

Syllabi & Scheme of Examination
Under Choice Based Credit System

MASTER OF COMPUTER APPLICATION
Department of Computer Science and Applications
Chaudhary Devi Lal University, Sirsa

Department of Computer Science
 Chaudhary Devi Lal University, Sirsa (Haryana)
 Scheme of Examination for Master of Computer Applications (MCA)
 under Choice Based Credit System


MCA SEMESTER-I

Course No.	Course Title	Credit	Int.	Ext.	Total
MCA-11	Fundamentals of Computer	4	30	70	100
MCA-12	C Programming	4	30	70	100
MCA-13	Computer Organisation	4	30	70	100
MCA-14	Software Engineering	4	30	70	100
MCA-15	Computer Oriented Numerical Methods	4	30	70	100
MCA-16	Software Laboratory (Based on MCA-12)	2.5	30	45	75
MCA-17	Software Laboratory (Productivity Tools)	2.5	30	45	75
MCA-18	Seminar	2	50	-	50
Total		27	270	500	700

MCA SEMESTER -II

Course No.	Course Title	Credit	Int.	Ext.	Total
MCA-21	C++ Programming	4	30	70	100
MCA-22	Data Structures Using C++	4	30	70	100
MCA-23	Database Systems	4	30	70	100
MCA-24	Operating Systems	4	30	70	100
MCA-25	Discrete Mathematical Structures	4	30	70	100
MCA-26	Software Laboratory (Based on MCA-22)	2.5	30	45	75
MCA-27	Software Laboratory (Based on MCA-23)	2.5	30	45	75
MCA-28	Seminar	2	50	-	50
Total		27	270	500	700

Note: During the first 5 semesters (semester I to semester V), students have to earn a total of 17 credits from Open Elective courses offered by various departments of the university. In each of the first five semesters of MCA the students will have register for and earn a minimum of 2 credits and a maximum of 6 credits.


9/10/16







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Unit-I

Introduction: Characteristics of Computers, The Evolution of Computers, The Computer's generations, Basic Computer Organization: Input Unit, Output unit, Storage unit, Arithmetic unit, Control unit, Central processing unit, The System concept, Number Systems: Non positional number system, positional number system, number system conversion, fractional number, Computer Codes: BCD Code, EBCDIC code, ASCII, Collating Sequence, Binary Arithmetic: Addition, Subtraction, Multiplication, Division.

Unit-II

Boolean Algebra and Logic Circuits: Boolean Algebra, Boolean Function, Logic Gates, Logic Circuits, Design of Combinational Circuit, processor and memory, Secondary Storage Devices: Sequential and Direct Access Devices, Punched Paper Tape, Magnetic Tape, Magnetic Disk, Floppy Disk, Winchester Disk, Magnetic Drum, Mass Storage, Optical Disk, Magnetic Bubble Memory, Storage Hierarchy, Input-Output Devices: Punched Hole Devices, Magnetic media devices, printers, keyboard devices, Scanners, Other devices, Offline Data Entry Devices.

Unit-III

Computer Software: Introduction, Relationship between Hardware and Software, Types of Software, Acquiring Software, Planning the Computer Program: Purpose of Program Planning, Algorithm, Flowcharts, Decision Tables, Pseudocodes, Application Software Packages, Data Communications and Computer Networks: Introduction, Data Transmission Modes, Data Transmission Speed, Transmission Media, Digital and Analog Transmission, Communication Processors, The Internet, Multimedia.

Unit-IV

Computer Languages: Analogy with Natural Language, Machine Language, Assembly Language, High Level Language, Compilers, Interpreters, Characteristics of good Language, Subroutine, System Implementation and Operation: Testing and Debugging, Documentation, Changeover to new system, System Evaluation, System Maintenance, Operating Systems: Introduction, Functions, Evolution, Batch Processing, Job Control Language, Spooling, Multiprogramming, Time Sharing, On-Line Processing, Real-Time Processing, Virtual Storage.

