Scheme of Examination

Third Semester
Master of Computer Application

(wef:-2020-21)

S.No	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End sem. Exam	Tests (Two)	Assignment /Quiz	End Sem Practical / Viva	Practical record/ Assignment/Quiz/ Presentation	
1	MCA 301	Data ware housing & Mining	3	1	-	4	70	20	10		-	100
2	MCA 302	Unix & shell Programming	3	1	-	4	70	20	10	-	-	100
3	MCA 303	Cloud Computing	3	1	-	4	70	20	10	-	-	100
4	MCA 304	.NET Framework Technology	3	1	-	4	70	20	10	-	-	100
5	MCA 305	Elective I	3	1	-	4	70	20	10	-	-	100
6	MCA306	Minor Project -II	-	-	8	8	-	-	-	120	80	200
7	MCA 307	Lab in Unix & She Programming	-	-	2	2	-	-	-	30	20	50
		Total	**15**	**5**	**10**	**30**	**350**	**100**	**50**	**150**	**100**	**750**

L: Lecture - T: Tutorial - P: Practical

Elective I

a) Distributed System
b) Embedded System
c) Network Security
d) Networking Programming
e) Simulation and Modeling
f) Web-Technology & E-Commerce
g) Optimization Techniques
h) Computer Graphics

MCA-301 Data Warehousing and Mining

Course Objectives:

1. To identify the scope and essentiality of Data Warehousing and Mining.
2. To analyze data, choose relevant models and algorithms for respective applications.
3. To study spatial and web data mining.
4. To develop research interest towards advances in data mining.

Total (60 Hours)

UNIT-I (12 Hours)

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 (12 Hours)

Data Warehouse and OLAP Technology for Data Mining: Differences between Operational Databases Systems and Data Warehouses, a multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology.

UNIT-III (12 Hours)

Data Preprocessing: 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 (12 Hours)

Mining Association Rules in Large Databases: Association Rule Mining: Market Basket Analysis, Basic Concepts, Mining Single-Dimensional Boolean Association Rules from Transactional Databases: the Apriori algorithm, Generating Association rules from Frequent items, Improving the efficiency of Apriory, Mining Multilevel Association Rules, Multidimensional Association Rules, Constraint-Based Association Mining.

UNIT V (12 Hours)

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

Books

1. J. Han and M. Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann Pub.
2. Berson “Dataware housing, Data Mining & DLAP, @004, TMH.
3. S.K. Pujari, “Data Mining Techniques”, University Press, Hyderabad.

Course Outcomes:

1. Understand Data Warehouse fundamentals, Data Mining Principles
2. Design data warehouse with dimensional modeling and apply OLAP operations.
3. Identify appropriate data mining algorithms to solve real world problems.
4. Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining.
5. Describe complex data types with respect to spatial and web mining. 6. Benefit the user experiences towards research and innovation, integration.

MCA-302 Unix and Shell Programming

Course Objectives:

1. To provide introduction to UNIX Operating System and its File System.
2. To gain an understanding of important aspects related to the SHELL and the process.
3. To provide a comprehensive introduction to SHELL programming, services and utilities.

Total-(60 Hours)

UNIT-I (12 Hours)

General Overview of the System: System structure, user perspective, O/S services assumption about Hardware The Kernel and buffer cache architecture of Unix O/S, System concepts, Kernel data Structure, System administration, Buffer headers, Structure of the buffer pool, Scenarios for retrieval of the buffer, Reading and writing disk block, Advantage and disadvantage of buffer cache.

UNIT-II (12 Hours)

Internal Representation of Files: INODES, Structure of regular, Directories conversions of a path name to an inode, Super block, Inode assignment to a new file, Allocation of disk blocks.
System Calls for the System: Open read write file and record close, File creation, Operation of special files change directory and change root, change owner and change mode, STAT and FSTAT, PIPES mounting and unmounting files system, Link Unlink.

UNIT-III (12 Hours)

Structures of Processes and process control: Process states and transitions layout of system memory, the context of a process, manipulation of process address space, Sleep process creation/termination. The user Id of a process, changing the size of a process. The SHELL
Interprocess Communication and multiprocessor system: Process tracing system V IPO network communication sockets problem of multiprocessors systems, solution with master and hare process, and solution with semaphores.

