

SCHEME OF EXAMINATION

&

DETAILED SYLLABUS

for

**MASTER OF COMPUTER APPLICATIONS
(MCA) DEGREE**

**GURU GOBIND SINGH
INDRAPRASTHA UNIVERSITY
KASHMERE GATE, DELHI**

Master of Computer Applications

FIRST SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits
MCA 101	Introduction to Information Technology	3	1	4
MCA 103	Digital Electronics	3	1	4
MCA 105	Problem Solving Using C	3	1	4
MCA 107	Discrete Mathematics	3	1	4
MCA 109	Financial Accounting	3	1	4
PRACTICALS				
MCA 151	Practical – I	0	8	4
MCA 153*	General Proficiency – I	2	0	2
	Total	17	13	26

*NUES

Master of Computer Applications

SECOND SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits
MCA 102	Data Structures	3	1	4
MCA 104	Theory of Computation	3	1	4
MCA 106	Computer System Architecture	3	1	4
MCA 108	Computer Graphics	3	1	4
MCA 110	Object Oriented Programming	3	1	4
PRACTICALS				
MCA 152	Practical – II	0	8	4
MCA 154*	General Proficiency – II	2	0	2
	Total	17	13	26

*NUES

Master of Computer Applications

THIRD SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits
MCA 201	Operating Systems	3	1	4
MCA 203	Database Management System	3	1	4
MCA 205	Design and Analysis of Algorithms	3	1	4
MCA 207	Front End Design Tools	3	1	4
MCA 209	Software Engineering	3	1	4
PRACTICALS				
MCA 253	Practical – III	0	8	4
MCA 255*	General Proficiency – III	2	0	2
	Total	17	13	26

*NUES

Master of Computer Applications

FOURTH SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits
MCA 202	Data Warehousing and Data Mining	3	1	4
MCA 204	Linux & X – Windows Programming	3	1	4
MCA 206	Java Programming & Website Design	3	1	4
MCA 208	Computer Networks	3	1	4
MCA 210	Organizational Behaviour	3	1	4
PRACTICALS				
MCA 252	Practical – IV	0	8	4
MCA 254*	General Proficiency – IV	2	0	2
	Total	17	13	26

*NUES

Master of Computer Applications

FIFTH SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credit
MCA 301	Object Oriented Software Engineering	3	1	4
ELECTIVES (select any four)				
MCA 303	Artificial Intelligence	3	1	4
MCA 305	Multimedia Technologies	3	1	4
MCA 307	Microprocessors	3	1	4
MCA 309	Advanced Computer Networks	3	1	4
MCA 311	Digital Signal Processing	3	1	4
MCA 313	Neural Networks	3	1	4
MCA 315	Digital Image Processing	3	1	4
MCA 317	Software Testing	3	1	4
MCA 319	Fuzzy Sets and Logic	3	1	4
MCA 321	Advanced Computer Architecture	3	1	4
MCA 323	Compiler Construction	3	1	4
MCA 325	Requirement & Estimation Techniques	3	1	4
MCA 327	Distributed DBMS	3	1	4
MCA 329	Operational Research	3	1	4
MCA 331	Project	-	-	4
PRACTICALS				
MCA 351	Practical – IV	0	8	4
MCA 353*	General Proficiency – IV	2	0	2
	Total	17	13	26

*NUES

Master of Computer Applications

SIXTH SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits
MCA 302	Dissertation	-	-	26
MCA 304*	Seminar and Progress Reports	-	-	4
	TOTAL	-	-	30

*NUES

The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format. The student will have to present the progress of the work through seminars and progress reports.

Note:

1. The total number of the credits of the MCA programme = 160.
2. Each student shall be required to appear for examinations in all courses. However, for the award of the degree a student shall be required to earn the minimum of 150 credits.

Code No.: MCA 101

L T C

Paper: Introduction to Information Technology

3 1 4

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT - I

What are computers? The evolution of computers, Classification of computers, The control unit, computer organization & Block diagram representation, storage devices, microprocessors, instruction set, CISC & RISC processor, Input-Output devices, interconnection architectures.

Low level and high level languages, assemblers, compilers, interpreters, linkers, algorithms, flow charting, decision tables, pseudo code, software, application software packages

[No. of Hrs: 15]

UNIT - II

Operating system concepts, Different types of operating systems, structure of operating system, DOS/UNIX/LINUX commands, working with Windows, Windows 9x/NT/XP, Data Processing, File systems and Database Management Systems, different types of Database Management System.

[No. of Hrs: 12]

UNIT - III

Basic elements of a Communication System, Data transmission modes, Data Transmission speed, Data transmission media, Digital and Analog Transmission, Network topologies, Network Types (LAN, WAN and MAN), Communication protocols, Inter networking tools, Distributed Computing Systems.

[No. of Hrs: 10]

UNIT - IV

What is Multimedia?, What is a Multimedia computer systems, Multimedia components, Multimedia applications, Internet-Definition, Basic services, Internet search tools, WWW, Web browsers

[No. of Hrs: 13]

TEXT:

1. Alex Leon & Mathews Leon, "Fundamentals of Information Technology", Leon Techworld, 1999.
2. P. K. Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications, 1992.

REFERENCES:

1. V. Raja Raman, "Introduction to Computers", PHI, 1998.
2. Alex Leon & Mathews Leon, "Introduction to Computers", Vikas Publishing House, 1999.
3. Norton Peter, "Introduction to computers", 4th Ed., TMH, 2001.
4. Simon Haykins, "Communication System", John Wiley & Sons., 1999.

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1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT - I

Digital Signals, Basic Circuits, NAND and NOR operations, exclusive OR (XOR) op., Boolean algebra, Number systems, Binary octal and hexadecimal number systems, signed binary number, binary arithmetic, 2's complement arithmetic, Codes, Error codes

[No. of Hrs : 13]

UNIT - II

Logic function representation, K-Maps and their simplifications.

Multiplexes, Demultiplexers, Decoders, adders, BCD arithmetic, ALU, Comparators, Parity generator/Checkers, Code converters, priority encoders.

[No. of Hrs : 13]

UNIT - III

Flip-flops – S-R, J-K, D, T Registers, shift registers, ripple and Asynchronous counters, synchronous counters, sequential circuit design, Logic gates and timing circuits, OP-AMP, Schmitt triggers

[No. of Hrs : 12]

UNIT – IV

A/D and D/A converters, Semiconductor memories (sequential, ROM, R/W Memory, content addressable memory, charge coupled device memory), PLD, PLA

Microprocessors Introduction, Data Bus, Address Bus, Control Bus, Operation, Architecture

[No. of Hrs :12]

TEXT:

1. M.Mano, "Digital Logic and Computer Design", PHI, 2002
2. R.P. Jain, "Modern Digital Electronics", TMH, 3rd Ed., 2003

REFERENCES:

1. Ramesh S. Gaonkar, "Microprocessor Architecture Programming and Application with 8085, PHI, 2001
2. Malvino & Leach, "Digital Principles and Application", TMH, 1999.
3. B. Basaraj, "Digital Fundamentals", Vikas Publications, 1999.

Code No.: MCA 105

L T C

Paper: Problem Solving using C

3 1 4

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

C basics: C character set, Identifiers and keywords, Data types, constants, variables and arrays, declarations, expressions statements, symbolic constants, compound statements, arithmetic operators, unary operators, relational and logical operators, assignment operators, conditional operators, bit operators.

C constructs: If statement, if...else statement, if....else if....else statement, while statement, do...while statement, for statement, switch statement, nested control statement, break operator, continue operator, comma operator, goto statement. **[No. of Hrs :12]**

UNIT – II

C Functions:Function: declaration, definition & scope, recursion, call by value, call by reference.

Storage Classes: automatic, external (global), static & registers.

Arrays: Arrays, pointers, array & pointer relationship, pointer arithmetic, dynamic memory allocation, pointer to arrays, array of pointers, pointers to functions, array of pointers to functions, Preprocessor directives: #include, #define, macro's with arguments, the operators # and ##, conditional compilations, multiple file programming. **[No. of Hrs :15]**

UNIT – III

Structures:Structures, unions, structure passing to functions, bit fields, file handling [text (ascii), binary], Standard library functions from stdio.h, stdlib.h, conio.h, ctype.h, math.h, string.h, process.h **[No. of Hrs : 10]**

UNIT – IV

Algorithms: Problem solving techniques, top-down design, algorithm implementation

Algorithm: to exchange value of two variables, array element counting, summation of set of numbers and of a series, fibonacci sequence generation, integer base conversion, character to numeric conversion, finding the square root of a number, smallest divisor of a number, Euclid's GCD algorithm, prime number generation, prime factoring of integers, pseudo-random number generation, raising the number to a large positive integer power, array partitioning, binary search, linear pattern search, permutation generation. **[No. of Hrs: 13]**

TEXT:

1. Yashwant Kanetkar, "Let us C", BPB Publications, 2002
2. R.G. Dromey, "How to solve it by computer", PHI, 1992.

REFERENCES:

1. E. BalaGuruswamy, "Programming in ANSI C", TMH, 1999.
2. Al Kelly and Ira Pohl, "A Book on C", (4th Ed.), Addison Wesley, 1999.
3. B. Kernighan and D. Ritchie, "The ANSI C Programming Language", PHI., 2000.

Code No.: MCA 107

L T C

Paper: Discrete Mathematics

3 1 4

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

Fundamentals: Sets & Relations- Sets, Types of Sets, Multi Sets, Operations on Sets, Relations and Properties of Relations, Representation of Relations, Equivalence Relation, Closures of Relations, Methods of Proof-Direct Proofs, Indirect Proofs, Mathematical Induction, Method of Contradiction.

Combinatorics: Permutations and Combinations, Pigeon Hole Principle, Principle of Inclusion and Exclusion, Sequence and Series, Generating Functions. **[No. of Hrs: 15]**

UNIT – II

Boolean Algebra, Posets and Lattices: Partial Order Set, Poset, Bounding Elements, Well Ordered Set, Topological Sorting, Lattices, Principle of Duality, Bounded, Distributed, and Complemented Lattices, Finite Boolean Algebra, Boolean Functions and Expressions, Minimization of Boolean Expression, Karnaugh Maps, Quine McClusky Method, Proposition and Propositional Calculus. **[No. of Hrs: 10]**

UNIT – III

Graphs and Group Theory: Basic Introduction of Graphs- Types of Graphs, Path and Circuits, Eulerian Path and Circuits, Hamiltonian Path and Circuits, Shortest Path Algorithms, Group, Definitions and Properties, Coset & Subgroup, Normal subgroup, Homomorphism of groups, Cyclic Group, Permutation Group. **[No. of Hrs: 15]**

UNIT – IV

Finite State Machines and Languages: Grammar and Languages- Phrase structure Grammar, Types of Grammars and Languages, Finite State Machines and Languages, Minimization of Finite State Machines. **[No. of Hrs: 10]**

TEXT:

1. Keneth H. Rosen, “Discrete Mathematics and Its Applications”, TMH, 1999.
2. C.L. Liu, “Elements of Discrete Mathematics”, TMH, 2000.

REFERENCES:

1. Kolman, Busby & Ross, “Discrete Mathematical Structures”, PHI, 1996.
2. Narsingh Deo, “Graph Theory With Application to Engineering and Computer Science”, PHI, 2004.
3. Trembly J.P. & Manohar P., “Discrete Mathematical Structures with Applications to Computer Science”, McGraw Hill, 1997.
4. Vinay Kumar, “Discrete Mathematics”, BPB Publications, 1998.

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT - I

Meaning and Scope of Accounting: Need for Accounting, Definition and Functions of Accounting, Book Keeping and Accounting, Is Accounting Science or Art? End User of Accounting Information, Accounting and other Disciplines, Role of Accountant, Branches of Accounting, Difference between Management Accounting and Financial Accounting

Meaning of Accounting Principles: Accounting Concepts, Accounting Conventions, Introduction to Accounting Standards, Systems of Book Keeping, Systems of Accounting

Journalising Transactions: Journal, Rules of Debit and Credit, Compound Journal Entry, Opening Entry

Ledger Posting and Trial Balance: Ledger, Posting, Relationship between Journal and Ledger, Rules Regarding Posting, Trial Balance

Sub-Division of Journal: Cash Journal, Petty Cash Book, Purchase Journal, Sales Journal, Sales Return Journal

Capital and Revenue: Classification of Income, Classification of Expenditure, Classification of Receipts

Rectification of Errors: Classification of Errors, Location of Errors, Suspense Account, Rectifying Accounting Entries, Effect on Profit [No. of Hrs: 15]

UNIT - II

Depreciation Provisions and Reserves: Concept of Depreciation, Causes of Depreciation, Basic Features of Depreciation, Meaning of Depreciation Accounting, Objectives of Providing Depreciation, Fixation of Depreciation Amount, Methods of Recording and Providing Depreciation, AS-6(Revised) Depreciation Accounting

Final Accounts: Manufacturing Account, Trading Account, Profit and Loss Account, Balance Sheet, Simple Adjustment Entries [No. of Hrs: 13]

UNIT - III

Inventory Valuation: Meaning of Inventory, Objectives of Inventory Valuation, Inventory Systems, Methods of Valuation of Inventories

Accounting Standard 2 (Revised): Valuation of Inventories

Accounts of Non-profit Making Organisations: Receipts and Payments Account, Income and Expenditure Account, Balance Sheet, Items Peculiar to Non-trading Concerns [No. of Hrs: 12]

UNIT - IV

Company Final Accounts: Familiarity with the requirements of Schedule VI to the Companies Act 1956, Elementary Knowledge about Items in the Profit & Loss Account and Balance Sheet of a Company, (Preparation of Company Final Accounts not required)

Financial Statements - Analysis and Interpretation: Meaning and Types of Financial Statements, Nature of Financial Statements, Limitations of Financial Statements, Analysis and Interpretation of Financial Statements, Steps involved in Financial Statement Analysis, Ratio Analysis, Classification of Ratios, Profitability Ratios, Turnover Ratios, Financial Ratios, Advantages of Ratio Analysis, Limitations of Ratio Analysis [No. of Hrs: 10]

TEXT:

1. Dr. S.N. Maheshwari & Dr. S.K. Maheshwari “An Introduction to Accountancy” (For G.G.S.I.P. University) 8th Ed. Vikas Publication, 2003.
2. R.L. Gupta & V.K. Gupta, “Principles and Practice of Accountancy”, Sultan Chand & Sons, 1999.

REFERENCES:

1. R.N. Anthony & J.S. Reece “Accounting Principles” 6th Ed., Homewood, Illinois, Richard D Irwin 1995.
2. P.K. Ghosh and G.S. Gupta, “Fundamentals of Management Accounting”, New Delhi, 1988.
3. Dr. S.N. Maheshwari & Dr. S.K. Maheshwari “Advanced Accountancy” 8th Ed., Vikas Publishing House, 1984.
4. L.E. Heitger and Serge Matulich, “ Financial Accounting”, New Delhi, McGraw Hill, 1990.

Code No. : MCA 151

Paper: Practical – I

Practicals will be based on following Papers:

- | | | |
|----|-------------------------|---------|
| 1. | Digital Electronics | MCA 103 |
| 2. | Problem Solving Using C | MCA 105 |

Code No. : MCA 153*

Paper: General Proficiency – I

***Non University Examination Scheme (NUES)**

There will not be any external examination of the university. The performance of the candidates should continuously be evaluated by an internal committee. The committee may conduct viva-voce at the end for the award of the marks.

INSTRUCTIONS TO PAPER SETTERS:

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

Fundamentals of algorithm analysis

Big ‘O’ notations, Time and space complexity of algorithms., Elementary data structures and their applications

Arrays: ordered lists, representation of arrays, linked lists: singly and doubly linked lists, stacks, queues, deque, multiple stacks and queues, generalized lists, Applications: polynomial arithmetic, sparse matrices, equivalence relations, infix, postfix and prefix arithmetic expression conversion and evaluations. **[No. of Hrs: 10]**

UNIT – II

Trees

Binary trees: Definition, traversal, threaded binary tree, set representation and operations, Decision tree, Game tree, B-Tree: Definition, B⁺ tree, B* trees, AVL trees.

Graphs

Representation, traversal, connected components, spanning trees, shortest path and transitive closure, topological sort, activity network, critical path, path enumeration. Dijkstra’s Algorithm, Floyd Warshall’s Algorithm, Coloring of Graphs, Trees-Binary Search Tree, Tree Traversals, Spanning Tree, Minimum Spanning Tree Algorithms, Kruskal’s Algorithm, Prim’s Algorithm, Algorithms of discrete Mathematics **[No. of Hrs: 15]**

UNIT – III

Searching & Sorting

Binary search, Hash function, Hash table, Search tree. Internal sort: Radixsort, Insertion sort, Exchange sort, Selection sort, Quicksort, Shellsort, Mergesort. External sort: K-way mergesort, balanced mergesort, polyphase mergesort **[No. of Hrs: 15]**

UNIT – IV

Files

Files, Queries and sequential organization; Cylinder surface indexing, Hashed Indexed, Tree Indexing, Trie Indexing, Sequential file organizational, random file organization, Hashed file organization, Inverted files, cellular partitions. **[No. of Hrs: 10]**

TEXT:

1. E. Horowitz and S. Sahani, “Fundamentals of Data Structures”, Galgotia Booksources Pvt. Ltd, 1999.
2. R. L. Kruse, B. P. Leung, C. L. Tondo, “Data Structures and program design in C”, PHI, 1998.

REFERENCES:

1. Schaum’s outline series, “Data Structure”, TMH, 2002
2. Y. Langsam et. al., “Data Structures using C and C++”, PHI, 1999.
3. N. Dale and S.C. Lilly, D.C. Heath and Co., “Data Structures”, 1995.
4. “Data Structure & Algorithms”, R. S. Salaria, Khanna Book Publishing Co. (P) Ltd., 2002.

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

Review of basic concepts: Graphs, Trees, Strings, Mathematical Induction, finite State Machine, types of languages and Grammars.

Regular Language, Regular Expression, Regular Grammar, Right and Left Linear Grammar, Closure property of Regular Languages, Pumping Lemma, Properties of Regular expressions, DFA, NFA and their equivalence, Moore's and Mealy machine and their equivalence. identifying non regular languages, reduction of number of states, equivalence between regular language and regular grammars. **[No. of Hrs: 12]**

UNIT – II

Context free Language and Grammar, derivation tree, left most and right most derivation, Parsing and ambiguity, Chomsky and Greibach Normal Form, Pumping Lemma, Properties of CFL including closure property, PDA, NPDA as recognizer of CFL. **[No. of Hrs: 12]**

UNIT – III

Context sensitive language and grammars, matrix Grammar, Markov algorithm, L-Systems. Recursive and recursively enumerable languages, recursive functions, ackerman's functions, r-recursive functions. **[No. of Hrs: 12]**

UNIT – IV

Turing machine and thesis, Non Deterministic Turing Machine, Universal Turing Machine, computability and Decidability, Undecidable Problems: Halting Problem of TM, Post-correspondence problem, undecidable problems of CFL, Post Systems. Computational Complexity, complexity classes and introduction to P, NP and NP complete. **[No. of Hrs: 14]**

TEXT:

1. J. E. Hopcroft, J. D. Ullman, "Introduction of automata Theory, Languages and Computation", Student Edition, Norasa, 1979.
2. Zohar Manna, "Mathematical Theory of Computation", McGraw-Hill, 2000

REFERENCES:

1. P. Linz, "An Introduction to formal Languages and Automata", Norasa, 2000.
2. Mishra, Chandrashekharan, "Theory of Computer Science", PHI
3. John C Martin, "Introduction to Theory of formal Languages and Automata", McGraw Hill, 2004.
4. S. P. Eigere Xavier, "Theory of Automata, Formal Languages and Computation, New Age Publishers, 1st Edition, 2004.

Code No.: MCA 106

L T C

Paper: Computer System Architecture

3 1 4

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UNIT – I

Introduction and overview: Review of digital components, Evolution of computers.

Register Transfer and Microoperation: Register transfer language, register transfer, bus and memory transfer, arithmetic microoperations, logic microoperations, shift microoperations.

Basic Computer Organization and Design: Instruction codes, computer registers, computer instructions, timing & control, instruction cycle, memory reference instructions, input-output and interrupts, design of basic computer, design of accumulator logic. **[No. of Hrs: 14]**

UNIT – II

Microprogrammed Control Unit: Control memory, address sequencing.

Central Processing Unit: Introduction, general register organization, stack organization, instruction formats, addressing modes.

Pipeline and vector processing Parallel Processing, pipelining, arithmetic pipeline, RISC Pipeline, Vector Processing, Array Processors. **[No. of Hrs: 12]**

UNIT – III

Computer Arithmetic: Introduction, addition and subtraction, multiplication algorithms, division algorithms, floating point arithmetic operation, decimal arithmetic unit, decimal arithmetic operations.

Input-Output Organization: Peripheral devices, input-output interface, asynchronous data transfer, modes of data transfer, priority interrupt, direct memory access, input-output processor. **[No. of Hrs: 12]**

UNIT – IV

Memory organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory, memory management hardware.

Multiprocessors: Characteristics of multiprocessor, Interconnection Structure, Interprocessor Communication & Synchronization **[No. of Hrs: 12]**

TEXT:

1. Mano M, “Computer System and Architecture”, PHI, 1993.

REFERENCES:

1. Malvino, “Digital Computer Electronics: An Introduction to Microcomputers”, McGraw Hill, 1993.
2. Hayes, J.P. “Computer Architecture and Organization”, McGraw Hill, 1998.
3. Stallings W, “Computer Organization & Architecture”, PHI, 2001.

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

Transformation, Projections, and Clipping Algorithms: Bresenham's Line Drawing Algorithm, Homogeneous Coordinate System for 2D and 3D, Various 2D, 3D Transformation matrices (Translation, Scaling, Rotation, Shear), Rotation about an arbitrary point (2D), Rotation about an arbitrary axis (3D), Computing location of V.P, Clipping Algorithms, Sutherland-Cohen Clipping Algorithm. **[No. of Hrs. : 12]**

UNIT – II

Curves and Surfaces: Bresenham's Circle Drawing Algorithm, Bezier Curves, 4 point and 5 point Bezier curves using Bernstein Polynomials, Conditions for smoothly joining curve segments, Bezier bi-cubic surface patch, B-Spline Curves, Cubic B-Spline curves using uniform knot vectors, Testing for first and second order continuities, Effect of multiple control points at same location, Geometrical Construction, Computing control points given end slopes for a specified curve segment **[No. of Hrs: 12]**

UNIT – III

Projection and Solid Modelling: Parallel Projection, Oblique Projection on xy plane, Isometric Projection, Perspective Projection, One Vanishing Point (V.P.) projection from a point on z axis, Generation of 2 V.P. Projection, Isometric Projection, Perspective, Projection, one vanishing Pint (VP), projection from 0 point on z axis, Generation of 2 VP Projector & Projections, Solid Modelling, Sweeping a polygon or a surface patch along a path to form solids, Boundary Representation (B-Rep), octrees, CSG – Constructive Solid Geometry. **[No. of Hrs: 12]**

UNIT – IV

Shading and Hidden Surface Removal: Shading, Illumination Model for diffused Reflection, Effect of ambient lighting, distances, Specular Reflection Model, Computing Reflection Vector, Curved Surfaces, Polygonal Approximations, Gourard Shading, Phong Model, Hidden Surface Removal, Floating Horizon Method, Back Face Detection, Depth Buffer (Z-Buffer, A-Buffer) Method, Scan Line Method, Depth Sorting Method, BSP-Tree Method, Area Subdivision Method. **[No. of Hrs: 14]**

TEXT:

1. Foley et. al., "Computer Graphics Principles & practice", Addison Wesley, 1999.
2. David F. Rogers, "Procedural Elements for Computer Graphics", McGraw Hill Book Company, 1985.

REFERENCES:

1. D. Rogers and J. Adams, "Mathematical Elements for Computer Graphics", MacGraw-Hill International Edition, 1989.
2. D. Hearn and P. Baker, "Computer Graphics", Prentice Hall, 1986.
3. R. Plastock and G. Kalley, "Theory and Problems of Computer Graphics", Schaum's Series, McGraw Hill, 1986.

INSTRUCTIONS TO PAPER SETTERS:

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

Introduction: Introducing Object-Oriented Approach, Relating to other paradigms (functional, data decomposition).

Basic terms and ideas: Abstraction, Encapsulation, Inheritance, Polymorphism, Review of C, Difference between C and C++ - cin, cout, new, delete operators. **[No. of Hrs: 12]**

UNIT – II

Classes and Objects: Encapsulation, information hiding, abstract data types, Object & classes, attributes, methods, C++ class declaration, State identity and behavior of an object, Constructors and destructors, instantiation of objects, Default parameter value, object types, C++ garbage collection, dynamic memory allocation, Metaclass/abstract classes.

[No. of Hrs: 12]**UNIT – III**

Inheritance and Polymorphism: Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition vs classification hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, Parametric polymorphism, Generic function – template function, function name overloading, Overriding inheritance methods, Run time polymorphism, Multiple Inheritance.

[No. of Hrs: 12]**UNIT – IV**

Files and Exception Handling: Persistent objects, Streams and files, Namespaces, Exception handling, Generic Classes

Standard Template Library and UML: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors, UML-Introduction., Class Diagrams, Sequence Diagrams, Object Diagrams, Use Cases, State Machine Diagrams.

[No. of Hrs: 14]**TEXT:**

1. A.R.Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 1997.
2. S. B. Lippman & J. Lajoie, “C++ Primer”, 3rd Edition, Addison Wesley, 2000.

REFERENCE:

1. R. Lafore, “Object Oriented Programming using C++”, Galgotia Publications, 2004.
2. D. Parsons, “Object Oriented Programming with C++”, BPB Publication.
3. Steven C. Lawlor, “The Art of Programming Computer Science with C++”, Vikas Publication.
4. Schildt Herbert, “C++: The Complete Reference”, 4th Ed., Tata McGraw Hill, 1999.

Code No. : MCA 152

Paper: Practical – II

Practicals will be based on following Papers:

1. Data Structures
2. Computer Graphics
3. Object Oriented Programming

Code No. : MCA 154*
Paper: General Proficiency – II

***Non University Examination Scheme (NUES)**

There will not be any external examination of the university. The performance of the candidates should continuously be evaluated by an internal committee. The committee may conduct viva-voce at the end for the award of the marks.

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

Introduction, What is an Operating System, Simple Batch Systems, Multiprogrammed Batches systems, Time-Sharing Systems, Personal-computer systems, Parallel systems, Distributed Systems, Real-Time Systems

Memory Management: Background, Logical versus Physical Address space, swapping, Contiguous allocation, Paging, Segmentation, Segmentation with Paging

Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations, Demand Segmentation

[No. of Hrs.: 14]

UNIT – II

Processes: Process Concept, Process Scheduling, Operation on Processes, Cooperating Processes, Interprocess Communication

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Algorithm Evaluation

Process Synchronization: Background, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions, Monitors, Synchronization in Solaris 2, Atomic Transactions

[No. of Hrs.: 12]

UNIT – III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Combined Approach to Deadlock Handling.

