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Institute of Computer Applications

Name of Program : MCA + Ph.D.

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
MCCA401	COMPULSORY	Computer Graphics	60	20	20	30	20	4	1	4	7

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To provide knowledge about hardware and software used in computer Graphics.
- To impart knowledge about drawing algorithms.
- To provide detailed knowledge about color and intensity levels.
- To acquaint students with windowing and clipping.
- To make the student understanding about Rendering Concept

Course Outcomes (Cos):

- An ability to understand basic knowledge of Computer Graphics.
- An ability to apply knowledge of Computer Graphics.
- An ability to understand the color and intensity levels.
- An ability to identify visible area of any surface.
- An ability to understand rendering and reflection.

UNIT-I

Introduction to Computer Graphics, Types of refresh graphics displays, Interactive devices, CRT. Raster scan graphics : Video basics, Scan conversion. Line drawing algorithms: Digital Differential Analyzer, Bresenham's algorithm for line and circle. Polygon filling, edge fill algorithm, seed fill algorithm.

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UNIT-II

Attributes of output primitives, line style, color and intensity, Area filling algorithms, Scan line algorithm, boundary fill flood fill algorithm, Antialiasing techniques. Two dimensional transformations; translation, scaling, rotation, reflection sheering, composite transformation, transformation commands, character generation.

UNIT-III

Introduction to clipping: 2D clipping : line clipping algorithms – Cohen-Sutherland, Line sub-division algorithm, Midpoint sub-division, Cyrus–Beck algorithm. 2D-Parameteric clipping. Introduction to 3D Clipping.

Hidden line & Hidden surfaces: Floating Horizon algorithms: Upper Horizon and Lower Horizon, Roberts algorithm, Warnock algorithm, Weiler- Atherton algorithm, Z-buffer algorithm.

UNIT-IV

3-D Viewing: Three-dimensional concepts, 3D display techniques, 3D representation polygon & curved surfaces. Design of curves & surfaces- Bezier's Method, B-spline methods, 3D transformation transition, scaling, composite transformation rotation about arbitrary axis, projections: Parallel & Perspective, Hidden surface and line removal; back face removal, depth buffer and scan line methods.

UNIT-V

Rendering Illumination model: Surface normal, Reflection vector, Effect of Ambient Object, Specular Reflection, Halfway vector. Shading, Ray tracing, color.

List of Practical:

1. Write a C program for generating line using DDA algorithm.
2. Write a C program for generating line using Bresenham's algorithm.
3. Write a C program for generating circle using DDA algorithm.
4. Write a C program for generating circle using Bresenham's algorithm.
5. Write a C program for Cohen Sutharland line clipping algorithm.
6. Write a C program for polygon clipping.
7. Write a C program to draw mid-point circle algorithm.
8. Write a C program to draw a Bezier curve.
9. Write a C program to draw a Bezier surface.
10. Write a C program for rotation of a 3D objects about arbitrary axis.
11. Write a C program for Hidden surface removal from a 3D objects.

Reference Books:

1. Rogers, D. F. “Procedural Elements for computer graphics”. McGraw Hill.
2. Hearn, D. and Baker,M. “Computer Graphics” PHI.
3. Asthana, R. G. S. and Sinha, N. K. “Computer Graphics”, New Age international.

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Subject Code	Category	Subject Name	Teaching & Evaluation Scheme								
			Theory			Practical		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teacher Assessment	End Sem University Exam	Teacher Assessment				
MCCA412	Elective	Operations Research	60	20	20	--	--	3	1	0	4

Legends: L – Lecture; T – Tutorial/Teacher Guided Student Activity; P – Practical; Q/A – Quiz/Assignment/Attendance; MST – Mid Semester Test.
***Teacher Assessment** shall be based on following components:
Quiz/Assignment/Project/Participation in class activities, given that no component shall exceed more than 10 marks

Course Education Objective (CEOs):

- This course aims to introduce students to use quantitative methods and techniques for effective decision-making; model formulation and applications that are used in solving business decision problems.
- Operations research helps in solving problems in different environments that needs decisions. Analytic techniques will be used to solve problems facing business managers in decision environments.

Course Outcomes (COs):

- Be able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type.
- Be able to build and solve Transportation Models and Assignment Models.
- Be able to design new simple models, like: CPM, MSPT to improve decision –making and develop critical thinking and objective analysis of decision problems.

