

Indira Gandhi University, Meerpur Rewari



Syllabus for MCA- Regular

Session –w.e.f. 2019-2020

Indira Gandhi University Meerpur Rewari
Master of Computer Applications (MCA) Regular Programme
Syllabus and Scheme of Examination (CBCS)
w.e.f. 2019-20

MCA First Year
Semester-I

Course No.	Paper	(L:T:P)	Credits	University Exams	Internal Assessment	Total
MCA-101A	Mathematical Foundation of Computer Science	4:1:0	5	80	20	100
MCA-102 A	Computer Fundamentals & Programming in C	4:1:0	5	80	20	100
MCA-103 A	Digital Design	4:1:0	5	80	20	100
MCA-104A	Internet and Web Designing	4:1:0	5	80	20	100
MCA-105 A	Data Base Management System	4:1:0	5	80	20	100
MCA-106 A	Software Lab-1 i) Programming in C ii) Web Programming Using HTML	0:0:3	3	80	20	100
MCA-107 A	SoftwareLab-2 i) SQL/Oracle Programs ii) Use of MS office	0:0:3	3	80	20	100
MCA-108A	Seminar	-	1	-	-	25
MCA-109A	Self Study Paper	-	1	-	-	25
			33	560	140	750

*Practical Examination of MCA-106 & 107 may be conducted on the same day in 2 sittings each maximum of 4 hours.

Semester-II

Course No.	Paper	(L:T:P)	Credits	University Exams	Internal Assessment	Total
MCA-201A	Data Structures	4:1:0	5	80	20	100
MCA-202A	Computer Organization & Architecture	4:1:0	5	80	20	100
MCA-203 A	Computer Based Management System & E-Commerce	4:1:0	5	80	20	100
MCA-204 A	Object Oriented Programming Using C++	4:1:0	5	80	20	100
MCA-205 A	Operating Systems	4:1:0	5	80	20	100
MCA-206 A	Software Lab-3 Data structure lab Using C/C++	0:0:3	3	80	20	100
MCA-207 A	Software Lab-4 C++ Lab	0:0:3	3	80	20	100
MCA-208A	Seminar	-	1	-	-	25
MCA-209A	Self Study Paper	-	1	-	-	25
	Total Credits		33	560	140	750

*Practical Examination of MCA-206 & 207 may be conducted on the same day in 2 sittings each maximum of 4 hours.

MCA Second Year

Semester-III

Course No.	Paper	(L:T:P)	Credits	University Exams	Internal Assessment	Total
MCA-301A	Computer Graphics & Multimedia	4:1:0	5	80	20	100
MCA-302A	Theory of Automata	4:1:0	5	80	20	100
MCA-303A	Artificial Intelligence & Expert Systems	4:1:0	5	80	20	100
MCA-304A	Data Communication & Computer Networks	4:1:0	5	80	20	100
MCA-305A	Java Programming	4:1:0	5	80	20	100
MCA-306A	Software Lab-5 i) Graphics Programming in C/C++. ii) PROLOG Programming	0:0:3	3	80	20	100
MCA-307A	Software Lab-6 i) Java Programming	0:0:3	3	80	20	100
MCA-308A	Seminar	-	1	-	-	25
MCA-309A	Self Study Paper	-	1	-	-	25
			33	560	140	750

*Practical Examination of MCA-306 & 307 may be conducted on the same day in 2 sittings each maximum of 4 hours.

Open Elective	
To be Chosen from the pool of Open Electives provided by the University	2

Total Credits= 33 Credits

Semester-IV

Paper Code	Course	(L:T:P)	Credits	University Exams	Internal Assessment	Total
MCA-401A	UNIX & Shell Programming	4:1:0	5	80	20	100
MCA-402 A	Data Warehousing & Mining	4:1:0	5	80	20	100
MCA-403 A	Software Engineering & Software Testing	4:1:0	5	80	20	100
MCA-404 A	Elective-I*	4:0:0	5	80	20	100
MCA-405 A	NET Programming with C#	4:1:0	5	80	20	100
MCA-406 A	SoftwareLab-7 C# .NET Programming	0:0:3	3	80	20	100
MCA-407 A	Software Lab-8 UNIX Lab	0:0:3	3	80	20	100
MCA-408A	Minor Project-I	0:2:0	2	-	25	25
MCA-408A	Seminar/Journal Club	-	1	-	-	25
MCA-409A	Self Study Paper	-	1	-	-	25
	Total		35	560	165	775

Open Elective	
To be Chosen from the pool of Open Electives provided by the University	2

Total Credits= 35 Credits

*Practical Examination of MCA-406 & 407 may be conducted on the same day in 2 sittings each maximum of 4 hours.

MCA Third Year

Semester-V

Paper Code (HC/SC/FE/OE)	Course	(L:T:P)	Credits	Univer sity Exams	Internal Assessment	Total
MCA-501 A	Principles of System Programming & Compiler Design	4:1:0	5	80	20	100
MCA-502 A	Advanced JAVA	4:1:0	5	80	20	100
MCA-503 A	Soft Computing	4:1:0	5	80	20	100
MCA-504 A	Advanced Database Management System	4:1:0	5	80	20	100
MCA-505 A	Elective – II*	4:0:0	4	80	20	100
MCA-506A	Software Lab-9 Advanced JAVA programming	0:0:3	3	80	20	100
MCA-507 A	Software Lab-10 Elective – II Lab*	0:0:3	3	80	20	100
MCA-508A	Minor Project-II	0:2:0	2	-	25	25
MCA-508A	Seminar	-	1	-	-	25
MCA-509A	Self Study Paper	-	1	-	-	25
	Total		34			775

*Practical Examination of MCA-506 & 507 may be conducted on the same day in 2 sittings each maximum of 4 hours.

Semester-VI

Paper Code	Course	University Exams	Internal Assessment	Total	Credits
MCA-601A	Major Project	400	100	500	10 Credits
	Grand Total of 3 Years/Credits			4300	167Credits

General Instructions

1. Seminar/ Journal Club

Max.Marks-25

Every candidate will have to deliver a seminar of 30 minutes duration on a topic (not from the syllabus) which will be chosen by him / her in consultation with the teacher of the department. The seminar will be delivered before the students and teachers of the department. A three member committee (one coordinator and two teachers of the department of different branches) duly approved by the departmental council will be constituted to evaluate the seminar. The following factors will be taken into consideration while evaluating the candidate.

Distribution of marks will be as follows:

1. Presentation 10 marks
2. Depth of the subject matter 10 marks
3. Answers to the questions 05 marks

2. Self Study Paper

Max.Marks-25

Objective: This course intends to create habits of reading books and to develop writing skills in a manner of creativity and originality. The students are to emphasis his/her own ideas/words which he/she has learnt from different books, journals and newspapers and deliberate the same by adopting different ways of communication techniques and adopting time scheduling techniques in their respective fields. This course aims: - To motivate the students for innovative, research and analytical work - To inculcate the habit of self study and comprehension - To infuse the sense of historical back ground of the problems - To assess intensity of originality and creativity of the students. Students are guided to select topic of their own interest in the given area in consultation with their teachers/Incharge/Resource Person.

Instructions for Students

1. Choose the topic of your interest in the given areas and if necessary, seek the help of your teacher.
2. Select a suitable title for your paper.
3. You are expected to be creative and original in your approach.
4. Submit your paper in two typed copies of A4 size 5-6 pages (both sides in 1.5 line spaces in Times New Roman Font size 12).
5. Organize your paper in three broad steps: (a) Introductions (b) Main Body (c) Conclusion
6. Use headings and sub-headings
7. Use graphics wherever necessary
8. Give a list of books/references cited/used
9. The external examiner will evaluate the self-study paper in two ways i.e. Evaluation 15 Marks and Viva-Voce 10 marks.