References:

- Pradeep k. Sinha & Priti Sinha, Computer Fundamentals, BPB Publications
- Rajaraman V, Fundamentals of Computers, PHI


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Unit-I

Elements of C: C character set, identifiers & keywords, data types: declaration & definition.
Operators: Arithmetic relational, logical, bitwise, unary, assignment and conditional operators & their hierarchy & associativity. Data input/output.

Unit-II

Control statements: Sequencing, Selection: if and switch statement; iteration, Repetition: for, while, and do-while loop; break, continue, goto

Unit-III

Functions: Definition, prototype, passing parameters, recursion, Data structure: arrays, structures, union, string, data files.

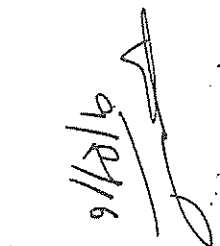
Unit-IV

Pointers: Declaration, operations on pointers, array of pointers, pointers to arrays.

References:

- Jeri R. Hanly & Elliot P. Koffman, Problem Solving & Program Design in C, 3rd Ed., Addison Wesley, 2000.
- All Kelley, Ira Pohl, A Book on C, Programming in C, 4th Ed., Addison Westley, 2000.
- Yashwant Kanetker, Let us C, BPV Publications.
- Gottfried, Programming with C, Tata McGraw Hill.

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Unit-I

Information Representation: Number systems, BCD codes, character codes, error detecting and correcting codes, fixed-point and floating point representation, Binary arithmetic operation, Booths multiplication.

Unit-II

Binary logic: Boolean algebra, Boolean functions, truth table, canonical and standard forms, simplification of Boolean functions, digital logic gates. Combinational logic: Design procedure, adders, subtractors, encoder, decoder, multiplexer, demultiplexer & comparators.

Unit-III

Memory system: Memory parameters, semiconductor RAMs, ROMs, magnetic & optical storage devices.

CPU organisation: Processor organisation, Machine instructions, instruction cycles, instruction formats and addressing modes, microprogramming concepts, microprocessor sequence

Unit-IV

Sequential logic: Flip flops, shift registers and counters, transfer of information between I/O Organisation: I/O interface, interrupt structure, transfer of information between CPU/memory & I/O devices, and, IOPs.

References:

- Mano, M. Morris Digital Logic & Computer systems Design, Prentice hall of India Pvt. Ltd., 2000.
- Rajaraman, V., Radhakrishanan, T., An Introduction to digital computer design ; Prentice hall of India Pvt. Ltd., 4th Ed.
- Hayes, J.P., Computer architecture and oragination, McGraw Hill 1998, Third Ed..
- Hauring, V.P., Jorden, H.F., Computer Systems Design & Architecture, Addison Wesley, 2000.

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Unit-I

Software and software engineering, Software characteristics, software crisis, software engineering paradigms, Planning and software project, Software cost estimation., project scheduling, personnel planning, team structure.

Unit-II

Software configuration management, quality assurance, project monitoring, risk management. Software requirement analysis - structured analysis, object oriented analysis and data modeling. software requirement specification, validation.

Unit-III

Design and implementation of software - software design fundamentals, design methodology (structured design and object oriented design), design verification, monitoring and control, coding.
Software Reliability - metric and specification, fault avoidance and tolerance, exception handling, defensive programming.

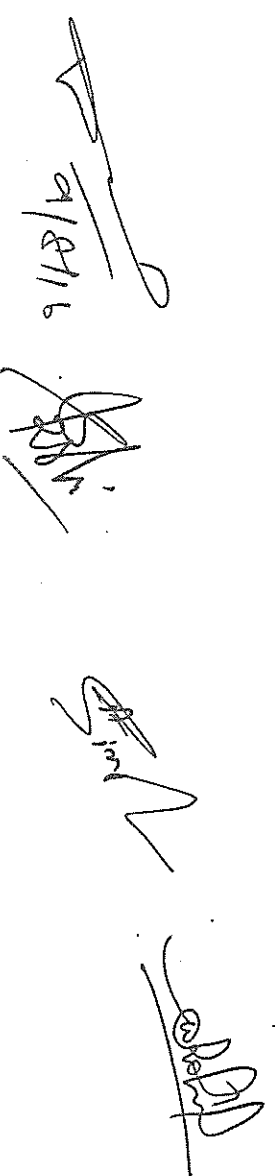
Unit-IV

Testing - Testing fundamentals, white box and black box testing, software testing strategies: unit testing, integration testing, validation testing, system testing, debugging.
Software maintenance - maintenance characteristics, maintainability, maintenance tasks, maintenance side effects, CASE tools.