UNIT-I
Introduction to operations research, Overview of OR modelling. Linear Programming (LP): Assumptions of LP models, LP problem formulation, Graphical methods for solving LP problems.

UNIT-II
The Simplex method, Big M-method and Two-Phase simplex method, Duality: Definition of the

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dual problem, relationship between the primal and dual solutions, Economic interpretation of duality, the dual Simplex method, sensitivity analysis. Transportation and Assignment problems. Integer programming models, Cutting Plane method, Branch and Bound method.

UNIT-III

Job Sequencing Models: Sequencing problems, Johnson's algorithm for processing *n* jobs on two machines and *n* jobs on three machines, Processing 2 jobs on *n* machines using graphical method. Review of Network models, minimal spanning tree algorithm, and shortest route problems: Dijkstra's algorithm, Maximal flow model, maximal flow algorithm, min-cut, min-cut Max-flow theorem.

UNIT-IV

Project Scheduling by CPM/PERT: Designing an activity network, Critical path calculations, Determination of floats, Program Evaluation and Review Technique (PERT). Cost-Time analysis of projects: crashing activities in a project.

UNIT-V

Queuing systems, Elements of queuing model, role of exponential distribution, birth and death models, steady state measures of performance, single server models, multiple-server models, machine servicing model, Pollaczek-Khintchine formula, queuing decision models. Multi criteria Decision making, Introduction to Game theory, Zero-sum Game.

TEXT BOOKS:

1. H. Taha, "Operations Research: An Introduction", PHI, 8th edition, 2009.
2. Hilier and Liebermann, "Introduction to Operations Research", McGraw-Hill, 8th ed., 2009.
3. Wayne Winston, "Operations Research: Applications and Algorithms", Cengage, 4th edition, 2009.

REFERENCES:

1. J. K. Sharma, "Operation Research Theory and Applications", 3rd edition, Macmillan, India.
2. Paul A. Jensen, "Operations Research Models and Methods", John Wiley, 2003.
3. G. Srinivasan, "Operational Research Principles and Applications", PHI, 2nd edition, 2008.
4. A.M. Natarajan, P. Balasubramani, A. Tamilarasi, "Operational Research", Pearson, 4th edition, 2009.

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Subject Code	Category	Subject Name	Teaching & Evaluation Scheme								
			Theory			Practical		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teacher Assessment	End Sem University Exam	Teacher Assessment				
MCCA422	Elective	**Numerical Methods**	60	20	20	0	0	3	1	0	4

Legends: L – Lecture; T – Tutorial/Teacher Guided Student Activity; P – Practical; Q/A – Quiz/Assignment/Attendance; MST – Mid Semester Test.
***Teacher Assessment** shall be based on following components:
Quiz/Assignment/Project/Participation in class activities, given that no component shall exceed more than 10 marks

Course Education Objective (CEOs):

- To introduce the students with the Numerical Analysis.

Course Outcomes (COs): After the successful completion of this course students will be able to

- understand and apply the techniques to find the numerical solution of the non-linear, algebraic and transcendental equations.
- find the complex roots of a polynomial equation and numerical solution of the system of linear algebraic equations.
- apply the techniques to find the eigenvalues and corresponding eigenvectors of a square matrix.
- know the interpolation technique.
- understand and apply the techniques to find the numerical differentiation, Integration and numerical solution of the differential equations

UNIT – I

Approximations and Errors associated with numerical methods, **Solution of non-linear equations:** Iterative method using repeated substitutions, Bisection method, method of false position, Newton-Raphson method, Secant method, Chebyshev method.

UNIT – II

Finding complex roots of a polynomial equation: Lin's method, Bairstow's method. **Solution of linear simultaneous equations:** *Direct methods:* Gaussian elimination, Gauss-Jordan elimination, matrix inversion using Gauss-Jordan elimination. *Iterative methods:* Jacobi's method, Gauss-Seidel method and their analysis.

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UNIT – III

Solution of non-linear simultaneous equations: Iterative method and newton-Raphson method. **Finding the eigenvalues and corresponding eigenvectors of a square matrix:** Definitions of eigenvalues and eigenvectors, Power method for finding the eigenvalues and corresponding eigenvectors of a square matrix.