Device Management: Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Device Characteristics-Hardware Consideration, Input or Output Devices, Storage Devices, Channels and Control Units, Independent Device Operation, Buffering, Multiple Paths, Block Multiplexing, Device Allocation Consideration,

Secondary-Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Reliability, Stable-Storage Implementation

[No. of Hrs.: 12]

UNIT – IV

Information Management: Introduction, A Simple File System, General Model of a File System, Symbolic File System, Basic File System, Access Control Verification, Logical File System, Physical File System File-System Interface: File Concept, Access Methods, Directory Structure, Protection, Consistency Semantics File-System Implementation: File-System Structure, Allocation Methods, Free-Space Management, Directory Implementation, Efficiency and Performance, Recovery.

[No. of Hrs.: 12]

TEXT:

1. Silberschatz and Galvin, "Operating System Concepts", Pearson, 5th Ed., 2001
2. Madnick E., Donovan J., "Operating Systems", Tata McGraw Hill, 2001

REFERENCES:

1. Tannenbaum, "Operating Systems", PHI, 4th Edition, 2000

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

Basic Concepts and Conceptual Database Design: Database administrator & Database Users, Characteristics of the Database, Database Systems, Concepts and Architecture, Data Models, Schemes & Instances, DBMS Architecture & Data Independence, Database Languages & Interfaces, Overview of Hierarchical, Network & Relational Data Base Management Systems, Data Modelling Using The Entity-Relationship Model – Entities, Attributes and Relationships, Cardinality of Relationships, Strong and Weak Entity Sets, Generalization, Specialization, and Aggregation, Translating your ER Model into Relational Model

[No. of Hrs.: 12]**UNIT – II**

Relational Model, Languages & Systems: Relational Data Model & Relational Algebra, Relational Model Concepts, Relational Model Constraints, Relational Algebra, SQL – A Relational Database Language, Data Definition in SQL, View and Queries in SQL, Specifying Constraints and Indexes in SQL, Practicing SQL commands using ORACLE.

[No. of Hrs.: 12]**UNIT – III**

Relational Data Base Design and Oracle Architecture: Functional Dependencies & Normalization for Relational Databases, Functional Dependencies, Normal Forms Based on Primary Keys, (1NF, 2NF, 3NF & BCNF), Lossless Join and Dependency Preserving Decomposition, Oracle 8 Architecture, Database Storage, Oracle Software Structures, Shared Database Access Mechanism, Database Protection.

[No. of Hrs.: 12]**UNIT – IV**

Transaction Management: Transaction Concept and State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Concurrency Control Techniques, Lock-Based Protocols, Timestamp-based Protocols, Validation – based Protocols, Multiple Granularity, Multiversion Schemes, Deadlock Handling, Recovery System, Failure Classification, Storage Structure, Recovery and Atomicity, Log-based Recovery, Shadow Paging, Recovery with Concurrent Transactions, Buffer Management, Failure with Loss of Nonvolatile Storage, Advanced Recovery Techniques, Remote Backup Systems. Indexing, Hashing and Query Processing: Query Processing, Overview, Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions, Concepts of Object Oriented Database Management Systems, Distributed Data Base Management Systems.

[No. of Hrs.: 14]**TEXT:**

1. Korth, Silberschatz, “Database System Concepts”, 4th Ed., TMH, 2000.
2. Steve Bobrowski, “Oracle 8 Architecture”, TMH, 2000

REFERENCES:

1. Date C. J., “An Introduction to Database Systems”, 7th Ed., Narosa Publishing, 2004
2. Elmsari and Navathe, “Fundamentals of Database Systmes”, 4th Ed., A. Wesley, 2004
3. Ullman J. D., “Principles of Database Systems”, 2nd Ed., Galgotia Publications, 1999.

INSTRUCTIONS TO PAPER SETTERS:

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UNIT – I**Preliminaries:**

Review of growth of functions, Recurrences: The substitution method, The iteration method, The master method, Data Structures for Disjoint Sets.

Divide and Conquer Approach:

Merge Sort, Quick sort, Medians and Order statistics, Strassen's algorithm for Matrix Multiplications. [No. of Hrs.: 12]

UNIT – II**Dynamic Programming:**

Elements of Dynamic Programming, Matrix Chain Multiplication, Longest common subsequence and optimal binary search trees problems.

Greedy Algorithms:

Elements of Greedy strategy, An activity selection problem, Huffman Codes, A task scheduling problem. [No. of Hrs.: 13]

UNIT – III**Graph Algorithms:**

Representation of Graphs, Breadth First Search, Depth First Search, Topological Sort, Strongly Connected Components, Algorithm for Kruskal's and Prim's for finding Minimum cost Spanning Trees, Dijkstra's and Bellman Fort Algorithm for finding Single source shortest paths. All pair shortest paths and matrix multiplication, Floyd – Warshall algorithm for all pair shortest paths. [No. of Hrs.: 13]

UNIT – IV**String matching:**

The naïve String Matching algorithm, The Rabin-Karp Algorithm, String Matching with finite automata, The Knuth-Morris Pratt algorithm.

NP-Complete Problem:

Polynomial-time verification, NP-Completeness and Reducibility, NP-Completeness Proof, NP-Complete problems. [No. of Hrs.: 12]

TEXT:

1. T. H. Cormen, C. E. Leiserson, R. L. Rivest, Clifford Stein, "Introduction to Algorithms", 2nd Ed., PHI, 2004.

REFERENCES:

1. A. V. Aho, J. E. Hopcroft, J. D. Ullman, "The Design and Analysis of Computer Algorithms", Addison Wesley, 1998.
2. Ellis Horowitz and Sartaz Sahani, "Computer Algorithms", Galgotia Publications, 1999.
3. D. E. Knuth, "The Art of Computer Programming", 2nd Ed., Addison Wesley, 1998

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

Visual Basic: Variable Names, Data Types, Assignment, If-then, If-then-else, if then-elseif-else, expression, print statement, arrays, variable declaration, built-in & User defined types, Subroutine and functions, Boolean Operators, Arithmetic Operator, For- .next, do loop, while-wend, procedure/Public, Private and Static & Dim Statement. **[No. of Hrs.: 12]**

UNIT – II

Structure of VB program, Forms & built in controls, Properties and events, Code Module, Scale Modes, Printer Object (Printing text, setting Fonts, graphics), Common dialog Boxes, picture controls, image-controls, send keys, MS-Common Controls, Error Handling, Classes, Control Arrays, MDI, SDI.

File Handling – Text and Binary Files, Files System Orbit Object. **[No. of Hrs.: 12]**

UNIT – III

Database Interface: Review of ANSI SQL, ODBC, Pass through ODBC, DAO, MS-Jet Engine, DB-Engine, Workspaces, Databases, recordsets, Data bound controls, ActiveX controls, ADO, Active X Data controls, RDO

Data view Window, Data Environment Designer, Crystal Report and Data Report Utility Using Visual Basic (VB) for Transaction Management, Concurrency Control, Interfacing with RDBMS, Backend Stored procedure Usage. **[No. of Hrs.: 13]**

UNIT – IV

Help Writing: Building a help, System, Building & Topics File, Labeling the topics, Creating a help project, primary & secondary help window, linking to internet, Adding Multimedia, Using HTML help workshop, content sensitive help, help file.

Overview of COM/DCOM using Windows API Functions, MAPI interface, Microsoft Transaction Server, Visual source safe, VB Script. **[No. of Hrs.: 13]**

TEXT:

1. E. Petroustos, “Mastering Visual Basic 6.0”, BPB Publications, 1998.
2. Perry, Greg, “Teach Yourself Visual Basic 6 in 21 Days”, Techmedia, 1998.

REFERENCES:

1. E. Petroustos, “Mastering Database Programming with Visual Basic 6”, BPB Publications, 2000
2. Norton Peter, “Peter Norton’s Guide to Visual Basic 6”, Techmedia, 1998.

INSTRUCTIONS TO PAPER SETTERS:

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UNIT – I

Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models

Software Requirements analysis & specifications: Requirement engineering, requirement elicitation techniques like FAST, QFD & Use case approach, requirements analysis using DFD, Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS. **[No. of Hrs.: 12]**

UNIT – II

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, COCOMO-II, Putnam resource allocation model, Risk Management.

Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design **[No. of Hrs.: 13]**

UNIT - III

Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics, Information Flow Metrics

Software Reliability: Importance, Hardware Reliability & Software Reliability, Failure and Faults, Reliability Models, Basic Model, Logarithmic Poisson Model, Software Quality Models, CMM & ISO 9001. **[No. of Hrs.: 12]**

UNIT - IV

Software Testing: Testing process, Design of test cases, functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing, Path Testing, Data flow and mutation testing, Unit Testing, Integration and System Testing, Debugging, Alpha & Beta Testing, Testing Tools & Standards.

Software Maintenance: Management of Maintenance, Maintenance Process, Maintenance Models, Regression Testing, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation. **[No. of Hrs.: 13]**

TEXT:

1. K. K. Aggarwal & Yogesh Singh, “Software Engineering”, 2nd Ed., New Age International, 2005.
2. R. S. Pressman, “Software Engineering – A practitioner’s approach”, 5th Ed., McGraw Hill Int. Ed., 2001.

REFERENCE:

1. Stephen R. Schach, “Classical & Object Oriented Software Engineering”, IRWIN, 1996.
2. James Peter, W. Pedrycz, “Software Engineering: An Engineering Approach”, John Wiley & Sons.
3. I. Sommerville, “Software Engineering”, Addison Wesley, 2002.

Code No. : MCA 253

Paper: Practical – III

Practicals will be based on following Papers:

1. Data base Management Systems
2. Front End Design Tools
3. Software Engineering

Code No. : MCA 255*
Paper: General Proficiency – III

***Non University Examination Scheme (NUES)**

There will not be any external examination of the university. The performance of the candidates should continuously be evaluated by an internal committee. The committee may conduct viva-voce at the end for the award of the marks.

INSTRUCTIONS TO PAPER SETTERS:

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

The Compelling Need for data warehousing: Escalating Need for strategic information, failures of Past decision-support systems, operational versus decision-support systems, data warehousing – the only viable solution, data warehouse defined

Data warehouse – The building Blocks: Defining Features, data warehouses and data marts, overview of the components, metadata in the data warehouse

Defining the business requirements: Dimensional analysis, information packages – a new concept, requirements gathering methods, requirements definition: scope and content

[No. of Hrs.: 12]

UNIT – II

Principles of dimensional modeling: Objectives, From Requirements to data design, the STAR schema, STAR Schema Keys, Advantages of the STAR Schema

Dimensional Modeling:

Updates to the Dimension tables, miscellaneous dimensions, the snowflake schema, aggregate fact tables, families of STARS

[No. of Hrs.: 12]

UNIT – III

OLAP in the Data Warehouse:

Demand for Online analytical processing, need for multidimensional analysis, fast access and powerful calculations, limitations of other analysis methods, OLAP is the answer, OLAP definitions and rules, OLAP characteristics, major features and functions, general features, dimensional analysis, what are hypercubes? Drill-down and roll-up, slice-and-dice or rotation, OLAP models, overview of variations, the MOLAP model, the ROLAP model, ROLAP versus MOLAP, OLAP implementation considerations

[No. of Hrs.: 13]

UNIT – IV

Data Mining Basics: What is Data Mining, Data Mining Defined, The knowledge discovery process, OLAP versus data mining, data mining and the data warehouse, Major Data Mining Techniques, Cluster detection, decision trees, memory-based reasoning, link analysis, neural networks, genetic algorithms, moving into data mining, Data Mining Applications, Benefits of data mining, applications in retail industry, applications in telecommunications industry, applications in banking and finance.

[No. of Hrs.: 13]

TEXT:

1. Paul Raj Poonia, “Fundamentals of Data Warehousing”, John Wiley & Sons, 2003.
2. Sam Anahony, “Data Warehousing in the real world: A practical guide for building decision support systems”, John Wiley, 2004

REFERENCES:

1. W. H. Inmon, “Building the operational data store”, 2nd Ed., John Wiley, 1999.
2. Kamber and Han, “Data Mining Concepts and Techniques”, Hartcourt India P. Ltd., 2001

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UNIT – I

Linux – The Operating System: Linux history, Linux features, Linux distributions, Linux's relationship to Unix, Overview of Linux architecture, Installation, Booting, Login and Shutdown Process, Start up scripts, controlling processes, system processes (an overview), Linux Security, Networking on Linux: Preparing Linux for Networking, Network Installation, configuring network setting after installation. **[No. of Hrs.: 12]**

UNIT – II

User Management: Types of users, The powers of Root, managing users (adding and deleting): using the command line, shell scripts and GUI tools.

The Linux File System: Basic Principles, Pathnames, Mounting and Unmounting File Systems, Different File Types, File Permissions, Disk Usage Limits, Directory Structure, The Ext2 and Ext3 File Systems, Check and Repair File Systems. **[No. of Hrs.: 14]**

UNIT – III

Shell in Linux: Available shells under Linux (viz. Bash, TCSH, Korn or so on), different shell features, editors, shell commands, shell scripts: shell variables, environmental variables, purpose of shell scripts, writing, storing and executing scripts, Filters- The grep family, advanced filters-sed and awk. **[No. of Hrs.: 12]**

UNIT – IV

Using the X-Windows System: What is X clients, servers and Windows Management, Exploring X Applications X – Lib Programming Model, creating and managing windows, handling events: key board and mouse management, an overview of drawing graphics, text handling colormap and manipulation. **[No. of Hrs.: 12]**

TEXT:

1. Barkakati N. "X-Windows System Programming", PHI, 2001
2. Cox K, "Red Hat Linux Administrator's Guide", PHI, 2001
3. Peterson Richard, "The Complete References Linux", 2nd Ed., Tata McGraw Hill, 2000

REFERENCES:

1. O'Reilly and Associates Vol. 0: Protocol Reference Manual, 1992
2. O'Reilly and Associates Vol. 1: Xlib Programming Manual, 1992
3. O'Reilly and Associates Vol. 2: Xlib Programming Manual, 1992
4. Bach, "The Design of the Unix Kernel", PHI, 2000

INSTRUCTIONS TO PAPER SETTERS:

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

Introduction to Java: Importance and features of Java, Keywords, constants, variables and Data Types, Operators and Expressions, Decision Making, Branching and Looping: if..else, switch,?: operator, while, do, for statements, labeled loops, jump statements: break, continue return. 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. **[No. of Hrs.: 12]**

UNIT – II

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 Datagram Programming **[No. of Hrs.: 13]**

UNIT – III

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. Beans: Introduction to Java Beans and Swings, Servlets

[No. of Hrs.: 12]**UNIT – IV**

Website Designing: Overview of Internet and Intranet Services, HTML Tags, Tables, Frames, Graphical and animation techniques, Static & Dynamic Web Pages, DHTML, ASP, Javascript **[No. of Hrs.: 13]**

TEXT:

1. Patrick Naughton and Herbert Schildt, “Java-2 The Complete Reference”, TMH, 1999.
2. Rick Dranell, “HTML 4 unleashed”, Techmedia Publication, 2000
3. Shelley Powers, “Dynamic Web Publishing”, 2nd Ed., Techmedia, 1998.

REFERENCES:

1. E. Balaguruswamy, “Programming with Java: A Primer”, TMH, 1998.
2. Horstmann, “Computing Concepts with Java 2 Essentials”, John Wiley
3. Decker & Hirshfield, “Programming Java: A introduction to programming using JAVA”, Vikas Publication, 2000.

INSTRUCTIONS TO PAPER SETTERS:

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UNIT – I

Introduction and The Physical Layer: Uses of Computer Networks, Network Hardware, Network Software, Reference Model (OSI, TCP/IP Overview), The Physical Layer, Theoretical Basis for Data Communication, Guided Transmission Media, Wireless Transmission, Communication Satellites, Digital Signal Encoding Formats – NRZ-L, NRZI, Bipolar-AMI, Manchester, Differential Manchester, Digital Modulation – ASK, FSK, PSK, QPSK, Digitization – Sampling Theorem, PCM, DM, Analog Modulation – Introducing AM, FM, PM, The Public Switched Telephone Network, The Mobile Telephone System.

[No. of Hrs.: 15]

UNIT – II

The Data Link Layer: Data Link Layer Design Issues, Error Detection and Correlation, Flow Control Protocols, Stop-and-wait Flow Control, Sliding – Window Flow Control, Error Control, Stop-and-wait ARQ, Go-back-N, Selective-repeat, Example of Data Link Protocols-HDLC

The Medium Access Control Sub Layer: The Channel Allocation Problem, Multiple Access Protocols, Ethernet, wireless LANs, Blue Tooth, Data Link Layer Switching.

[No. of Hrs.: 12]

UNIT – III

The Network Layer: Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Quality of Service, Internetworking, The Network Layer in the Internet.

[No. of Hrs.: 12]

UNIT – IV

The Transport Layer and Network Security: The Transport Service, Elements of Transport Protocols, A Simple Transport Protocol, The Internet Transport Protocols; UDP, TCP, Performance Issues.

[No. of Hrs.: 11]

TEXT:

1. A. S. Tananbaum, “Computer Networks”, 4th Ed., Pearson, 2003
2. W. Stallings, “Data and Computer Communications”, 7th Ed., Pearson, 2002.

REFERENCES:

1. Black U, “Computer Networks-Protocols, Standards and Interfaces”, PHI 1996
2. Comer E. Douglas, “Computer Networks and Internets”, 2nd Ed., Pearson, 2000
3. Comer E. Douglas, “Internetworking with TCP/IP, Vol. 1, PHI, 2000
4. Laura Chappell (Ed), “Introduction to Cisco Router Configuration”, Techmedia, 99.

Code No. MCA 210

L T C

Paper: Organizational Behaviour

3 1 4

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

Meaning & Nature of Management, Management Systems and Processes, Managerial Skills, Tasks & Responsibilities of a Professional Manager.

[No. of Hrs.: 12]

UNIT – II

Planning Types and Process, Management by Objectives, Decision-Making Models, Organizational context of decisions, Problem solving techniques and processes, Controlling: Process and Techniques

[No. of Hrs.: 13]

UNIT – III

Organizational Climate, Culture and Managerial ethos, Organisational structure & Design, Managerial Communication.

[No. of Hrs.: 12]

UNIT – IV

Individual Determinants of organizational, Behaviours: Perceptions, Learning, Personality, Attitudes & Values, Motivation, Job Anxiety & Stress, Analysing, Interpersonal relations, Group Dynamics, Management of Organizational Conflicts, Management of Change, Leadership Styles & Influence.

[No. of Hrs.: 13]

TEXT:

1. Stephen P. Robbins, David & Decenzo, “Fundamentals of Management”, 3rd Edition, Pearson Education, 2002.
2. Stoner, et. al., “Management”, 6th Edition, PHI, 2002.
3. J. S. Chandan, “Organisational Behaviour”, Vikas Publishing House, 2004.

REFERENCES:

1. Joseph W. Weiss, “Organisational Behaviour & Change, Managing Diversity, Cross-Cultural Dynamics & Ethics”, 2nd Edition, Vikas Publishing House, 2001
2. Richard Pettinger, “Introduction to Management”, 3rd Edition, Palgrave Macmillan, 2002.
3. Udai Pareek, “Understanding Organisational Behaviour”, 1st Edition, Oxford University Press, 2004.
4. Fred Luthans, “Organisational Behaviour,” 9th Edition, McGraw Hill International Edition, 2002.

Code No. : MCA 252

Paper: Practical – IV

Practicals will be based on following Papers:

1. Java Programming & Web Site Design
2. Linux & X – Windows Programming
3. Data Warehousing and Data Mining

Code No. : MCA 254*

Paper: General Proficiency – IV

***Non University Examination Scheme (NUES)**

There will not be any external examination of the university. The performance of the candidates should continuously be evaluated by an internal committee. The committee may conduct viva-voce at the end for the award of the marks.

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UNIT – I

Introduction to Software Engineering: Software Engineering Development, Software Life Cycle Models, Comparison of various models

Requirement Elicitation: Introduction to Object Oriented Methodology, Overview of Requirements Elicitation, Requirements Model-Action & Use cases, Requirements Elicitation Activities, Managing Requirements Elicitation. **[No. of Hrs.: 12]**

UNIT – II

Architecture: Introduction, System development is model building, model architecture, requirements model, analysis model, the design model, the implementation model, test model

Analysis: Introduction, the requirements model, the analysis model

[No. of Hrs.: 13]**UNIT – III**

Construction: Introduction, the design model, block design, working with construction

Testing: introduction, on testing, unit testing, integration testing, system testing, the testing process **[No. of Hrs.: 13]**

UNIT – IV

Modelling with UML: Basic Building Blocks of UML, A Conceptual Model of UML, Basic Structural Modeling, UML Diagrams.

Case Studies

[No. of Hrs.: 12]**TEXT:**

1. Ivar Jacobson, "Object Oriented Software Engineering", Pearson, 2004.
2. Grady Booch, James Runbaugh, Ivar Jacobson, "The UML User Guide", Pearson, 2004.

REFERENCES:

1. Stephen R. Scach, "Classical & Object Oriented Software Engineering with UML and Java: McGraw Hill, 1999.
2. Richard C. Lee, William M. Tepfenhard, "UML and C++, A Practical guide to object-oriented Development", Pearson

INSTRUCTIONS TO PAPER SETTERS:

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

Scope of AI: Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques-search knowledge, abstraction.

Problem Solving (Blind): State space search; production systems, search space control; depth-first, breadth-first search.

Heuristic Based Search: Heuristic search, Hill climbing, best-first search, branch and bound, Problem Reduction, Constraint Satisfaction End, Means-End Analysis. **[No. of Hrs.: 14]**

UNIT – II

Game Playing: Game Tree, Minimax Algorithm, Alpha Beta Cutoff, Modified Minimax Algorithm, Horizon Effect, Futility Cut-off.

Knowledge Representation: Predicate Logic: Unification, Modus Ponens, Modus Tolens, Resolution in Predicate Logic, Conflict Resolution Forward Chaining, Backward Chaining, Declarative and Procedural Representation, Rule based Systems.

Structured Knowledge Representation: Semantic Nets: Slots, exceptions and default frames, conceptual dependency, scripts. **[No. of Hrs.: 14]**

UNIT – III

Handling Uncertainty: Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic.

Natural Language Processing: Introduction, Syntactic Processing, Semantic Processing, Pragmatic Processing. **[No. of Hrs.: 12]**

UNIT – IV

Learning: Concept of learning, learning automation, genetic algorithm, learning by inductions, neural nets.

Expert Systems: Need and justification for expert systems, knowledge acquisition, Case Studies: MYCIN, RI. **[No. of Hrs.: 10]**

TEXT:

1. E. Rich and K. Knight, "Artificial Intelligence", TMH, 2nd Ed., 1992.
2. N. J. Nilsson, "Principles of AI", Narosa Publ. House, 1990.
3. M. N. Hoda, "Foundation Course in Artificial Intelligence", Vikas Pub., 2004.

REFERENCES:

1. P. H. Winston, "Artificial Intelligence", Pearson Education, 3rd Edition, 2000
2. D. W. Patterson, "Introduction to AI and Expert Systems", PHI, 1992.
3. R. J. Schalkoff, "Artificial Intelligence – An Engineering Approach", McGraw Hill Int. Ed. Singapore, 1992.
4. M. Sasikumar, S. Ramani, "Rule Based Expert Systems", Narosa Publishing House, 1994.

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

Introductory Concepts: Multimedia – Definitions, CD-ROM and the Multimedia Highway, Uses of Multimedia, Introduction to making multimedia – The Stages of project, the requirements to make good multimedia, Multimedia skills and training, Training opportunities in Multimedia. Motivation for multimedia usage, Frequency domain analysis, Application Domain & ODA etc.

Multimedia-Hardware and Software: Multimedia Hardware – Macintosh and Windows production Platforms, Hardware peripherals – Connections, Memory and storage devices, Media software – Basic tools, making instant multimedia, Multimedia software and Authoring tools, Production Standards. **[No. of Hrs.: 12]**

UNIT – II

Multimedia – making it work – multimedia building blocks – Text, Sound, Images, Animation and Video, Digitization of Audio and Video objects, Data Compression: Different algorithms concern to text, audio, video and images etc., Working Exposure on Tools like Dream Weaver, 3D Effects, Flash Etc., **[No. of Hrs.: 13]**

UNIT – III

Multimedia and the Internet: History, Internet working, Connections, Internet Services, The World Wide Web, Tools for the WWW – Web Servers, Web Browsers, Web page makers and editors, Plug-Ins and Delivery Vehicles, HTML, VRML, Designing for the WWW – Working on the Web, Multimedia Applications – Media Communication, Media Consumption, Media Entertainment, Media games. **[No. of Hrs.: 13]**

UNIT – IV

Multimedia-looking towards Future: Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing, Assembling and delivering a project-planning and costing, Designing and Producing, content and talent, Delivering, CD-ROM technology. **[No. of Hrs.: 12]**

TEXT:

1. Steve Heath, “Multimedia & Communication Systems”, Focal Press, UK, 1999.
2. Tay Vaughan, “Multimedia: Making it work”, TMH, 1999.
3. K. Andleigh and K. Thakkar, “Multimedia System Design”, PHI, PTR, 2000.

REFERENCES:

1. Keyes, “Multimedia Handbook”, TMH, 2000.
2. Ralf Steinmetz and Klara Naharstedt, “Multimedia: Computing, Communications & Applications”, Pearson, 2001.
3. Steve Rimmer, “Advanced Multimedia Programming”, MHI, 2000.

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UNIT – I

Computer Number Systems, Codes, and Digital Devices: Computer Number Systems and Codes, Microprocessor Evolution and Types, the 8086 microprocessor family-overview, 8086 internal architecture, introduction to programming the 8086, addressing modes of 8086.

8086 Family Assembly Language Programming: Program Development Steps, Constructing the machine codes for 8086 instructions, writing programs for use with an assembler, assembly language program development tools
[No. of Hrs.: 12]

UNIT – II

Implementing Standard Program Structures in 8086 Assembly Language: Simple Sequence Programs, Jumps, Flags, and Conditional Jumps, If-Then, if-then-else, and multiple if-then-else programs, while-do programs, repeat-until programs, instruction timing and delay loops

Strings, Procedures, and macros: the 8086 string instructions, writing and using procedures, writing and using assembler macros

8086 Instruction Descriptions and Assembler Directives
[No. of Hrs.: 13]

UNIT – III

8086 System Connections, Timing, and Troubleshooting: A basic 8086 microcomputer System, An example Minimum-mode System, the SDK-86, Troubleshooting a simple 8086-based microcomputer, Timing Diagrams

8086 Interrupts and Interrupt Applications: 8086 interrupts and Interrupt Responses, Hardware Interrupt Applications
[No. of Hrs.: 12]

UNIT – IV

Interfacing 8086 with 8255, 8254, 8259, 8253, 8251, 8259, 8279.

Brief Introduction to Architecture of 80186, 80286, 80386, 80486, 8087 and Pentium architecture.
[No. of Hrs.: 13]

TEXT:

1. D. V. Hall, “Microprocessors and Interfacing”, TMH, 2nd Edition, 1999

REFERENCES:

1. Peter Able, “IBM PC Assembly language programming”, PHI, 1994.
2. James. L. Antonaks, “An Introduction to the Intel Family of Microprocessors”, Addison Wesley, 1999.
3. Liu Gibson, “Microprocessor Systems: The 8086/8088 family Architecture, Programming & Design”, PHI, 1999.

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UNIT – I

Review of Physical, Layer, Data link layer, LAN Technologies, ISDN, Frame-relay & ATM, Datalink Protocol.

[No. of Hrs.: 12]**UNIT – II**

Network Layer: ARP, RARP, ICMP, Routing Algorithms and Protocols, Router Operation, Router Configuration, Internetworking, IPv4 Protocol, IPv6 (an overview).

[No. of Hrs.: 14]**UNIT – III**

User Datagram Protocol: Header, Checksum and Port Numbers.

Transmission Control Protocol: Services and Headers, Connection establishment and Termination, Timeout of Connection Establishment and TCP timeout and retransmission, Maximum Segment Size, Reset Segments, TCP Options.

[No. of Hrs.: 12]**UNIT – IV**

Application Layer: DNS, SNMP, RMON, Electronic Mail, WWW.

Network Security: Firewalls (Application and packet filtering), Virtual Private Network, Cryptography

[No. of Hrs.: 12]**TEXT:**

1. Behrouz A. Forouzan, "TCP/IP Protocol Suit", TMH, 2000.
2. Tananbaum A. S., "Computer Networks", 3rd Ed., PHI, 1999.

REFERENCES:

1. Black U, "Computer Networks-Protocols, Standards and Interfaces", PHI, 1996.
2. Stallings W., "Data and Computer Communications", 6th Ed., PHI, 2002.
3. Stallings W., "SNMP, SNMPv2, SNMPv3, RMON 1 & 2", 3rd Ed., Addison Wesley, 1999.
3. Laurra Chappell (Ed), "Introduction to Cisco Router Configuration", Techmedia, 1999.

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UNIT - I

Discrete time signals and systems, Z-transforms, structures for digital filters, design procedures for FIR and IIR filters. Frequency transformations: linear phase design; DFT. Methods for computing FFT. Noise analysis of digital filters, power spectrum estimation.

Signals and signal Processing: characterization & classification of signals, typical Signal Processing operations, example of typical Signals, typical Signals Processing applications.

Time Domain Representation of Signals & Systems: Discrete Time Signals, Operations on Sequences, the sampling process, Discrete-Time systems, Time-Domain characterization of LTI Discrete-Time systems **[No. of Hrs.: 12]**

UNIT - II

Transform-Domain Representation of Signals: the Discrete-Time Fourier Transform, Discrete Fourier Transform, DFT properties, computation of the DFT of real sequences, Linear Convolution using the DFT. Z-transforms, Inverse z-transform, properties of z-transform, transform domain representations of random signals, FFT.

Transform-Domain Representation of LTI Systems: the frequency response, the transfer function, types of transfer function, minimum-phase and maximum-Phase transfer functions. **[No. of Hrs.: 14]**

UNIT - III

Digital Processing of continuous-time signals: sampling of continuous signals, analog filter design, anti-aliasing, filter design, sample-and-hold circuits, A/D & D/A converter, reconstruction filter design.

Digital Filter Structure: Block Diagram representation, Signal Flow Graph Representation, Equivalent Structures, FIR Digital Filter Structures, IIR Filter Structures. **[No. of Hrs.: 12]**

UNIT - IV

Digital Filter Design: Impulse invariance method of IIR filter design, Bilinear Transform method of IIR Filter Design, Design of Digital IIR notch filters, FIR filter Design based on truncated fonner sens, FIR filter design based on Frequency Sampling approach.

Applications of DSP. **[No. of Hrs.: 12]**

TEXT:

1. Sanjit K. Mitra, "Digital Signal Processing a Computer based approach", TMH, 2001.
2. Allan Y. Oppenheim & Ronald W. Schater, "Digital Signal Processing", PHI, 1975.

REFERENCES:

1. Proakis Manodans, "Digital Signal Processing: Principles, algorithms and applications", PHI, 2003.
2. Vijay K. Madiseti, "The Digital Signal Processing Hand Book", Butterworth-Heinemann, USA, 1999.

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UNIT – I

Biological, Analogy, Architecture classification, Neural Models, Learning Paradigm and Rule, single unit mapping and the preception. **[No. of Hrs.: 12]**

UNIT - II

Feed forward networks – Review of optimization methods, back propagation, variation on backpropagation, FFANN mapping capability, Mathematical properties of FFANN's Generalization, Bias & variance Dilemma, Radial Basis Function networks.

[No. of Hrs.: 13]

UNIT - III

Recurrent Networks – Symmetric hopfield networks and associative memory, Boltzmann machine, Adaptive Resonance Networks **[No. of Hrs.: 12]**

UNIT - IV

PCA, SOM, LVQ, Hopfield Networks, Associative Memories, RBF Networks, Applications of Artificial Neural Networks to Function Approximation, Regression, Classification, Blind Source Separation, Time Series and Forecasting. **[No. of Hrs.: 14]**

TEXT:

1. Haykin S., “Neural Networks-A Comprehensive Foundations”, Prentice-Hall International, New Jersey, 1999.
2. Anderson J.A., “An Introduction to Neural Networks”, PHI, 1999.

REFERENCES:

1. Hertz J, Krogh A, R.G. Palmer, “Introduction to the Theory of Neural Computation”, Addison-Wesley, California, 1991.
2. Freeman J.A., D.M. Skapura, “Neural Networks: Algorithms, Applications and Programming Techniques”, Addison-Wesley, Reading, Mass, 1992.
3. Patterson D.W., “Artificial Neural Networks: Theory and Applications”, Prentice Hall, Singapore, 1995.
4. J. M. Zurada, “Artificial Neural Systems”, Jaico Pub., 2000.

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UNIT - I

Introduction And Digital Image Fundamentals: The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbours, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations.

Image Enhancement in the Spatial Domain: Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothing and Sharpening Spatial Filters, Combining Spatial Enhancement Methods. [No. of Hrs.: 12]

UNIT - II

Image Enhancement in the Frequency Domain: Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters, Homomorphic Filtering.

Image Restoration: A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear Position-Invariant Degrations, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations. [No. of Hrs.: 13]

UNIT - III

Image Compression: Coding, Interpixel and Psychovisual Redundancy, Image Compression models, Elements of Information Theory, Error free comparison, Lossy compression, Image compression standards.

Image Segmentation: Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region Oriented Segmentation, Motion based segmentation. [No. of Hrs.: 13]

UNIT - IV

Representation and Description: Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.

Object Recognition: Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods. [No. of Hrs.: 12]

TEXT BOOKS:

1. Rafael C. Gonzales & Richard E. Woods, "Digital Image Processing", 2nd edition, Pearson Education, 2002.
2. A.K. Jain, "Fundamental of Digital Image Processing", PHI, 1989.

REFERENCES:

1. Bernd Jahne, "Digital Image Processing", 5th Ed., Springer. 2000
2. William K Pratt, "Digital Image Processing: Pks Inside", John Wiley & Sons, 2001.

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks.

UNIT – I

Introduction: What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory. **[No. of Hrs.: 12]**

UNIT - II

Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Structural Testing: Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing. **[No. of Hrs.: 13]**

UNIT - III

Reducing the number of test cases:

Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, Slice based testing

Testing Activities: Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, Domain Testing. **[No. of Hrs.: 12]**

UNIT - IV

Object Oriented Testing: Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.

Testing Tools: Static Testing Tools, Dynamic Testing Tools, Characteristics of Modern Tools. **[No. of Hrs.: 13]**

TEXT:

1. William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995.
2. Louise Tamres, "Software Testing", Pearson Education Asia, 2002
3. Robert V. Binder, "Testing Object-Oriented Systems-Models, Patterns and Tools", Addison Wesley, 1999.

REFERENCE:

1. Cem Kaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
2. K.K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed., New Age International Publishers, New Delhi, 2005
3. Boris Beizer, "Software Testing Techniques", Second Edition, Wiley-Dreamtech India, New Delhi, 2003
4. Boris Beizer, "Black-Box Testing – Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc., New York, 1995.

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UNIT – I

Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, α -cuts, Properties of α -cuts, Decomposition Theorems, Extension Principle.

Operations on Fuzzy Sets: Complement, Intersections, Unions, Combinations of Operations, Aggregation Operations. **[No. of Hrs.: 12]**

UNIT - II

Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Fuzzy Relations: Crisp & Fuzzy Relations, Projections & Cylindric Extensions, Binary Fuzzy Relations, Binary Relations on single set, Equivalence, Compatibility & Ordering Relations, Morphisms, Fuzzy Relation Equations. **[No. of Hrs.: 14]**

UNIT - III

Possibility Theory: Fuzzy Measures, Evidence & Possibility Theory, Possibility versus Probability Theory.

Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges. **[No. of Hrs.: 13]**

UNIT – IV

Unertainty based Information: Information & Uncertainty, Nonspecificity of Fuzzy & Crisp sets, Fuzziness of Fuzzy Sets.

Applications of Fuzzy Logic: **[No. of Hrs.: 11]**

TEXT:

1. G.J.Klir & T.A. Folyger, "Fuzzy Sets, Uncertainty & Information", PHI, 1988.
2. G.J.Klir & B.Yuan, "Fuzzy sets & Fuzzy logic," PHI, 1995.

REFERENCES:

1. Guanrong Chen, Trung Tat Pham, "Introduction to Fuzzy Sets, Fuzzy Logic and Fuzzy Control Systems", CRC Pren, USA, 2001.
2. Ulrich Hohle, "Mathematics of Fuzzy Sets: Logics topology and Measure Theory", Kluwer Academic Publishers, USA, 1999.

