

# Chhattisgarh Swami Vivekanand Technical University, Bilai

Semester – 2<sup>nd</sup> Semester MCA      Code 521211

## OPERATING SYSTEM

### UNIT-1

Introduction to operating system, Functions provided by operating system, Introduction to multiprogramming, Time sharing and real time systems. Introduction to file systems, Access and allocation methods of file systems, Directory structure of a file system on a disk and tape, File protection.

### UNIT-2

Introduction to scheduling, CPU scheduling, Various types of CPU scheduling algorithms and their evaluation. Meaning of disk and drum scheduling, Various types of disk and drum scheduling algorithms like FCFS, SCAN etc., CPU protection.

### UNIT-3

Introduction to memory management, Various types of memory management schemes like paging, Segmentation etc. Concept of virtual memory, Meaning of demand paging, Various page replacement algorithms, Meaning of thrashing and methods to tackle it, Memory protection.

### UNIT-4

Meaning of deadlocks, Various methods to avoid deadlocks like deadlock avoidance, Deadlock prevention etc., Banker's algorithm for deadlock avoidance. Introduction to concurrent processing, Precedence graphs, Critical section problem, Semaphore concept, Study of classical process co-ordination problem.

### UNIT-5

Introduction to distributed systems and I/O Subsystem Principles of I/O Hardware: I/O devices, device controllers, direct memory access. Principles of I/O Software: Goals, interrupt handles, device drivers, device independent I/O Software. User space I/O software, I/O protection. Distributed file systems: Design, Implementation, and trends. Performance Measurement, important trends affecting performance issues, performance measures evaluation techniques, bottlenecks and saturation feedback loops.

**Case study of UNIX and DOS operating systems.**

**Text Book :**

1. Operating System Concepts by James L. Peterson, Abraham Silberschatz (Addison-Wesley)
2. Operating System Concepts & Design by Milan Milenkovic (MGH)

**Reference:**

1. Modern Operating System by Andrew .S. Tanenbaum (PHI)
2. An Introduction to Operating Systems by Haevey M. Dietel(Addison Wesley)

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester – 2<sup>nd</sup> Semester MCA Code 521212

## DATA BASE MANAGEMENT SYSTEM

- UNIT-1 Basic concepts, Database & Database Users.**  
Characteristics of the Database Approach ,Advantages of using DBMS. Data Models, Schemas & Instances. DBMS Architecture & Data Independence. System Architecture for DBMS and Data Dictionary, Database Users Data Base languages & Interfaces. Data Modeling using the Entity-Relationship Model -Entity types, Entity Sets, Attributes and Keys, Relationship, Relationship Types, Weak Entity Types, Structural Constraints, Enhanced ER Model- Specialization Generalization, Constraints on Specialization Generalization.
- UNIT-2 Relational Model, Languages & Systems.**  
Relational Data Model Concepts and Constraints. Relational Algebra - select, project, set theoretic, join operations. Overview of Relational Calculus. SQL - A Relational Database Language.Data Definition commands, View and Queries , transaction commands,Specifying Constraints & Indexes in SQL.
- UNIT-3 Relational Data Base Design.**  
Function Dependencies & Normalization for Relational Databases. Informal design guidelines for relation schemas, Functional Dependencies. Normal forms based on primary keys (1NF, 2NF, 3NF& BCNF). Lossless join & Dependency preserving decomposition. Multivalued dependencies, join dependencies (4NF & 5NF), Denormalization.
- UNIT-4 Transactions, Concurrency Control , Recovery Techniques.**  
Basic concept; ACID properties; transaction state; implementation of atomicity and durability; concurrent executions; basic idea of serializability; view and conflict serializability Recovery Techniques Failure Classification , Storage Structure, Recovery and Atomicity Log Based Recovery, Shadow Paging ,stable storage implementation, data access; recovery and atomicity - log based recovery, deferred database modification, immediate database modification, checkpoints.
- UNIT-5 Emerging fields in DBMS**  
Distributed databases; Basic idea; distributed data storage; data replication; data fragmentation horizontal, vertical and mixed fragmentation. Concepts of Multimedia databases, Object oriented data base management systems. Data Warehousing & mining.

**TEXT BOOK:-**

1. Elmsari and Navathe, "Fundamental of Database System", Addison Wesley. New York.
2. H.Korth & A. Silberschatz, "DATABASE SYSTEM CONCEPTS", TMH.

**References:-**

1. Date. CJ, "An Introduction to Database System", Narosa Publishing House. New Delhi.
2. Desai, B, "An Introduction to Database Concepts", Galgotia Publications. New Delhi.
3. Ullman. J.D, "Principles of Database Systems", Galgotia Publications, New Delhi.

# Chhattisgarh Swami Vivekanand Technical University, Bilai

Semester – 2<sup>nd</sup> Semester MCA      Code 521213

## DATA STRUCTURE

### UNIT-1 Stack & Queue:

Contiguous implementation of stack; Various operation on stack; various Polish Notations- prefix, postfix, infix, Conversion from one to another - using stack; Evaluation of post & prefix expression. Contiguous implementation of Queue; Linear queue, its drawback; Circular queue; Various operations on queue; Linked implementation of Stack & Queue- operations.

### UNIT-2 General List:

List and its contiguous implementation, its drawback; Singly linked list- operations on it; doubly linked list- operations on it; Circular linked lists: Josephoes Problem; Linked list using arrays, polynomial Arithmetic: addition, Subtraction and Evaluation, Linked Stack and Queues.

### UNIT-3 Trees and Its Representation:

Definitions- Height, depth, order, degree, parent & children relationship etc; Binary Tree-Variou theorems, complete binary tree, almost complete binary tree; Tree Traversals-preorder, in order & post order traversals, their recursive and non recursive implementations; Expression tree-evaluation; Linked representations of binary tree operations. Threaded binary trees; Forrest, Conversion of forest into tree Heap definition.

### UNIT-4 Searching, Hashing & Sorting:

Requirements of a search algorithm; sequential search, binary search, indexed sequential search, interpolation search, Hashing- Basics, methods, collision, resolution of collision, chaining; Internal Sorting- bubble sort, selection sort, insertion sort, quick sort, merge sort on linked and contiguous lists, shell sort, heap sort, tree sort.

### UNIT-5 Graph:

Related definitions; Graph representations- adjacency matrix, adjacency list, adjacency multi-list; Traversal schemes - depth first search, breadth first search; Minimum spanning tree; Shortest path algorithm; Kruskal & Dijkstra algorithms. Miscellaneous features: Basic idea of AVL Tree- Definition, insertion & deletion operation; Basic idea of B-tree definition, order, degree, insertion & deletion operations; B+-tree-definition, comparison with B-tree; Basic idea of string processing.

### Text books:

1. Kruse R.L.: Data Structures and Program Design in C; PHI
2. Tennenbaum A.M. & others: Data Structures using C & C++; PHI

## References

1. Horowitz & Sawhaney: Fundamentals of Data Structures, Galgotia Publishers.
2. Schaum Series Data Structure

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester – 2<sup>nd</sup> Semester MCA      Code - 521214

## Computer Oriented Numerical Analysis

### UNIT-1 Numerical Solution of Algebraic & Transcendental Equations

Regula Falsi Method, Bisection Method, Newton-Raphsm Method, Birge-Vieta Method, Error analysis for iterative methods, Accelerating Convergence.

### UNIT-2 System of Linear Algebraic Equations

Solution of simultaneous algebraic equations by Gaum elimination method, Gauss-Jordan method, Crout's triangularition method, Iterative methods of solutions, Jacobi method, Gaum-seidal method, relaxation method, ILL-conditional equation.

### UNIT-3 Interpolation & Finite Difference.

Finite difference, Difference of polynomial Factorial notation, Other difference operator, Newton's Forward, and Backward interpolation formula, Central interpolation formula, Lagrauges & Newton's Divided difference interpolation formula.

### UNIT-4 Numerical Differentiation, Integration & Curve fitting.

Numerical differentiations, Numerical integration- Trapezoidal Rule, Simpsms Rules, Wedls Rule, Principle of least square, Curve Fitting Linear & non linear, exponential, logarithmic curve.

### UNIT-5 Numerical Solution of Ordinary Differential Equation.

Picard's method, taylor's series method, Euler's method, Euler's modified method, Runge-kutta method, Predictor-corrector method, Adams, Bashforth Method, Milner's method.

#### Text Books:

1. Jain , M.K. & Iyenger, R.K, " Numerical Methods for Scientific & Engg. Computation, New-Age, International Pub. 4<sup>th</sup> Edition.
2. Grawal; B.S., "Numerical Methods", Kahanna Pub.

