## Chhattisgarh Swami Vivekanand Technical University, Bhilai

### SCHEME OF TEACHING & EXAMINATION

#### Master of Computer Applications (MCA) II\textsuperscript{nd} Semester

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Board of Study</th>
<th>Subject Code</th>
<th>Subject Code</th>
<th>SUBJECT</th>
<th>Periods Per Week</th>
<th>Scheme of Exam</th>
<th>Total Marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>521251(21)</td>
<td>Operating System</td>
<td>4 1 0</td>
<td>ESE 100</td>
<td>140</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>Computer Applications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CT 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>521252(21)</td>
<td>Database Management System</td>
<td>4 1 0</td>
<td>TA 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Computer Applications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Computer Applications</td>
<td></td>
<td>521253(21)</td>
<td>Data Structures</td>
<td>4 1 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Applied Maths</td>
<td></td>
<td>521254(14)</td>
<td>Computer Oriented Numerical Analysis</td>
<td>4 1 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Management</td>
<td></td>
<td>521255(76)</td>
<td>Introduction to Management Functions</td>
<td>4 1 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Computer Applications</td>
<td></td>
<td>521261(21)</td>
<td>Data Structures Laboratory</td>
<td>0 0 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Computer Applications</td>
<td></td>
<td>521262(21)</td>
<td>Programming Laboratory in RDBMS</td>
<td>0 0 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Computer Applications</td>
<td></td>
<td>521263(21)</td>
<td>Software Technology laboratory II</td>
<td>0 0 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Humanities</td>
<td></td>
<td>521264(46)</td>
<td>Group Discussion</td>
<td>0 0 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Library</td>
<td></td>
<td></td>
<td></td>
<td>-- -- 1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

- Duration of End Semester Examination of all theory papers will be of Three Hours

---

**ESE:** End Semester Examination  **CT:** Class Test  **TA:** Teacher’s Assessment  **L:** Lecture  **T:** Tutorial  **P:** Practical
Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: Master of Computer Applications

Subject: Operating System

Semester: II

ESE Duration: Three Hours

Code: 521251(21)

Total Theory Periods: 40

Total Tutorial Periods: 10

Class Tests: Two (Minimum)

Assignments: Two (Minimum)

Maximum Marks: 100

Minimum Marks: 40

Course Objectives:
1. To provide an understanding of the functions of operating systems.
2. To provide an insight into internals and functional modules of operating systems.
3. To study the concepts underlying the design and implementation of memory management of operating systems.
4. To make student able to understand deadlocks and to recover them.
5. To make student understand the core structure, functions and design principles of distributed operating system will be introduced with this subject.

UNIT – I 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 – II Introduction to scheduling: Process concept, states of process, Process control block, 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 – III Introduction to memory management: Various types of memory management schemes like paging, Segmentation etc. Concept of virtual memory, demand paging, Various page replacement algorithms, thrashing and methods to tackle it, Memory protection.


Text Books:
1. Operating System Concepts, James L. Peterson and Abraham Silberschatz (Addison-Wesley)
2. Modern Operating System, Andrew .S. Tanenbaum, PHI

Reference Books:
1. Operating System Concepts & Design, Milan Milenkovic (MGH)
2. An Introduction to Operating Systems, Harvey M. Dietel(Addison Wesley)

Course Outcome:
1. The student will be able to learn the various functionalities of OS.
2. The student will be able to use the various algorithms and techniques to perform the various jobs performed by operating systems.
3. The student will be able to get the overview of how operating system is designed.
4. The student will be able to demonstrate how various resources are managed by operating system.
Name of program: Master of Computer Applications
Subject: Database Management System
Semester: II
ESE Duration: Three Hours
Code: 521252(21)
Total Theory Periods: 40
Total Tutorial Periods: 10
Class Tests: Two (Minimum)
Assignments: Two (Minimum)
Maximum Marks: 100
Minimum Marks: 40

Course Objectives:
1. To understand basic concepts of designing and building a database management system.
2. To familiarize student with syntax and implementation of Structured Query Language (SQL).
3. To make students understand the relational model and design relational database management system.
4. To provide detailed knowledge of transaction, concurrency and recovery strategies of DBMS.
5. To impart significance of normalization in DBMS and different normalization techniques.