UNIT-IV (12 Hours)

Introduction to shell scripts: shell Bourne shell, C shell, Unix commands, permissions, editors, filters sed, grep family, shell variables, scripts, metacharacters and environment, if and case statements, for while and until loops. Shell programming.

UNIT-V (12 Hours)

Awk and perl Programming: Awk pattern scanning and processing language, BEGIN and END patterns, Awk arithmetic and variables, Awk built in variable names and operators, arrays, strings, functions, perl; the chop() function, variable and operators, $_ and $. , Lists, arrays, regular expression and substitution, file handling, subroutines, formatted printing.
Linux:
History & Features of Linux, Linux structure, various flavours of linux.
Books

1. M.J. Bach “Design of UNIX O.S. “, Prentice Hall of India.
2. Y.Kanetkar “Unix shell programming”, BPB Pub.
3. Linux complete, BPB Publications
4. Sumitabha Das “ Unix concepts and Applications

Course Outcomes

1. Describe the architecture and features of UNIX Operating System and distinguish it from other Operating System Understanding.
2. Demonstrate UNIX commands for file handling and process control.
3. Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem.

MCA-303 Cloud Computing

Course Objectives:

1. Basics of cloud computing.
2. Key concepts of virtualization.
3. Different Cloud Computing services.
4. Cloud Implementation, Programming and Mobile cloud computing.
5. Key components of Amazon Web Services
6. Cloud Backup and solutions.

Total-(60 Hours)

UNIT-I (12 Hours)

Introduction to Cloud Computing, Definition, Characteristics, Components, Cloud provider, SAAS, PAAS,IAAS and Others, Organizational scenarios of clouds, Administering & Monitoring cloud services, benefits and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS Cloud computing platforms: Infrastructure as service: Amazon EC2,Platform as Service: Google App Engine, Microsoft Azure, Utility Computing, Elastic Computing.

UNIT-II (12 Hours)

Introduction to Cloud Technologies, Study of Hypervisors Compare SOAP and REST Web services, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization Multitenant software: Multi-entity support, Multi-schema approach, Multitenance using cloud data stores, Data access control for enterprise applications.

UNIT-III (12 Hours)

Data in the cloud: Relational databases, Cloud file systems: GFS and HDFS, Big Table, HBase and Dynamo. Map-Reduce and extensions: Parallel computing, The map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development, Example/Application of Map reduce, Features and comparisons among GFS,HDFS etc, Map-Reduce model.

UNIT-IV (12 Hours)

Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud Cloud computing security architecture: Architectural Considerations- General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures; Identity Management and Access control Identity management, Access control, Autonomic Security Cloud computing security challenges: Virtualization security management virtual threats, VM Security Recommendations, VM-Specific Security techniques, Secure Execution Environments and Communications in cloud.

UNIT-V (12 Hours)

Issues in cloud computing, Implementing real time application over cloud platform Issues in Inter cloud Environments, QOS Issues in Cloud, Dependability, data migration, streaming in Cloud. Quality of Service (QoS) monitoring in a Cloud.

Books

1. Google Apps by Scott Granneman, Pearson
2. Cloud Security & Privacy by Tim Malhar, S.Kumaraswammy, S.Latif(SPD,O'REILLY)
3. Cloud Computing: A Practical Approach, Antohy T Velte, et.al McGraw Hill.

Course Outcomes:

1. Define Cloud Computing and memorize the different Cloud service and deployment models.
2. Describe importance of virtualization along with their technologies.
3. Use and Examine different cloud computing services.
4. Analyze the components of open stack & Google Cloud platform and understand Mobile Cloud Computing.
5. Describe the key components of Amazon web Service 6. Design & develop backup strategies for cloud data based on features.

MCA-304 .Net Framework Technology

Course Objectives:

This course is designed to provide the knowledge of Dot Net Frameworks along with C#.

Total-(60 Hours)

UNIT-I (12 Hours)

Introduction to VB.NET, Event Driven Programming, NET as better Programming Platform NET Framework, NET Architecture, The Just-In-Time Compiler, NET Framework class library introduction VB.NET Development Environment, Creating Applications, Building Projects Using simple components, Running VB.NET applications, Mastering VB Language. Data, Operators, Conditionals and Loops. Procedures, Error Handling, Classes and Objects.

