Vol 1: The Protocols, 1st Edition,2006, Pearson Education, India.

Course Outcomes:

After completing the course, students will be able to:

1. Describe the functions of each layer in OSI and TCP/IP model.
2. Classify the routing protocols and analyze how to assign the IP addresses for the given network.
- 3.State the properties and challenges of Ad Hoc wireless networks.
4. To understand the principles and functionality of mobile IP, explaining its concretization in IPv6; to understand the needs of optimization of the mobility mechanisms and description of some extensions that aim to reduce handover latency and requirements from terminals.
5. to identify and discuss the concepts underlying IPv6 protocol, and their main characteristics and functionality.
6. recognize the need for service integration and discuss how it can be accomplished.

MCA 412 Cryptography and Network Security

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: - MCA 101 Computer Concepts and C programming, MCA 303 Data Communication & Computer Network

Course Objectives:

- 1- To define cryptography, its use, areas where cryptography is needed.
- 2- To understand security concepts, ethics in Network Security, security threats, and the security services and mathematical foundation required for various cryptographic algorithms.
- 3- To develop code to implement a cryptographic algorithm or write an analysis report on any existing security product.
- 4- To analyze all key less and keyed algorithms to identify their strength and weaknesses and try to solve and remove the limitations or optimize the complexity of algorithm(s).
- 5- To test different available algorithms in terms of complexity, response time, key size, data size, security assurance, etc.
- 6- To design an algorithmic solution of a problem either by applying existing algorithms or a new one. Identify and classify computer and security threats and develop a security model to prevent, detect and recover from attacks.

Detailed Syllabus

UNIT I
Introduction to Cryptography and Network Security: Security Goals, Attacks, Services and Mechanisms, Techniques, Traditional Symmetric Key Cipher.
UNIT II
Modern Symmetric Key Ciphers: Fiestal Cipher, S-DES, DES, Double DES, Triple DES, AES, Block Cipher. Modes of Operation : ECB, CBC, CFB, OFB and CTR, KDC.
UNIT III (10 Hours)
Introduction to Mathematics for Cryptography: Modular Arithmetic, The Euclidian Algorithm, Extended Euclid, Farmet's and Euler's Theorem, Chinese Remainder Theorem.
UNIT IV (10 Hours)
Asymmetric Key Cryptography: RSA Algorithm, ECC, Key Management- Public Key Distribution, Sharing of secret key using A-symmetric Key Cryptosystem.
UNIT V (10 Hours)
Message Authentication: MAC, SHA-512 and MD5. Digital Signature: DSS Key Management: Symmetric Key Distribution, Kerberos.
UNIT VI (10 Hours)
Network Security: IPsec, SSL and TSL, PGP AND S/MIME, SET, System Security: Malicious Software, Firewalls and Intruders.

Text and Reference Books

1. Cryptography and Network Security, Behrouz A Frouzan, TMH, 1st Edition 2007.
2. Cryptography and Network Security, William Stallings, Pearson Education, 4th Edition, 2006.
3. Applied Cryptography, Bruce Schinner, Willy and Sons, 2nd Edition 1996.

Course Outcomes:

After completing the course, students will be able to:

1. Identify some of the factors driving the need for network security.
2. Identify and classify particular examples of attacks.
3. Define the terms vulnerability, threat and attack.
4. Identify physical points of vulnerability in simple networks.
5. Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack, and explain the characteristics of hybrid systems.

MCA413: Distributed Database Systems

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: - Database management system

Course Objectives:

The objectives of this course are

1. Enhanced the knowledge in the area of Distributed Database system.
2. Comprehend the Distributed query processing.
3. The subject explores the ideas of Transaction management and concurrency control.
4. Know the parallel database system architecture.
5. Become conscious about current trends.

Detailed Syllabus:

UNIT I

Introduction: Distributed Data processing, Distributed Database Systems (DDBMSs), Promises of DDBMSs, Complicating factors and Problem areas in DDBMSs, Overview Of Relational DBMS, Relational Database concepts, Normalization, Integrity rules, Relational Data Languages, Relational DBMS.

UNIT II

Distributed DBMS Architecture: DBMS Standardization, Architectural models for Distributed DBMS, Distributed DBMS Architecture. Distributed Database Design: Alternative design Strategies, Distribution design issues, Fragmentation, Allocation. Semantic Data Control: View Management, Data security, Semantic Integrity Control.