UNIT – IV

Methods for interpolation: Newton's forward difference formula, Newton's backward difference formula, Gauss central difference formula. Divided difference formula, Lagrange's formula, iterative interpolation method. *Curve fitting:* method of least squared error, cubic splines.

UNIT – V

Methods for differentiation: Computation of derivatives using Newton's forward/backward difference formulae**. Methods for integration:** Trapezoidal method, Simpson's method, Gauss quadrature formula. **Solution of differential equations:** Euler's method, modified Euler's method, Runge-Kutta 2nd order formula, Runge-Kutta 4th order formula, predictor-corrector methods.

Suggested Readings:

1. Numerical Algorithms by Krishnamoorthy and Sen

2. Numerical Methods by J.H.Mathews, PHI

3. Numerical Analysis and Algorithms by P. Niyogi, TMH

4. Numerical Methods for scientific and engineering computations by Jain, Iyengar and Jain, New Age International publisher

5. Computer Systems and Data Analysis by D.K.Basu, M.Nasipuri and M.Kundu, Narosa

6. Introductory Methods of Numerical Analysis by S.S.Sastry , P.H.I

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
MCCA 432	Elective	Data Mining and Warehousing	60	20	20	0	0	3	1	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.

***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To familiarize the students with the need and scope of the subject.
- to build the mental makeup of the students for the field of data mining
- To develop a better understanding of the recent techniques like Support Vector Machine, Rough Set Theory etc as the tools of data mining.
- Using simple and well drawn illustrations develop students skills to discover knowledge to support the decision making process.
- To make the students well versed with the latest trends in data warehousing and data mining.

Course Outcomes (Cos): The student will be able to

- understand the basic principles, concepts and applications of data warehousing and data mining
- introduce the task of data mining as an important phase of knowledge recovery process
- Ability to do Conceptual, Logical and Physical design of Data Warehouses, OLAP applications and OLAP deployment
- Have a good knowledge of the fundamental concepts that provide the foundation of data mining
- Design and implement a data warehouse or data mart to present information needed by management in a form that is usable for management client
- Design and implement the data preprocessing solutions for different applications
- Identify and use suitable data mining techniques for Knowledge Discovery
- Develop dashboard solutions for presentation of knowledge
- Explore the subject to start as a researcher

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UNIT – I

Motivation, importance, Data type for Data Mining : relation Databases, Data Warehouses, Transactional databases, advanced database system and its applications, Data mining Functionalities: Concept/Class description, Association Analysis classification & Prediction, Cluster Analysis, Outlier Analysis, Evolution Analysis, Classification of Data Mining Systems, Major Issues in Data Mining.

UNIT – II

Data Warehouse and OLAP Technology for Data Mining: Differences between Operational Database Systems and Data Warehouses, a multidimensional Data Model, Data Warehouse Architecture, data warehouse servers, Data Warehouse Architecture, Implementation of Data Warehouse, Data Cube Technology.

UNIT- III

Data Preprocessing: Problems with real world data, data preprocessing as a process, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation. Data Mining Primitives, Languages, and System Architectures, Concept Description: Characterization and Comparison, Analytical Characterization.

UNIT – IV

Mining Association Rules in Large Databases: Association Rule Mining: Market Basket Analysis, Basic Concepts, Mining Single-Dimensional Boolean Association Rules from Transactional Databases: different algorithms, the Apriori Partition, Dynamic Itemset Counting, pincer search, FP tree Growth, Generating Association rules from Frequent items, Improving the efficiency of Apriory, Mining Multilevel Association Rules, Multidimensional Association Rules, Constraint-Based Association Mining.

UNIT – V

Classification and Prediction and Cluster Analysis: Issues regarding classification and prediction, Different Classification and clustering Methods, Prediction, Cluster Analysis, Applications and Trends in Data Mining: Data Mining Applications, currently available tools.

References

1. J. Han and M. Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann Pub.
2. Berson, “Data Warehousing, Data Mining and OLAP, TMH.
3. W.H. Inmon, “ Building the Data Warehouse’, Wiley India.
4. Anahory, “Data Warehousing in Real World”, Pearson Education.
5. Adriaans, “Data Mining”, Pearson Education.
6. A.K. Pujari, “Data Mining Techniques”, University Press, Hyderabad.