UNIT-II (12 Hours)

Windows Applications in VB .NET. Windows Forms, Text Boxes, Buttons, Labels, Check Boxes, and Radio Buttons. List Boxes, Combo Boxes. Picture Boxes, Scrollbars, Splitters, Timer Menus, Built-in Dialogs, Image List, Tree Views, List Views, Toolbars, Status Bar and Progress bars. Object Oriented Programming in VB .NET, Class and Object, Properties, methods and events. Constructors and Destructors.

UNIT-III (12 Hours)

Method overloading, Inheritance, Access modifiers: Public, Private, Protected, Friend. Overloading and Overriding. Interfaces, Polymorphism.

UNIT-IV (12 Hours)

File handling, File handling using File Stream, Stream Writer, Stream Reader, Binary Reader, Binary Writer classes, File and Directory Classes.

UNIT-V (12 Hours)

Databases in VB .NET, Database: Connections, Data adapters, and datasets, Data Reader, Connection to database with server explorer Multiple Table Connection Data binding with controls like Text Boxes, List Boxes, Data grid etc. Navigating data source ,Data Grid View, Data form wizard, Data validation Connection Objects, Command Objects, Data Adapters, Dataset Class, Working with formula fields, Parameter fields, Group, Special fields, Working with Multiple Tables, SQL in Crystal Report, Report Temples.

Books:

1. Programming Microsoft Visual Basic.NET – Francesco Balena.
2. The Complete Reference -Visual Basic .NET – Jefrey R. Shapiro.
3. Visual Basic .NET 2003 in 21 Days. – Steven Holzner, SAMS Publications.
4. Crystal Report – The Complete Reference.

Course outcomes:

After completion of the course the student will be able to use the features of Dot Net Framework along with the features of C#.

MCA-305 Elective I: EI(a) : Distributed Systems

Course Objectives:
This course provides an introduction to the fundamentals of distributed computer systems.

Total (60 Hours)

UNIT-I (12 Hours)

Introduction to Distributed Systems: Goals of Distributed Systems, Hardware and Software concepts, the client server model, Remote procedure call, remote object invocation, message and stream oriented Communications.

UNIT-II (12 Hours)

Process and synchronization in Distributed Systems: Threads, clients, servers, code migration, clock Synchronization, mutual exclusion, Bully and Ring Algorithm, Distributed transactions.

UNIT-III (12 Hours)

Consistency, Replication, fault tolerance and security: Object replication, Data centric consistency Model, client-centric consistency models, Introduction to fault tolerance, process resilience, recovery, Distributed security architecture, security management, KERBEROS, secure socket layer, cryptography.

UNIT-IV (12 Hours)

Distributed Object Based and File Systems: CORBA, Distributed COM, Goals and Design Issues of Distributed file system, types of distributed file system, sun network file system.

UNIT-V (12 Hours)

Distributed shared memory, DSM servers, shared memory consistency model, distributed document Based systems: the World Wide Web, distributed co-ordination based systems: JINI Implementation: JAVA RMI, OLE, ActiveX, Orbix, Visbrokes, Object oriented programming with SOM.

Books:

1. Andrew S. Tanenbaum, Maarten Van Steen "Distributed Systems Principles and Paradigms" Pearson Education Inc. 2002.
2. Lui "Distributed Computing Principles and Applications".
3. George Coulios, "Distribute System: Design and Concepts", Pearson Education

MCA-305 Elective I: EI(b) : Embedded Systems

Course Objectives:

1. Develop an understanding of the technologies behind the embedded computing systems.
2. To introduce students to the design issues of embedded systems.
3. Enable students to analyze and develop software programs for embedded systems.

Total- (60 Hours)

UNIT-I (12 Hours)

Princeton (Von Neumann) and Harvard Architecture, CISC and RISC architecture, General-purpose processor, microcontroller, Embedded processor, Digital Signal processor, Application specific processor, Super scalar, VLIW, pipelined Architecture. Definition of Embedded System, classification of embedded system, skills required for an Embedded System Designer, Trends in embedded system various examples of an embedded system, Challenges to design embedded system, embedded system development design methodology.

UNIT-II (12 Hours)

Hardware units required to design embedded system like power source, clock oscillator circuit, Real time clock and timer, reset circuit, watchdog timer, memories, interrupts, DAC and ADC, LCD and LED display, PWM, Keypad/keyboard, pulse dialer, modem and transceiver.