UNIT III

Overview of Query Processing: Query processing problem, Objectives of Query Processing, Complexity of Relational Algebra operations, characterization of Query processors, Layers of Query Processing.

UNIT IV

Introduction to Transaction Management: Definition of Transaction, Properties of transaction, types of transaction. Distributed Concurrency Control: Serializability theory, Taxonomy of concurrency control mechanisms, locking based concurrency control algorithms.

UNIT V

Parallel Database Systems: Database servers, Parallel architecture, Parallel DBMS techniques, Parallel execution problems, Parallel execution for hierarchical architecture. Database Interoperability: Database Integration, Query processing.

UNIT VI

Distributed Object Database Management systems: Fundamental Object concepts and Object models, Object distribution design. Architectural issues, Object management, Distributed object storage, Object query processing. Transaction management.

Text and Reference Books

1. Principles of Distributed Database Systems, M.TamerOzsu, Patrick Valduriez, 2nd Edition, 1999.
2. Distributed Databases principles and systems, Stefano Ceri, Giuseppe Pelagatti, TMH, 2008.

Course Outcomes:

After completing the course, students will be able to:

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| 1. Aware of fundamentals of Distributed Database systems. |
| 2. Use the different techniques of Distributed query processing |
| 3. Set the rules over management of transaction and concurrency control. |
| 4. Familiar with parallel database system architecture. |
| 5. Apprehend Machine Learning Algorithms. |

MCA 414: Theory of Computation

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks
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Prerequisite: Sets, Relations, Trees, Graphs, Boolean Algebra etc.

Course Objectives:

1. Introduce concepts in automata theory and theory of computation.
2. Identify different formal language classes and their relationships.
3. Design grammars and recognizers for different formal languages.
4. Prove or disprove theorems in automata theory using its properties.
5. Determine the decidability and intractability of computational problems.

Detailed Syllabus

UNIT I

Mathematical preliminaries: sets, relations, functions, graphs, trees, string and their properties, principle of induction, proof by contradiction.

UNIT II

Theory of automata: Alphabets, Strings and Languages; Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA, Equivalence of NFA and DFA, Minimization of Finite Automata.

UNIT III

Regular sets and regular grammars: Regular expression (RE) , Definition, Operators of regular expression and their precedence, Algebraic laws for Regular expressions, Kleen's Theorem, Regular expression to FA, DFA to Regular expression, Arden Theorem, Non Regular Languages, Pumping Lemma for regular Languages. Application of Pumping Lemma, Closure properties of Regular Languages, Decision properties of Regular Languages, FA with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA.

UNIT IV

Context free grammar (CFG) and Context Free Languages (CFL): Definition, Examples, Derivation , Derivation trees, Ambiguity in Grammar, Inherent ambiguity, Ambiguous to Unambiguous CFG, Useless symbols, Simplification of CFGs, Normal forms for CFGs: CNF and GNF, Closure properties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Membership, Pumping lemma for CFLs.

UNIT V

Push down automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG.

UNIT VI

Turing machines (TM): Basic model, definition and representation, Instantaneous Description, Language acceptance by TM, Variants of Turing Machine, TM as Computer of Integer functions, Universal TM, Church's Thesis, Recursive and recursively enumerable languages, Halting problem, Introduction to Un-decidability, Un-decidable problems about TMs.

Text and Reference Books:

1. Hopcroft, Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education, 2010.
2. K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science : Automata, Languages and Computation", PHI,2007.

Course Outcomes:

After completing the course, students will be able to:

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| 1. Acquire a fundamental understanding of the core concepts in automata theory and formal languages. |
| 2. An ability to design grammars and automata (recognizers) for different language classes. |
| 3. An ability to identify formal language classes and prove language membership properties. |
| 4. An ability to prove and disprove theorems establishing key properties of formal languages and automata. |
| 5. Acquire a fundamental understanding of core concepts relating to the theory of computation and computational models including (but not limited to) decidability and intractability. |

MCA 421: Android Programming

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Unit Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: - Basics of Java language and PL/SQL

Course Objectives:

1. To gain knowledge of installing Android Studio
2. To learn designing of User Interface and Layouts for Android App.
3. To learn how to use intents to broadcast data within and between Applications.
4. To use Content providers
5. To introduce Android APIs
6. To design basic applications

Detailed Syllabus

UNIT I

JAVA Concepts (10 hrs): Platform Independency, OOPs Concepts, Inheritance in detail, Exception handling, Packages & interfaces, JVM & .jar file extension, Multi threading (Thread class & Runnable Interface). **SQL:** DML & DDL Queries in brief.