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Subject Code	Category	Subject Name	Teaching & Evaluation Scheme								
			Theory			Practical		L	T	P	CREDITS
			University Exam	Two Term Exam	Teacher Assessment	End Sem University Exam	Teacher Assessment				
MCCA403	Compulsory	Cloud Computing and Management	60	20	20	--	--	4	0	0	4

Legends: L – Lecture; T – Tutorial/Teacher Guided Student Activity; P – Practical; Q/A – Quiz/Assignment/Attendance; MST – Mid Semester Test.

***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class activities, given that no component shall exceed more than 10 marks

Course Objective:

The goal of this course is to provide students with an understanding of basic concepts of Cloud Computing along with cloud computing architecture, cloud management and Cloud Security.

Outcomes course students will be able to:

- Introduce the broad perceptive of cloud architecture and model
- Understand the concepts of cloud Management.
- Understand the Virtualization Technology Concepts.
- Understand the Cloud Security.
- Explore some important cloud computing driven commercial systems such as Google Apps, Microsoft Azure ,Amazon Web Services and other businesses cloud applications

UNIT-I

Cloud Computing :Introduction, Historical development, Vision, Characteristics as per NIST, reference model, Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments.

Unit-II

Architecture for Cloud Computing: Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance.

Cloud Solutions: Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management.

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Cloud Offerings: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure.

Unit –III

Cloud Management: Resiliency, Provisioning, Asset management, Concepts of Map reduce, Cloud Governance, High Availability and Disaster Recovery. Market Based Management of Clouds, Federated Clouds/Inter Cloud: Characterization & Definition, Cloud Federation Stack, Third Party Cloud Services.

Unit-IV

Virtualization Technology: Virtualization of computer hardware ,storage, networking, desktop and application virtualization .Virtualization benefits, server virtualization, Block and file level storage virtualization Hypervisor management software, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits .

Unit-V

Cloud Security: Introduction of cloud Information security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, and Security Challenges.

Overview of cloud applications: ECG Analysis in the cloud, Protein structure prediction, Gene Expression Data Analysis ,Satellite Image Processing ,CRM and ERP ,Social networking .

Case study of cloud computing plateforms: Google App Engine, Microsoft Azure , Hadoop. Amazon.

Reference Books:

1. Krutz , Vines, “Cloud Security “ , Wiley Pub.
2. Kumar Saurabh, “Cloud Computing” , Wiley Pub
3. Sosinsky, “ Cloud Computing” , Wiley Pub.
4. Velte, “Cloud Computing- A Practical Approach” ,TMH Pub .
5. Buyya, Selvi ,” Mastering Cloud Computing “,TMH Pub.
6. Thomas Erl, Ricardo Puttini, Zaigham Mahmood “Cloud Computing: Concepts, Technology & Architecture”, Prentice Hall

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SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
		THEORY			PRACTICAL		L	T	P	CREDITS
		END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MCCA414	Managerial Economics	60	20	20	--	--	4	1	0	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based on following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

- To introduce the economic concepts
- To familiarize with the students the importance of economic approaches in managerial decision making
- To understand the applications of economic theories in business decisions

Course Outcomes

- It provides principles to foster the goals of the organization, as well as a better understanding of the external business environment in which an organization operates

UNIT 1 Meaning and Importance of Managerial Economics
Introduction, Meaning, Scope of Managerial Economics
Importance of the study of Managerial Economics
Two Major Functions of a Managerial Economist

UNIT 2 Demand Analyses
Introduction
Meaning and Law of Demand
Elasticity of Demand
Pricing Policies, Objectives of Pricing Policies

UNIT 3 Demand Forecasting
Introduction, Meaning and Forecasting
Level of Demand Forecasting
Criteria for Good Demand Forecasting
Methods or Techniques of Demand Forecasting

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UNIT 4 Market Structure

Perfect Competition
Monopoly
Monopolistic Competition
Duopoly
Oligopoly

UNIT 5 Macro Economic Environment

Macro Economic Environment
Economic Transition in India - A quick Review
Liberalization, Privatization and Globalization
Business and Government
Public-Private Participation (PPP)
Industrial Finance - Foreign Direct Investment (FDIs).

