

## MCA Syllabus Fourth Semester

### MANAGEMENT INFORMATION SYSTEM MCA 401

#### **Unit 1 :**

**Foundation of Information Systems :---** Introduction to information system in business, fundamentals of information systems, Solving business problems with information systems, Types of information systems, Effectiveness and efficiency criteria in information system.

#### **Unit 2 :**

**An overview of Management Information Systems :---** Definition of a management information system, MIS versus Data processing, MIS & Decision Support Systems, MIS & Information Resources Management, End user computing, Concept of an MIS, Structure of a Management information system.

#### **Unit 3 :**

**Concepts of planning & control :---** Concept of organizational planning, The Planning Process, Computational support for planning, Characteristics of control process, The nature of control in an organization.

#### **Unit 4:**

**Business applications of information technology :---** Internet & electronic commerce, Intranet, Extranet & Enterprise Solutions, Information System for Business Operations, Information System for Managerial Decision Support, Information System for Strategic Advantage.

#### **Unit 5:**

**Managing Information Technology :---** Enterprise & global management, Security & Ethical challenges, Planning & Implementing changes. Advanced Concepts in Information Systems: Enterprise Resource Planning, Supply Chain Management, Customer Relationship Management, and Procurement Management.

#### **Reference**

1. O Brian, "Management Information System", TMH
2. Gordon B. Davis & Margrethe H. Olson, "Management Information System", TMH.
3. Murdick, "Information System for Modern Management", PHI.
4. Jawadekar, " Management Information System", TMH.
5. Jain Sarika, "Information System", PPM
6. Davis, "Information System", Palgrave Macmillan

# **MODELING AND SIMULATION**

## **MCA 402**

### **Unit-I**

System definition and components, stochastic activities, continuous and discrete Systems, System modeling, types of models, static and dynamic physical models, Static and dynamic mathematical models, Full corporate model, types of system study.

### **Unit-II**

System simulation, Why to simulate and when to simulate, Basic nature of simulation, technique of simulation, comparison of simulation and analytical methods, types of system simulation, real time simulation, hybrid simulation, simulation of pure-pursuit problem single-server queuing system and an inventory problem, Monte Carlo simulation, Distributed Lag models, Cobweb model.

### **Unit-III**

Simulation of continuous systems, analog vs. digital simulation, simulation of water reservoir system, simulation of a servo system, simulation of an autopilot Discrete system Simulation, Fixed time-step vs. event-to-event model, generation of random numbers, Test for randomness, Generalization of non-uniformly distributed random numbers, Monte-Carlo computation vs. stochastic simulation.

**Unit-IV** System dynamics, exponential growth models, exponential decay models, modified exponential growth models, logistic curves, generalization of growth models, System Dynamics diagrams, Feedback in Socio-Economic systems, world model.

### **Unit-V**

Simulation of PERT networks, Critical path computation, uncertainties in Activity duration, Resource allocation and consideration. Simulation software, Simulation languages, continuous and discrete simulation languages, Expression based languages, object-oriented simulation, general-purpose vs. application-oriented simulation packages, CSMP-III, MODSIM-III.

### **References**

1. Geoffrey Gordon, "System Simulation", PHI
2. Narsingh Deo, "System Simulation with digital computer", PHI
3. Averill M. Law, W. David Kelton, "Simulation Modeling and Analysis", TMH

# **INTERNET & JAVA PROGRAMMING**

## **MCA 403**

## **Unit-1**

**Internet :---** Internet, Connecting to Internet: Telephone, Cable, Satellite connection, Choosing an ISP, Introduction to Internet services, E-Mail concepts, Sending and Receiving secure E-Mail, Voice and Video Conferencing.

## **Unit- II**

**Core Java :---** Introduction, Operator, Data type, Variable, Arrays, Control Statements, Methods & Classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Networking, Event handling, Introduction to AWT, AWT controls, Layout managers, Menus, Images, Graphics.

## **Unit-III**

**Java Swing :---** Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box, Progress Bar, Menus and Toolbars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes, Inner frame. **JDBC: The connectivity Model, JDBC/ODBC Bridge, java.sql package, connectivity to remote database, navigating through multiple rows retrieved from a database.**

## **Unit-IV**

**Java Beans :---** Application Builder tools, The bean developer kit(BDK), JAR files, Introspection, Developing a simple bean, using Bound properties, The Java Beans API, Session Beans, Entity Beans, Introduction to Enterprise Java beans (EJB), Introduction to RMI (Remote Method Invocation): A simple client-server application using RMI.

## **Unit-V**

**Java Servlets :---** Servlet basics, Servlet API basic, Life cycle of a Servlet, Running Servlet, Debugging Servlets, Thread-safe Servlets, HTTP Redirects, Cookies, Introduction to Java Server pages (JSP).