UNIT II

Introduction to Android: Introduction of Android, Setting up development environment, Installing the SDK, Creating Android Emulator, Android development Tool. **Fundamentals:** Basic Building blocks - Activities, Services, Broadcast Receivers & Content provider, UI Components - Views & notifications, Components for communication -Intents & Intent Filters, Android API levels (versions & version names)

UNIT III

Application Structure: AndroidManifest.xml, uses-permission & uses-sdk, Resources & R.java, Assets, Layouts & Draw-able Resources, Activities and Activity lifecycle, First sample Application.

UNIT IV

Emulator-Android Virtual Device: Launching emulator, Editing emulator settings, Emulator shortcuts, Logcat usage, Introduction to DDMS. **Second App:** (switching between activities), Develop an app for demonstrating the communication between Intents.

UNIT V

Basic UI design: Form widgets, Text Fields, Layouts, [dip, dp, sip, sp] versus px, Examples
Preferences: Shared Preferences, Preferences from xml, Examples.

UNIT VI

Menu: Option menu, Context menu, Sub menu, Menu from xml, Menu via code, Examples
UI design: Time and Date, Images and media, Composite, Alert Dialogs & Toast, Popup, Examples

Text and Reference Books

1. Android Application Development (With Kitkat Support), Black Book, by Kogent Learning Solutions Inc. by Pradeep Kothari
2. Android Application Development Cookbook: 93 Recipes for Building Winning Apps (WROX), by Wei-Meng Lee
3. Professional Android 4 Application Development, by Reto Meier
4. Beginning Android 4 Application Development, Wei-Meng Lee
5. Android Application Development, by Lombardo John and Blake Meike

Course Outcomes:

After completing the course, students will be able to:

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| 1. Understand basic knowledge of Java fundamental concepts and PL/SQL |
| 2. Design and Implement User Interfaces and Layouts of Android App. |
| 3. Use Intents for activity and broadcasting data in Android App. |
| 4. Design and Implement Content Providers. |
| 5. Evaluate performance of Application in terms of activity switching |
| 6. Design menu driven applications |

MCA 422: Oracle DBA

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite : - Database Management Systems

Course Objectives:

1. Understand DBMS architecture
2. Understand Transaction control language.
3. Understand Updating and deleting data through views.
4. Oracle Overview and Architecture.
5. Maintaining and monitoring redo log files.
6. Managing Users and Security.

Detailed Syllabus:

UNIT I

Introduction: DBMS architecture and data independence, DBA roles and responsibilities. SQL *PLUS Overview: SQL plus Fundamentals, Producing more readable outputs, Accepting values at runtime, Using iSQL *Plus.

UNIT II

Modifying Data: Introduction to DML Statements, Truncating a table, Transaction control language. Managing Constraints: Creating constraints, dropping constraints, enabling and disabling constraints, deferring constraints checks.

UNIT III

Managing Views: Creating and modifying views, Using views, Inserting, Updating and deleting data through views. User Access and Security: Creating and modifying use accounts, creating and using roles, granting and revoking privileges, managing user groups with profiles.

UNIT IV

Oracle Overview and Architecture: An overview of logical an physical storage structures, Oracle memory structures, Oracle background processes, connecting to oracle instance, processing SQL command. Managing Oracle: starting up the oracle instance, managing sessions, and shutting down the oracle instance, instances messages and instance alerts.

UNIT V

Control and Redo Log Files: Managing the control files, Maintaining and monitoring redo log files. Managing tables, indexes and constraints: Storing data (create, alter, analyzing, and querying table information), Managing indexes, Managing constraints.

UNIT VI

Managing Users and Security: Profiles, Managing users, managing privileges, managing roles, querying role information. Introduction to Network Administration: Network design considerations, network responsibilities for the DBA, network configuration, Overview of oracle Net features, Oracle Net Stack Architecture.