References

1. Yogesh Maheswari, Managerial Economics, Phi Learning, New delhi, 2005 Gupta G.S.
2. Managerial Economics, Tata Mcgraw-Hill, New Delhi Moyer &Harris,
3. Anagerial Economics, Cengage Learning, Newdelhi, 2005 Geetika, Ghosh & Choudhury,
4. Managerial Economics, Tata Mcgrawhill, Newdelhi, 2011.
5. Dwivedi, D. N (2009). Managerial Economics. Vikas Publishing House: New Delhi.Latest Edition.
6. VarshneyandMaheshwari (2009). Managerial Economics. Sultan Chand and Sons: New Delhi.Latest Edition.
7. DholakiaandOza (2012). Microeconomics for Management Students.Oxford University Press:New Delhi. Latest Edition.
8. Udipto Roy. Managerial Economics. Asian Book: Kolkata.Latest Edition.
9. Samuelson andNordhaus (2009).Economics .Tata-McGraw Hill: New Delhi.Latest Edition.

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SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MCCA424	Elective	Advanced DBMS	60	20	20	--	--	4	1	0	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
***Teacher Assessment** shall be based on following components:
Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To familiarize the students with the need and scope of the subject.
- to prepare the students so that they can handle the need of data of different organizations
- To develop a better understanding of the recent advancements in the field of Database Management System.
- Using simple and well drawn illustrations develop students skills to store and retrieve data to support the decision making process.

Course Outcomes (Cos): The student will be able to

- understand the different issues involved in the design and implementation of a database system.
- Understand and use the concepts of physical and logical database designs, database modeling, relational, hierarchical and network models for real world problems
- use data manipulation language to query, update, and manage a database
- To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database and intelligent database, Client/Server (Database Server), Data Warehousing.
- To apply the concepts of transaction processing for safe and secure transactions in different scenarios
- Design and demonstrate the different kind of databases and use backup and recovery provisions
- design and build simple and complex database systems and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

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UNIT-I

Advanced Transaction Processing: Advanced transaction models: Save points, Nested and Multilevel Transactions, Compensating Transactions and Saga, Long Duration Transactions, Weak Levels of Consistency, Transaction Work Flows, Transaction Processing Monitors, Shared disk systems.

UNIT-II

Objected Oriented and Object Relational Databases: Modeling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity and its implementation, Clustering, Equality and Object Reference, Architecture of Object Oriented and Object Relational databases, Persistent Programming Languages, Cache Coherence. Case Studies: Gemstone, O2, Object Store, SQL3, Oracle xxi, DB2.

UNIT-III

Deductive Databases: Data log and Recursion, Evaluation of Data log program, Recursive queries with negation.

Parallel and Distributed Databases: Parallel architectures, shared nothing/shared disk/shared memory based architectures, Data partitioning, Intra-operator parallelism, pipelining. Distributed Data Storage – Fragmentation and Replication, Location and Fragment Transparency, Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel Databases, and Parallel Query Evaluation.

UNIT-IV

Active Database and Real Time Databases: Issues with Real time databases, Triggers in SQL, Event Constraint and Action: ECA Rules, Query Processing and Concurrency Control, Recursive query processing, Compensation and Databases Recovery, multi-level recovery.

UNIT-V

Image and Multimedia Databases: Modeling and Storage of Image and Multimedia Data, Data Structures – R-tree, k-d tree, Quad trees, Content Based Retrieval: Color Histograms, Textures etc., Image Features, Spatial and Topological Relationships, Multimedia Data Formats, Video Data Model, Audio and Handwritten Data, Geographic Information Systems (GIS).

WEB Database: Accessing Databases through WEB, WEB Servers, XML Databases, Commercial Systems – Oracle xxi, DB2.

References

1. A Silberschatz, H.F Korth, Sudersan “Database System Concepts”, MGH Publication.
2. C.J. Date “An introduction to Database Systems”
3. Elmasri and Navathe “Fundamentals of Database systems”, Morgan Kaufman.
4. B.C. Desai. “An introduction to Database systems” BPB
5. R. Ramakrishnan, “Database Management Systems”, McGraw Hill

6. Elmagarmid. A.K. “Database Transaction Models For Advanced Applications”,
7. “Transaction Processing, Concepts and Techniques”, J. Gray and A. Reuter, Morgan Kauffman.
8. S. Abiteboul, R. hull and V. Vianu, “Foundations of Databases”, Addison – Wesley
9. W. Kim, “Modern Database Systems”, ACM Press, Addison – Wesley.
10. D. Maier, “The Theory of Relational Databases”, Computer Science Press, Rockville

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
MCCA434	Elective	Advanced Computer Network	60	20	20	--	--	4	1	0	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.