## **References:**

1. Margaret Levine Young, "The Complete Reference Internet", TMH
2. Naughton, Schildt, "The Complete Reference JAVA2", TMH
3. Balagurusamy E, "Programming in JAVA", TMH
4. Dustin R. Callway, "Inside Servlets", Addison Wesley
5. Mark Wutica, "Java Enterprise Edition", QUE
6. Steven Holzner, "Java2 Black book", dreamtech

MCA-404 Any One of the following

[Compiler Design\(1\)](#) / [Cryptography And Network Security\(2\)](#) / [Data Comparision\(3\)](#) / [Client Server\(4\)](#)

## **COMPILER DESIGN**

### **MCA 404/(1)**

#### **Unit-1**

**Compiler Structure** :--- Compilers and Translators, Various Phases of Compiler, Pass Structure of Compiler, Bootstrapping of Compiler Programming Languages: High level languages, The lexical and syntactic structure of a language, Data elements, Data Structure, Operations, Assignments, Program unit, Data Environments, Parameter Transmission. Lexical Analysis: The role of Lexical Analyzer, A simple approach to the design of Lexical Analyzer, Regular Expressions , Transition Diagrams, Finite state Machines, Implementation of Lexical Analyzer, Lexical Analyzer Generator: LEX, Capabilities of Lexical Analyzer

#### **Unit-II**

**The Syntactic Specification of Programming Languages** :--- CFG, Derivation and Parse tree, Ambiguity, Capabilities of CFG. Basic Parsing Techniques: Top-Down parsers with backtracking, Recursive Descent Parsers, Predictive Parsers, Bottom-up Parsers, Shift-Reduce Parsing, Operator Precedence Parsers, LR parsers (SLR, Canonical LR, LALR) Syntax Analyzer Generator: YACC

#### **Unit-III**

**Intermediate Code Generation** :--- Different Intermediate forms: three address code, Quadruples & Triples. Syntax Directed translation mechanism and attributed definition. Translation of Declaration, Assignment, Control flow, Boolean expression, Array References in arithmetic expressions, procedure calls, case statements, postfix translation.

#### **Unit-IV**

**Run Time Memory Management** :--- Static and Dynamic storage allocation, stack based memory allocation schemes, Symbol Table management Error Detection and Recovery: Lexical phase errors, Syntactic phase errors, Semantic errors.

#### **Unit-V**

**Code Optimization and Code Generation** :--- Local optimization, Loop optimization, Peephole optimization, Basic blocks and flow graphs, DAG, Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection

#### **References:**

1. Alfred V Aho , Jeffrey D. Ullman, “Principles of Compiler Design”, Narosa
2. A.V. Aho, R. Sethi and J.D Ullman, “Compiler: principle, Techniques and Tools”, AW

3. H.C. Holub “Compiler Design in C”, Prentice Hall Inc.
4. Apple, “Modern Computer Implementation in C: Basic Design”, Cambridge press

## **CRYPTOGRAPHY AND NETWORK SECURITY**

### **MCA 404/(2)**

#### **Unit-I**

**Introduction to Cryptography** :--- Introduction To Security: Attacks, Services & Mechanisms, Security, Attacks, Security Services. Conventional Encryption: Classical Techniques, Conventional Encryption Model, And Steganography, Classical Encryption Techniques. Modern Techniques: Simplified DES, Block Cipher Principles, DES Standard, DES Strength, Differential & Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes Of Operation.

#### **Unit-II**

**Conventional Encryption Algorithms** :--- Triples DES, Blowfish, International Data Encryption Algorithm, RCS, CAST-128, RC2 Placement & Encryption Function, Key Distribution, Random Number Generation, Placement Of Encryption Function.

#### **Unit-III**

**Public Key Encryption** :--- Public-Key Cryptography: Principles Of Public-Key Cryptosystems, RSA Algorithm, Key Management, Fermat's & Euler's Theorem, Primality, The Chinese Remainder Theorem.

#### **Unit-IV**

**Hash Functions** :--- Message Authentication & Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Birthday Attacks, Security Of Hash Function & MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA), Digital Signatures: Digital Signatures, Authentication Protocol, Digital Signature Standard (DSS), Proof Of Digital Signature Algorithm.

#### **Unit-V**

**Network & System Security** :--- Authentication Applications: Kerberos X.509, Directory Authentication Service, Electronic Mail Security, Pretty Good Privacy (PGP), S / Mime, Security: Architecture, Authentication Header, Encapsulating Security Payloads, Combining Security Associations, Key Management, Web Security: Secure Socket Layer & Transport Layer Security, Secure Electronic Transaction (Set), System Security: Intruders, Viruses, Firewall Design Principles, Trusted Systems.

#### **Text Book:**

1. William Stallings, “Cryptography and Network Security: Principles and Practice”, Prentice Hall, New Jersey.

**Reference Books:**

1. Johannes A. Buchmann, "Introduction to cryptography", Springer- Verlag.
2. Atul Kahate, "Cryptography and Network Security", TMH

## **DATA COMPRESSION**

### **MCA 404/(3)**

**Unit-I**

**Introduction** :--- Compression Techniques: Loss less compression, Lossy compression, Measures of performance, Modeling and coding. Mathematical Preliminaries for Lossless compression: A brief introduction to information theory: -Models: -Physical models, Probability models, Markov models, composite source model, Coding? -Uniquely decodable codes, Prefix codes.

**Unit-II**

**Huffman coding** :--- The Huffman coding algorithm, minimum variance Huffman codes, length of Huffman codes, extended Huffman codes, non binary Huffman codes, Adaptive Huffman codes: Update procedure, Encoding procedure, decoding procedure, Golomb codes, Rice codes, Tunstall codes, Applications: loss less image compression, Text compression and Audio compression.

**Unit-III**

**Arithmetic coding** :--- Coding a sequence, generating a binary code, Comparison of Huffman and Arithmetic coding, Application :--- Bi –level image compression -The JBIG standard, JBIG2 Image compression, Dictionary Techniques :-Introduction, Static Dictionary: Diagram Coding, Adaptive dictionary: The LZ77 Approach, The LZ78 approach, Applications: File Compression-UNIX compress, Image compression: - The Graphics interchange Format (GIF), Predictive Coding: -Prediction with partial match (PPM): The basic algorithms, The ESCAPE SYMBOL, length of context, The Exclusion Principle, The Burrows-Wheeler Transform: Move-to-front coding, CALIC, JPEG-LS, Multiresolution Approaches, facsimile Encoding, Dynamic Markov Compression.

**Unit-IV**

**Mathematical Preliminaries for Lossy Coding** :--- -Distortion criteria, Models. Scalar Quantization, the Quantization problem, Uniform Quantization, adaptive Quantization, Non uniform Quantization.

**Unit-V**

**Vector Quantization** :--- Advantages of Vector Quantization over Scalar Quantization, The linde-Buzo-Gray algorithm, Tree structured Vector quantizers, Structured Vector Quantizers.

**Text Book:**

1. Khalid Sayood, "Introduction to Data Compression", Morgan Kaufmann Publications.

**Reference Book:**

1. Ralf Steinmetz and/ Klara Nahrstedt, "Multimedia Computing and communication and applications", Prentice Hall

## Client Server Computing MCA 404(4)

### **Unit I**

**Client/Server Computing :---** DBMS concept and architecture, Single system image, Client Server architecture, mainframe-centric client server computing, downsizing and client server computing, preserving mainframe applications investment through porting, client server development tools, advantages of client server computing.

### **Unit II**

**Components of Client/Server application :---** The client: services, request for services, RPC, windows services, fax, print services, remote boot services, other remote services, Utility Services & Other Services, Dynamic Data Exchange (DDE), Object Linking and Embedding (OLE), Common Object Request Broker Architecture (CORBA). The server: Detailed server functionality, the network operating system, available platforms, the network operating system, available platform, the server operating system.

### **Unit III**

**Client/Server Network :---** connectivity, communication interface technology, Interposes communication, wide area network technologies, network topologies (Token Ring, Ethernet, FDDI, CDDI) network management, Client-server system development: Software, Client-Server System Hardware: Network Acquisition, PC-level processing unit, Macintosh, notebooks, pen, UNIX workstation, x-terminals, server hardware.

### **Unit IV**

**Data Storage :---** magnetic disk, magnetic tape, CD-ROM, WORM, Optical disk, mirrored disk, fault tolerance, RAID, RAID-Disk network interface cards. Network protection devices, Power Protection Devices, UPS, Surge protectors. Client Server Systems Development: Services and Support, system administration, Availability, Reliability, Serviceability, Software Distribution, Performance, Network management, Help Desk, Remote Systems Management Security, LAN and Network Management issues.

### **Unit V**

**Client/Server System Development :---** Training, Training advantages of GUI Application, System Administrator training, Database Administrator training, End-user training. The future of client server Computing Enabling Technologies, The

transformational system.