References:

- Pressman S. Roger. Software Engineering, Tata McGraw-Hill.
- Jalote Pankaj. An Integrated Approach to software. Engineering. Narosa Publishing House.
- Sommerville Ian, Software Engineering, 5th Ed., Addison Wesley-2000.
- Fairley Richard, Software Engineering Concept, Tata McGraw - Hill.

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Unit-I

Computer Arithmetic: Floating point representation of numbers, arithmetic operations with normalized floating point numbers and their consequences, Error in number representation - pitfalls in computing. Iterative Methods: Bisection, False position, Newton-Raphson methods, Discussion of convergence, Polynomial evaluation, Solving polynomial equations (Bairstow's Method)

Unit-II

Solving of Simultaneous Linear Equations and ordinary Differential Equation, Gauss elimination method, ILL - conditioned equations, Gauss-Seidal iterative method, Taylors series and Euler methods, Runge-kutta methods, Predictor methods.

Unit-III


Numerical Differentiation and Integration: Differentiation formulae based on polynomial fit, pitfalls in differentiation, Trapezoidal, Simpson rules and Gaussian Quadrature. Interpolation and Approximation: Polynomial interpolation, Difference tables, Inverse interpolation, Polynomial fitting and other curve fitting, Approximation of function by Taylor series and Chebyshev polynomials.

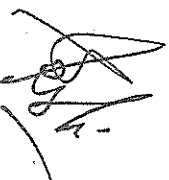
Unit-IV

Statistical methods: Sample distributions, Test of Significance, chi square, t and f test. Analysis of Variance: Definition, Assumptions, Cochran's Theorem. One way classification, ANOVA Table, Two-way classification (with one observation per cell). Time Series Analysis: Components and Analysis of Time Series, Measurement of Trend, Seasonal fluctuations and cyclic movement.

Reference:

- Gupta S.P. and Kapoor, V.K., Fundamentals of Applied station statistics, Sultan Chand & Sons, 1966.
- Gupta S.P. and Kapoor, V.K., Fundamentals of mathematical statistics, Sultan Chand & Sons.
- Rajaraman V., Computer Oriented Numerical Methods, Prentice Hall, India.
- Graybill, Introduction to Statistics, McGraw.
- Anderson, Statistical Modeling, McGraw.


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MCA-21 Object Oriented Programming Using C++

Total Credits – 4

Internal - 30 Marks

External – 70 Marks

L/T - 4

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Unit-I

Object oriented concept: Data abstraction, encapsulation, classes and objects modularity, hierarchy, typing, concurrency, persistence, object oriented methodology: advantages and disadvantages of OO Methodologies, Modeling, domain analysis.

Unit-II

OMT Methodology- object model, links and association, multiplicity, link attributes, role names, ordering qualification, aggregation, generalization and inheritance, abstract class, meta data, object diagram, dynamic model – events, states, scenarios, event traces, state diagram, functional model- data flow diagram, analysis, system design and object design.

Unit-III

Programming in C++ : Data types, structures vs classes, static data and member function, constant parameters and destruction, dynamic objects, operator overloading, function overloading, abstract class, virtual class.

Unit-IV

Inheritance, virtual functions, Template functions & template classes, exception handling file stream classes, ASCII & Binary files, sequential & random access to a file.