Distribution of Marks

1. The evaluation is divided into different segment as under : 15 Marks

- i. Selection of Topic - 3 Marks
- ii. Logical Organization of subject matter - 5 Marks
- iii. Conclusions - 5 Marks
- iv. References - 2 Marks

2. Viva-Voce: - 10 Marks

The external examiner will hold Viva-Voce based on contents of the student's Self Study Paper focusing upon the description by the Candidate.

ELECTIVE – I*

Elective-I is being offered depending upon the availability of expertise and the required infrastructure determined by the University, any one of the following subjects (minimum 10 students are required for any elective-I subject.)

- i) Software Project Management
- ii) Distributed Operating System
- iii) Mobile Computing
- iv) Neural Networks
- v) Real Time Operating System
- vi) Bio-Informatics
- vii) Enterprise Resource Planning
- viii) Geometric Information System
- ix) Simulation and Modeling
- x) Embedded Systems
- xi) Computer Security
- xii) Analysis and Design of Algorithms

ELECTIVE – II*

Elective-II is being offered depending upon the availability of expertise and the required infrastructure determined by the University, any one of the following subjects (minimum 10 students are required for any elective-II subject.)

- i) Windows Programming & Visual C++
- ii) Digital Image Processing
- iii) Perl Programming
- iv) Unix and Network Programming
- v) SciLab
- vi) VB .NET Programming
- vii) Hadoop
- viii) Python
- ix) Multimedia and Animation

MCA-101A: MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit – I

Fundamentals: Set, Types of set, Operations, **Venn's diagram, Relations, Properties of Binary relation**, representation of relation, Equivalence relations, Partial order relation. Function: Types, Composition of function, mathematical induction, permutation and combination, pigeonhole principle and inclusion and exclusion.

Unit – II

Propositional Calculus: Prepositions, logical operations, Tautologies, Contradictions, Logical implication, Logical equivalence, Normal forms, Predicates. Recurrence relation, solving it, divide and conquer algorithm, Lattice, distributed and complemented lattice.

Unit – III

Graph and Group: group, properties of Boolean operation, subgroup, abelian group, monoids, normal subgroup, Graph, types, representation, path & circuit, euclerian & Hamiltonian graph, shortest path algorithm.

Unit – IV

Random Experiment, Sample Space, Events – Simple, Composite, Mutually Exclusive and Exhaustive Events, Various Definitions of Probability, Properties of probability function, Addition Theorem, Conditional Probability, Multiplication Theorem, Measures of Central Tendency: Mean, median and Mode. Measures of Dispersion: Range, Variance, Standard Deviation, Moments, Skewness and Kurtosis

References:

1. C.L.Liu: Elements of Discrete Mathematics, McGraw Hill.
2. Gupta,S.B: Discrete Mathematics and Structures, University Science Press, New Delhi
3. Lipschutz, Seymour: Discrete Mathematics, Schaum's Series
4. Babu Ram: Discrete Mathematics, Vinayek Publishers, New Delhi.
5. Trembley, J.P & R. Manohar: Discrete Mathematical Structure with Application to Computer Science, TMH.
6. Kenneth H. Rosen: Discrete Mathematics and its applications, TMH.
7. Doerr Alan & Levasseur Kenneth: Applied Discrete Structures for Computer Science, Galgotia Pub. Pvt. Ltd.
8. Gersting: Mathematical Structure for Computer Science, WH Freeman & Macmillan.
9. Hopcroft J.E, Ullman J.D.: Introduction to Automata theory, Languages and Computation, Narosa Publishing House, New Delhi.

MCA-102A: COMPUTER FUNDAMENTALS & PROGRAMMING IN C

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit-I

Evolution of computer, applications, data processing and information, classification of computer, hardware, software and firmware, Overview of Operating System, classification of Operating System, Programming Language and its Classification, Translators, virus and their remedial solutions.

Unit-II

Phases of C program: Problem Identification, Analysis, Flow Chart, Pseudo Code and Algorithms, C Programming, Character set, Keywords, Identifiers, Data Types, Constants and Variables, Operators and Expressions, Control Statements.

Unit-III

Functions: Introduction, Library Function, Storage Classes, Strings and its operations. Array: Defining and processing, Passing to a Function, Multi Dimensional Array. Pointer and their uses, Dynamic memory allocation.

Unit-IV

Structure: Passing to a function, union (array within structure, array of structure, nesting of structure, passing structure and its pointer to UDP, Introduction to Union and its Utilities). Data Files: Documentation, Debugging, C Processor Directives and Macros.

References:

1. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
2. Gupta, S.B., Amit Singla: Computer Fundamentals and Programming in C, Shree Mahavir Book Depot (Publishers), New Delhi
3. Kenneth.A.: C problem solving and programming, Prentice Hall.
4. Gottfried, B.: Theory and problems of Programming in C, Schaum Series.
5. Sanders, D.: Computers Today, Tata McGraw-Hill.
6. Rajender Singh Chhillar: Application of IT to Business, Ramesh Publishers, Jaipur.
7. Kernighan & Ritchie: The C Programming Language, PHI.
8. Gottfried, B.: Theory and problems of Programming in C, Schaum Series.
9. E. Balaguruswamy: Programming in C, Tata McGraw Hill.
10. H. Schildt: C-The Complete Reference, Tata McGraw Hill.
11. Y. Kanetkar: Let us C, BPB Publication

MCA-103A: DIGITAL DESIGN

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit-I

Number System: 1's and 2's Complements, Inter- conversion of numbers. Codes, Parity Bits, Hamming Code, Floating Point Numbers. Binary Arithmetic, Addition and Subtraction Using 2's Complement Method, Binary Multiplication and Division.

Unit-II

Positive and Negative Logic, Truth Tables, Logic Gates, Fan out of Logic Gates, Logic Families, TTL Logic Family, CMOS, ECL, NMOS and PMOS. Boolean Algebra vs. Ordinary Algebra, Boolean Expressions- Variables and Literals, Boolean Minimisation Techniques, SOPs & POSs Boolean Expressions, Quine- McCluskey Tabular Method, Expressions- Equivalent and Complement, Theorems of Boolean Algebra, Karnaugh Map Method.

Unit-III

Combinational Circuits, Arithmetic Circuits, Adder- Subtractor, BCD Adder, Magnitude Comparator, Parity Generator and Checker, De-multiplexers and Decoders, Encoders, Read Only Memory (ROM), Programmable Logic Array (PLA). R-S Flip Flop, Level Triggered and Edge Triggered Flip Flops, J.K Flip Flop, Master-slave Flip Flops, T-flip Flop, D-flip Flop, Synchronous and Asynchronous Inputs.

Unit-IV

Ripple Counter vs. Synchronous Counter, Modulus of a Counter, Propagation Delay in Ripple Counters, Binary Ripple Counters, Up/Down Counters, Decade and BCD Counters, Pre-settable Counters, Shift Register, Controlled Shift Registers. RAM Architecture, Static RAM (SRAM), Dynamic RAM (DRAM)

References:

1. Mano, M.M.: Digital Logic and Computer Design, Prentice-Hall of India.
2. Gill, Nasib Singh and Dixit J.B: Digital Design and Computer Organisation, University Science Press (Laxmi Publications), New Delhi.
3. Stallings, William: Computer Organisation & Architecture.
4. Mano, M.M.: Digital Design, Prentice-Hall of India.
5. Anand Kumar: Fundamentals of Digital Circuits, PHI.
6. Tokheim: Digital Electronics, TMH.
7. S. Rangnekar: Digital Electronics, ISTE/EXCEL

MCA-104A: INTERNET AND WEB DESIGNING

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit-I

Introduction to Internet, Internet Services, WWW, Working of Internet, Internet Connection Concepts, Intranet and Extranet, DNS working, Modem, ISP. Single User, Multi User, Server, Workstation, PPP, Client-Server environment, Computer Network, Types Computer Network: PAN, LAN, MAN, WAN; Network Topologies. Network Protocols, Windows and GUI. E-Mail Concepts – Configuring E-Mail Program, Sending and Receiving Files through E-Mail, Fighting Spam, differ to Postal mail.