***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To provide an introduction to the fundamental concepts on data communication and the design of computer networks.
- To get familiarized with the basic protocols of computer networks.

Course Outcomes (COs): After the successful completion of this course students will be able to

- Identify the different components in a Communication System and their respective roles.
- Describe the technical issues related to the local Area Networks
- Identify the common technologies available in establishing LAN infrastructure.
- Familiar with networking concepts.
- Familiar with contemporary issues in networking technologies.
- Familiar with network tools and network programming.

UNIT-I

Introduction: Computer Network, Data communication, Network Topologies, Layered Network Architecture-Review of ISO-OSI Model., Data Link Layer: Simplex, Half duplex and Full duplex, Transmission Media: Guided and unguided.

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UNIT-II

Contention Protocol- Stop-Go-Access Protocol, Flow and error control, Go-Back-N protocol sliding window protocol. Carrier sense multiple access with collision detection (CSMA/CD) Data Security and Integrity: Parity Checking Code, Cyclic redundancy checks (CRC), Hemming Code.

UNIT-III

Local Area Network: Ethernet : 802.3 IEEE standard, Token Ring : 802.5 IEEE standard, Token Bus : 802.4 IEEE standard, , Inter Networking, Layer 1 connections-Repeater, Hubs, Layer 2 connections-Bridges, Switches, Layer 3 connections-Routers, Gateways.

UNIT-IV

Wide Area Network: Introduction, Network routing, Least cost routing algorithms, Dijkstra's algorithm, Bellman –Ford algorithm, Open shortest path first, Elements of Transport Protocol, Internetworking, Network-Layer in the internet.

UNIT-V

Network Security, Intruders, Viruses and related threats, Virtual Terminal Protocol, Overview of DNS, SNMP, email, Multimedia.

References:

1. A.S.Tanenbaum, "Computer Network", 4thaddition,PHI
2. Forouzan "Data Communication and Networking 3ed", TMH
3. J.F.Hayes, "Moduling and Analysis of Computer Communication Networks", Plenum Press
4. D.E.Comer, "Internetworking with TCP/IP", Volume Ist & IInd, PHI
5. Willium Stalling, "Data & Computer communications",Maxwell Macmillan International Ed.
6. D.Bertsekas and R.Gallager,"Data Networks", 2ndEd. , PHI.
7. G.E. Keiser ,"Local Area Networks ", McGraw Hill, International Ed.

Shri VaishnavVidhyapeethVishvavidhyalaya, Indore

Institute of Computer Applications

Name of Program: MCA + Ph.D.

Subject Code	Category	Subject Name	Teaching & Evaluation Scheme								
			Theory			Practical		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teacher Assessment	End Sem University Exam	Teacher Assessment				
MCCA405	Compulsory	Java Programming	60	20	20	30	20	4	1	6	8

Course Education Objectives (CEOs):

- Students must be able to understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- Students must be able to understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Students must have the ability to write a computer program to solve specified problems.
- Students must be able to use the Java SDK environment to create, debug and run simple Java programs.

Course Outcomes (COs):

After the successful completion of the course students will be able to perform the following tasks:

- Write, compile, and execute Java programs that may include basic data types and control flow constructs using Integrated Development Environments (IDEs) such as Eclipse, NetBeans, and JDeveloper.
- Write, compile and execute Java programs using object oriented class structures with parameters, constructors, and utility and calculations methods, including inheritance, test classes and exception handling.
- Write, compile, and execute Java programs using arrays and recursion, manipulating Strings and text documents.
- Write, compile, and execute Java programs that include GUIs and event driven programming.
- Write a final project that may be selected from among the following: applets for inclusion in web pages; applets to access enterprise data bases in robust, enterprise three level applications; secure communications over the internet; or an approved project chosen by the student.

UNIT – I

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Importance and features of Java, *Language Construct of java including* Keywords, constants, variables and looping and decision making construct, Classes and their implementation, Introduction to JVM and its architecture including set of instructions. Overview of JVM Programming. Internal and detailed explanation of a valid .class file format. Instrumentation of a .class file, Byte code engineering libraries, Overview of class loaders and Sandbox model of security.

