MCA COURSE STRUCTURE

SEMESTER I

MCA-101 (N2) Introduction to Information Technology
MCA-102 (N2) Programming in C
MCA-103 (N2) Accounting & Financial Mgmt.
MCA-104 (N2) Computer Mathematical Foundation
MCA-105 (N2) System Analysis And Design
MCA-106 (N2) Software Lab-I (IT)
MCA-107 (N2) Software Lab-II (C)

SEMESTER II

MCA-201 (N2) Management Information System
MCA-202 (N2) Object Oriented Programming using C++
MCA-203 (N2) Data Communication & Networks
MCA-204 (N2) Principles of Management
MCA-205 (N2) Introduction to Micro Processor
MCA-206 (N2) Software Lab-III (C++)
MCA-207 (N2) Hardware Lab-I (Micro Processor)

SEMESTER III

MCA-301 (N2) Computer System Architecture
MCA-302 (N2) Data Structures
MCA-303 (N2) Workshop on Visual Basic
MCA-304 (N2) RDBMS-I
MCA-402 (N2) Software Engineering
MCA-306 (N2) Software Lab-IV (DS)
MCA-307 (N2) Software Lab-V (RDBMS-I)

SEMESTER IV

MCA-401 (N2) RDBMS-II
MCA-305 (N2) Computer Based Optimization Methods
MCA-403 (N2) System Software
MCA-404 (N2) Operating System
MCA-405 (N2) Elective-I
MCA-406 (N2) Software Lab-VI (RDBMS)
MCA-407 (N2) Software Lab-VII (OS)
(LINUX/NT)

SEMESTER V

MCA-501 (N2) Computer Graphics
MCA-502 (N2) Internet Programming And Java
MCA-503 (N2) Elective-II
MCA-504 (N2) Elective-III
MCA-505 (N2) Software Lab-VIII (Graphics)
MCA-506 (N2) Software Lab-IX (Java)
MCA-507 (N2) Comprehensive Viva Voce

SEMESTER VI

MCA (N2)-601 Project

Elective-I

MCA-405-A (N2) Artificial Intelligence
MCA-405-B (N2) Robotics Engineering
MCA-405-C (N2) Object Oriented Analysis and Design

Elective-II

MCA-503-A (N2) E-Commerce
MCA-503-B (N2) Compiler Design

Elective-III

MCA-504-A (N2) System Simulation And Modeling
MCA-504-B (N2) Advanced Microprocessor Systems

Note:

For 2003 batch & onward.
The course contents of scheme are exactly same as of N2 Scheme. Only few papers have been shifted from one semester to another.
1ˢᵗ and 2ⁿᵈ semester courses are exactly the same.

MCA 101(N2) INTRODUCTION TO INFORMATION TECHNOLOGY

Internal Assessment: 40
External Assessment: 60
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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed
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Section A
Computer Fundamentals: Block structure of a computer, characteristics of computers, generation of computers, classification of computers.

Number System: Bit, byte, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other, Binary Arithmetic: Addition, subtraction and multiplication. Representation of Information: Integer and floating point representation, Complement schemes, Character codes (ASCII, EBCDIC, BCD, Excess-3, Grey).

Section B
Elements of a computer processing system: Hardware – CPU storage devices and media, VDU, input-output devices, data communication equipment. Software – system software, application software.

Programming languages: classification, machine code, assembly language, higher level language, and fourth generation languages

Section C
Operating system: Batch, multi-programming, time sharing, mmultiprocessing, PC operating system, network operating system, on-line and real time operating system.

Computer Network and Communication: Network types, network topologies, network communication devices, physical communication media, network protocol, (TCP/IP.)
Internet and its Applications: E-mail, TELNET, FTP, World Wide Web, Internet chatting.

Section D
Range of application: Scientific, Business, educational, weather forecasting, and remote sensing, planning, multilingual applications, management information, decision support system, inventory control, medical, industrial control, banks, railways, etc.

References:
1. D.H. Sanders," Computers Today", Mc Graw Hill, 1988.
2. T.N. Trainers," Computers" (4th edition) Mc Graw Hill, 1994.
3. V. Rajaraman,"Fundamentals of Computers" (2nd edition),

MCA-102 (N2) **PROGRAMMING IN C**

Internal Assessment: 40
External Assessment: 60

Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E
Use of non-programmable scientific calculator is allowed

Section A
Problem Solving with Computers: Algorithms, and Flowcharts. Data types, constants, variables, operators, data input and output, assignment statements, conditional statements.

Section B
Iteration, arrays, strings processing, defining function, types of functions, function prototype, passing parameters, recursion.
Storage class specifiers, pre-processor, header files and standard functions.

Section C
Pointers: Definition and uses of pointers, pointer arithmetic, pointers and array, pointers and functions, pointer to pointer.
Structures, union, pointers to structures, user-defined data types, enumeration.

Section D
Data files: Opening, closing, creating, processing and unformatted data files.
Introduction to Dynamic Memory Allocation
C-programming applications: Sorting (Bubble sort, Selection sort), Searching
(Binary search, Linear Search)

References:

1. Kerighan & Richie   The C programming language   (PHI Publication)
2. Byron Gottorfried   Schaum's outline of programming with C
3. E.Balaguruswamy   Programming in ansi 'C'   (Tata McGraw Hill)
4. Kanetkar   "Let Us C", BPB Publications.   (Tata McGraw Hill)

MCA-103 (N2)   **ACCOUNTING AND FINANCIAL MANAGEMENT**

Internal Assessment: 40
External Assessment: 60

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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed
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Section A
Accounting: Principles, concepts and conventions, double entry system of accounting, introduction to basis books of accounts of sole proprietary concern, closing of books of accounts and preparation of trial balance.

Final Accounts: Trading, Profit and Loss accounts and Balance sheet of sole proprietary concern (without adjustment)

Section B
Financial Management: Meaning, scope and role, a brief study of functional areas of financial management. Introduction to various FM tools: Ration Analysis, Fund Flow statement and cash flow statement (without adjustments)
Section C
Costing: nature, importance and basic principles. Marginal costing: Nature scope and importance, Break even analysis, its uses and limitations, construction of break even chart, Standard costing: Nature, scope and variances (only introduction)
Section D
Computerized accounting: Meaning and advantages, Computer Programs for accounting, Balancing accounts, Trial balance and final accounts in computerized, Accounting, control, and Audit, Sub-Modules of computerized accounting systems.