Text and Reference Books

1. C.J. Date, Database Systems, Addison Wesley, 2000
2. Chip Dawes, Biju Thomas, Introduction to Oracle 9i SQL, BPB, 2002
3. Bob Bryla, Biju Thomas, Oracle 9i DBA Fundamental I, BPB, 2002
4. Doug Stums, Matthew Weshan, Oracle 9i DBA Fundamental I, BPB, 2002
5. Joseph C. Johnson, Oracle 9i Performance Tuning., BPB, 2002

Course Outcomes:

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| 1. Acquire knowledge of handling large volume of data. |
| . Acquire skills to deal with Real life database implementation. |
| 3. Response off faster queries and serve as many users as possible concurrently. |
| . Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning. |
| 5. Fit with any Database project in industry after completion of degree. |

MCA 424: UNIX and Shell Programming

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: - DOS Operating System

Course Objectives:

1. To familiarize the students with the Operating System.
2. To demonstrate the process, memory, file and directory management issues under the UNIX
3. Operating system.
4. To introduce UNIX basic commands.
5. To make students how to make simple programs in UNIX and administrative task of UNIX.

Detailed Syllabus

UNIT I (6 Hours)

Introduction to UNIX: features of UNIX, Shell Vs Kernel, types of shell, System Calls, System calls Vs Library functions, UNIX file System, The Parent-Child Relationship, Orphan, Zombie, UNIX Architecture, UNIX Commands.

UNIT II (10 Hours)

The first faltering step(Login), Password, Password Ageing, files related commands, Symbolic links, Listing Files & directories, Hidden files, Shell Meta characters, Masking file permission, Changing file permission(Absolute & Symbolic mode), Sticky bit, Directory related commands, Best calculator.

LAB WORK—who am i, who, logname, uname, id, tty, sty, passwd, touch, cat, cp, rm, mv, ls, ln, umask, chmod, pwd, mkdir, rmdir, cd, bc, cal, date, echo, printf.

UNIT III (10 Hours)

The UNIX file system, INODE Table, Disk related commands, File related commands, viewing files, Locating files, Taking printouts, File Compression (File Compression & Archiving), Filters, The Stream Editors, I/O redirection & Piping, Command substitution.

LAB WORK—df, dfspace, du, ulimit, file, dosdir, doscat, pg, more, find, lp, lpstat, cancel, pr, tr, cmp, comm., diff, compress, uncompress, gzip, gunzip, bzip, bunzip, zip, unzip, tar, wc, sort, grep, cut, head, sort, uniq, use of (>, <, >>, |).

UNIT IV (10 Hours)

Process basic, process status, Mechanism of process creation, Job Control, background processes, Killing a process, Daemon, Changing process priorities, Scheduling a process, process synchronization, Semaphores, Communication In UNIX,

System Administration in UNIX- the System administrator's login, the administrator's privileges, Adding & Removing groups, user's management, Booting & Shutdown, Making a file system, Mounting & Unmounting File system, Monitoring System Usage.

LAB WORK— ps, nohup, kill, nice, at, batch, crontab, finger, talk, write, mesg, wall, mail, mailx, pine, motd.

UNIT V (10 Hours)

Editor, types of editor (vi and ed), Modes of operation in vi, Navigation in vi (use of h, j, k and l keys), word navigation (use of b, e and w keys), Scrolling, deleting text, copy & paste in vi, block commands, Searching, Find & replace, Abbreviation(abbr), set command.

UNIT VI (10 Hours)

Shell Scripts/program, need of shell scripts, Interactive shell scripts, shell variables, shell keywords, System variables, shell keywords, System variables, user defined variables, Command line arguments, exit and status of command, use of operators, Control Instructions in shell, arrays, functions, Positional parameters, trapping signals.

Text and Reference Books

- 1.UNIX shell programming By Yashvant Kanetkar ---BPB Publications
- 2.UNIX Concepts and Application By Sumitabha Das--- Tata McGraw-Hill publication
- 3.The C Odyssey UNIX the open boundless C By Meeta Gandhi-- BPB Publications

Course Outcomes:

After completing the course, students will be able to:

1. Knowledge about working environment in UNIX.
2. Knowledge about the UNIX commands to perform different tasks.
3. Difference between DOS and UNIX environment.
4. Create or design different scripts using shell programming.
5. Implement process, thread, semaphore concept of operating system
6. Responsibilities and duties of a system administrator along with the knowledge how to grant permission to users, create user account etc.