Unit-II

Web Browsers, Search Engines, Categories of Search Engines, Searching Criterion, Surfing the Net, Hypertext Transfer Protocol (HTTP), URL, Hypertext. Other Internet Tools. Online Chatting, Messaging, and Conferencing Concepts, Usenet newsgroup concepts – Reading usenet newsgroups, Internet Relay Chat, Web-Based chat rooms and discussion boards, Voice and Video conferencing. Streamlining Browsing, Keeping track of Favorite Web Sites, Web Security: cryptography techniques, Substitution and Transposition, Privacy, cookies and Site-Blocking.

Unit-III

HTML: Internet Language, Understanding HTML, Create a Web Page, Linking to other Web Pages, Publishing HTML Pages, Text Alignment and Lists, Text Formatting Fonts Control, E-mail Links and link within a Page, Creating HTML Forms. Creating Web Page Graphics, Putting Graphics on a Web Page, Custom Backgrounds and Colors, Creating Animated Graphics. Web Page Design and layout, Advanced Layout with Tables, Using Style Sheets.

Unit-IV

Introduction to MS Excel: Features of Excel, Creating a table, Formatting worksheet, Types of graph, Excel functions, printing a worksheet. Presentation with Power- Point: Features of Power-point, Creating presentation the easy way, working with different views, working with graphics in Power Point, Sound effects and animations effects, printing in Power-point. Introduction to XML, PHP and HTML 5.

References:

1. Dick Oliver: Tech Yourself HTML 4 in 24 Hours, Techmedia.
2. Satish Jain: "O" – Level Information Technology,
3. Craig Zacker: 10 minutes Guide to HTML Style Sheets, PHI.
4. V.K. Jain: "O" – Level Information Technology, BPB Publications.
5. Gill, Nasib Singh: Essentials of Computer and Network Technology, Khanna Books Publishing Co., New Delhi.
6. Margaret Levine Young: Internet – The Complete Reference
7. Harley Hahn: The Internet – Complete Reference, TMH.

MCA-105A: DATA BASE MANAGEMENT SYSTEMS

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit-I

Introduction to Database, features, Applications, data base System Vs. File Processing System, Instances and Schemas. Data Models – Hierarchical, Network, Relational Model. Database Access for applications Programs – data base Users and Administrator, Data Independence, Data base System Architecture. Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Concept Design with the ER Model, Conceptual Design for Large enterprises.

Unit-II

Relational Model: Introduction to the Relational Model, Integrity Constraint Over relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views, Destroying /altering Tables and Views. Relational Algebra and Calculus: Relational

Algebra, Selection and projection set operations, renaming, Joins, Division, Examples of Algebra overviews, Query Processor, Codd's 12 Rules. Relational calculus– Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus.

Unit-III

Form of Basic SQL Query – Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries Set, Comparison Operators, NULL values, Comparison using Null **values**, **Logical connectivity's** – AND, OR and NOT. Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases. Database Languages – DDL, DML, DCL and Its commands. Schema refinement, Problems Caused by redundancy, Decompositions, Problem related to decomposition, Normalization: FIRST to FIFTH Normal forms, BCNF, Lossless join Decomposition, Dependency preserving Decomposition, Schema refinement in Data base Design, Multi valued Dependencies.

Unit-IV

Overview of Transaction Management: ACID Properties, Transactions and Schedules, Concurrent Execution of transaction, Lock Based Concurrency Control, Performance Locking, Transaction Support in SQL, Introduction to Crash recovery. Concurrency Control: Serializability, and recoverability, Introduction to Lock Management, Lock Conversions, Dealing with DeadLocks, Specialized Locking Techniques, Concurrency without Locking.

References:

1. Raghurama Krishnan: Data base Management Systems, Johannes Gehrke, Tata McGrawHill Latest Edition.
2. Silberschatz, Korth: Data base System Concepts, McGraw Hill, latest edition.
3. P. Radha Krishna: Database Management Systems, HI-TECH Publications.
4. C.J.Date: Introduction to Database Systems, Pearson Education.
5. Gupta,S.B., Aditya Mittal, Introduction to Data base Management System, University Science Press, New Delhi.
6. Elmasri Navrate: Data base Management System, Pearson Education.

MCA-201A: DATA STRUCTURES

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit – I

Definition, Classification of data structures, Operations on data structures, Design and analysis of algorithm, Top down and bottom up approaches to Algorithm design. Frequency count, Complexity. Arrays: Address calculation using column and row major ordering. Various operations on Arrays, Vectors, Application of arrays: Matrix multiplication, sparse polynomial representation and addition

Unit – II

Stacks and Queues: Introduction, Operations, Representation using arrays and linked-list. Circular queues, Priority Queue and D-Queue. Applications of stacks: Conversion from infix to postfix and prefix expressions, Evaluation of postfix expression using stacks. Linked list: Singly linked list; operations on list, Linked stacks and queues. Polynomial representation and manipulation using linked lists. Circular linked lists, doubly linked lists.

Unit-III

Binary tree traversal methods: Preorder, In-order, Post-ordered. Recursive Algorithms. Traversal methods. Binary tree representation of a general tree. Conversion of forest into tree. Threaded binary trees. Binary search tree: Height balanced (AVL) tree, B-trees. Sorting: Selection sort, Insertion sort, Bubble sort, Quick sort, merge sort, Heap sort, Radix sort and their complexity

Unit-IV

Searching, sorting and complexity, Hashing Schemes. Comparison of time complexity. Graph representation: Adjacency matrix, Adjacency lists, Depth first search, Breadth first search. Spanning tree: Definition, Minimal spanning tree algorithms. Shortest Path algorithms (Prim's and Kruskal's). File Structures: File Organization, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons.

References:

1. Hubbard JR: Schaum's outline of Data Structures with C++, TMH.
2. R. Sedgewick: Algorithms in C++, Pearson Education Asia.
3. Y.Langsam, M.J.Augenstein and A.M.Tanenbaum: Data Structures Using C and C++, Prentice Hall of India.
4. R.Kruse, C.L.Tonodo and B.Leung: Data Structures and Program Design in C, Pearson Education.
5. S.Chottopadhyay, D.Ghoshdastidar & M.Chottopadhyay: Data Structures Through 'C' Language, BPB Publication.
6. G.L. Heileman: Data Structures, Algorithms and Object Oriented Programming, Tata McGraw Hill.
7. E. Horowitz, Sahni and D. Mehta: Fundamentals of Data Structures in C++, Galgotia Publication.

MCA-202A: COMPUTER ORGANIZATION & ARCHITECTURE

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit-I

Basic organization of the computer and block level description of the functional units as related to the execution of a program. Operational concepts, Bus structures, Von Neumann Concept. Fetch, decode and execute cycle. Design of ALU: Binary arithmetic, Addition and Subtraction of signed number, Multiplication of Positive number, Signed operand multiplication, Division, Floating point number representation and arithmetic.

Unit-II

Basic Processing: Instruction code, Instruction set, Instruction sequencing, Instruction cycle, Instruction format, Hardwired controlled unit, Micro programmed controlled unit. General Register Organization, Stack Organization, Addressing Models, Data Transfer and Manipulation, RISC Vs. CISC architectures. Levels of programming languages, assembly language instructions, 8085 instruction set architecture Programming in Assembly Language for 8086/8088/80x6 micro-processor.

Unit-III

Input/Output Organization: Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Mode of Transfer, Priority Interrupt, Direct Memory Access, Input-output Processor, Serial Communication, Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

Unit-IV

Parallel processing– Pipelining, Parallelism in unipolar systems, Architectural classification schemes. Principles of pipelining & Vector processing – Principles of Linear pipelining, General pipelines and reservation tables, interleaved memory Organizations, Instruction and Arithmetic pipelines, Principles of designing pipelined processors, Vector processing Requirements. Structures for array processors: SIMD Array processor, SIMD Interconnection networks.

References:

1. Mano, M.M.: Computer System Architecture, 3rd ed., Prentice-Hall of India.
2. Stallings, William: Computer Organisation & Architecture.
3. Gill, Nasib Singh and Dixit J.B: Digital Design and Computer Organisation, University Science
4. Press (Laxmi Publications), New Delhi.
5. Mano, M.M.: Digital Logic and Computer Design, Prentice-Hall of India.
6. Kai Hwang: Advanced Computer Architecture, McGraw Hill International

MCA-203A: COMPUTER BASED MANAGEMENT SYSTEM & E-COMMERCE

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit-I

Introduction to Management: The Management Processes: Planning, Organizing, Leading and Controlling. Management Levels: Top, Middle and Bottom. The Management School: Scientific Management, Classical Management, Behavioral Management, Management as a Science, Management as an art. Systems Approach, Contingency Approach.

Unit-II

Management in 21st Century: Seven – S Model, Organization Structure, Communication Processes Strategy: Institutional, Operational, Total Quality Control (TQC), Total Quality Management (TQM), Electronic Data Interchange (EDI), Just-In-Time (JIT) Approach.

Unit-III

Applications of Management Information System: Types of Information System in Organizations: Transaction Processing System (TPS), Office System, Knowledge Work System (KWS), Decision Support System (DSS), Management Information System (MIS), Executive Support system (ESS). Introduction to ERP and SAP: Software application and product for business application.

Unit-IV

E-Commerce: Overview of E-Commerce, Benefits of E-Commerce, Impact of E-Commerce, Types of E-Commerce, Applications of E-Commerce, Business Models of E-Commerce. Electronic Payment System: Introduction to Payment System, Online Payment System, Smart card, Debit card, credit card, Pre-paid and Post-paid Payment System. Security in E-Commerce: Transaction Security, Cryptology, Authentication Protocol, Digital Signature.

References:

1. Stoner, Freeman, Gilbert: Management, Latest, PHI Publication.
2. Kenneth C. Laudon, Jane P. Laudon: Management Information System, Latest Edition, Pearson Education Publication.
3. P.T. Joseph: E-Commerce - A Managerial Perspective, PHI Publication.
4. Jeffery: Introduction to E-Commerce, TMH.

MCA-204A: OBJECT ORIENTED PROGRAMMING USING C++

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit-I

Introduction to object oriented programming, user defined types, polymorphism, and encapsulation. Getting started with C++ - syntax, data-type, variables, strings, functions, exceptions and statements, namespaces and exceptions, operators. Flow control, functions, recursion. Arrays and pointers, structures.

Unit-II

Abstraction Mechanisms: Classes, private, public, constructors, destructors, member functions, static members, references etc. Class hierarchy, derived classes. Inheritance: simple inheritance, polymorphism, object slicing, base initialization, virtual functions.

Unit-III

Prototypes, linkages, operator overloading, ambiguity, friends, member operators, operator function, I/O operators etc. Memory management: new, delete, object copying, copy constructors, assignment operator, this Input/output. Exception handling: Exceptions and derived classes, function exception declarations, Unexpected exceptions, Exceptions when handling exceptions, resource capture and release etc.

Unit-IV

Templates and Standard Template library: template classes, declaration, template functions, namespaces, string, iterators, hashes, iostreams and other type. Design using C++ design and development, design and programming, role of classes.

References:

1. Herbert Schildt: C++ - The Complete Reference, Tata McGraw Hill Publications
2. Balaguru Swamy: C++, Tata McGraw Hill Publications.
3. Balaguruswamy: Object Oriented Programming and C++, TMH.
4. Shah & Thakker: Programming in C++, ISTE/EXCEL.
5. Johnston: C++ Programming Today, PHI.
6. Olshevsky: Revolutionary Guide to Object Oriented Programming Using C++, SPD/WROX.
7. Object Oriented Programming and C++, R.Rajaram, New Age International.
8. Samanta: Object Oriented Programming with C++ & JAVA, PHI.
9. Subburaj: Object-Oriented Programming with C++, VIKAS.

MCA-205A: OPERATING SYSTEMS

Max.Marks 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit-I

Functions, Characteristics, Various Structures, System components, Operating-System services, System Calls and their types, System programs, Operating-System Design and Implementation, Operating-System Structure, Virtual Machines. Operating-System Debugging, Operating System Generation, system Boot, Process Concepts and Scheduling, IPC Systems, Multithreaded Programming, Scheduling Criteria, Scheduling Algorithm, Multiple-Processor Scheduling, Real-Time Scheduling.

Unit-II

Process Management and Synchronization - **The Critical Section Problem, Peterson's Solution**, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors, Atomic Transactions. Deadlocks - System Model, Dead locks Characterization, Methods for Handling Deadlocks Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

Unit-III

Memory Management Schemes, Fragmentation, Virtual Memory - Logical versus Physical Address Space, Swapping, Paging Contiguous, Segmentation, Demanding Paging, Page Replacement Algorithm, Frames, Thrashing, Memory mapped files, System Interface and implementation – Access Method, Directory and Disk Structure, File System Structure, File System Implementation, Directory Implementation, Free Space Management, Directory Management, efficiency and performance.

Unit-IV

I/O System and Secondary storage structure, I/O Hardware, Application I/O Interface, kernel I/O Subsystem, Transforming , I/O request to Hardware operations, STREAMS, Disk Structure, Disk Scheduling, Disk Management, RAID Structure. Distributed Operating Systems: Types of Network Based operating System: Network Structure, Network topology, Communication Structure, Communication Protocols, Robustness, Design Issues.

References:

1. Silberschatz & Galvin: Operating System Concept, Wiley, Latest Edition.
2. Milan Milenkovic: Operating Systems, Tata McGraw – Hill, Latest Edition.
3. William Stallings: Operating Systems, PHI, Latest Edition.
4. Yashawant Kanetkar: Unix Shell Programming, BPB.
5. A.S. Tanenbaum: Modern Operating Systems, latest edition Pearson/PHI.
6. Dhamdhare: Operating Systems, Tata McGraw Hill.

MCA-301A: COMPUTER GRAPHICS AND MULTIMEDIA

Max. Marks: 80
Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit – I

An Introduction Graphics System: Computer Graphics and Its Types, Application of computer graphics, Graphics Systems: Video Display Devices, Raster Scan Systems, Random Scan Systems, Input Devices, Hard Copy Devices, Graphics Software.

Output Primitives and Attributes of Output Primitives: Output Primitives Points and Lines, Line Drawing Algorithms, Circle Generating Algorithms, Inside-Outside tests, Boundary-Fill Algorithm, Flood Fill Algorithm, Cell Array, Character Generation, Anti-aliasing.

Unit – II

Two-dimensional Geometric Transformations: Basic Transformations, Matrix Representations and Homogeneous Coordinates, Composite Transformations, Reflection and Shearing

Two-Dimension Viewing: The viewing Pipeline, Window to view port coordinate transformation, Point Clipping, Line Clipping, Polygon Clipping, Text Clipping, Three- Dimensional Concepts: Three Dimensional Display Methods, 3D Transformations, Parallel Projection and Perspective Projection.

Unit – III

Curves and Surfaces: Bezier Curves, Conditions for smoothly joining curve segments, Bezier bi-cubic surface patch, B-Spline Curves, Cubic BSpline curves using uniform knot vectors, testing for first and second order continuities

Shading and Hidden Surface Removal: Shading, Illumination Model for diffused Reflection, Curved Surfaces, Gourard Shading, Phong Model, Hidden Surface Removal, Back Face Detection, Depth Buffer (Z-Buffer, A-Buffer) Method, Scan Line Method, BSP-Tree Method.

Unit – IV

Multimedia: Introduction to Multimedia: Classification of Multimedia, Multimedia Software, Components of Multimedia – Audio: Analog to Digital conversion, Audio play backing and recording Video, Text: Hyper text, Hyper media and Hyper Graphics, Graphics and Animation: Classification of Animation, process of animation, Authoring Process and Tools.

Suggested Readings:

1. Donald Hearn and M.Pauline Baker: Computer Graphics, PHI Publications
2. Plastock : Theory & Problem of Computer Graphics, Schaum Series.
3. Foley & Van Dam: Fundamentals of Interactive Computer Graphics, Addison-Wesley.17
4. Newman : Principles of Interactive Computer Graphics, McGraw Hill.
5. Tosijas, L.K. : Computer Graphics, Springer-verleg.
6. S Gokul: Multimedia Magic, BPB Publication.
7. Bufford: Multimedia Systems, Addison Wesley.
8. Jeffcoate : Multimedia in Practice, Pretice-Hall.
9. Any other book(s) covering the contents of the paper in more depth.

MCA-302A: THEORY OF AUTOMATA

Max. Marks: 80
Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit-1

Finite Automata and Regular Expressions: Finite State Systems, Non-Deterministic finite automata (NFA), Deterministic finite automata (DFA), Equivalence of DFA and NFA Finite automata with E-moves, Regular Expressions, Equivalence of finite automata and Regular Expressions, Regular expression conversion and vice versa.

Introduction to Machines: Concept of basic Machine, Properties and limitations of FSM. Moore and mealy Machines, Equivalence of Moore and Mealy machines, Conversion of NFA to DFA by Arden's Method.

Unit-2

Properties of Regular Sets: The Pumping Lemma for Regular Sets, Applications of the pumping lemma, Closure properties of regular sets, Kleene Closure and minimization of finite Automata, Minimization Algorithm.

Grammars: Definition, Context free and Context sensitive grammar, Ambiguity regular grammar, Reduced forms, Removal of useless Symbols and unit production, Chomsky Normal Form (CNF), Griebach Normal Form (GNF).

Unit-3

Pushdown Automata: Introduction to Pushdown Machines, Application of Pushdown Machines Turing Machines: Deterministic and Non-Deterministic Turing Machines, Design of T.M, Halting problem of T.M., multi-tape and multi-head Turing machine, PCP Problem, Universal T.M.

Unit-4

Chomsky Hierarchies: Chomsky hierarchies of grammars, Unrestricted grammars, Context sensitive languages, Relation between languages of classes, Linear bound automata.

Computability: Basic concepts, Primitive Recursive Functions, Total Recursive Functions.

References:

1. Introduction to automata theory, language & computations-Hopcroft & O.D. Ullman, R Mothwani, 2001, A.W.
2. Theory of Computer Sc. (Automata, Languages and computations):K.L.P.Mishra & N.Chandrasekaran, 2000PHI.
3. Introduction to formal Languages & Automata-Peter LinZ, 2001, Narosa Publ.
4. Fundamentals of the Theory of Computation-Principles and Practice By RamondGreenlaw and H.James Hoover, 1998, Harcourt India Pvt. Ltd.
5. Elements of theory of Computation by H.R.Lewis & C.H.Papaditriou, 1998,PHI.
6. Introduction to languages and the Theory of Computation by John C.Martin 2003, T.M.H.

MCA-303A: ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit – I

Introduction and applications of artificial intelligence, Problem solving: Defining the problem as state space search, Production system, Problem characteristics, Problem system characteristics, Search techniques: Generate and test, Hill climbing, Best first search, A* algorithm, Problem reduction, Expert system: Definition, Role of knowledge in expert system, Architecture of expert system.

Unit – II

Expert system development life cycle: Problem selection, Prototype construction, Formalization, Implementation, Evaluation, Knowledge acquisition: Knowledge engineer, Cognitive behavior, Acquisition techniques, Knowledge representation: Level of representation, Knowledge representation schemes, Formal logic, Inference Engine, Semantic net, Frame, Scripts.

Unit – III

Perception: Sensing, Speech recognition, Vision, Action, Neural networks : Introduction, Comparison of artificial neural networks with biological neural networks, Learning in neural networks, Perceptrons, Back propagation networks, application of neural networks, Fuzzy logic : Definition, Difference between Boolean and Fuzzy logic, fuzzy subset, fuzzy membership function, fuzzy expert system, Inference process for fuzzy expert system, fuzzy controller.

Unit – IV

Programming in Logic (PROLOG): Introduction, Prolog variables, Using rules, Input and Output predicates, Fail and cut predicates, Recursion, Arithmetic operation, Compound object, Dynamic database, Lists, String, File operations.

Suggested Readings:

1. David W. Rolston: Principles of Artificial Intelligence and Expert System Development, McGraw Hill Book Company.
2. Elaine Rich, Kevin Knight: Artificial Intelligence, Tata McGraw Hill.
3. Carl Townsend: Introduction to Turbo Prolog, BPB
4. Stamations V. Kartalopoulos: Understanding Neural Networks and Fuzzy Logic, PHI
5. Satinder Bal Gupta: Artificial Intelligence, Shree Mahavir Book Depot(Publishers), New Delhi.

MCA-304A: DATA COMMUNICATION & COMPUTER NETWORKS

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit – I

Data Communication: Theoretical basis of data communication; analog and digital signals; asynchronous and synchronous transmission; data encoding and modulation, techniques, broadband and base band transmission; pulse code modulation, bandwidth, channel, baud rate of transmission; multiplexing; transmission medium; transmission errors - error detection and correction.

Unit – II

Network Classification and Data Communication Services: Local area networks, metropolitan area network, wide area network, wireless network, internetworking; switched multi-megabit data services, X.25, frame relay, narrow band and broad band ISDN, asynchronous transfer modes.

Network Reference Models: Layered architectures, protocol hierarchies, interface and services: ISO- OSI reference model, TCP/IP reference model; internet protocol stacks.

Unit – III

Datalink Layer Functions and Protocols: Framing, error-control, flow -control; sliding window protocol; HDLC; Data link layer of internet and ATM.

Medium Access Sublayer: CSMA/CD protocol, switched and fast Ethernet, token ring, FDDI, IEEE standards for LAN and MAN; satellite networks.

Unit – IV

Network functions and protocols: Switching mechanism: Circuit switching, message switching, packet switching, cell switching, routing and congestion control, TCP/IP protocol architecture.

Network Applications: File transfer protocol, electronic mail, World Wide Web.

Suggested Readings:

1. A.S. Tanenbaum: Computer Networks (4th ed.), Prentice-Hall of India.
2. W. Tomasi: Introduction to Data Communications and Networking, Pearson Education.
3. P.C. Gupta: Data Communications and Computer Networks, Prentice-Hall of India.
4. Behrouz Forouzan and S.C. Fegan: Data Communications and Networking, McGraw Hill.
5. L. L. Peterson and B. S. Davie: Computer Networks: A Systems Approach, Morgan Kaufmann.
6. William Stallings: Data and Computer Communications, Pearson Education.

MCA-305A: OBJECT TECHNOLOGY

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit – I

Object-Oriented Languages, **Java's** History, Creation of Java, Importance of Java for the Internet, Java's Magic: Byte-code, Its Features, Object-Oriented Programming in Java.

Java Program Structure and Java's Class Library, Data Types, Variables, and Operators, Operator Precedence. Selection Statements, Scope of Variable, Iterative Statement. Defining Classes & Methods, Constructors, Creating Objects of a Class, Assigning Object Reference Variables, Variable this, Defining and Using a Class, Automatic Garbage Collection.

Arrays and Strings: Arrays, Arrays of Characters, String Handling Using String Class, Operations on String Handling Using, String Buffer Class.

Unit – II

Extending Classes and Inheritance: Using Existing Classes, Class Inheritance, Choosing Base Class, Access Attributes, Polymorphism, Multiple Levels of Inheritance, Abstraction through Abstract Classes, Using Final Modifier, The Universal Super class-Object Class.

Packages & Interfaces: Understanding Packages, Defining a Package, Packaging up YourClasses, Adding Classes from a Package to Your Program, Understanding CLASSPATH, Standard Packages, Access Protection in Packages, Concept of Interface.

Exception Handling: The concept of Exceptions, Types of Exceptions, Dealing with Exceptions, Exception Objects, Defining Your Own Exceptions.

Unit – III

Multithreading Programming: The Java Thread Model, Understanding Threads, The Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priorities, Synchronization, Deadlocks Inter-thread communication, Deadlocks

Input/Output in Java: I/O Basic, Byte and Character Structures, I/O Classes, Reading Console Input Writing Console Output, Reading and Writing on Files, Random Access Files, Storing and Retrieving Objects from File, Stream Benefits.

Creating Applets in Java: Applet Basics, Applet Architecture, Applet Life Cycle, Simple Applet Display Methods, Requesting Repainting, Using The Status Window, The HTML APPLET Tag Passing Parameters to Applets.

Unit – IV

Working with Windows: AWT Classes, Window Fundamentals, Working with Frame, Creating aFrame Window in an Applet, Displaying Information Within a Window.

Working with Graphics and Texts: Working with Graphics, Working with Color, Setting the Paint Mode, Working with Fonts, Managing Text Output Using Font Metrics, Exploring Text and Graphics. Working with AWT Controls, Layout Managers and Menus.

Suggested Readings:

1. The Complete Reference JAVA, TMH Publication.
2. Beginning JAVA, Ivor Horton, WROX Public.
3. JAVA 2 UNLEASHED, Tech Media Publications.
4. JAVA 2(1.3) API Documentations.
5. Any other book(s) covering the contents of the paper in more depth.

MCA-401A: UNIX AND SHELL PROGRAMMING

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

Theoretical Concepts of UNIX operating system: Basic feature of Operating System; File Structure; CPU Scheduling; Memory Management: Swapping, Demand paging; File System; Block and Fragments, I-nodes, Directory Structure; User to User Communication.

UNIT – II

Getting Started with UNIX: User Names and Groups, Logging in; Format of UNIX commands; changing your Password; Characters with Special Meaning; UNIX Documentation; Files and Directories; Current directory looking at the Directory contents, Absolute and Relative Pathnames, Some UNIX Directories and Files; Looking at File contents; File Permissions; Basic operation on Files; Changing Permission Modes; Standard files, Standard output; Standard Input, Standard Error, Filter and pipelines, Processes: Finding out about Process; Stopping Background Process.

UNIT - III

Text Manipulation: Inspecting Files; File Statistics, Searching for Patterns; Comparing Files; Operating on Files; Printing Files, Rearranging Files; Splitting Files; translating characters; UNIX Editor vi.

UNIT - IV

Shell Programming, Shell Variables – Export, Read, Exit Commands – Control Structures – Arithmetic in Shell Programming – Debugging Scripts – Structure of an AWK Script – AWK Control Structures – Functions in AWK – Executing AWK Scripts with the Shell, AWK utility.

References:

1. Brain Kernighen & Rob Pike: The UNIX Programming Environment Prentice Hall
2. Maurice Bach : Design of the UNIX Operating System Prentice Hall
3. Stephen Parto : Advanced UNIX Programmer's guide BPB.
4. Sumitabha Das : UNIX Concepts and Application – Faecturing SCO UNIX and LINUX 2nd TMH

MCA-402A: DATAWAREHOUSING & MINING

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit – I

Need for data warehouse, definition, goals of data warehouse, Data Mart, Data warehouse architecture, ETL process, star, snowflake and galaxy schemas for multidimensional databases, Designing fact tables. Partitioning.

Unit-II

OLTP vs OLAP technology, multidimensional data models and different OLAP operations, OLAP Server: ROLAP, MOLAP and HOLAP. Data cubes, efficient computation of data cubes, distributed and virtual data warehouse.

Unit-III

Data preprocessing, Data mining primitives, Types of Data Mining, Data Mining query language, Architectures of data mining. Data generation & Summarization based characterization, Mining class comparisons, Mining Association Rules in large databases: Association rule mining, single dimensional Bookan association rules from Transactional DBS, Multi level association rules from transaction DBS, multidimensional association rules. Correlation analysis, Constraint based association mining.

Unit-IV

Classification and Prediction: Classification by decision tree induction, Back propagation, Bayesian classification, classification based in association rules, Prediction, Cluster analysis, partitioning and hierarchical methods, Denrity based method, web mining, Temporal and spatial data mining.

References:

1. W.H.Inmon: Building Data Ware House, John Wiley & Sons.
2. S . Anahory and D.Murray: Data warehousing, Pearson Education, ASIA.
3. Jiawei Han & Micheline Kamber: Data Mining - Concepts & Techniques, Harcourt India PVT Ltd. (Morgan Kaufmann Publishers).
4. Michall Corey, M.Abbey, I Azramson & Ben Taub: Oracle 8i Building Data Ware Housing, TMH.
5. I.H. Whiffen: Data Mining, Practical Machine Cearing tools & techniques with Java (Morgan Kanffmen)
6. Sima Yazdanri & Shirky S. Wong: Data Ware Housing with oracle.
7. A.K. Pujari: Data Mining Techniques, University Press.
8. IBM An Introduction to Building the Data Warehouse, PHI Publication.
9. Pieter Adriaans Dolf Zantinge: Data Mining, Addition Wesley.
10. David Hand, Heikki Mannila, and Padhraic Smyth: Principles of Data Mining, PHI Publication.

MCA-403A: SOFTWARE ENGINEERING & SOFTWARE TESTING

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit – I

Software Engineering Paradigms: Software Characteristics, Software myths, Software Applications, Software Process Models, Process iteration, Process activities, CASE Tools. Software Project Management: Management activities, Project planning, Project scheduling, Risk management and activities. Software Requirements Engineering: Requirements Engineering Processes, and phases, Types of Software Requirements. Software requirement specification document. Specification languages.

Unit – II

Software Metrics and Measures — Process Metrics, Project metrics, Software Project Estimation Models- Empirical, Putnam, COCOMO models. Software Design Process, Principles of software design, Design Strategies, Levels of Software Design, Interface Design, Coding, Software Reuse. Software Testing, Testability and features of Test cases, Software Reliability, Software Safety, Defect testing, Debugging Tools, Software Testing techniques; WBT, BBT, Ticking Box testing; static analysis, symbolic testing, program mutation testing, input space , partitioning, functional program testing, data flow guided testing.

Unit – III

Software Testing Strategies: Approach, Issues; integration, incremental, System, alpha, Beta testing etc; Comparative evaluation of techniques: Testing tools; Dynamic analysis tools, test data generators, Debuggers, test drivers etc. Technical Metrics for Software: Quality Factors, framework; Metrics for analysis, design, testing source code etc. Object Oriented Testing: OOT strategies and issues, Test Case design, interface testing.

Unit – IV

Software Maintenance and its types, S/w Configuration Management, S/w Reuse, Software Evolution, Software Quality Assurance: – plans & activities, concept, importance and essence; FTR, structured walk through technique etc., Software Documentation. Software Reliability, validation, Software Safety and Hazards Analysis; Features affecting software quality, SQA Plan. Using project management software tools, Quality management, issue, standards and methods. ISO Quality models: ISO 9000 and SEI-CMM and their relevance.

References:

1. Pressman: Software Engineering, TMH.
2. Gill N.S. : Software Engineering, Khanna Book Publishing Co.(P) Ltd, N. Delhi.
3. Jalote, Pankaj: An Integrated Approach to Software Engineering, Narosa Publications.
4. Meyers, G.: The art of Software Testing, Wiley-Inter-Science.
5. Chhillar Rajender Singh: Software Engineering: Testing, Faults, Metrics, Excel Books, New Delhi.
6. Deutsch, Willis: Software Quality Engineering: A Total Technical and Management Approach, Prentice Hall.

MCA-405A: .Net Programming with C#

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit-I

Introduction to .Net, Two tier and Three tier client server model, .Net Architecture, Features of .Net, Advantages of .Net, .Net Framework, CLR, CTS, CLS, JIT, Assemblies, Memory management issues – Garbage Collector and collection process, Assemblies, .NET framework class library, Managed code, interoperability with unmanaged code.

Unit-II

Data Types, Operators, Access Specifier: Private, Public, Protected and Internal, Classes, Methods, Static Method, Array, Jagged Array, Collection (Array list, Hash table, Dictionary), Property and Indexer (One Dimension, two dimensional), Delegates and events, Exception Handling. Encapsulation, Abstraction, Inheritance, interface, polymorphism (Overloading, Overriding).

Unit-III

ADO v/s ADO.Net, ADO.Net data namespaces, ADO.Net Object Model, Accessing data from Server, Creating Connection, Command, Data Adapter, Data Reader and Data Set with OLEDB and SQLDB, Data Binding.

GUI Programming – Common Controls, Properties, Methods and Events. Interacting with controls - Textbox, Label, Button, Listbox, Combobox, Checkbox, Picture Box, Radio Button, Panel, scroll bar, Timer, ListView, TreeView, toolbar, Status Bar. Dialog Controls, Creating and Using MDI applications, Toolbar, Creating Menus, Data Grid view, Crystal Report

Unit-IV

ASP.Net : Server Controls : label, dropdown list box, validation controls, list box, text box, radio button, check box, image, DateTimePicker control, Multiview, Introduction to Ajax controls, State Management: session, caching, Authentication(window,.Net Passport, Forms Based), Authorization, web services,

References:

1. C# 2010 programming Black Book, by Kogent Learning Solutions, Wiley India
2. Jeffrey Richter, Francesco Balena: Applied .Net Framework Prog. In MS VB.Net, TMH Publication.
3. Herbert Schildt: Complete Reference C#, TMH Publication.
4. Michael Halvorsan: Microsoft Visual Basic.NET step by step, PHI Publication.
5. G.Andew Duthie: Microsoft ASP.Net With C#.Net step by step, PHI Publication.

MCA-501A: PRINCIPLES OF SYSTEMS PROGRAMMING & COMPILER DESIGN

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit I

Evolution of the Components of Systems Programming: Assemblers, Loaders, Linkers, Macros, Compilers, Software Tools: Variety of software tools, Text editors, Interpreters and program generators, Debug Monitor, Programming environment, Loader schemes, compile and go loader, general loader schemes, absolute loader, Subroutine linkage, Reallocating loader, Direct Linkage Loader, Binders, Linking loader, overlays.

Compiler Structure: Compilers and translators, need of translators, structure of compiler: its different phases, Compiler construction tools. Analysis-synthesis model of compilation.

Lexical analysis: Role of lexical analyzer, design of lexical analyzer, token, lexeme and patterns, regular expressions, Specification and recognition of tokens, input buffering, A language specifying lexical analyzer. Finite automata, conversion from regular expression to finite automata, and vice versa, minimizing number of states of DFA, Implementation of lexical analyzer

Unit II

Syntax Analysis: Context free grammars, ambiguity, definition of parsing, shift reduce, operator precedence, top down parsing, recursive descent parsing, predictive parsing LL(1) grammar, Bottom up parsing, LR parsers (SLR, LALR, LR).

Unit III

Syntax directed definitions: Syntax directed definition, construction of syntax trees, Inherited and synthesized attributes, dependency graph, syntax directed translation scheme, and implementation of syntax directed translation, three address code, postfix notation, quadruples and triples.

Type checking: type system, type expressions, structural and name equivalence of types, type conversion, symbol table, data structure and implementation of symbol table, dynamic storage allocation. Intermediate code generation: intermediate representation, translation of declarations, assignments, Intermediate Code generation, Error, Lexical-phase errors, syntactic phase errors, semantic errors.

Unit IV

Code generation and instruction selection: Issues, basic blocks and flow graphs, register allocation, code generation, DAG representation of programs, code generation from DAGS, peep hole optimization, code generators.

Code optimization: source of optimizations, optimization of basic blocks, loops, code improving transformations, data flow analysis of structured flow graphs.

Text Book:

1. K. C. Loudon, "Compiler Construction, Principle and Practice" Thomson Books, 2006
2. Alfred V. Aho, Ravi Sethi & Jeffrey D. Ullman, "Compilers Principles, Techniques & Tools". Pearson, 1998.
3. S. S. Muchnick Harcourt Asra, "Advanced Compiler Design implementation", Morgan Kaufman, 2006.
4. Allen, "Modern Compiler Implementation in C", Cambridge Uty. Press 1997
5. Alan Holub, "Compiler Design in C", PHI, 2004.
6. Vinu V. Das, "Compiler Design using FLEX and YACC" PHI, 2005

MCA-502A: ADVANCED JAVA

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit – I

Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script.

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX: Review of Applets, Class, Event Handling, AWT Programming.

Unit – II

Introduction to Swing: JApplet, Handling Swing Controls like Icons – Labels – Buttons – Text Boxes – Combo – Boxes – Tabbed Pains – Scroll Pains – Trees – Tables Differences between AWT Controls & Swing Controls Developing a Home page using Applet & Swing.

Java Beans: Introduction to Java Beans, Advantages of Java Beans, JDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizers, Java Beans API.

Unit – III

Introduction to Servlets: Lifecycle of a Servlet, JSDK The Servlet API, The javax.servelet Package, Reading Servlet parameters, Reading Initialization parameters. The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies- Session Tracking, Security Issues.

Introduction to JSP, The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat

Unit – IV

JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Data between Pages – Sharing

Session and Application Data – Memory Usage Considerations.Database Access Database Programming using JDBC Studying Javax.sql.* package Accessing a Database from a JSP Page Application – Specific Database Actions Deploying JAVA Beans in a JSP Page. Introduction to Strut Framework.

Suggested Readings:

1. Dietel and Nieto: Internet and World Wide Web – How to program?, PHI/Pearson Education Asia.
2. Patrick Naughton and Herbert Schildt: The Complete Reference Java, Edition, Tata Latest
3. Murach: Murach’s beginning JAVA JDK 5, SPD.
4. Wang-Thomson: An Introduction to Web Design and Programming.
5. Knuckles: Web Applications Technologies Concepts- John Wiley.
6. Sebesta: Programming world wide web, Pearson.
7. Jon Duckett: Beginning Web Programming, WROX.
8. Pekowsky, Java Server Pages, Pearson.

MCA-503A: SOFT COMPUTING

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit – I

Introduction: Introduction to soft computing; introduction to biological and artificial neural network; introduction to fuzzy sets and fuzzy logic systems.

Introduction to Genetic Algorithm, Genetic Operators and Parameters, Genetic Algorithms in Problem Solving, Theoretical Foundations of Genetic Algorithms, Implementation Issues.

Unit-II

Artificial neural networks and applications: Different artificial neural network models; learning in artificial neural networks; neural network applications in control systems. Neural Nets and applications of Neural Network.

Unit-III

Fuzzy systems and applications: fuzzy sets; fuzzy reasoning; fuzzy inference systems; fuzzy control; fuzzy clustering; applications of fuzzy systems.

Neuro-fuzzy systems: neuro-fuzzy modeling; neuro-fuzzy control.

Unit-IV

Applications: Pattern Recognitions, Image Processing, Biological Sequence Alignment and Drug Design, Robotics and Sensors, Information Retrieval Systems, Share Market Analysis, Natural Language Processing.