References:
1. J.C.Katyal," Principles A Book-Keeping".
2. Jain and Narang," Principles of Accounting".
3. I.M.Pandey," Financial Management, Vikas Publications.
4. Sharma, Gupta & Bhalla,"Management Accounting".
5. Jain and Narang," Cost Accounting".
6. Katyal,"Cost Accounting".
7. P.H.Barrett," Computerized Accounting", BPB.

MCA-104 (N2)   **COMPUTER MATHEMATICAL FOUNDATION**

Internal Assessment: 40
External Assessment: 60

Instructions for paper-setter

The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed

Section A

Sets and Relations: Definition of sets, subsets, complement of a set, universal set, intersection and union of sets, De-Morgan's laws, Cartesian products, Equivalent sets, Countable and uncountable sets, minset, Partitions of sets, Relations: Basic definitions, graphs of relations, properties of relations

Section B

Algebra of logic, Propositions, Connectives, Tautologies and contradiction, Equivalence and implication, Principle of Mathematical induction, quantifiers.

Section C

Introduction of a Matrix, its different kinds, matrix addition and scalar multiplication, multiplication of matrices, transpose etc. Square matrices, inverse and rank of a square matrix, solving simultaneous equations using Gauss elimination, Gauss Jordan Methods, Matrix Inversion method.

Section D

A general introduction, simple and multipgrpahs, directed and undirected graphs, Eulerian and Hamiltonian Graphs, Shortest path algorithms, Chromatic number, Bipartite graph, graph coloring.

References:

Alan Doerr,"Applied Discrete Structures for Computer Science", Galgotia Publications.
Kolman and Busby " Discrete Mathematical structures for Computer Sciences" PHI.

MC-105 (N2)   **SYSTEMS ANALYSIS AND DESIGN**

Internal Assessment: 40
External Assessment: 60

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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E
Use of non-programmable scientific calculator is allowed

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Section A
System: Definition, Characteristics, elements and types of system. System Development Life Cycle, Role of system analyst, Initial investigation, Feasibility study-Technical, economic and behavioral feasibility, Cost and Benefit analysis.

Section B
System Analysis: Problem Definition, Information requirements, Information gathering tools, Tools of structured Analysis – Data Flow Diagrams, Data Dictionary, Decision Tree, Decision tables and structured English.

Section C
System Design: Structured Design, Input design, and Output design, Form Design. File Organization: Sequential Indexed Sequential, Chaining and Inverted list organization. System Testing: Test Plan AND test data, type s of system test.

Section D
System Implementation: Implementation Plan, activity network for conversion, combating resistance to change. Hardware/Software Selection: Procedure for selection, Major phases in selection, Make v/s buy decision, Criteria for software selection.

References:

1. Awad, EM: System Analysis and Design, Galgotia Publications Pvt. Ltd
2. Gane and Sarson: Structured System Analysis and Design.
3. Silver, GA, Silver, ML: System Analysis and Design, Addison-Wesley Publishing Co

MCA-106 (N2)   **SOFTWARE LAB-I (IT)**

Internal Assessment: 40
External Assessment: 60

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This laboratory course will mainly comprise of exercises on:

MCA 101: Typical Commands of DOS, GUI in Windows.
MCA-103: Introductory Study of Computerized Accounting Packages

Maximum marks for continuous assessment: 40
Maximum marks for university examination: 60

Note: The break up of marks for the practical 9university examination) will be as under

Lab record   15 marks
Viva Voce   15 marks
Execution of commands   30 marks

MCA-107 (N2)   **SOFTWARE LAB II (C)**

Internal Assessment: 40
External Assessment: 60

This laboratory course will mainly comprise of exercises on what is learnt under paper: MCA-102

Maximum marks for continuous assessment: 40
Maximum marks for university examination: 60

Note: Program should be fully documented with simple I/O data. Flow charts should be developed wherever necessary.

Write program in 'C' language

1.Using input and output statements
2.Using control statements.
3.Using functions.
4.Using array
5.Using structure.
6.Using files.
7.To sort an array using different methods
8.To search an element from array.

  ➢ The break up of marks for the practical 9university examination) will be as under

     Lab record   15 marks
     Viva Voce   15 marks
     Program Development   30 marks
     And execution

MCA-201 (N2)   **MANAGEMENT INFORMATION SYSTEM**

Internal Assessment: 40
External Assessment: 60
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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E
Use of non-programmable scientific calculator is allowed
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Section A
Introduction to systems and Basic systems concepts, Types of systems, The systems Approach, Information systems: Definition and characteristics, types of Information, role of Information in Decision – Making, Sub – systems of information systems: EDP and MIS, management levels, EDP/MIS/DSS

Section B
An overview of Management Information System: Definition and Characteristics, Components of MIS, Frame Work understanding MIS: Robert Anthony's Hierarchy of Management Activity. Information requirements and Levels of Management, Simon's Model of decision – Making, structured Vs un-structured decisions, Formal Vs. Information systems

Section C
Developing Information systems: Analysis and design of information systems: Implementation and evaluation, Pitfalls in MIS development.

Section D
Functional MIS: A study of Marketing, Personnel, financial and Production MIS

References:

1. J. Kanter," Management Information Systems", PHL.
2. Goirden B. Davis & M.H.Olsca " Management Information Systems: Conceptual Foundation, Structure and Development:
3. Robert G. Murdick & Joel E. Ross & James R. Claggett, " Information Systems for Modern Management", PHI.
4. Lucas, "analysis, Design & Implementation of Information system".

MCA-202 (N2)   **Object Oriented Programming Using C++**

Internal Assessment: 40
External Assessment: 60

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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E
Use of non-programmable scientific calculator is allowed
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Section A

Evolution of OOP, OOP Paradigm, advantages of OOP, Comparison between functional programming and OOP Approach, characteristics of object oriented language – objects, classes, inheritance, reusability, user defined data types, polymorphism, overloading. Introduction to C++, Identifier and keywords, constants, C++ operators, type conversion, Variable declaration, statements, expressions, features of iostream.h and iomanip.h input and output, conditional expression loop statements, breaking control statements.

Section B

Defining function, types of functions, storage class specifiers, recursion, pre-processor, header files and standard functions, Arrays, pointer arithmetic's, structures, pointers and structures, unions, bit fields typed, enumerations.

Section C

Classes, member functions, objects, arrays of class objects, pointers and classes, nested classes, constructors, destructors, inline member functions, static class member, friend functions, dynamic memory allocation. Inheritance, single inheritance, types of base classes, types of derivations, multiple inheritance, container classes, member access control

Section D

Function overloading, operator overloading, polymorphism, early binding, polymorphism with pointers, virtual functions, late binding, pure virtual functions, opening and closing of files, stream state member functions, binary file operations, structures and file operations, classes and file operations, random access file processing.

References:
1. D. Ravichandran,"Programming with C++", TMH, 1996.
2. Robert Lafore,"Object Oriented Programming in Turbo C++", Galgotia Publ, 1994.
3. Bjarne Strautrup,"The C++ programming language", addition-Wesley Publ, 1994.
4. S.Halladay and M. Wiebel," Object Oriented Software Engg", BPB Publ, 1995.

MCA-203 (N2) <u>DATA COMMUNICATION & COMPUTER NETWORKS</u>

Internal Assessment: 40
External Assessment: 60

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A) Instructions for papers-setter
The question paper will consist of five A, B, C, D and E, Section A, B, C and D will have two question from the respective sections of the syllabus and will carry 15% marks   each, section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates
1. Candidates are required to attempt one question each from sections A, B, C, and D of the question paper and the entire section E.
2. Use of non-programmable scientific calculator is allowed.

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SECTION A

Introduction to data communication, analog Vs Digital Communication, Fourier Analysis, Band Width limitation, data rate of a channel, Error detection and correction; nature of errors, parity check, CRC, hamming code, Modulation; Multiplexing: SDM, FDM, TDM, STDM.

SECTION B

Introduction to computer networks and application; network hardware, network software, OSI reference model, TCP/IP model, network standardization, physical layer: circuit switching, packet switching, message switching, terminal handling, telephone system, modems, connections, transmission media.

SECTION C

Data link layer: design issues, elementary data link protocols-sliding window protocol, HDLC/SDLC, ALOHA, CSMA/CD, token passing, IEEE standard 802 for LAN and WAN.
Network layer: design issues, Routing algorithms: shortest path routing, flooding, distance vector routing, flow based routing, Congestion control algorithms: leaky bucket, token bucket, Internet working, the network layer in the Internet IP protocol, IP address.

SECTION-D

Transport layer: design issues, elements of transport protocol, addressing establishing & releasing a connection, flow control & buffering, TCP/IP service model, TCP connection management.

<u>REFERENCES:</u>

1 Andrew S. Tanenbaum, "Computer Network 2nd Edition", PHI, Third Edition 1997.
2 Schwaber, " Data Communication"
3 William Stallin Maxwell, " Data And Computer Communication", 2nd Edition,
4 D.E. Corner,"Inter Networking With TCP/IP: Principles, Protocol And Architecture", Vol1, 2nd Edition Prentice Hall, 1991
5. D. Bertsekas And R.Gallagar,"Data Networks", 2nd Edition, Prentice Hall, 1992.

MC-204 (N2)   **PRINCIPLES OF MANAGEMENT**

Internal Assessment: 40
External Assessment: 60

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Instruction for paper setter
The question paper will consist of two sections A and B. Sections B will have six questions and will carry 10 marks each. Section A will have 10 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instructions for Candidates
Candidates are required to attempt four questions from section B and the entire section A. Use of non-programmable scientific calculator is allowed
Use of non-programmable scientific calculator is allowed

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Management: Nature and scope

Planning: - Nature, Types, Steps in planning, the process of planning, setting of objectives, strategies policies and planning premises, the process of decision making.

Organizing: nature, Process of organizing, departmentation, line and staff arrangement, organization structure and design, project and matrix organization, authority, decentralization, delegation, creating an effective span of management.

Need, recruitment and selection techniques, types of interview co-ordination: Need and importance, types and techniques.

Controlling: Control process, control techniques

Directing: - Conception, motivation, communication and leadership.

Introduction of the following function Areas:
Production – Production systems Production planning and control, work study
Marketing – Concept, segmentation of market, marketing mix, marketing research.
Finance – Finance functions, sources of finance for fixed assets and working capital structure
HRD – concept, different functions of HRD

Reference:

Koontz & O' Donnell   Essentials of Management
Stephen P. Robbins   Management
Chabbra   Business Organization and Management
T.N.Prasad   Principles & Practice of Management
L.M.Arun Kumar & R. Sharma   Principles of Business Management

MCA-205 (N2)   **INTRODUCTION TO MICROPROCESSOR**

Internal Assessment: 40
External Assessment: 60

Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E
Use of non-programmable scientific calculator is allowed
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Section A

Introduction to Microprocessor, its historical background and Microprocessor applications.
INTEL 8085: Microprocessor Architecture and its operations, 8085 MPU and its architecture, 8085 instruction cycle and timing diagram, Memory read and Memory Write operations, Instructions for 8085: Data movement, Arithmetic and logic; and branch control instructions., RISC v/s CISC processors.

Section B

INTEL 8086: Introduction, 8086Architecture, real and Protected mode, Memory Addressing, Memory Paging, Addressing Modes. Pin diagram of 8086, clock generator (8284A)

Section C

Various types of instructions: Data movement, Arithmetic and logic; and program control.

Section D

Interrupts: Introduction, 8257 Interrupt controller, basic DMA operation and 8237 DMA Controller, Arithmetic coprocessor, 80X87 Architecture

REFERENCES:

1.   B. Brey   The Intel microprocessors 8086/8086, 80186/80188, 80286,
                         80386, 80486 Pentium pro processor Architecture,
                         Programming and interfacing 4th Edition.
2.   B. Ram   Fundamentals of microprocessors and HI microcomputers
                         Dhanpat RaiPublication.
3.   Ramesh S. Gaonkar Microprocessor Architecture, Programming and Applications   with
                         8085,4^{th} edition, Penram International Publishing (India)

MCA-206 (N2)   **SOFTWARE LAB III (C++)**

This laboratory course will mainly comprise of exercises on what is learnt under paper: MCA 202

Maximum marks for continuous assessment: 40
Maximum marks for university examination: 60

Note: Program should be fully documented with simple I/O data. Flow charts should be developed wherever necessary.

Write program in 'C++' language

1.Using input and output statements
2.Using control statements.
3.Using functions.
4.Using array
5.Using Classes and implementation of Constructor and Destructor.
6.Using files.
7.Using OOP's Concepts (Inheritance, Polymorphism, Encapsulation, Friend and Static Functions)

> The break up of marks for the practical 9university examination) will be as under

Lab record	15 marks
Viva Voce	15 marks
Program Development	30 marks
And execution	

MCA-207 (N2)   **Practical Hardware Lab – I(Microprocessor)**

Internal Assessment 40
External Assessment 60

This laboratory course will mainly comprise of exercise on what is learnt under the paper: **MCA-205 (up)**.

Using 8085 and 8086 microprocessor kits do the following programs:

8085

1. To examine and modify the contents of a register and memory location.
2. To add two hexadecimal nos.
3. To subtract two hexadecimal nos.
4. To add two hexadecimal nos. The result should not be greater than 199.
5. To add two sixteen bit nos.
6. To subtract two sixteen bit nos.
7. For addition of 8 bit no series neglecting the carry generated.
8. To separate hexadecimal number into two digits(Breaking the byte into two nibbles).

8086

1.To add two binary no's each 8 bit long.
2 To add two binary no's each 8 bit long.
3. To multiply two binary no's.
4.To find the maximum no in a given string (16 bytes long) and store it in a
   particular location.
5.To find the minimum no in a given string (16 bytes long) and store it in a
    particular location.
6.To sort a string of a no of bytes in descending order.
7.To multiply an ASCII string of eight numbers by single ASCII digit.
8.To calculate the no. of bytes in a string starting from a particular location up to an Identifier
   (data byte) placed in AL register. Store the actual count in a particular memory
    Location.

MCA-301 (N2)   **COMPUTER SYSTEM ARCHITECTURE**

Internal Assessment: 40
External Assessment: 60

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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed
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Section A
Logic gates, flip flops, Registers, Counters, Adder, Subtractor, MUX and DEMUX, Encoder-Decoder

Section –B
Computer organization and design: Instruction codes, op-code, computer registers, computer instructions, Timing and control, instruction cycle, memory reference instructions. CPU: Stack organization, Instruction formats and addressing modes Program control, Types of Interrupts

Section C
Control Memory, Micro programming vs Hardwired control unit, Overview of RISC/CISC, I/O and their brief description, I/O, processing, Bus interface, data transfer techniques, I/O interrupts, channels.

Section D
Memory system, storage technologies, Memory hireachary, Memory management, Main and Auxiliary memory, Associative, Virtual and cache memory

References:
M.M. Mano "Computer System Architecture", PHI.
J.P.Hayes: Computer Architecture and Organizations", Mc Graw Hill
R.P.Jain "Modern Digital Electronics", Tata Mc Graw Hill.
R.P.Jain "Modern Digital Electronics", Tata Mc Graw Hills.
Stallings "Computer Organization and Architecture" PHI.

MCA-302 (N2)   **DATA STRUCTURES**

Internal Assessment: 40
External Assessment: 60

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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed
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Section A

Basic concepts and notations, data structures and data structure operations, mathematical notation and functions, algorithmic complexity and time space trade off.
Basic data structures such as arrays, stack and queues and their applications, linked and sequential representation. Linked list, representation of linked list, multi linked structures.

Section B
Trees-definitions and basic concepts, linked tree representation, representations in contiguous storage, binary trees, binary tree traversal, searching insertion and deletion in binary trees, heap tree and heap sort algorithm, AVL trees.

Section C
Graphs and their application, sequential and linked representation of graph – adjacency matrix, operations on graph, traversing a graph, Dijkstra's algorithm for shortest distance, DFS and BFS, Hashing.

Section D
Searching and sorting use of various data structures for searching and sorting, Linear and Binary search, Insertion sort, Selection sort, Merge sort, Radix sort, Bubble sort, Quick sort, Heap Sort.

Note: -
1. Programs are to be implemented in 'C/C++'
2. Insertion, deletion, search and traversal operations are to be performed on all the data structures.

References:
1. A. Tannenbaum, Y. Lanhgsam and A.J.Augenstein,"Data Structures Using C", Prentice Hall of India, 1990
2. Seymour Lipschultz, " Theory and Practice of Data structures", Mc Graw Hill, 1988.
3. E. Horowitz and S.Sahni,"Data structures with Pascal", Galgotia, 3rd edition, 1991.

Workshop on Visual Basic

MCA-303 (N2)

Internal Assessment 100

Develop an application using Visual Basic.

1.   Hospital automation
2.   Bank transactions management
3.   Hotel Management
4.   Gas agency management
5.   Office Automation
6.   Railway Automation
7.   Computerization course registration
8.   Hostel Management
9.   Hospital Management
10.   Inventory Management
11.   Competitive examination database
12.   Air line reservation
13.   Transport management
14.   College admission
15.   Library management

Note: Any similar project using Relational Database System.

MCA-304 (N2)   **RELATION DATA BASE MANAGEMENT SYSTEM-I**

Internal Assessment: 40
External Assessment: 60

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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed

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SECTION-A
   Overview of DBMS, Basic DBMS terminology, data independence. Architecture of a DBMS, Distributed databases, structure of distributed databases, design of distributed databases.

SECTION-B
   Introduction to data models: entity relationship model, hierarchical model: from network to hierarchical, relational model, object oriented database, object relational database, comparison of OOD & ORD, comparison of network, hierarchical and relational models.

SECTION-C
   Relational model: storage organizations for relations, relational algebra, relational calculus, functional dependencies, multivalued dependencies, and normalization.

SECTION-D
   Relational query language: SQL, database integrity, security, concurrency, recovery, client/server architecture, and technical introduction to oracle.

References:
   1. C.J. Date, " An introduction to database systems", (3rd ed Narosa publishers, 1985), 1997 (reprint)
   2. ullman, "principles of database systems", (2nd ed. Galgotia, 1984).
   3. D. Kroenke, " database processing", (Galgotia, 1987)
   4. Henry F.korth, Abraham, " database system concepts", McGraw hill Inc., 1997.
   5. Naveen Prakash, Introduction to database management", TMH, 1993.
   6. Bobrowski, " client server architecture and introduction to oracle 7", 1996.

MCA-402 (N2)   SOFTWARE ENGINEERING

Internal Assessment: 40
External Assessment: 60

Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed

SECTION-A
 Software: Characteristics, Components Applications, Software Process Models: Waterfall, Spiral, Prototyping, Fourth Generation Techniques, Concepts Of Project Management, Role Of Metrics And Measurement.

SECTION - B
S/W Project Planning: Objectives, Decomposition Techniques: S/W Sizing, Problem Based Estimation, Process Based Estimation, Cost Estimation Models: COCOMO Model, The S/W Equation, System Analysis: Principles Of Structured Analysis, Requirement Analysis, DFD, Entity Relationship Diagram, Data Dictionary.

SECTION-C
S/W Design: Objectives, Principles, Concepts, Design Mythologies: Data Design, Architecture Design, Procedural Design, Object – Oriented Concepts.

SECTION-D
Testing Fundamentals: Objectives, Principles, Testability, Test Cases: White Box & black box Testing, Testing Strategies: Verification & Validation, Unit Test, Integration Testing, Validation Testing, System Testing.

Reference:

1. Roger s. pressman, "software engineering – A practitioner's approach ", McGraw Hill
2. R.E. fairly, "software engineering concepts", McGraw Hill.
3. Jalota, "an integrated approach to software engineering", (Narosa Publishing House).

MCA-306 (N2) **SOFTWARE LAB IV (DS)**

Internal Assessment: 40
External Assessment: 60

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This laboratory course will mainly comprise of exercises on what is learnt under paper: mca-302 (Data Structures)

Maximum marks for continuous assessment: 40
Maximum marks for university examination: 60

Note: Program should be fully documented with sample I/O data Flow charts should be developed wherever necessary.

Write program in C / C++

1. To insert and delete a node in a linked list
2. To add two polynomials using linked list
3. To insert and delete a node in a circular linked list.
4. To implement a stack using arrays and linked list.
5. To implement a queue using arrays and linked list.
6. To invert a linked list.
7. To merge two arrays.
8. To solve polish expression using stacks.
9. For tower of hanoi problem using recursion.
10. Library management application using searching and sorting technique.
11. List words with their occurrence in a paragraph-using file.
12. Resemblance of particular words with respect to meaning or spelling checking
13. To insert and delete node in binary search tree
14. To find traversals of expressions using binary tree
15. To search an element using binary tree.

➢ The break up of marks for the practical (university examination) will be as under

    Lab record   15 marks
    Viva Voce   15 marks
    Program Development   30 marks
    And execution

MCA-307 (N2)   **SOFTWARE LAB V (RDBMS-I)**

Internal Assessment: 40
External Assessment: 60

This laboratory course will mainly comprise of exercise on what is learnt under the paper: **MCA-304 (RDBMS-I)**.

*
Maximum Marks For Continuous Assessment: 40
Maximum Marks For University Examination: 60

Note: The break up of marks for the practical will be as under
   Lab Record   15 marks
   Viva Voce   15 marks
   Program development   30 marks
   And execution

MCA-401 (N2)   <u>**RELATIONAL DATABASE MANAGEMENT SYSTEM-II**</u>

Internal Assessment: 40
External Assessment: 60

Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed
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SECTION-A
Degree Of Data Abstraction, The Database Life Cycle (DBLC): Initial Study Of The Database, Database Design, Implementation And Loading, Testing And Evaluation, Operation, Maintain Ace And Evaluation.

SECTION-B
Centralized Verses Decentralized Design, What Is A Transaction? Concurrency Control (Locking Methods, Time Stamping Method, Optimistic Method) DDBMS Distributed Database Management Systems) Advantage And Disadvantages. Homogeneous And Heterogeneous DBMS, Distributed Database Transparency Features. Level Of Data And Process Distribution: SPSD (Single–Site Processing, Single-Site Data), MPSD (Multiple-Site Processing, Single Site Data), MPMD (Multiple –Site Processing, Multiple-Site Data)

SECTION-C
Systems, Client / Server: Architecture And Implementation Issues.
Client / Server Systems, What Is Client / Server? The Forces That Drive Client /Server

SECTION-D
(DSS) Decision Support Systems: Operational Data Vs. Decision Support Data, The DSS Database Requirements. The Data Warehouse: The Evaluation Of The Data Warehouse, Rules For Data Warehouse. Online Analytical Processing (OLAP): OLAP Architecture Relational, OLAP And Comparison, Data Mining.

REFERENCES:
1. An Introduction To Database Systems (Sixth Edition) By C.J.Date
2. Data Base Systems (3rd Edition) Galgotia Publications (P) Ltd. By Peter Rob Carlos Coronel
3. An Introduction To Database Systems By Bipin C. Desai

MCA-305 (N2)   **COMPUTER BASED OPTIMISATION METHODS**

Internal Assessment: 40
External Assessment: 60

Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed

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SECTION-A

Origin & development of O.R., Nature & Characteristic features of O.R., Models & Modeling in operation research. methodology of O.R., general methods for solving O.R. & decision making, application, use & limitations of O.R.
Linear Programming formulation, graphical & simplex method, duality in L.P.

SECTION-B
Transportation Problems: Loops, Test For Optimality, Degeneracy In Transpiration Problems. Unbalanced Transportation Problems. Transmanship Problems, Assignment & Routing Problems, Traveling Salesman Problem.

SECTION-C
Probability & Uncertainty, Sample Space & Probability, Algebra Of Events, Conditional Probability.
Decision Making: Decision Making, Enviorment, Decision Under Uncertainty, Decision Under Risk, Decision Tree Analysis.

SECTION – D
Revised Simplex Method, Integer Programming, Branch & Bound Method, Dynamic Programming.

References:
1. Kanti Swarup P.K. Gupta And Manmohan,"Operation Research ", Sultan Chand & Sons, Seventh Ed.1994.
2. S.D.Sharma, " Operation Research ", Kedar Nath Ram Nath And Co. Meerut, Tenth Ed. 1992.

MCA –403 (N2)   **SYSTEM SOFTWARE**

Internal Assessment: 40
External Assessment: 60
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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed
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Section A
Introduction to software processors; elements of assemble language programming; assembly scheme; single pass and two pass assembler; general design procedure of a two pass assembler
Software Tools: Text editor and its design.

Section B
Macros and microprocessor: macro definition, macro expansion, Nested macro calls, features of macro facility, design of a macro preprocessor.
Interpreters: use of interpreter, pure and impure interpreter
Loaders: Compile and go loader, Absolute loader, Relocating loader, and direct linking loader.

Section C
Compilers: Aspects of compilation, lexical analysis, syntax analysis, memory allocation, compilation of expressions; intermediate code for expressions, compilation of control structures, Code optimization – local and global optimization. Linkers – translated linked and load time addresses, relocation and linking concepts. Design of a linker, self relocating programs.

Section D
Basic concept so f an operating system and its functions.
Memory management: contiguous, non-contiguous memory allocation, Paged allocation, Demand paged allocation, segmented paged allocation.
Processor management: Scheduler, traffic controller, race condition.
Information management: Structure and features of file systems, objectives of segmented environment

References:
1. Dhamdhere,"Systems Programming and operating systems", TMH.
2. Donovan," System Programming". (MC Graw Hill)

MC-404 (N2) **OPERATING SYSTEMS**

Internal Assessment: 40
External Assessment: 60

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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed
_____

Section A
Introduction to operating system, its need and operating system services; operating system classification – single user, multi user, simple batch processing, Multiprogramming, Multitasking, parallel Systems, Distributed system, Real time system

Process Management: Process concept, Process scheduling, threads, overview of Inter process communication, CPU scheduling: Basic concepts, Scheduling Criteria, Scheduling algorithms.

Section B
Memory management: Logical versus Physical address space, Swapping, Partition, Paging and segmentation.

Virtual memory: Demand paging, Page replacement algorithms, Allocation algorithms, Thrashing.

Section C
File Management: File concept, access methods, and Directory structure – single level, two lever, tree structures, acrylic graph and general graph directory, file protection. Allocation methods: Contiguous, linked and index allocation, free space management.

Device management: Disk structure, disk scheduling, FCFS scheduling, SSTF scheduling, SCAN scheduling, C-SCAN scheduling, Selecting Disk Scheduling Algorithms

Section D
Deadlock: Deadlock characteristics, Prevention, Avoidance, Detection and Recovery, critical section, synchronization hardware, semaphores, combined approach to deadlock handling

Resource Management: Mechanism and Policy, domain of protection, access matrix.
Security: Authentication, Program Threats, System Threats, and Encryption.
References:
1. Peterson, Silberscahatz, "Operating System Concepts", Addison-Wesley publishing Co; 2nd, Ed., 1985.
2. Andrew S. Tanenbaum "Modern Operating System".

MCA-405-B (N2)   <u>**ROBOTICS ENGINEERING (ELECTIVE I)**</u>

Internal Assessment: 40
External Assessment: 60

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Instructions for paper-setter

The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed

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Section A

Introduction to robotics, Manipulators & Mobile Robots, Classification of Robots, Robot Applications. Industrial application environment and work cells. Feeders and Oriented Device. Robot Anatomy, Robot and effectors, Transmission and actuators, with special reference to servomotors.

Section B

Robot arm kinematics, World, Tool, and Joint coordinates, DH transformation and Inverse Kinematics. Fundamentals of Closed loop control, PWM amplifiers, PID control, and Robotics sensors: Range, Proximity, Touch, Force and Torque Sensing, uses of sensors in Robotics.

Section C

Machine Vision: Introduction to machine Vision, The sensing and digitizing function in Machine Vision, Image processing and analysis, Training and vision system, Robotic Application, Low and High level vision.

Section D

Robot programming and languages and environment: Different methods, features of various programming methods, case study, Robot Task planning: concept, different methods, robot learning, Mobile Robot: Introduction, obstacle Representatives, Motion Planning in fixed, Changing structured.

References:

1. M.P.Groover, M. Weins, R.N.Nage, N.C.Odrey, Industrial Robotics, McGraw Hill
2. K.D. Richard, Chmielewski T.A and Michael "Robotic Engineering" PHI
3. K.S. Fu Gonzalez, Lee, Robotics Control, Sensing, Vision and intelligence

MCA-405-A (N2)   **ARTIFICIAL INTELLIGENCE (ELECTIVE-I)**

Internal Assessment: 40
External Assessment: 60
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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed
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SECTION A
Introduction to AI: Definitions, Basic Elements of AI, AI application Areas, Introductory Concepts of AI - clausal form, Resolution, Unification, Inference Mechanisms.

SECTION B
AI Language PROLOG: Operators, Data Structures, Input & Output, Controlling Program Flow, Strings, and Recursion.

SECTION C
Knowledge Based Systems: Knowledge representation, acquisition, organization & Manipulation, Basic Components & architecture of Expert systems, ES-Shells, Dealing with uncertainty.

SECTION D
Natural language processing: syntactic processing, semantic analysis, Morphological, discourse and pragmatic processing.

References:

1. E. Rich and K. Knight," Artificial Intelligence", Tata McGraw Hill.
2. E. Charnaik and D. McDermott," Introduction to artificial Intelligence", Addison-Wesley Publishing Company.
3. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", PHI.
4. Nils J. Nilson, "Principles of Artificial Intelligence", Narosa Publishing Co.
5. W.F. Clofisin and C.S. Mellish, "Programming in PROLOG", Narosa Publishing Co.
6. Sanjiva Nath, "Turbo PROLOG", Galgotia Publications Pvt. Ltd.
7. M. Chandwick and J.A. Hannah, "Expert Systems for Personal Computers", Galgotia Publications Pvt. Ltd.

MCA-405-C (N2) **OBJECT ORIENTED ANALYSIS AND DESIGN (ELECTIVE-I)**
Internal Assessment: 40
External Assessment: 60

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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.
Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E
Use of non-programmable scientific calculator is allowed

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Section – A
Abstract Data Types: Model of Real World, Autonomy, Generation of correct Applications, Reusability Classes, Instance Values, Methods and Messages, Creating and destroying Objects, Constraints on object and Instance Variables, Pre and Post conditions of Methods.
Inheritance: Subsets as Subtypes, Sub typing of Structured Types Contrasting in inheritance with subtyping, Implicit Subtyping verses Explicit inheritance, Subtyping and dynamic binding class inheritance. Redefining Instance variables, Hiding Instance Variables inheriting methods, Method Overriding, Invoking Superclass method, Constrained Overriding, Inheriting the Interface, Excluding Super class Methods metaclasses, Explicit Support, Implicit of hidden Metaclasses, Object Oriented Languages without Metaclasses, Prototype Systems and Delegation, Multiple inheritance.

Section – B
Polymorphism, Object Identity, Object Modeling concepts, Object Oriented Design, Object Oriented Programming Languages, Object Oriented Database, Object Oriented User Interface.
Overview C + +: Linkages, How to make a Library, Functions, Macros.
Class & Objects: Data Members, Member Functions, Private and Public Members, Default Labels, Data hiding and Encapsulation, Arrays within a class, Class Function Definition and pass values.
Operator Overloading: Operator Function, User Defined Type Conversion Literal, Large Objects, Assignments and Intialization, Subcripting, Function Call, Deferencing, Increment and Decrement A string Class, Friends and Members.

Section – C
Inheritance through Extending C: Concept of Inheritance, Visibility Modes, Private, Public, Protected, Single Inheritance: Privately derived, Publicly derived.
Streams, Templates and Design of Libraries: Output, Input, Formatting, Files and Streams, Design of libraries.
Object Oriented Analysis & Design: Object Oriented Development, System Design, Object Design, Entity Relationship Model, Overview of Existing methodologies.

Section – D
Semantic and Entity Relationship Modeling: Contrasting Design for Databases and OOA/OOD.
Overview of Existing Methodologies: Object Oriented Analysis, Object Oriented Design, Object Diagram, Dynamic Model, Functional Model.

References
1.   Object-Oriented Modeling and Design by Rambaugh & Others (Prentice Hall)
2.   Object-Oriented Programming: Fundamental and Applications by Sengupta & Chaudhuri (P.H.I.)
3.   Object Oriented Programming using C ++ by E.Balagursamy (Tata Mc-Graw Hill)
4.   Mastering C ++ by Robert Lafore.

MCA-406 (N2)   <u>**SOFTWARE LAB VI (RDBMS II)**</u>

Internal Assessment: 40
External Assessment: 60

This laboratory course will mainly comprise of exercise on what is learnt under the paper: MCA-401 (RDBMS II).

Maximum Marks For Continuous Assessment: 40
Maximum Marks For University Examination: 60

Note: The break up of marks for the practical will be as under

Lab Record	15 marks
Viva Voce	15 marks
Program development	30 marks
And execution	

MCA-407 (N2)   **Practical S/W Lab - VII**

Internal Assessment 40
External Assessment 60

Paper MCA-404

Practical to Learn NT/Unix/Linux commands.

MCA-501 (N2)   <u>**COMPUTER GRAPHICS**</u>

Internal Assessment: 40
External Assessment: 60

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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed
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SECTION A
Graphics Hardware: The Functional Characteristics Of The Systems Are Emphasized. Input Device: Keyboard Touch Panel, Light Pens, Graphic Tablets, Joysticks, Trackball, Data Glove, Digitizer, Image Scanner, Mouse, Voice Systems.
Hard Copy Devices: Impact And Non Impact Printers, Such As Line Printers, Dot Matrix Printers, Laser, Ink-Jet, Electrostatic, Flatbed And Drum Plotters.
Video Display Devices: Refresh Cathode–Ray Tube, Raster Scan Display, Random Scan Displays, Color CRT-Monitors, Direct View Storage Tube, Flat Panel Displays, 3-D Viewing Devices, Raster Scan Systems, Random Scan Systems, Graphic Monitors And Workstation.

SECTION-B
Scan Conversation Algorithm Line, Circle And Ellipse, Breshenham's Algorithm, Area Filling Techniques, Character Generation.
2-Dimensional Graphics: Cartesian And Homogenous Co-Ordinate Systems, Geometrical Transformation (Translation, Scaling, Rotation, Reflection, Shearing), Two Dimensional Viewing Transformation And Clipping (Line, Polygon And Text)

SECTION-C
3-Dimensional Graphics: Geometrical Transformation (Translation, Scaling, Rotation, Reflection, Shearing), Mathematics And Projections (Parallel And Perspective). 3-D Viewing Transformation And Clipping.

SECTION – D
Hidden Line Surface Removal Algorithms, Z-Buffer, Scan Line, Sub Division
Shading: Modeling Light Intensities: Diffuse Reflection, Refracted Light, Half toning.
Surface Shading Methods: Constant Intensity Method, Gouraud Shading, Phong Shading.

References:
1. "Computer Graphics" by D.Hearn And M.P.Baker
2. "Introduction To Computer Graphics" J.D.Foley, A.V.Dam, S.K.Feiner, J.F.Hughes, R.L.Phillips
3. "Computer Graphics" R.A.Plastock And G.Kalley

MCA-502 (N2)   <u>**INTERNET PROGRAMMING AND JAVA**</u>

Internal Assessment: 40
External Assessment: 60

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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed
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SECTION-A
Internet Basics: What Is Internet. What Special About Internet?
Dial Up Connection/Direct Connection; Slip Or PPP
WWW: The Client Site, Server Site, Web Pages In HTML, CGI Programming Overview, Environment Variables, Difference Between HTML And DHTML, ECOM And Portals.

SECTION –B
Internet Internals: Transmission Control Protocol/Internet Protocol (TCP/IP), FTP, HTTP, WAIS (Wide Area Information Service), TELNET, Internet Addressing, IP Address, Electronic Mail Address, URL, E-Mail Basic.
Domain Name System: Name for Machine, Flat Name Space, Hierarchical
Names Internet Domain Names, Domain Name Revolution.

SECTION-C
Introduction To Java: Applets, Application & JDK, Differences between Java and C++, Working With Java Objects: Encapsulation, Inheritance And Polymorphisms, Constructors, Garbage Collection and finalize, Data Types, Data Types, Modifiers And Expressions, Array and Flow Control Statement, Exception Handling, Threads, Event Handling, JDBC.

SECTION-D
Socket Interface: Socket Abstraction, Creating Socket, Receiving Data Through A Socket. Using Socket With Servers. JComponents, Network Programming.

REFERENCES: -
1. Internetworking With TCP/IP Vol-I Third Edition (Phi) By Douglas E. Comer
2. Java 2 The Complete Reference By Petric Noughton And Herbet Schildt.

MCA 503-A (N2)   <u>**E-Commerce (Elective II)**</u>

Internal Assessment: 40
External Assessment: 60

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Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed
_____

SECTION-A
Internet Fundamentals
Internet, its origin, connectivity and service. Introduction to www, GOPHER, FTP, Telnet, HTTP, network protocols, Internet facilities through www.

SECTION-B
HTML (hypertext marking language)
Basic HTML and tags, Language description, usability, static creation of HTML web pages. Creating tables, forms and their advantages.

SECTION-C
DHTML (Dynamic HTML)
What is DHTML? Style sheets, their advantages and interaction with scripting language. Java script objects and events, cookies.

SECTION-D
ASP (Active Server Pages)
Introduction to ASP technology. How to create dynamic web pages. Under standing ASP objects model, processing data using session variables. What is the purpose of global asa file. Data base connectivity through ADO's.

<u>**REFERENCES:**</u>

1.Internet For Every One: Leon And Leon
2. Mastering HTML 4.0 BPB: D.S. Ray
3. Java Script: R. Allenwyke
4. Asp In 21 Days

MCA-503-B (N2)   **COMPILER DESIGN (Elective II)**

Internal Assessment: 40
External Assessment: 60

Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed

SECTION–A
The Structure Of A Compiler, Phase Of A Compiler, Compiler Tools, Finite Automata, Regular Expressions, Conversion From Regular Expression To Finite Automata.

SECTION-B
Syntax Analysis, Context Free Grammars, Top Down & Bottom Up Parsing Techniques. Construction of LR, SLR&LALR Parsers.

SECTION-C
Syntax Directed Translation & Their Implementation. Intermediate Code, Postfix Translation, Phase Trees, Syntax Trees.

SECTION-D
Run Time Environment: Storage Organization, Storage Allocation Strategies, Parameter Passing, Symbol Tables, Code Generation, Problem In Code Generation, A Simple Code Generation & Code Optimization: Principle Sources, Loop Optimization, DAG Representation

REFERENCES:-
1. Aho & ulman: "principles of compiler design"
2.Alfred V. Aho, Ravi Sethi Jaffery D.Ullman: "compiler principles, techniques & tools"

MCA-504-B (N2)   ADVANCED MICRO PROCESSORS SYSTEMS (Elective III)

Internal Assessment: 40
External Assessment: 60

Instructions for paper-setter
The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed

SECTION-A
Review of 8 bit microprocessors and support components
Selected Case Studies of 16/32//64 bit microprocessors and support Contents

SECTION-B
Power PC 601, Alpha 2106, Pentium super space, Transporter Architectures and Case Studies: High Performance Embed Micro controllers, Case Studies

SECTION-C
403 GA Development Systems and Support Contents

SECTION-D
Selected Applications

References:
    1. J.T.Kain   : IEEE Press 1984
    2. M.Rafiquzzaman   : Microprocessors and microcomputers
    3. Daniel Tabak   : Advanced microprocessors McGraw Hill

MCA-504-A (N2)   SYSTEM SIMULATION & MODELLING (Elective III)

Internal Assessment: 40
External Assessment: 60

Instructions for paper-setter
The question paper will consist of five sections A , B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus and will carry 10 marks each. Section E will have 10-20 short answer type questions, which will cover the entire syllabus uniformly and will carry 20 marks in all.

Instruction for candidates
Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E

Use of non-programmable scientific calculator is allowed

SECTION-A
System Models: Concept Environment, Continues and discrete systems, Types of Models; Subsystems, System Analysis, System design; System simulation: Technique, method types.

SECTION-B
Probability concepts in simulation: Stochastic variables and probability functions; Discrete system simulation; fixed time step v/s event-to-event model, Generation of Random numbers, Monte Carlo Computation V/S Stochastic simulation.

SECTION-C
Simulation of Queuing system, Simulation of single and two server queue, Network Model of a project.

SECTION-D
Case study: Simulation of an autopilot, Telephone system & Inventory system.
 Introduction to GPSS.

References:

1.   Narsingh Deo "System Simulation with Digital Computers" PHI
         2. G.Gordon "System Simulation" PHI

MCA-505 (N2)   SOFTWARE LAB VIII (Graphics)

Internal Assessment: 40

This laboratory course will mainly comprise of exercise on what is learnt under the paper: MCA-501

Maximum Marks For Continuous Assessment: 40
Maximum Marks For University Examination: 60

Note: The break up of marks for the practical will be as under

Lab Record	15 Marks
Viva Voce	15 Marks
Program Development	30 Marks
And Execution	

MCA-506 (N2)   **SOFTWARE LAB IX (Java)**

Internal Assessment: 40

This laboratory course will mainly comprise of exercise on what is learnt under the paper: MCA-502

Maximum Marks For Continuous Assessment: 40
Maximum Marks For University Examination: 60

Note: The break up of marks for the practical will be as under

Lab Record	15 Marks
Viva Voce	15 Marks
Program Development	30 Marks
And Execution	

MCA-507 (N2)   **Comprehensive Viva Voce**

This course will mainly comprise of what is learnt under the MCA course.

. A student should present a file at the time of viva-voce, which should have atleast 100 terms drawn from topics relevant to the courses studied by him/her during MCA. The choice should be as per student's own method of selection.

A student should make a programe of his/her choice written in atleast four different languages like basic, C, C++ and java. The programe should solve a problem based on MCA-104 (N2), computer mathematical fondation. The listings and the solution should be presented to the examiner.

MCA-601 (N2)   **SYLLABUS**
OUTLINE OF PAPER AND TESTS
MCA (Master of Computer Applications)

Project in a Computer Organization/University computer Center/Dept. of Computer Science, etc, as decided by the Head of the Department.

Project: 400 Marks

The evaluation committee will distribute these marks for seminar/viva/voce/
Project report and for any other activity, which the committee thinks to be proper.
Academic dairy is to be maintained by the student which should have day to day work done by him/her. This dairy should be presented at the time of viva.

Joint project will be allowed and joint project report will be also being accepted. Individual project will be recognized and the student should highlight their contribution in a joint project report.

Committee for evaluation of project report / work:

Head of department / director
Internal guide (if any) faculty
External examiner.

Format Of Project Report

- ➢ Title Cover
- ➢ Certificate from organization about your stay (Project Duration) at that place and about submission of work done under external guide at the place of training.
- ➢ Certificate from your guide about the submission of work done under his/her guidance, Internal Supervisor.
- ➢ Table of Contents, abstract of the project (abstract of actual workdone).
- ➢ A brief overview of the organization (regarding function area, location, division in which you are working, turnover)
- ➢ Profile of problems assigned.
- ➢ Study of existing system, if any.
- ➢ System requirements
  - o Product Definition
    - ▪ Problem Statement
    - ▪ Function to be Provided
    - ▪ Processing Environment: H/W, S/W.
    - ▪ Solution Strategy
    - ▪ Acceptance Criteria
  - o Feasibility Analysis
  - o Project Plan
    - ▪ Team Structure
    - ▪ Development Schedule
    - ▪ Programming Languages And Development Tools
- ➢ System Requirement Specifications
  - o Developing / Operating / Maintenance Environments
  - o External Interface And Data Flows
    - ▪ User display and report format, user command summary
    - ▪ High level DFD and data dictionary
  - o Functional and performance specifications

- Design
  - Detailed DFD's and structure diagrams
  - Data structures, database and file specifications
  - Pseudo Code
- Test Plan
  - Functional, Performance, Stress tests etc.
- Implementation / Conversion Plan
- Project Legacy
  - Current status of project
  - Remaining areas of concern
  - Technical and managerial lessons learnt
  - Future recommendations
- Bibliography
- Source Code (if available)

Note: - The above is meant to serve as a guideline for preparation of your project report. You may add to, modify or omit some of the above-mentioned points depending upon their relevance to your project. You may also consult your internal supervisor for the same.