MCA425: Advanced Java and Internet Programming

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test – 12 Marks

Teachers Assessment – 6 Marks

Attendance – 12 Marks

End Semester Exam – 70 Marks

Prerequisite: HTML, CSS, C Programming, and OOPs Concepts.

Course Objectives:

1. To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
2. To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
3. Discuss the principles of inheritance, interface and packages and demonstrate through problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
4. To understand importance of Multi-threading & different exception handling mechanisms.
5. To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and AWT that respond to different user events.
6. To understand Java Swings for designing GUI applications based on MVC architecture.

Detailed Syllabus:

Unit-1

Internet: Internet, Development of Internet, Internet Service Provider (ISP), Intranet, Extranet, World Wide Web (WWW). Web Browsers, Active –X-controls.

Protocols: IP, TCP, HTTP, HTTPS, FTP, SMTP.

Introduction: Web Application and its Life Cycle, Web Page, Websites, Type of Websites, Client side Application, Server side Application. Search Engine and Search Technique.

Unit-2

GUI Component: Introduction of Java Beans, Advantages, Properties, Bean Development Kit (BDK), Creating GUI Component.

Overview of J2EE: Distributed Multi-tiered Applications, J2EE Application Components, J2EE Architecture, Introduction of J2EE API's, Introduction and working of Web Application Server's: Sun Micro System's Application Server, Web Logic (Bea).

AJAX: HTML, Java Script, CSS, XML Http Request, MSXMLDOM, AJAX Examples

Unit-3

Java Servlet Technology: Introduction of Servlet, Life cycle of a Servlet, Sharing Information, Initialization a Servlet, Compilation, Debugging and Execution of Servlet, Writing Service Methods, Filtering Request and Response, Invoking Other Web Resources, Accessing Web Context, Maintaining Client State, Finalizing a Servlet.

Session Management and Tracking using: Cookies, URL Re-Writing, Hidden from Fields, Session Object.

HttpSession: Putting data into a session object, Retrieving data from a session object.

Unit-4

Java Server Pages Technology: Introduction of JSP, Life Cycle of JSP, JSP Processing, JSP Application Design, Creating Static and Dynamic Content, Expression Language, Adding Applet to Jsp Page, Types of Tag, Using add Bean Tags, Using Custom Tags.

JDBC: Database Programming Using JDBC, java, sql package, Accessing Database on JSP page, Creating Login and Logout in JSP page, Creating Registration Page, searching data as a Grid and searching records based on Primary Key, deleting records from the Database, Joining Tables.

Unit-5

Enterprise Java Beans (EJB): Introduction of EJB, Enterprise Bean Architecture, Creating the application Client, Creation of web Client, Session Bean, Entity Bean, Message-Driven Bean, Introduction of Bean-Managed Persistence Examples(BMP), Container-Managed Persistence Examples. **Application Based on EJB:** A shopping cart an online bookstore Application

Unit-6

RMI (Remote method Invocation): Introduction to Distributed Applications, RPC, RMI Architecture, RMI Examples, Java Naming and Directory Interface Web Services: Interoperability, CORBA, SOAP, UDDI, WSDL, JAXP, JAX-RPC, JAXB, JAXM.Design Patterns Struts: MVC, MVC 2, Command Pattern, Front Controller, Introduction to Struts Framework.

Suggested Readings:

1. The Complete Reference JAVA 2, NaughtonSchildt, TMH, 5th Edition 2010
2. Programming in JAVA, Balagurusamy E, TMH, 2nd Edition 2007
3. The complete Reference Internet,Margaret Levine Young, TMH, 2nd Edition 2005
4. Inside Servlets, Dustin R. Callway, Addison Wesley, 2nd Edition 2001
5. Java enterprise Edition, Mark Wutica, QUE ,3rd Edition,2007
6. Java Black book, Steven Helzner, Dreamtech, 3rd Edition,2009

Course Outcomes:

1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem
3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
4. Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events
6. Identify, Design & develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture.