

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA
(University of Technology of Madhya Pradesh)

Air Port Bypass Road
Gandhi Nagar, Bhopal-462 036

COURSE OF STUDY AND SCHEME OF EXAMINATION
MASTER OF COMPUTER APPLICATIONS (MCA)

W.E.F. 2005-2006

MCA THIRD SEMESTER

Course No.	Course Name	L (Hrs)	T (Hrs)	P (Hrs)	Theory Marks		Sessional Marks		Practical Marks		Total Marks
					Max	Min	Max	Min	Max	Min	
MCA-301	Computer Oriented Optimization Techniques	3	1	-	100	40	50	30	-	-	150
MCA-302	Software Engineering Methodologies	3	1	-	100	40	50	30	-	-	150
MCA-303	Object Oriented Methodology & C++	3	1	4	100	40	50	30	50	25	200
MCA-304	Theory of Computation	3	1	-	100	40	50	30	-	-	150
MCA-305	Computer Networks	3	1	-	100	40	50	30	-	-	150
MCA-306	Programming Laboratory any two tools from VB, VC++, D2K etc.	-	-	6	-	-	100	60	100	50	200
	Total	15	5	10	500		350		150		1000

MCA-301

Computer Oriented Optimization Techniques

UNIT-I

Introduction of operation research. LP Formulations, Graphical method for solving LP's with 2 variables, Simplex method, Duality theory in linear programming and applications, Integer linear programming, dual simplex method,

UNIT-II

Transportation problem, Assignment problem.

Dynamic Programming : Basic Concepts, Bellman's optimality principles, Dynamics programming approach in decision making problems, optimal subdivision problem.

Sequencing Models: Sequencing problem, Johnson's Algorithm for processing n jobs through 2 machines, Algorithm for processing n jobs through 3 or more machines, Processing 2 jobs through n machines.

UNIT-III

Project Management : PERT and CPM : Project management origin and use of PERT, origin and use of CPM, Applications of PERT and CPM, Project Network, Diagram representation, Critical path calculation by network analysis and critical path method (CPM), Determination of floats, Construction of time chart and resource labelling, Project cost curve and crashing in project management, Project Evaluation and review Technique (PERT).

UNIT-IV

Queuing Models : Essential features of queuing systems, operating characteristics of queuing system, probability distribution in queuing systems, classification of queuing models, solution of queuing M/M/1 : ∞ /FCFS, M/M/1 : N/FCFS, M/M/S : ∞ /FCFS, M/M/S : N/FCFS

UNIT-V

Inventory Models : Introduction to the inventory problem, Deterministic Models, The classical EOQ (Economic Order Quantity) model, Inventory models with deterministic demands (no shortage & shortage allowed), Inventory models with probabilistic demand, multiitem deterministic models.

BOOKS

1. Gillet B.E. : Introduction to Operation Research, Computer Oriented Algorithmic approach - Tata McGraw Hill Publishing Co. Ltd. New Delhi.
2. P.K. Gupta & D.S. Hira, "Operations Research", S.Chand & Co.
3. J.K. Sharma, "Operations Research: Theory and Applications", Mac Millan.
4. S.D. Sharma, "Operations Research", Kedar Nath Ram Nath, Meerut (UP).
5. S.S. Rao "Optimization Theory and Application", Wesley Eastern.
6. Tata Hamdy, A "Operations Research - An Introduction", Fifth Edition, Prentice Hall of India Pvt. Ltd., New Delhi.
7. Taha H.A. "Operations Research an Introduction" McMillan Publication.

Note : Paper is to be set unit wise with internal choice & emphasis is to be given on computerized implementation.

MCA-302

Software Engineering Methodologies

UNIT -I

System concepts and Information system environment:

The system concept, characteristics of system, elements of system, The System Development Life Cycle, The Role of System Analyst. Introduction system planning & initial investigation, various information gathering tools feasibility study conretions & structures tools of system analysis, various methods of process design, form design methodologies, introduction to information system testing, quality assurance security & diastruct computer various (deleting recovery)

UNIT -II

Software Process, Product and Project:

The Product : Software, Software Myths, The process : Software Engineering : A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Software Process Models, Component – Based Development, Fourth Generation Techniques, Software process and Project Metrics : Software measurement.

UNIT-III

Software Project Planning and Design:

Software Project Planning : Project planning objectives, Decomposition Techniques, Empirical estimation models, The Make/Buy Decision., Risk analysis.

Software Design: Design Principles, Cohesion & Coupling, Design notation and specification, structure design methodology.

UNIT-IV

Software Quality Assurance and Testing:

Software Quality Assurance : Quality Concepts, The Quality Movement, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Statistical Software Quality Assurance, Software Reliability, Mistake Proofing for Software, Introduction to ISO standard.

Testing Strategies: A strategic approach of software testing strategic issues, unit testing, integration testing, validation testing, system testing, the art of debugging. OOA, OOD.

UNIT-V

Advanced Topics:

MIS & DSS: Introduction to MIS, long range planning, development and implementation of an MIS, applications of MIS in manufacturing sector and in service sector.

Decision Support System concepts, types of DSS.

Object Oriented Software Engineering: Object Oriented Concepts, Identifying the Elements of an Object Model, Management of Object Oriented Software Projects.

CASE tools, Re-engineering

BOOKS

1. R. S. Pressman, "Software Engineering – A practitioner's approach", 6th ed., McGraw Hill Int. Ed., 2002.
2. Pankaj Jalote "Software Engg" Narosa Publications.
3. Ian Sommerville : Software Engineering 6/e (Addison-Wesley)
4. Richard Fairley : Software Engineering Concepts (TMH)
5. Elis Awad, "System Analysis & Design", Galgotia publications
6. W.S. Jawadekar: Management Information Systems, TMH Publication, India
7. Hoffer "Modern System Analysis & Design" 3e, Pearson Edition

Note : Paper is to be set unit wise with internal choice.

MCA-303

Object Oriented Methodology & C++

UNIT-I

C++ basics, loops and decisions, structures and functions, object and classes, object arrays, constructor and destructor functions.

UNIT-II

Operator and function overloading, pointers, pointers to base and derived classes inheritance, public and private inheritance, multiple inheritance.

UNIT-III

Polymorphism, virtual functions, abstract base classes and pure virtual function, friend function, early and late binding.

UNIT-IV

C++ I/O system, formatted I/O, creating insertors and extractors, file I/O basis, creating disk files and file manipulations using seekg(), seekp(), tellg() and tellp() functions, exception handling: try, catch and throw.

UNIT-V

UML concepts, object-oriented paradigm and visual modeling, UML diagrams, UML specifications, object model, object oriented design, identifying classes and object, object diagrams.

BOOKS

1. Lafore R. "Object Oriented Programming in C++", Galgotia Pub.
2. Lee "UML & C++ a practical guide to Object Oriented Development 2 ed, Pearson.
3. Schildt "C++ the complete reference 4ed, 2003.
4. Hans Erit Eriksson "UML 2 toolkit" Wiley.
5. Balagurusawmy "Object Orienter Programming with C++".
6. B.G., Boach "Object Oriented Analysis & Design with Applications", Addison Wesley.

7. S. Parate "C++ Programming", BPB.
8. Boggs "Mastering UML" BPB Publications.

Note : Paper is to be set unit wise with internal choice.

MCA-304

Theory of Computation

UNIT-I

Review of Mathematical Preliminaries : Set, Relations and functions, Graphs and trees, string, alphabets and languages. Principle of induction, predicates and propositional calculus.

Theory of Automata : Definition, description, DFA,NFA, Transition systems,2DFA, equivalence of DFA & NDFA, Regular expressions, regular grammar, FSM with output (mealy and moore models), Minimisation of finite automata.

UNIT-II

Formal Languages : Definition & description, Parse structured grammars & their classification, Chomsky classification of languages, closure properties of families of language, regular grammar, regular set & their closure properties, finite automata, equivalence of FA and regular expression, equivalence of two way finite automata, equivalence of regular expressions.

UNIT -III

Context-Free grammar & PDA : Properties unrestricted grammar & their equivalence, derivation tree simplifying CFG, unambiguifying CFG, ϵ -productions, normal form for CFG, Pushdown automata, 2 way PDA, relation of PDA with CFG, Determinism & Non determinism in PDA & related theorems, parsing and pushdown automata.

UNIT-IV

Turing Machine : Model, design, representation of TM, language accepted by TM, universal turing machine, determine & non-determinism in TM, TM as acceptor/generator/algorithms, multidimensional, multitacks, multitape, Two way infinite tape, multihead, Halting problems of TM.

UNIT-V

Computability : Concepts, Introduction to complexity theory, Introduction to undecidability, recursively enumerable sets, primitive recursive functions, recursive set, partial recursive sets, concepts of linear bounded Automata, context sensitive grammars & their equivalence.

BOOKS

1. Hopcroft & Ullman "Introduction to Automata theory, languages & Computation" , Narosha Publishing house.
2. Lewis Papadimitrou "Theory of Computation" , Prentice Hall of India, New Delhi.
3. Peter linz, "An Introduction to formal language and automata", Third edition, Narosa publication.
4. Marvin L. Minsky "Computation : Finite & Infinite Machines", PHI.
5. Mishra & Chander Shekhar "Theory of Computer Science (Automata, Language & Computations), PHI.

Note : Paper is to be set unit wise with internal choice.

MCA-305

Computer Networks

UNIT-I

Introduction: Computer Network, Layered Network Architecture-Review of ISO-OSI Model., Transmission Fundamentals-, Communication Media-Conductive Metal (Wired Cable), Optical Fiber links, Wireless Communication-Radio links, Setellite Links, Communication Services & Devices, Telephone System., Integrated Service Digital Network (ISDN)., Cellular Phone., ATM, Modulation & Demodulation-, Digital to Analog Conversion-Frequency Modulation (FM), Amplitude, Modulation (AM), Phase Modulation (PM)., Analog to Digital Conversion-Pulse Amplitude Modulation(PAM), Pulse Code Modulation (PCM), Differential Pulse Code Modulation, (DPCM)., Modem & Modem Types., Multiplexing-, Frequency Division Multiplexing (FDM)., Time Division Multiplexing (TDM), Statistical Time Division Multiplexing (STDM)., Contention Protocol-, Stop-Go-Access Protocol, Aloha Protocol- Pure aloha & Slotted aloha, Carrier sense multiple access with collision detection (CSMA/CD)

UNIT-II

Data Security and Integrity: Parity Checking Code, Cyclic redundancy checks (CRC), Hemming Code, Protocol Concepts –, Basic flow control, Sliding window protocol-Go-Back-N protocol and selective repeat protocol, Protocol correctness- Finite state machine

UNIT-III

Local Area Network: Ethernet : 802.3 IEEE standard, Token Ring : 802.5 IEEE standard, Token Bus : 802.4 IEEE standard, FDDI Protocol, DQDB Protocol, 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, Routing Tables, Types of routing, Dijkstra's Algorithm, Bellman-Ford Algorithm, Link state routing, Open shortest path first, Flooding, Broadcasting, Multicasting, Congestion & Dead Lock, Internet Protocols, Overview of TCP/IP, Transport protocols, Elements of Transport Protocol, Transmission control protocol (TCP), User data-gram protocol (UDP).

UNIT-V

Network Security, Virtual Terminal Protocol, Overview of DNS, SNMP, email, WWW, Multimedia.

BOOKS

1. A.S.Tanenbaum, "Computer Network", 4th addition, 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", 2nd Ed. ,PHI.
7. G.E. Keiser , "Local Area Networks ", McGraw Hill, International Ed.

Note : Paper is to be set unit wise with internal choice.

MCA FOURTH SEMESTER

Course No.	Course Name	L (Hrs)	T (Hrs)	P (Hrs)	Theory Marks		Sessional Marks		Practical Marks		Total Marks
					Max	Min	Max	Min	Max	Min	
MCA-401	Artificial Intelligence & Applications	3	1	-	100	40	50	30	-	-	150
MCA-402	Mobile Communication	3	1	-	100	40	50	30	-	-	150
MCA-403	Computer Graphics & Multimedia	3	1	4	100	40	50	30	50	25	200
MCA-404	Design and Analysis of Algorithms	3	1	-	100	40	50	30	-	-	150
MCA-405	Elective I(E1)	3	1	-	100	40	50	30	-	-	150
MCA-406	Minor Project-I (Based on client server technology)	-	-	6	-	-	100	60	100	50	200
	Total	15	5	10	500		350		150		1000

Elective-I

- E-I(a) : Managerial Economics
- E-I(b) : JAVA Programming & Technologies
- E-I(c) : Compiler Design
- E-I(d) : Microprocessors & Interface
- E-I(e) : Advanced Data Base Management System

MCA-401

Artificial Intelligence & Applications

UNIT-I

General Issues and Overview of AI

The AI problems, what is an AI technique, Characteristics of AI applications. Introduction to LISP programming: Syntax and numeric functions, Basic list manipulation functions, predicates and conditionals, input output and local variables, iteration and recursion, property lists and arrays.

UNIT-II

Problem Solving, Search and Control Strategies

General problem solving, production systems, control strategies forward and backward chaining, exhaustive searches depth first breadth first search.

Heuristic Search Techniques

Hill climbing, branch and bound technique, best first search & A* algorithm, AND / OR graphs, problem reduction & AO* algorithm, constraint satisfaction problems.

UNIT-III

Knowledge Representations

First order predicate calculus, skolemization, resolution principle & unification, inference mechanisms, horn's clauses, semantic networks, frame systems and value inheritance, scripts, conceptual dependency.

UNIT-IV

Natural Language processing

Parsing techniques, context free grammar, recursive transitions nets (RNT), augmented transition nets (ATN), case and logic grammars, syntactic analysis.

Game playing

Minimax search procedure, alpha-beta cutoffs, additional refinements.

Planning

Overview an example domain the block word, component of planning systems, goal stack planning, non linear planning.

UNIT-V

Probabilistic Reasoning and Uncertainty

Probability theory, bayes theorem and bayesian networks, certainty factor.

Expert Systems

Introduction to expert system and application of expert systems, various expert system shells, vidwan frame work, knowledge acquisition, case studies, MYCIN.

Learning

Rote learning, learning by induction, explanation based learning.

BOOKS

1. Elaine Rich and Kevin Knight “Artificial Intelligence” - Tata McGraw Hill.
2. “Artificial Intelligence” 4 ed. Pearson.
3. Dan W. Patterson “Introduction to Artificial Intelligence and Expert Systems”, Prentice India.
4. Nils J. Nilson “Principles of Artificial Intelligence”, Narosa Publishing House.
5. Clocksin & C.S.Melish “Programming in PROLOG”, Narosa Publishing House.
6. M.Sasikumar,S.Ramani etc. “Rule based Expert System”, Narosa Publishing House.

Note : Paper is to be set unit wise with internal choice.

MCA-402

Mobile Communications

UNIT- I

Overview of OSI Model : Significance of layered Model , PDUs, SDUs,IDUs, Higher layer Protocols. Switching and Components. Introduction, Applications, history, of wired & wireless Communication systems. Radio Transmission: frequencies ,signal propogation, antenna , types of modulation, FHSS, DSSS. Multiple Access technology for Wireless Communication : FDMA,TDMA,CDMA
Cellular System: Introduction, types.