Suggested Books:

1. M. Mitchell: An Introduction to Genetic Algorithms, Prentice-Hall.
2. J.S.R.Jang, C.T.Sun and E.Mizutani: Neuro-Fuzzy and Soft Computing, PHI, Pearson Education.
3. Timothy J.Ross: Fuzzy Logic with Engineering Applications, McGraw-Hill.
4. Davis E.Goldberg: Genetic Algorithms: Search, Optimization and Machine Learning, Addison Wesley.
5. S. Rajasekaran and G.A.V.Pai: Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI.
6. D. E. Goldberg: Genetic Algorithms in Search, Optimization, and Machine Learning, Addison-Wesley.
7. Z. Michalewicz: Genetic Algorithms+ Data Structures = Evolution Programs, Springer-Verlag.
8. N.K. Sinha & M. M. Gupta(Eds): Soft Computing & Intelligent Systems: Theory & Applications, Academic Press.
9. M.T. Hagan, H. B. Demuth, And M. Beale: Neural Network Design, Thompson Learning.
10. C. Lau (Ed): Neural Networks, IEEE Press.
11. J. Freeman and D. Skapura: Neural Networks: Algorithms, Applications, and Programming Techniques, Addison-Wesley.
12. G. J. Klir and T. A. Folger: Fuzzy Sets, Uncertainty, and Information, PHI.
13. A. Konar: Computational Intelligence Principles, Techniques and Applications, Springer.
14. Kishan Mehrotra, Chilukuri K. Mohan and Sanjay Ranka: Elements of Artificial Neural Networks, Penram, Mumbai.

MCA-504A: ADVANCED DATABASE MANAGEMENT SYSTEM

Max. Marks: 80

Time: 3 Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit – I

Architecture, advantages, disadvantages, data models

Relational Databases: Integrity Constraints revisited, Extended ER diagram, Relational Algebra & Calculus, Functional, Multivalued and Join Dependency, Normal Forms, Rules about functional dependencies.

Unit-II

Query Processing and Optimization: General strategies for query processing, Valuation of Relational Operations, Transformation of Relational Expressions, Indexing and Query Optimization, Limitations of Relational Data Model, Null Values and Partial Information.

Objected Oriented and Object Relational Databases: Specialization, Generalization, Aggregation and Association, Objects, Object Identity, Object defining language, object query language, Architecture of Object Oriented and Object Relational Databases

Unit-III

Parallel and Distributed Databases: Distributed Data Storage – Fragmentation & Replication, Location and Fragment Transparency, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel Databases, Parallel Query Evaluation.

Advanced Transaction Processing: Nested and Multilevel Transactions, Long Duration Transactions, Weak Levels of Consistency, Transaction Work Flows, Transaction Processing Monitors.

Unit-IV

Data Mining: Knowledge Representation Using Rules, Association and Classification Rules, Algorithms for Rule Discovery

Data Warehousing: Introduction, Data Warehousing Architecture, Reconciled data layer, data transformation, Characteristics

Text Books:

1. Elmars, Navathe, Somayajulu, Gupta, “Fundamentals of Database Systems”, 4th Edition, Pearson Education, 2007
2. Garcia, Ullman, Widom, “Database Systems, The complete book”, Pearson Education, 2007
3. R. Ramakrishnan, “Database Management Systems”, McGraw Hill International Editions, 1998
4. Date, Kannan, Swaminathan, “An Introduction to Database Systems”, 8th Edition Pearson Education, 2007
5. Singh S.K., “Database System Concepts, design and application”, Pearson Education, 2006.
6. Silberschatz, Korth, Sudarshan, “Database System Concepts”, Mcgraw Hill, 6th Edition, 2006

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit – I

Introduction to Scilab: Scilab as {best} calculator, Standard Scilab windows, Operations with variables, Naming, Checking existence, Clearing, Operation, Arrays, Columns and rows: creation and indexing, Size & length, Multiplication, division, power, Operations, Writing script files, Logical variables and operators, Flow control, Loop operators, Writing functions, Input/output arguments, Function visibility, path. Example: Scilab startup, Simple graphics, 2D plots, Figures and subplots.

Unit-II

Data and data flow in Scilab. Data types Matrix, string, cell and structure, Creating, accessing elements and manipulating of data of different types, File Input-Output, Matlab files, Text files, Binary files, Mixed text-binary files, Communication with external devices, serial port, Parallel port, Sound card, Video input.

Unit-III

Function minimization and parameters search: Polynomial fit, 1D and 2D fits, Data windowing, Error bounds, Arbitrary function fit, Error function, Fixing parameters, Goodness of fit, criteria, Error in parameters.

Unit-IV

Handle graphics and user interface: Pre-defined dialogs, Handle graphics, Graphics objects, Properties of objects, Modifying properties of graphics objects, Menu-driven programs, Controls: uimenu and uicontrol, Interactive graphics, large program logic flow.

Open Elective

(Provided by the Deptt of Computer Science)

Paper MCA-Introduction to Computer

Max. Marks: 60.

Time: 3 Hrs.

Note: The examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory covering all the units and shall carry 6 small questions of two marks each. The rest of the eight questions will be set from all the four units. The examiner will set two questions from each unit out of which the candidate shall attempt four questions selecting one question from each unit. All questions shall carry 12 marks each.

Unit-I

Basic Concepts: What is computer, Characteristics of a Computer, Advantages of Computer, Limitations of Computer, Types of computer, Applications of computer, Data Representation, Hardware, firmware, Live-ware, Software: Relationship between hardware and software, System software: Operating system, Translators, Interpreter, Compiler, Assemblers, Linkers. Overview of operating system, Functions of operating system

Unit-II

Information Systems: Meaning, Need of an efficient Information system, Types of Information System. Information requirement for Planning, Coordination, and control for various levels in Business, Industry. Basic of data arrangement and access.

Introduction to database: Definition, Uses of databases, characteristics of database, DBMS, data independencies, difference between traditional file processing system and database approaches.

Unit-III

Net works: LAN, WAN. Wireless Network, Introduction networking, Importance of networking, Communication devices such as Modem, Features of Networking, Introduction to Internet: Meaning of Internet, Growth of Internet, Owner of Internet, Anatomy of Internet, Basic Internet Terminology, World Wide Web, Internet Protocols, Usage of Internet to society, Search Engines.

Unit-IV

Introduction to MS Word: Features of MS Word, component of word document window, creating and Printing a document, Formatting text and document, Mail Merge, Macro, Export and Import file, working with auto shapes, Adding pictures to a work document,

Introduction to MS Excel: Features of Excel, Creating a table, Formatting worksheet, Types of graph, Excel functions, Printing a worksheet, Managing and Organizing data. Power point presentation.

Paper MCA- Computer and Network Security

Max. Marks: 60.

Time: 3 Hrs.

Note: The examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory covering all the units and shall carry 6 small questions of two marks each. The rest of the eight questions will be set from all the four units. The examiner will set two questions from each unit out of which the candidate shall attempt four questions selecting one question from each unit. All questions shall carry 12 marks each.

Unit-I

The Security Problem in Computing: The meaning of Computer Security, Computer Criminals, Methods of Defense and Elementary Cryptography: Substitution Ciphers, Transpositions, Making "Good" Encryption Algorithms

Unit-II

Private Key Encryption, The Data Encryption Standard, The AES Encryption Algorithm, Public Key Encryptions, and Uses of Encryption RSA algorithms.

Unit-III

Security in Network: Threats in Network, Network Security Controls, Firewalls, Intrusion Detection Systems, Secure E-mail. Buffer Overflows, Software Security, Operating System Security, Trusted Computing and Multilevel Security,

Unit-IV

Privacy and ethical issues in networks, health issues in networked, Physical and Infrastructure Security, Security Auditing, Legal and Ethical Aspects, future of networked economy.