UNIT-III (12 Hours)

Embedded Software: Development tools for embedded software, Assemblers, Compilers, Editor, Interpreter, Cross Assembler, Simulator, Emulator, Locator, Linker, Profiler, Coding strategies for obtaining optimized time and space requirements, Debugging Embedded Software, Software in high level language, coding of software in machine language, Software for Device drivers and device management.

UNIT-IV (12 Hours)

Introduction to Real Time Operating System, comparison of RTOS with O.S., Tasks and Task States, Task and Data, Semaphores and Share data, Interrupt, Interrupt handler, Share data problem, Messages, Queue, Mailboxes and pipe. Introduction to U-COS II Real time operating system, main features of UCOS- II.

UNIT-V (12 Hours)

Embedded Communication System: Standard for Embedded Communication, USART, SPI, I2C, CAN, USB, Firewire, Ethernet, Wireless communication like IRDA, Bluetooth, 802.11, PCI Bus, SoC, IP Core, Case Study of Digital camera.

Books:

1. Frank Vahid & Tony Givargis "Embedded System Design" John Wiley &Sons.
2. Dr. Rajkamal "Embedded System" TMH.
3. Mark miller "VoIP" Wiley Dreamtech Publication.

Course Outcomes:

1. Understand hardware and software design requirements of embedded systems.
2. Analyze the embedded systems' specification and develop software programs.
3. Evaluate the requirements of programming Embedded Systems, related software architectures and tool chain for Embedded Systems.

MCA-305 Elective I: EI(c) : Network Security

Course Objectives:

1. To understand basics of Cryptography and Network Security.
2. To be able to secure a message over insecure channel by various means.
3. To learn about how to maintain the Confidentiality, Integrity and Availability of a data.
4. To understand various protocols for network security to protect against the threats in the networks.

Total (60 Hours)

UNIT-I (12 Hours)

Classical Encryption Techniques: Symantec Cipher model, substitution Techniques, transposition Techniques, rotor machines, steganography. Block Ciphers and the Data Encyption standards: Simplified DES, block cipher principles, the data Encryption standard, the strength of DES, differential and linear cryptanalysis, block cipher design principles, block cipher modes of operation. Advanced Encryption Standard: Evaluation Criteria for AES, the AES cipher. Contemporary symmetric ciphers: Triple DES, blowfish. Confidentiality using symmetric encryption: Placement of Encryption function, traffic confidentiality, key Distribution, and random number generation.

UNIT-II (12 Hours)

Public key Encryption and Hash functions: Prime numbers, Fermat's and Euler's Theorems, testing for Primality, the Chinese remainder theorem, discrete logarithms. Public key cryptography and RSA: Principles of Public key cryptosystems, the RSA algorithm. Key Management other public key cryptosystems: Key management, diffie-Hallman keyexchange, elliptic curve arithmetic, and elliptic curve cryptography.

UNIT-III (12 Hours)

Message authentication and Hash function: Authentication Requirements, Authentication functions, message authentication codes, hash functions, security of hash function and MACs. Hash Algorithms: MD5 message digest algorithm, secure Hash algorithm, ripemd-160, HMAC. Digital Signature and Authentication protocols: Digital signatures, Authentication protocols, and digital signature standard. Authentication Applications: Kerberos, X.509 Authentication service.

UNIT-IV (12 Hours)

Electronic Mail Security: Pretty Good privacy, S/MIME.IP Security: IP Security overview, IP security architecture, authentication header, encapsulating security payload, combining security associations, key management. Web Security: Web security considerations, secure sockets layer and transport layer security, secure electronic transaction.

UNIT-V (12 Hours)

Part four system security: Intruders, intrusion detection, and password Management. Malicious software: Viruses and related threats, virus Countermeasures. Firewalls: Firewall Design Principles, Trusted systems.

Books:

1. William Stallings "Cryptography and Network Security", 3 ed, Pearson Education.
2. W. Stallings "Network security Essential "Applications & Standards", Pearson ed.
3. Kanfren "Network Secirity : Private Communications in a public world 2/e
4. Eric Maiwald "Fundamentals of Network Security" Wiley India.

Course Outcomes:

1. Provide security of the data over the network.
2. Do research in the emerging areas of cryptography and network security.
3. Implement various networking protocols.
4. Protect any network from the threats in the world.

