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	Front End Design Tools	3	1	4
MCA 207	Microprocessor	3	1	4
MCA 209	Design and Analysis of Algorithms	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	Software Engineering	3	1	4
MCA 204	Java Programming	3	1	4
MCA 206	Computer Networks	3	1	4
MCA 208	Organizational Behaviour	3	1	4
ELECTIVE (select any one)				
MCA 210	Computer Networks	3	1	4
MCA 212	Internet Technologies	3	1	4
PRACTICALS				
MCA 252	Practical – IV	0	8	4
MCA 254*	General Proficiency – IV	2	0	2
	Total	**17**	**13**	**26**

*NUES

Code No.: MCA 101   **L**   **T**
Paper: Introduction to Information Technology   **3**   **1**

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. 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 1

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 2

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 3

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 4

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. "Fundamentals of Information Technology", Alex Leon & Mathews Leon", Leon Techworld.
2. "Foundation of Computing", P. K. Sinha & Priti Sinha, BPB Publications.

References:
1. "Introduction to Computers", V. Raja Raman, PHI.
2. "Introduction to Computers", Alex Leon & Mathews Leon, Vikas Publishing House.
3. "Introduction to computers", Norton Peter, 2/e McGraw Hill.
4. "Communication System", Simon Haykins, John Wiley & Sons.
5. "Introduction to Database System", West Publishing, Bipin Desai

Code No.: MCA 103   **L   T**

Paper: Digital Electronics   **3   1**

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. 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 1

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 2

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 3

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 4

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. "Digital Logic and Computer Design", M.Mano, PHI, 2002
2. "Modern Digital Electronics", R.P. Jain, TMH, 2nd Ed., 1997

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

w.e.f. session 2004-2005

Code No.:   MCA 105   L   T
Paper: Problem Solving using C   3   1

Unit 1

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 2

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 3

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 4

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

References:
1.   "Application programming in Ansi C", Johnsonbaugh et. al., PHI
2.   "A Book on C", Al Kelly and Ira Pohl, (4th Ed.) Addison Wesley
3.   "The ANSI C Programming Language", B. Kernighan and D. Ritchie (2nd Ed.), PHI.

w.e.f. session 2004-2005

Code No.: MCA 107　　　　　　　　　　　　　　　　**L**　　**T**
Paper: Discrete Mathematics　　　　　　　　　　　**3**　　**1**

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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. 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.

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Unit 1

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 2

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 3

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 4

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
2.　　C.L. Liu, "Elements of Discrete Mathematics", TMH.

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

Code No.: MCA 109   L   T
Paper: Financial Accounting   3   1

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. 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 1

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 2

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 3

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 4

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

w.e.f. session 2004-2005

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.

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
4. L.E. Heitger and Serge Matulich, " Financial Accounting", New Delhi, McGraw Hill, 1990
5. Charles Horngren "Principles of Financial & Management Accounting" Englewood Cliffs, New Jersey
6. Atkinson, Banker, Kaplam & Young, "Management Accounting", Prentice Hall
7. N.L. Hingorani an A.R. Ramanathan, "Management Accounting", 5th Ed., New Delhi, Sultan Chand,1992
8. Robert F. Meigs and Walter B. Meigs, "Accounting: The Basis for Business Decisions", 8th Ed., N.Y., 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.

Code No.: MCA 102   L   T
Paper: Data Structures   3   1

Unit 1

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, deques, multiples 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 2

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 3

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 4

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.   "Fundamentals of Data Structures", E. Horowitz and S. Sahani, Galgotia Booksource Pvt. Ltd., (1999)
2.   2. "Data Structures and program design in C", R. L. Kruse, B. P. Leung, C. L. Tondo, PHI.
3.   "Data Structure", Schaum's outline series, TMH, 2002
References:
1.   "Data Structures using C and C++", Y. Langsam et. al., PHI (1999).
2.   "Data Structures", N. Dale and S.C. Lilly, D.C. Heath and Co. (1995).
3.   "Data Structure & Algorithms", R. S. Salaria, Khanna Book Publishing Co. (P) Ltd., 2002.

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Code No.: MCA 104
Paper: Theory of Computation

L   T
3   1

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. 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 1

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 2

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 3

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 4

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

References:
1. "An Introduction to formal Languages and Automata", P. Linz, Norasa.
2. "Theory of Computer Science", Mishra, Chandrashekharan, PHI
3. "Introduction to Languages and the theory of Automata", John C Martin, McGraw Hill

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Code No.:   MCA 106   L   T
Paper: Computer System Architecture   3   1

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. 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 1

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 2

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 3

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 4

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.

References:
1.   Malvino, "Digital Computer Electronics: An Introduction to Microcomputers, 3/e", McGraw Hill.
2.   Hayes, J.P. "Computer Architecture and Organization", McGraw Hill.
3.   Stallings W, "Computer Organization & Architecture", PHI

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Code No.:MCA 108   **L   T**
Paper: Computer Graphics   **3   1**

Unit 1

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 2

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 3

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 4

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", AWL.
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.

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4. R.H. Bartels, J.C. Beatty and B.A. Barsky, "An Introduction to Splines for use in Computer Graphics and Geometric Modeling", Morgan Kaufmann Publishers Inc., 1987.
5. C.E. Leiserson, T.H. Cormen and R.L. Rivest, "Introduction to Algorithms", McGraw-Hill Book Company, 1990.
6. W. Newman and R. Sproul, "Principles of Interactive Computer Graphics, McGraw-Hill, 1973.
7. F.P. Preparata and M.I. Shamos, "Computational Geometry: An Introduction", Springer-Verlag New York Inc., 1985.
8. Alan Watt and Mark Watt, "Advanced Animation and Rendering Techniques", Addison-Wesley, 1992.

Code No.: MCA 110   **L**   **T**
Paper: Object Oriented Programming   **3**   **1**

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. 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 1
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 2
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 3
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 4
Files and Exception Handling: Persistant 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.
2. S. B. Lippman & J. Lajoie, "C++ Primer", 3rd Edition, Addison Wesley, 2000.
References:
1. R. Lafore, "Object Oriented Programming using C++", Galgotia.
2. D . Parasons, "Object Oriented Programming with C++",BPB Publication.
3. G . Booch "Object Oriented Design & Applications", Benjamin,Cummings.
4. Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication.
5. Schildt Herbert, "The Complete Reference C++", 4th Ed. Tata McGraw Hill, Fowler Martin, "UML Distilled", Pearson.

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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.