UNIT-II

Mobile Data Communication: Cellular Telephony, Structure, Fading, Small scale fading, Multi-path Fading, Speech Coding, Error Coding and Correction, Hand off Management, Switching and authentication, MTSO interconnections, frequency hopping, frequency reuse. Circuit Switched Data Services & Packet Switched Data Services on Cellular Networks, Personal Communication Systems (PCS) Architecture, Digital Enhanced Cordless Telecommunications (DECT,) Personal Access Comm. System (PACS).

UNIT-III

Digital Cellular Systems and Standards: GSM System overview, Architecture, GSM Protocol Model, GSM Mobility Management, SMS security aspects. Broadcast System overview. General Packet Service (GRPS) Architecture, GRPS Network, Interfaces and Procedures (2.5 G), 3G Mobile Services: UMTS and International Mobile Telecommunications (IMT-2000), W-C DMA and CDMA 2000,Quality of service in 3G .

UNIT- IV

WLAN : Components and working of Wireless LAN, Transmission Media for WLAN, Infrastructure & types of WLAN, IEEE 802.11 Standards , Protocols for WLAN ,MACA,MACAW, Infrared technology. Wireless Application Protocol (WAP) model, architecture, Gateway, WAP protocols and WML

UNIT-V

Introduction to Bluetooth technology. Wireless in Local Loop (WLL) architecture, products. Satellite as a switch, Components of VSAT system, VSAT topologies, access schemes.

BOOKS

1. Jochen Schiller “Mobile Communication”, Pearson Education.
2. Yi –Bing Lin and Imrich Chlamtac “Wireless and Mobile Network Architectures”, Wiley India.
3. Raj Pandaya “Mobile and Personal Communication System & Services”.
4. Uwe Hansmann, Lothar Merk “Principles of Mobile Computing” 2nd Ed. Wiley India.
5. Roger L. Freeman “ Telecom Transmission handbook” 4th ed. 1998 John Wiley & Sons Inc. New York.
6. Lee “Mobile Cellular Telecom” 1995 Mc Graw Hill.

Note : Paper is to be set unit wise with internal choice.

MCA-403

Computer Graphics & Multimedia

UNIT-I

Computer Graphics : definition, classification & Applications, Development of Hardware & Software for Computer Graphics. Display devices, Hard copy devices. Interactive Input devices, display processor, Line drawing; various algorithms and their comparison, circle generation- Bresenham’s mid point circle drawing algorithm, mid point ellipse drawing algorithm.

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

Viewing coordinates, Window, view port, clipping, Window to view port transformation, line clipping algorithm; Cohen Sutherland, polygon clipping; Sutherland hodgman algorithm, 3D clipping : Normalized view volumes, view port clipping, clipping in homogeneous coordinates.

Illumination model: Light sources, diffuse reflection specular reflection, reflected light, intensity levels, surface shading; phong shading ground shading, color models like RGB, YIQ, CMY, HSV etc.

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 translation, 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

Introduction to multimedia, multimedia components, multimedia hardware, SCSI, IDE, MCI, Multimedia data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia tools, presentations tools, Authoring tools, presentations.

BOOKS

1. D.Hearn and M.P. Baker “Computer Graphics” (2nd ed), PHI.
2. S. Harrington – “Computer Graphics - a Programming approach” (2nd ed) McGrawhill.
3. New Mann & Sprovl- “Principles of interactive computer graphics” (2nd ed) McGrawhill.

4. Roger S. David "Procedural Elements for Computer Graphics", McGraw Hill.
5. Roger S David "Mathematical Elements for Computer Graphics", McGraw Hill.
6. Foley & Vandan "Computer Graphics Principles & Practice in "C" "Addision Wesly.
7. Tay Vaughan " Multimedia Making it Work" 5th Ed. 2001, Tata McGraw Hill.
8. Prabhat K. Andleigh & Kiran Thakur "Multimedia System Design", PHI
9. Drew, "Fundamentals of Multimedia", Pearsons.
10. Nigel Chapman, J. Chapman "Digital Multimedia" Wiley India.