References :

- Rumbaugh, J.et. al., Object oriented modeling and design, Prentice hall of India 1998.
- Booch Grady, object oriented analysis & design, addition Wesley 1994.
- Stroustrup, B., The C++ programming language, Addison –Wesley 1993.
- Lipman, C++ primer 3e, Addison–Wesley.
- Balaguruswami, object oriented programming in C++ : Tata McGraw
- Schiltz, Herbert, C++: the complete reference 2e, Tata McGraw – hill 1998.


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MCA-22 Data Structural Using C++

L/T - 4

Total Credits - 4

Internal - 30 Marks
External - 70 Marks

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Unit-I

Introduction to Data Structure, Primitive and Composite, Arrays, Matrices, Sparse Matrices, String representation and manipulation.

Unit-II

Stack, Queue, Dequeue, Linked Lists, Dynamic memory management.

Unit-III

Trees, Binary trees, Threaded Binary tree, balanced tree, Different tree traversal algorithms.

Unit-IV

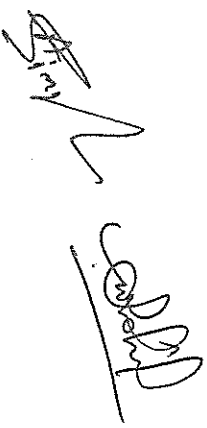
Representation of Graphs and Applications, searching and sorting techniques, Hashing.

References:

- Tanenbaum A.M., Langsam Y, Augenstein M.J., Data Structures using C & C++, Prentice Hall of India, 2002.
- Trembley, J.P. and Sorenson P.G., An Introduction to Data Structures with Applications, McGraw-Hill International Student Edition, New York (1984).
- Seymour Lipschutz, Data Structures, McGraw-Hill Book Company, Schaum's Outline series, New York (1986).


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Unit-I

Basic Concepts: A Historical perspective, File System vs. DBMS, characteristics of the Data Base Approach, Abstraction and Data Integration, Database users, Advantages and Disadvantages of a DBMS, Implication of Data Base approach. Data Base System concepts and Architecture: Data Models, Schemas and Instances, DBMS architecture and Data Independence Data Base languages & Interfaces, DBMS functions and component modules.

Unit-II

Entity Relationship Model: Entity Types, Entity Sets, Attributes & Keys, Relationships, Relationships Types, Roles and Structural Constraints, Design issues, weak entity types, E-R Diagrams. Design of an E-R Data Base Schema, Reduction of an E-R Schema to Tables, The Unified Modeling Language (UML), Relational Data Model: Relational Model concepts, Integrity constraints over Relations, Relational Algebra - Basic operations.

Unit-III

SQL: Data Definition, constraints, & Schema changes in SQL, Insert, Delete & update statements in SQL, view in SQL, specifying constraints and Indexes in SQL, Queries in SQL. A Relational Data Base Management System : ORACLE - A Historical perspective, Basic Structure, Data Base Structure and its manipulation in ORACLE, Storage Organization in ORACLE Programming ORACLE Applications.

Conventional Data Models: An overview of Network and Hierarchical Data Models, Relational Data Base Design: Functional Dependencies, Decomposition, Desirable properties of decomposition, normal forms based on primary keys (1 NF, 2 NF, 3 NF and BC NF), Practical Data Base Design: Role of Information systems in organizations, Data Base Design process, physical Data Base Design in Relational Data bases.

Unit-IV

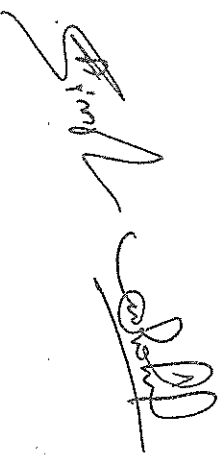
Transaction Processing concepts : Introduction to Transaction Processing, Transaction & System Concepts, Properties of Transaction, Schemes and Recoverability, Serializability of Schedules, Concurrency Control Techniques: Locking Techniques, Time stamp ordering, Multiversion Techniques, Optimistic Techniques Granularity of Data Items, Recovery Techniques: Recovery concepts, recovery Techniques in centralized DBMS, Data Base Security: Introduction to Data Base Security issues.