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UNIT – I

Parallel computer models: The state of computing , Multiprocessors and multicomputers, Multivector and SIMD computers, Architectural development tracks

Program and network properties :Conditions of parallelism, Data and resource dependences,Hardware and software parallelism,Program partitioning and scheduling, Grain size and latency, Program flow mechanisms,Control flow versus data flow,Data flow architecture,Demand driven mechanisms,Comparisons of flow mechanisms[**No. of Hrs.: 12**]

UNIT - II

System Interconnect Architectures : Network properties and routing, Static interconnection networks, Dynamic interconnection Networks, Multiprocessor system interconnects, Hierarchical bus systems, Crossbar switch and multiport memory,Multistage and combining network.

Processors and Memory Hierarchy : Advanced processor technology, Instruction-set Architectures,CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors,VLIW Architectures, Vector and Symbolic processors

Memory Technology :Hierarchical memory technology, Inclusion, Coherence and Locality, Memory capacity planning, Virtual Memory Technology [**No. of Hrs.: 13**]

UNIT - III

Backplane Bus System: Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt, Cache addressing models, Direct mapping and associative caches.

Pipelining :Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch handling techniques, Arithmetic Pipeline Design, Computer arithmetic principles, Static arithmetic pipeline, Multifunctional arithmetic pipelines [**No. of Hrs. 13**]

UNIT - IV

Vector Processing Principles : Vector instruction types, Vector-access memory schemes.

Synchronous Parallel Processing : SIMD Architecture and Programming Principles, SIMD Parallel Algorithms, SIMD Computers and Performance Enhancement [**No. of Hrs.: 12**]

TEXT:

1. Kai Hwang, “Advanced computer architecture”; TMH, 2000.

REFERENCES:

1. J.P.Hayes, “computer Architecture and organization”, MGH, 1998.
2. M.J Flynn, “Computer Architecture, Pipelined and Parallel Processor Design”, Narosa Publishing, 1998.
3. D.A.Patterson, J.L.Hennessy, “Computer Architecture :A quantitative approach”, Morgan Kauffmann, 2002.
4. Hwang and Briggs, “ Computer Architecture and Parallel Processing”; MGH.

Code No. MCA 323

L T C

Paper: Compiler Construction

3 1 4

INSTRUCTIONS TO PAPER SETTERS:

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UNIT - I

Classification of grammars, Context free grammars, Deterministic finite state automata (DFA) Non-DFA.

[No. of Hrs.: 12]

UNIT - II

Scanners, Top down parsing, LL grammars, Bottom up parsing, Polish expression Operator Precedence grammar, IR grammars, Comparison of parsing methods, Error handling.

Symbol table handling techniques, Organization for non-block and block structured languages.

[No. of Hrs.: 14]

UNIT - III

Run time storage administration, Static and dynamic allocation, Intermediate forms of source program, Polish N-tuple and syntax trees, Semantic analysis and code generation.

[No. of Hrs.: 13]

UNIT - IV

Code optimization, Folding, redundant sub-expression evaluation, Optimization within iterative loops.

[No. of Hrs.: 11]

TEXT:

1. Tremblay, et. al., "The Theory and Practice of Compiler Writing", McGraw Hill, New York, 1985.
2. A. Holub, "Compiler Design in C", PHI, 2004
3. Aho, Ullman & Ravi Sethi, "Principles of Compiler Design", Pearson Education, 2002

REFERENCES:

1. Andrew L. Appel, "Modern Compiler Implementation in C", Delhi, Foundation Books, 2000.
2. Dick Grune et. Al., "Modern Compiler Design", John Wiley and Sons, 2000.

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UNIT – I

Requirements engineering: Requirements Elicitation, Requirement Elicitation techniques, Requirement Analysis, Requirement Analysis Models, Requirement Documentation, Requirement Management, IEEE Std. For SRS **[No. of Hrs.: 12]**

UNIT - II

Size Estimation: Function Point Analysis, Mask II FPA, LOC estimation, Conversion between size measures **[No. of Hrs.: 13]**

UNIT - III

Effort, schedule & cost estimation: Estimation factors, COCOMO-II, Putnam Estimation Model, Estimation by Analogy, Validating Software Estimates **[No. of Hrs.: 13]**

UNIT - IV

Introduction to software life cycle, management activities in software project
Tools: Software Estimation Tools

Industry Resources; IFPUG, UQAM-SEMRL, COSMIC, IEEE, COCOMO **[No. of Hrs.: 12]**

TEXT:

1. Swapna Kishore, Rajesh Naik, “Software Requirements and Estimation”, TMH, 1992.

REFERENCE:

1. K.K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed., New Age International Publishers, New Delhi, 2005.
2. Roger Pressman, “Software Engineering: A Practitioner’s Approach”, 3rd Edition, McGraw Hill, 1992.

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UNIT – I

Distributed DBMS features and needs, Reference Architecture, Levels of Distribution Transparency, Replication, Distributed database design – Fragmentation, allocation criteria, Storage mechanisms, Translation of Global Queries / Global Query Optimisation, Query Execution and access plan.
[No. of Hrs.: 12]

UNIT – II

Concurrency control – 2 phase locks, distributed deadlocks, time based and quorum based protocols, comparison reliability – non-blocking commitment protocols, Partitioned networks, Check points and Cold starts.
[No. of Hrs.: 13]

UNIT – III

Management of Distributed Transactions – 2 phase unit protocols, Architectural aspects, Node and link failure recoveries, Distributed data dictionary management, Distributed database administration.
[No. of Hrs.: 12]

UNIT – IV

Heterogeneous database-federated database, reference architecture, loosely and tightly coupled, Alternative architectures, Development tasks, operation – global task management, Client server databases – SQL server, Open database connectivity, Constructing an Application.
[No. of Hrs.: 13]

TEXT:

1. S. Ceri, G. Pelagatti, “Distributed Database: Principles and Systems”, McGraw Hill, New York, 1985.

REFERENCES:

1. Lin Wujuan, Veeravalli Bhardwaj, “Object Management in distributed database systems”, Kluwer Academic Publishers, UK, 2003.
2. V. K. Jain, “Advanced DBMS”, Cyber Tech Publications, 2001.
3. Mario Piattini, “Advanced Database Technology and Design”, Artech House, UK, 2000.

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UNIT – I

Linear Programming: Linear Programming Formulations, Graphical Method for Solving Linear Programming with 2 variables, Simplex Methods, Duality Theory in Linear Programming and Applications, Transportation Problem (Modified Distribution Method, Stepping Stone Method), Assignment Problem (Hungarian Method). **[No. of Hrs.: 12]**

UNIT – II

Network Analysis: Shortest-route Problem, Dijkstras Algorithm, Application of Shortest-route Problems, Max Flow Problem, Flow Network, Labelling Routine, Labelling Algorithm for the Max Flow Problem, Min-cut and Max-flow min-cut theorem.

Project Scheduling by PERT/CPM: Project Management Origin and use of PERT and use of CPM, Applications of PERT and CPM, Project Network, Diagram representation, Critical path Calculations by Network Analysis and Critical Path Method, Determination of Floats, Construction of Time Chart and Resource Leveling, Project Cost Curve and Crashing in Project Management, Program Evaluation and Review Technique (PERT).

[No. of Hrs.: 15]

UNIT – III

Sequencing Models: Sequencing Problem, Johnson's Algorithm for Processing and Jobs through 2 Machines, Johnson's Algorithm for Processing and Jobs through 3 Machines, Processing m Jobs through n Machines, Processing 2 Jobs through n Machines; Graphical Solution, Dynamic Programming, Characteristics of Dynamic Programming Problem, Bellman's Optimality Principles, Dynamic Programming Under Certainty, Shortest Route Problem, Single Additive Constraint, Multiplicative Separable Return.

[No. of Hrs.: 12]

UNIT – IV

Queuing and Inventory Models: Queuing Models, The M/M/1 System, The M/M/C System, The M/M/∞ System, The M/E_K/1 System, Inventory Models, Introduction to the Inventory Problem, Deterministic Models, The Classical EOQ (Economic Order Quantity) Model, The EOQ with Shortages Allowed.

[No. of Hrs.: 11]

TEXT:

1. Hamdy A. Taha, "Operations Research: An Introduction", 7th Ed., Pearson, 2000.

REFERENCES:

1. Sharma J. K., "Operations Research: Theory and Applications", Macmillan India, 1997.
2. Gross Donald, "Fundamentals of Queuing Theory", 3rd Ed., John Wiley, 1998.
3. Mokhtar S. Bazaraa, "Linear Programming and Network Flows", 2nd Ed., John Wiley, 2000
4. Hiller Lieberman, "Introduction to Operations Research", 6th Ed., TMH, 1994.

Code No. MCA 331
Paper: Project

L	T	C
3	1	4

Student may select a project related to any of the subjects of the current semester.

Code No. : MCA 351

Paper: Practical – III

Practical will be based on following Paper:

1. Object Oriented Software Engineering
And
other electives subjects with, which lab can be associated

Code No. : MCA 353*
Paper: General Proficiency – IV

***Non University Examination Scheme (NUES)**

There will not be any external examination of the university. The performance of the candidates should continuously be evaluated by an internal committee. The committee may conduct viva-voce at the end for the award of the marks.