Note : Paper is to be set unit wise with internal choice.

MCA-404

Design and Analysis of Algorithms

UNIT – I

Pre-requisites: Data structure & Discrete structures, models of computation, algorithm analysis, order architecture, time space complexities average and worst case analysis.

UNIT-II

Divide and conquer: Structure of divide-and-conquer algorithms: examples; Binary search, quick sort, Strassen Multiplication; Analysis of divide and conquer run time recurrence relations.

Graph searching and Traversal: Overview, Traversal methods (depth first and breadth first search)

UNIT-III

Greedy Method: Overview of the greedy paradigm examples of exact optimization solution (minimum cost spanning tree), Approximate solution (Knapsack problem), Single source shortest paths.

Branch and bound: LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Traveling Salesman Problem, searching & sorting algorithms.

UNIT-IV

Dynamic programming: Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, Matrix multiplication, Traveling salesman Problem, longest Common sequence.

Back tracking: Overview, 8-queen problem, and Knapsack problem

UNIT-V

Computational Complexity: Complexity measures, Polynomial Vs non-polynomial time complexity; NP-hard and NP-complete classes, examples.

Combinational algorithms, string processing algorithm, Algebraic algorithms , set algorithms

BOOKS

1. Ullman "Analysis and Design of Algorithm" TMH
2. Goodman "Introduction to the Design & Analysis of Algorithms, TMH-2002.
3. Sara Basse, A. V. Gelder, " Computer Algorithms," Addison Wesley
4. T. H. Cormen, Leiserson , Rivest and Stein, "Introduction of Computer algorithm," PHI
5. E. Horowitz, S. Sahni, and S. Rajsekaran, "Fundamentals of Computer Algorithms," Galgotia Publication

Note : Paper is to be set unit wise with internal choice.

MCA-405

Elective-I : E1(a)

Managerial Economics

UNIT-I

Nature and scope of managerial economics, objectives of firm, management and behavioral theories of the firm.

UNIT-II

Concepts of opportunity cost, incremental, time perspective, principles of discounting and aquamarine, demand analysis purpose and concepts, elasticity of demand, methods of demand forecasting.

UNIT-III

Product and cost analysis: short run and long run average cost curves.
Profits: nature and measurement policy, break even analysis, case study.

UNIT-IV

Law of supply, economies and diseconomies of scale, law of variable proportions.
Production functions: single output isoquants.

UNIT-V

Pricing: prescriptive approach, price determination under perfect competition, monopoly, oligopoly and monopolistic competition, full cost pricing, pricing strategies

BOOKS

1. Dean J. Managerial Economics PHI, New Delhi
2. Mote V.L. et al Management Economics Concepts and Cases TMH, New Delhi
3. Boyes and Melvin "Text book of Economics" Wiley India.
4. Berry Keating & Wilson "Managerial Economics" Wiley India.

Note : Paper is to be set unit wise with internal choice.

MCA-405

Elective-I : E1(b)

Java Programming & Technologies

UNIT-I

The Java Environment: History of Java: Comparison of Java and C++; Java as an object oriented language: Java buzzwords; A simple program, its compilation and execution; the concept of CLASSPATH; Basic idea of application and applet;

Basics: Data types; Operators- precedence and associativity; Type conversion; The decision making – if, if ..else, switch; loops – for, while, do...while; special statements–return, break, continue, labeled break, labeled continue; Modular programming methods; arrays; memory allocation and garbage collection in java keywords.

Object Oriented Programming in Java: Class; Packages; scope and lifetime; Access specifies; Constructors; Copy constructor; this pointer; finalize () method; arrays; Memory allocation and garbage collection in java keywords

Inheritance : Inheritance basics, method overriding, dynamics method dispatch, abstract classes.