#### Reference Books:

1. Burden, Richard L., Fairs, J. Douglas Fairs, "Numerical Analysis", Thomson Asia. PTE, 7<sup>th</sup> Edition.
2. Gourdin A., Boumahrat M. "A pplied Numerical Method", PHI.
3. Rajasekaran, S. "Numerical Method in Science & Engineering, A Practical Approach", s. Chand & Co Ltd., II<sup>nd</sup> Edition.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester – 2<sup>nd</sup> Semester MCA      Code 521215

## ACCOUNTING AND MANAGEMENT CONTROL

### UNIT-1

Meaning and objects of accounting, Accounting Cycle, Accounting concepts and conventions, accounting equations, rules of journalizing, ledger posting.

### UNIT-2

Cash book, preparation of trial balance, trading and profit and loss account and balance sheet with adjustments relating to closing stock, outstanding expenses, prepaid expenses, Accrued income depreciation, Bad debts, provision for bad debts, provision for discount on debtors and creditors.

### UNIT-3

Basic concepts of cost accounting, elements of cost, classification of cost, preparation of cost sheet, inventory pricing, numerical through FIFO and LIFO methods.

### UNIT-4

Cost volume, profit analysis, standard costing computation of material and labor variances, budgetary control, preparation of cash budget and flexible budget, Zero base budgeting.

### UNIT-5

Management control and its characteristics, goals and strategies, structure and control. Responsibility centers and control centers: concept of responsibility centers, revenue centers, profit centers and investment centers, introduction of transfer pricing.

### Text Books:

1. Bhattacharya S. K. and Dearden John, " Accounting for Management", Prentice Hall of India, New Delhi.
2. Chadwick, " The Essence of Financial Accounting", Prentice Hall of India, New Delhi.

### Reference Books:

1. Chadwick, " The Essence of Management Accounting", PHI, India.
2. Subhash Sharma, "Management Control Systems (Text & Cases)", Tata McGraw Hill.
- 2 P. Sarvancel, " Management Control Systems"
- 3 Grewal, " Introduction to Book Keeping".



# Chhattisgarh Swami Vivekanand Technical University, Bilai

Semester – 2<sup>nd</sup> Semester MCA      Code 521221

## DATA STRUCTURES LAB

- Programs for implementation and operations on Arrays - one-dimensional, two-dimensional, Multidimensional: Creation, Insertion, and deletion of information elements from various array locations.
- Concept of C - Structures, Nested Structures, Recursion & Iteration Loops.
- Programs for implementation and operations on STACKS & QUEUES - Initializing Stack Structures using Arrays, Creation, Insertion, deletion of information elements from array locations in stacks, Implementation of Double-ended stacks, Double-ended queues, Elementary application programs: (stacks) postfix/ prefix expression evaluation, conversion of infix - to - postfix/ prefix expressions; (queues) - Airport Simulation program.
- Programs for implementation and operations on LINKED LISTS - Initializing node structures for Linear, Circular, Doubly- linear, Doubly-circular lists (with / with out header nodes), creation, insertion, deletion, sorting, reversal, of information nodes from any location in the lists, Elementary application programs: long integer addition / subtraction, Polynomial arithmetic, Classical Josephus problem.
- Programs for implementation and operations on TREES - Initializing node structures for Binary trees, Binary search trees, Expression trees, Threaded binary trees, General trees & forests and their traversal algorithms.
- Programs for implementation and operations on GRAPHS - Initializing node structures forming adjacency matrices & adjacency lists, traversal algorithms - depth-first search, breadth-first search, Construction of minimal spanning trees, shortest-paths from given graphs.
- Programs to implement SEARCHING: Sequential, Binary, Hashing algorithms.
- Programs to implement SORTING: Selection-sort, Bubble-sort, Insertion-sort, Quick-sort, Binary-tree, Heap-sort, Shell-sort, Merge-sort & Radix-sort algorithms.

# Chhattisgarh Swami Vivekanand Technical University, Bilai

Semester – 2<sup>nd</sup> Semester MCA      Code 521222

## PROGRAMMING LABORATORY IN RDBMS

- Definition of Database (create, desc, alter, creating duplicate tables, constraints (primary key, foreign key, check, not null)
- Creation and modification of Database (insert & interactive input, update, delete)
- Retrieval of Database - select: where, distinct, in, between-and, like, is null, group by-having, order by, column: (format, heading, justify, wrap trunc), nested queries: (any, all, in, not in, exists), joins:(simple, selfjoin, outer join, between joins)
- Views(create,update,drop),sequences(create,alter,drop), synonyms(create, drop), index(create, drop)
- Transaction control (commit, rollback, save point)
- Data control (grant, revoke)
- PL/SQL programming:  
(Exceptions, cursors, records, tables, triggers, procedures, functions)