MCA-305 Elective I: EI(d) : Network Programming

Total-(60 Hours)

UNIT-I (12 Hours)

Communication protocol, Internet Protocols, Novell, System Network Architecture, UUCP, IPX/SPX for LANS, protocol comparisons.

UNIT-II (12 Hours)

Berkeley sockets Overview, UNIX domain protocols, socket address, socket system call, reserved ports, passing file descriptions, I/O asynchronous and multiplexing, socket implementation.

UNIT-III (12 Hours)

Winsock programming Using windows socket, API window socket and blocking I/O, other window extension, network Dependent UNRI, DLL. Sending and receiving data over connection/termination.

UNIT-IV (12 Hours)

Novell IPX/SPX Novell's windows drivers, netware C interface for windows, IPX/SPX procedure, datagram Communication, connection oriented communication with SPX, IPX/SPX implementation of DLL.

UNIT-V (12 Hours)

Programming Applications Time and data routines, trivial file transfer protocol, remote login.

Books:

1. Davis R, Windows Network Programming, Add Wesley.
2. Steven R, UNIX Network Programming, (Vol I & II) PHI.

MCA-305 Elective I: EI(e) : SIMULATION AND MODELING

Total (60 Hours)

UNIT-I (20 Hours)

Introduction to modeling and simulation: Modeling and simulation methodology, system modeling, concept of simulation, continuous and discrete time simulation.

UNIT-II (20 Hours)

Basic concept of probability and random variables continuous and discrete random variables, Distribution of random variables: discrete and continuous, Compartmental models: linear nonlinear and stochastic models.

UNIT-III (20 Hours)

Introduction to Queuing Theory: Characteristics of queuing system, Poisson's formula, birth- death system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems, computer networks etc.
STELLA, POWERSIM.

Books:

1. Gorden G., System simulation, Prentice Hall.
2. Player T., Introduction to System Dynamics modeling: Identification of problem situation , preparation of causal loop diagrams and flow diagrams, equation writing, level and rate relationship. Simulation of system dynamics models.
3. Verification and validation: Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of Simulation sw - SIMULA, DYNAMO, simulation, McGraw Hill.
4. Seila, Applied Simulation Modeling, Cengage.
5. Spriet, Computer Aided Modeling and Simulation, W.I.A.
6. Sushil, System Dynamics, Wiley Eastern Ltd. 23.
7. Shannon R.E., System simulation, Prentice Hall.

MCA-305 Elective I: EI(f): A WEB TECHNOLOGY AND E-COMMERCE

Course Objectives:

1. Be familiar with web application development software tools and environments currently available on the market.
2. Teach the concepts, principles and methods of web engineering.
3. Build web applications that are scalable, flexible to modify and easy to manage.

Total-(60 Hours)

UNIT-I (12 Hours)

Introduction to building blocks of electronic commerce: Internet and networking. Technologies, IP addressing, ARP, RARP, BOOTP, DHCP, ICMP, DNS, TFTP, TELNET.

UNIT-II (12 Hours)

Static and dynamic web pages, tiers, plug-ins, frames and forms. Exposure to Markup languages, HTML, DHTML, VRML, SGML, XML etc. CGI, Applets & Serve-lets, JSP & JAVA Beans, active X control, ASP cookies creating and reading cookies, semantic web, semantic web service ontology Comparative case study of Microsoft and JAVA technologies, web server scalability, Distributed objects, object request brokers, component technology, Web services, Web application architectures, Browsers, Search engines.

UNIT-3 (12 Hours)

Electronic Commerce and physical Commerce, Different type of e-commerce, e-commerce scenarios, advantages of e-commerce. Business models: Feature of B2B e-commerce, Business models, Integration. E-Services: category of e-services, Web- enabled services, Matchmaking services, information-selling on the web.

UNIT-4 (12 Hours)

Internet payment system: Characteristics of payment system, 4C payments methods, SET Protocol for credit card payment, E-cash, E-check, Micro payment system, Overview of smart card, overview of Mondex E-Governance: E-Governance architecture, Public Private partnership Readiness, Security , Cyber Crime and Law, IT Act.

UNIT-5 (12 Hours)

Advanced technology for E-Commerce: Introduction to mobile.

Books:

1. Web Technologies, Achyut Godbole, Atual Kahate, Tata MCgraw Hill.
2. Web Technologies, Uttam K Roy, Oxford University Press.
3. Web Technologies, Jeffrey C. Jackson, Pearson's.