UNIT-II

Interfaces : defining an interface, implementing & applying interfaces, variables in interfaces, extending interfaces.

Multithreading and Exception Handling: Basic idea of multithreaded programming; The lifecycle of a thread; Creating thread with the thread class and runnable interface; Thread synchronization; Thread scheduling; Producer-consumer relationship; Daemon thread, Selfish threads; Basic idea of exception

handling; The try, catch and throw; throws Constructor and finalizers in exception handling; Exception Handling.

UNIT-III

Applets: Applet security restrictions; the class hierarchy for applets; Life cycle of applet; HTML Tags for applet.

The AWT: The class hierarchy of window fundamentals; The basic user interface components Label, Button, Check Box, Radio Button, Choice menu, Text area, Scroll list, Scroll bar; Frame; Layout managers-flow layout, Grid layout, Border layout, Card layout.

The Java Event Handling Model: Java's event delegation model – Ignoring the event, Self contained events, Delegating events; The event class hierarchy; The relationship between interface, methods called, parameters and event source; Adapter classes; Event classes action Event, Adjustment Event, Container Event, Focus Event, Item Event, Eey Event, Mouse Event, Text Event, Window Event.

UNIT-IV

Input/Output : Exploring Java i.o., Directories, stream classes

The Byte stream : Input stream, output stream, file input stream, file output stream, print stream, Random access file, the character streams, Buffered reader, buffered writer, print writer, serialization.

JDBC: JDBC-ODBC bridge; The connectivity model; The driver manager; Navigating the resultset object contents; java.sql Package; The JDBC exception classes; Connecting to Remote database.

UNIT-V

Networking & RMI: Java Networking : Networking Basics : Socket, Client server, reserved sockets, proxy servers, Inet address, TCP sockets, UDP sockets.

; RMI for distributed computing; RMI registry services; Steps of creating RMI Application and an example.

Collections: The collections framework, collection interfaces, collection classes.

BOOKS

1. Naughton & Schildt "The Complete Reference Java 2", Tata McGraw Hill
2. Deitel "Java- How to Program." Pearson Education, Asia
3. Horstmann & Cornell "Core Java 2" (Vol I & II) , Sun Microsystems
4. Ivan Bayross "Java 2.0" : BPB publications
5. Ivor Horton's "Beginning Java 2, JDK 5 Ed., Wiley India.

Note : Paper is to be set unit wise with internal choice.

MCA-405

Elective-I : E1(c)

Compiler Design

UNIT-I

Introduction to Compiling and one pass compiler : Compilers and translators, phases of compilers, Structure of a compiler, compiler writing tools, bootstrapping, overview of one pass compiler, Error handling.

Finite Automata & Lexical Analysis : Role of lexical analyser, specification of tokens, recognition of tokens, regular expression, finite automata, form regular expression to finite automata, DFA and NFA, implementation of lexical analyser, tools for lexical analyser, only introduction to LEX.

UNIT-II

Syntax Analysis & Parsing Techniques : Context free grammars, Phase tree, ambiguity of parse tree, bottom up parsing and top down parsing, shift reduce parsing, operator precedence parsing, elimination of left recursion, recursive descent parsing, predictive parser construction, Transition diagram.

UNIT-III

LR parsers, constructing SLR and canonical LR parsing tables, using ambiguous grammar, Introduction to YACC, LR(1) & LALR Parsers.

Syntax Directed Translation : Syntax directed translation scheme, construction of syntax trees, SDT with inherited and synthesized attributes, symbol tables.

UNIT-IV

Intermedicate code generation : Intermedicate languages, prefix notation, three address code, quadruples and triples, translation of assignment statements, boolean expression, procedural calls and iterative statements.

Run time Environment : Source language issues, storage organisation and allocation strategies, parameter passing, implementation of block structured languages.