Reference:

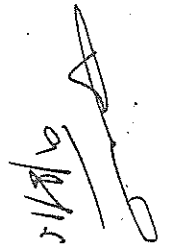



- Elmasri & Navathe : Fundamentals of Database System, 3rd Edition, Addison Wesley, New Delhi.


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Raghu Ramakrishnan & Johannes Gohrke: Database Management system, 2 Edition,
McGraw Hill International Edition.
C.J. Date: An Introduction to Database System 7th Edition, Addison Western New Delhi.
Abhey Abramson & Cory: ORACLE SI-A Beginner's Guide Tata McGraw Hill
Publishing Company Ltd.

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Unit-I

Group And Subgroups: Group axioms, Permutation groups, Subgroups, Co-sets, Normal subgroups, Semigroups, FREE Semi-groups, Applications, modular arithmetic, error correcting codes, grammars , language, Finite State Machine.

Unit-II

Graphs: Directed and undirected graphs, chains , Circuits , Paths, Cycles, connectivity, Adjacency & incidence matrices, Minima's path Application (Flow charts and state transition graphs, algorithms for determining cycle and minimal paths, polish notations and trees, flows in network).

Unit-III

Lattice; and Boolean algebra: Relational to Partial ordering, Lattices and Hasse diagram, Axiomatic definition of boolean algebra as algebraic structures with two operations basic results truth values and truth tables. Algebra of propositional function. The Boolean algebra of truth values. Application (Switching circuits. Gate circuits).

Unit-IV

Finite Fields: Definition Representation, Structure, Internal domain Irreducible polynomial, Polynomial roots, splitting field.

References:

- Alan Doerr, Kenneth Levasaur, Applied Discrete Structures for Computer Science. Galgotia publication Pvt. Ltd.
- Seymour Lipschutz, Marc Lars Lipson, Discrete mathematics, McGraw-Hill international editions, Schaum's series.
- Bernard Kolman, Robert C. Busbym, Discrete Mathematical structures for computer science, Prentice-Hall of India Pvt. Ltd.
- Kenneth G. Rosen: Discrete mathematics and its applications. McGraw-Hill internal editions. Mathematics series.


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L/T -4

Total Credits - 4

Internal - 30 Marks
External - 70 Marks

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Unit-I

Introductory Concepts: Operating system functions and characteristics historical evolution of operating systems. Real time systems, Distributed systems, Mythologies for implementation of O/S service system calls, system programs, interrupt mechanisms, File Systems: Function of the systems, File access and allocation methods, Directory systems: Structured Organizations, directory and file protection mechanisms, implementation issues: hierarchy of file and device management.

Unit-II

CPU scheduling: Levels of scheduling, comparative study of scheduling algorithms, Multiple processor scheduling, Case studies: Comparative study of DOS, WINDOW, UNIX & LINUX System, Protection: Goals of protection, mechanisms & policies implementation dynamic protection structures, revocation protection schemes in UNIX/MULTICS.

Unit-III

Storage Management: Storage allocation Methods: Single contiguous allocation, multiple contiguous allocations, Paging: Segmentation combination of Paging and segmentation, Virtual memory concepts, Demand Paging, Page Replacement Algorithms, Thrashing, Hardware Management: Hardware organization, Device Schedule Policies.

Unit-IV

Deadlocks: Deadlock characterization, Deadlock Prevention and avoidance, Deadlock detection and recovery, practical considerations, Concurrent Processes: Critical section problem, Semaphores, classical process co-ordination problems, and their solutions, Inter process communication.

Reference:

- Peterson, J.L. &Silberschatz, A, Operating System concept, Addison Wesley reading.
- Brinsh, Hansen, Operating System Principles, Prentice Hall of India a.
- Hageman, A.N., Introducing to Operation System Design Galgotia Publication, New Delhi.
- Tanenbaum, A.S., Operating system.
- Hansen P.B., Architecture Concurrent Programs, PHI.
- Shaw, A.C., Logic design of Operating Systems, PHI.
- Deitel, H.M., Operating System, John Wiley/Addison Wesley.


9/12/11