Course Outcomes:

1. Be able to understand the concepts, principles and methods of Web engineering.
2. Be able to apply the concepts, principles, and methods of Web engineering to Web applications development.
3. Be familiar with current Web technologies.

MCA-305 Elective I: EI(g) :Optimization Techniques

Course Objectives:

1 .To imparts knowledge in concepts and tools of Operations Research.

2. To understand mathematical models used in Operations Research.

3. To apply these techniques constructively to make effective business decisions.

Total-(60 Hours)

UNIT I (12 Hours)

Operation Research: Meaning. Scope of operations research in Computer Science, Methodology of Operations Research, Types of Models, Advantages and Limitations of Models.

UNIT II (12 Hours):

Linear programming: Meaning of linear programming General mathematical formulation of Linear programming, Graphic Analysis, Simplex method, Big M and 2- phase Methods, imitations of linear programming. Assignment problems: Definition, Formulation and Solution of Assignment problems, Route selection.

UNIT III (12 Hours):

Transportation Model: Definition, Formulation, Methods to find initial basic feasible solution. (N-W corner, ROW/ column/ matrix Minima, VAM) Optimization (Model & Stepping stone Method), Time Minimization.

UNIT IV (12 Hours):

Theory of Games: Detention Solution of Games, (Arithmetic Algebraic, Graphical linear programming)

UNIT V (12 Hours):

Replacement Theory: Need, Criteria for replacement, Single unit replacement and Group replacement.

Books:

1. R.Veerachamy, Operation Research, 2010,IK International Publication
2. Chawla, Operation Research, Kalyani Publication Ludhiyana,2009
3. Sharma Anand, Operation Research, 2008, Himalaya Publishing House
4. Kalawati, Operations Research, Vikas Publication Pvt.ltd.2008

Course Outcomes:

1. Solve Linear Programming Problems
2. Solve Transportation and Assignment Problems
3. Understand the usage of game theory and Simulation for Solving Business Problems

MCA-305 Elective I: EI(h) : Computer Graphics

Course Objectives:

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 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.

Total - (60 Hours)

UNIT-I (12 Hours)

What is Graphics, Application of Graphics, Elements of Graphics Workstation, Graphics I/P Devices-Keyboard, Trackball, Joystick, Light Pen, Digitizing Tables, Mouse, Touch Panels, Image Scanners . Graphics Display Devices-Raster Scan System, Random Scan System, Arch Of Vector and Raster Scan Display, Refresh CRT, Gray S Hade.

UNIT-II (12 Hours)

DRAWING GEOMETRY: Point – Plotting, Coordinate System, Point Plotting, Line Drawing –Line Segments, Line Drawing Algo: DDA Algo, Bresenham's Line Algorithm. Circle Drawing Polygon Representation Ellipse, Rectangle, Filling – Filled Area Primitives, Scan Line Polygon Fill Algo, Flood Fill Algo, Boundary Fill Algorithm

UNIT-III (12 Hours)

2D Geometric Transformation : Translation, Rotation, Scaling, Geometric Transformation, Coordinate Transform and Composite Transformation, 2D Viewing Transformation & Clipping : World Coordinate System (WCS), Normalized Device Coordinate System , Windows Viewing View Ports Viewing, Point Clipping, Line Segment Clipping, Coahen – Sutherland, Line Clipping, Polygon Clipping.

UNIT-IV (12 Hours)

3D Geometric Transformation 3D Geometric Transformation: Translation, Rotation, Scaling, Coordinate Transform Geometric Transformation Composite Transformation, 3D Display Methods – Parallel Projection, Perspective Projection 3D Viewing & Clipping.

UNIT-V (12 Hours)

Segment, Segment Table, Segment Creation, Deletion, Closing, Renaming, Curve Generation , B – Spline Curves, Bezier Curves, Hidden Surface, Z – Buffer Algorithm, Scan Line Algorithm, Painters Algorithm, Depth Comparisons.

Books:

1. Computer Graphics,2nd Ed.,Hearn & Baker,PHI
2. Porcedural & Mathematical Elements in Computer Graphics, Rogers,TMH
3. Computer Graphics,Plastock, Schaum Outline Series, TMH
4. Engineering Graphics,K.Venugopal,New Age International
5. Computer Graphics, EXCEL BOOKS
6. Introduction to Computer Graphics, A.Mukherjee, VIKAS