UNIT-II

Introducing classes, objects and methods: defining a class, adding variables and methods, creating objects, constructors, class inheritance. Arrays and String: Creating an array, one and two dimensional arrays, string array and methods, Classes: String and String Buffer classes, Wrapper classes: Basics types, using super, Multilevel hierarchy abstract and final classes, Object class, Packages and interfaces, Access protection, Extending Interfaces, packages.

UNIT – III

Exception Handling: Fundamentals exception types, uncaught exceptions, throw, throw, final, built in exception, creating your own exceptions,

Multithreaded Programming: Fundamentals, Java thread model: priorities, synchronization, messaging, thread classes, Runnable interface, inter thread Communication, suspending, resuming and stopping threads.

Input/output Programming: Basics, Streams, Byte and Character Stream, predefined streams, Reading and writing from console and files.

Using Standard Java Packages (lang, util, io, net). Networking: Basics, networking classes and interfaces, using java.net package, doing TCP/IP and Data-gram Programming, RMI (Remote Method Invocation).

UNIT – IV

Event Handling: Different Mechanism, the Delegation Event Model, Event Classes, Event Listener Interfaces, Adapter and Inner Classes, Working with windows, Graphics and Text, using AWT controls, Layout managers and menus, handling Image, animation, sound and video, Java Applet.

The Collection Framework: The Collection Interface, Collection Classes, Working with Maps & Sets

JDBC: Introduction to DBMS & RDBMS, DBC API, JDBC Application Architecture, Obtaining a Connection, JDBC Models: Two Tier and Three Tier Model, ResultSet, Prepared Statement, Callable Statement.

UNIT – V

RMI (Remote Method Invocation): Introduction, Steps in creating a Remote Object, Generating Stub & Skeleton, RMI Architecture, RMI packages.

Java Bean: Introduction, Bean Architecture, Using the Bean Development Kit, Creating simple bean-properties, methods and events, Packing beans- the manifest & the jar, Java bean package, Introduction to NetBean.

Swing : Introduction to JFC (Java Foundation Classes), Features of Swing, Comparison with

AWT, Advanced Control .

List of Experiments:

1. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that. Integer.
2. Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
3. Write a Java program for sorting a given list of names in ascending order.
4. Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (use StringTokenizer class).
5. Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
6. Write a Java program that displays the number of characters, lines and words in a text file.
7. Write a Java program for creating multiple threads
    a) Using Thread class.
    b) Using Runnable interface.
8. Write a Java program that illustrates how run time polymorphism is achieved.
9. Write a java program that illustrates the following
    a) Creation of simple package.
    b) Accessing a package.
    c) Implementing interfaces.
10. Write a java program that illustrates the following
    a) Handling predefined exceptions.
    b) Handling user defined exceptions .
11. APPLETS
    a) Working with Frames and various controls.
    b) Working with Dialogs and Menus.
    c) Working with Panel and Layout.
    d) Incorporating Graphics.
    e) Working with colours and fonts.
12. SWINGS

Jpanel- Jframe – Jtoolbar—JwindowFramework

Text Books

1. Patrick Naughton and Herbertz Schildt, “Java-2: The Complete Reference”, TMH, 5th editio, 2002.
2. Bill Venners, “Inside Java Virtual Machine”, TMH, 2nd edition.
3. Rick Darnell, “HTML 4 unleashed”, Techmedia Publication, 2000
4. Shelley Powers, “Dynamic Web Publishing”, 2nd edition, Techmedia, 1998.
5. Paul Dietel and Harvey Deitel, “Java How to Program”, PHI, 8th edition, 2010.

References

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1. E. Balagurusamy, “Programming with Java: A Primer”, TMH, 1998.
2. Horstmann, “Computing Concepts with Java 2 Essentials”, John Wiley.
3. Decker and Hirshfield, “Programming Java: A Introduction to Programming Using JAVA”, Vikas Publication, 2000.
4. N.P. Gopalan and J. Akilandeswari, “Web Technology- A Developer’s Perspective”, PHI, 2nd edition
5. Eric Jendrock, Jennifer Ball, Debbei Carson, “The Java EE5 Tutorial”, Pearson, 3rd edition, 2007.
6. Daniel Liang, “Introduction to Java Programming”, Pearson, 7th edition, 2010.