UNIT-V

Error Detection and Recovery : Errors, sources of errors, Lexical & syntactic phase error, semantic errors:panic mode error recovery & phrase level error recovery mechanisms.

Code Optimization : Optimization of basic blocks, loop optimization, global data flow analysis, loop invariant computations and other related optimization techniques.

Code Generation : Issues in design of code generation, simple code generation techniques.

BOOKS

1. Alfred V. Aho, Ravi Sethi and J.D. Ullman “Compilers- Principles, Techniques and tools” Addison Wesley. A
2. Alfred V.Aho and J.D. Ullman “Principles of Compiler Design” Narosa Publishing House.
3. Tremblay, “Theory and Practice of compiler writing”, Mc Graw Hill.
4. Holuv, “Compiler Design in C”, PHI.
5. Dhamdhare D.M., “Compiler Construction Principles and Practice”, Macmillan India.

Note : Paper is to be set unit wise with internal choice.

MCA-405

Elective-I : E1(d)

Microprocessor and Interfaces

UNIT –I

Intel 8086 Microprocessor: 8086 Architecture, Pin out diagram and pin description, Addressing Modes, bus transfer techniques with read/write cycle, 8086 Interrupts and Interrupt Responses.

UNIT –II

Interfacing of 8086 with Memories, PPI (8255), Keyboard Controller (8279), DMA Controller (8257) Interfacing of 8086 with Programmable Interval Timer (8254) and Programmable Interrupt Controller (8259).

UNIT-III

Introduction to Intel 80286, comparison of 80286 with 8086,80286 Architecture signal and system connection, Real and Virtual Addressing Modes, Memory Management Scheme, 80286 Protection Mechanism, 80286 Interrupts.

UNIT-IV

Introduction to Intel 80386,comparison of 80386 with 8086,80286,Difference between 80386SX and 80386DX, Memory and I/O system of 80386,Special 80386 Registers, 80386 Memory Management Scheme, memory Paging Scheme

UNIT-V

Introduction of 80486, Difference between 80486DX and 80486SX,Basic 80486 Architecture, 80486 Memory and I/O system, 80486 Memory Management Scheme, Introduction to Pentium, Pentium Memory and I/O system, Special Pentium Registers, Pentium Memory Management, Difference between Pentium and Pentium Pro.

BOOKS

1. D.V.Hall: “ Microprocessor and Interfacing, Programming and Hardware” TMH
2. D.V.Hall: “ Microprocessor and Interface Programming” TMH
3. Barry. B. Brey : “ The Intel Microprocessors Architecture, Programming and Interfacing” Pearson Education (6th Edition)
4. James L. Antonakos : “The Pentium Microprocessor” Pearson Education.
5. V.Korneev,A.Kiselev “Modern Microprocessor” 3rd Edition , Wiley Dreamtech Publication

Note : Paper is to be set unit wise with internal choice.

MCA-405

Elective-I : E1(e)

Advanced DataBase Management System

UNIT-I

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-II

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 & 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-III

Advanced Transaction Processing

Advanced transaction models: Savepoints, 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-IV

Active Database and 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 & Handwritten Data, Geographic Information Systems (GIS).

WEB Database

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

BOOKS

1. Elmarsi, “Fundamentals of Database Systems”, 4th Edition, Pearson Education

2. R. Ramakrishnan, "Database Management Systems", 1998, McGraw Hill International Editions
3. Elmagarmid.A.K. "Database transaction models for advanced applications", Morgan Kaufman.
4. Transaction Processing, Concepts and Techniques, J. Gray and A. Reuter, Morgan Kauffman..
5. S. Abiteboul, R. hull and V. Vianu, "Foundations of Databases", 1995, Addison – Wesley Publishing Co., Reading Massachusetts.
6. W. Kim, "Modern Database Systems", 1995, ACM Press, Addison – Wesley.
7. D. Maier, "The Theory of Relational Databases", 1993, Computer Science Press, Rockville, Maryland