**References:**

1. Patrick Smith & Steave Guengerich, "Client / Server Computing", PHI
2. Dawna Travis Dewire, "Client/Server Computing", TMH
3. Majumdar & Bhattacharya, "Database management System", TMH
4. Korth, Silberchatz, Sudarshan, "Database Concepts", McGraw Hill
5. Elmasri, Navathe, S.B, "Fundamentals of Data Base System", Addison Wesley

# **FOUNDATION OF E-COMMERCE**

## **MCA 405**

**Unit 1**

Introduction: Electronic Commerce - Technology and Prospects, Definition of E-Commerce, Economic potential of electronic commerce, Incentives for engaging in electronic commerce, forces behind E-Commerce, Advantages and Disadvantages, Architectural framework, Impact of E-commerce on business. Network Infrastructure for E- Commerce: Internet and Intranet based E-commerce- Issues, problems and prospects, Network Infrastructure, Network Access Equipments, Broadband telecommunication (ATM, ISDN, FRAME RELAY).

**Unit II**

Mobile Commerce: Introduction, Wireless Application Protocol, WAP technology, Mobile Information device, Mobile Computing Applications.

Unit III Web Security: Security Issues on web, Importance of Firewall, components of Firewall, Transaction security, Emerging client server, Security Threats, Network Security, Factors to consider in Firewall design, Limitation of Firewalls.

**Unit IV**

Encryption: Encryption techniques, Symmetric Encryption- Keys and data encryption standard, Triple encryption, Asymmetric encryption- Secret key encryption, public and private pair key encryption, Digital Signatures, Virtual Private Network.

Unit V Electronic Payments: Overview, The SET protocol, Payment Gateway, certificate, digital Tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online Banking. EDI Application in business, E- Commerce Law, Forms of Agreement, Govt. policies and Agenda.

**References**

1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", Addison Wesley.

2. Bajaj and Nag, "E-Commerce the cutting edge of Business", TMH
3. P. Loshin, John Vacca, "Electronic commerce", Firewall Media, New Delhi

# **COMPUTER GRAPHICS AND ANIMATION MCA 406**

## Unit I

Graphics Primitives: Display Devices: Refresh Cathode Ray Tube, Raster Scan Display, Plasma display, Liquid Crystal display, Plotters, Printers. Input Devices: Keyboard, Trackball, Joystick, Mouse, Light Pen, Tablet, and Digitizing Camera. Input Techniques: Positioning techniques, Positioning Constraints, Scales & Guidelines, Rubber-Band techniques, Dragging, Dimensioning techniques and Graphical Potentiometers, Pointing and Selection: the use of selection points, defining a boundary rectangle, multiple selections, Menu selection.

## Unit II

Mathematics for Computer Graphics: Point representation, Vector representation, Matrices and operations related to matrices, Vector addition and vector multiplication, Scalar product of two vectors, Vector product of two vectors. Line Drawing Algorithms: DDA algorithms, Bresenham's Line algorithm. Segment & Display files: Segments, Functions for segmenting the display file, Posting and unposting a segment, segment naming schemes, Default error conditions, Appending to segments, Refresh concurrent with reconstruction, Free storage allocation, Display file Structure. Graphics Operations: Clipping: Point Clipping, Line Clipping. Polygon Clipping. Filling: Inside Tests, Flood fill algorithm, Boundary-Fill Algorithm and scan-line polygon fill algorithm.

## Unit III

Conics, Curves and Surfaces: Quadric surfaces: Sphere, Ellipsoid, and Torus. Superquadrics: Superellipse, superellipsoid. Spline & Bezier Representations: Interpolation and approximation splines, parametric continuity conditions, Geometric Continuity Conditions, Spline specifications. Bezier curves and surfaces.

## Unit IV

Transformation: 2D transformation, Basic Transformations, Composite transformations: Reflection, Shearing, Transformation between coordinate systems. 3 D Graphics: 3 D Display Methods, 3 D modeling, 3 D transformations, Parallel projection, Perspective projection, Visible lines and surfaces identification, Hidden surface removal

Unit V Animation : Introduction to Animation, Principles of Animation, Types of Animation, Types of Animation Systems : Scripting, Procedural, Representational, Stochastic, etc. Animation Tools : Hardware –SGI, PC's, Amiga etc. Software : Adobe

Photoshop, Animation studio, Wave front etc. Gif Animator : Microsoft GIF Animation, GIF Construction, GIFmation etc. GKS: GKS Standards, GKS Primitives – Polyline, Polymarker, and Fill area, Text, GKS Workstation and Metafiles.

References:

1. Donald Hearn and M. Pauline Baker, “Computer Graphics”, PHI
2. Steven Harrington, “Computer Graphics: A Programming Approach”, TMH
3. Prajapati A. K, “Computer Graphics”, PPM Ed 2
4. Foley James D, ”Computer Graphics”, AW Ed 2
5. Newman and Sproul, “Principle of to Interactive Computer Graphics”, McGraw Hill
6. Rogers, “Procedural Elements of Computer Graphics”, McGraw Hill
7. Rogers and Adams, “Mathematical Elements of Computer Graphics”, McGraw Hill