UNIT – II The Relational Data Model: Relational data model concepts, Constraints, Relational Algebra, Relational Calculus, Tuple relational calculus SQL: DDL, DML, DCL , Types of Constraints, Defining different constraints on a table, Defining & Dropping integrity constraints in the alter table command, View, Index.


UNIT – V Crash Recovery: Failure classification, Different type of Recovery techniques & their comparative analysis, Deferred update, Immediate update, Shadow paging, Check points, On-line backup during database updates, Concurrency Control: Different type of concurrency control techniques & their comparative analysis, Locking techniques, Time- stamp ordering, Multi-version techniques, Optimistic techniques, Multiple granularity.

Text Books:
1. Database system concept, Korth & Sudarshan, TMH.

Reference Books:
2. Introduction to Database Systems ,C.J.Date, Pearson Education.
3. Database Design Fundamentals, Rishe, PHI.

Course Outcome:
1. Students will be able to design a database based on the given requirements.
2. Students will be able to make projects with knowledge of subject provided to them.
3. Students will be able to write Standard Query Language statements.
4. Students are expected to apply normalization techniques on given database.
**Chhattisgarh Swami Vivekanand Technical University, Bhilai**

<table>
<thead>
<tr>
<th>Name of program:</th>
<th>Master of Computer Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject:</td>
<td>Data Structure</td>
</tr>
<tr>
<td>Semester:</td>
<td>II</td>
</tr>
<tr>
<td>ESE Duration:</td>
<td>Three Hours</td>
</tr>
<tr>
<td>Code:</td>
<td>521253(21)</td>
</tr>
<tr>
<td>Total Theory Periods:</td>
<td>40</td>
</tr>
<tr>
<td>Total Tutorial Periods:</td>
<td>10</td>
</tr>
<tr>
<td>Class Tests:</td>
<td>Two (Minimum)</td>
</tr>
<tr>
<td>Assignments:</td>
<td>Two (Minimum)</td>
</tr>
<tr>
<td>Maximum Marks:</td>
<td>100</td>
</tr>
<tr>
<td>Minimum Marks:</td>
<td>40</td>
</tr>
</tbody>
</table>

**Course Objectives:**
1. To be familiar with basic techniques of algorithm analysis.
2. To master the implementation of linked data structures such as linked lists and binary trees.
3. To be familiar with advanced data structures such as balanced search trees, hash tables, priority queues.
4. To be familiar with sorting algorithms including quick sort, merge sort and heap sort.
5. To be familiar with some graph algorithms like shortest path and minimum spanning tree etc.

**UNIT – I Stack and Queue:** Introduction to data structure, Primitive data structure, Introduction to Algorithm analysis for time and space requirement, Rate of growth and Order notation, Basic time and space analysis of an algorithm. Stacks Definition, concepts, operation and application of Stacks, Recursion and Polish notations, Queue, Priority Queue: definition concepts, operation and application of Queue, circular queue and Dequeue.

**UNIT – II General List:** Linear data structures - List and its contiguous implementation, its drawbacks, Pointers and linked allocation concepts and operations on singly linked list, circular linked list, doubly linked lists, Application of linked list, Josephus Problem, Polynomial Manipulation, Linked Stacks and Queues.

**UNIT – III Trees and Its Representation:** Terminologies related to trees, Binary Tree, complete binary tree, almost complete binary tree; Tree Traversals-preorder, in order and post order traversals, their recursive and non-recursive implementations; Expression tree-evaluation; Linked representations of binary tree, operations. Threaded binary trees; Forest, Conversion of forest into tree, Heap definition.

**UNIT – IV Searching, Hashing and Sorting:** Requirement of a search algorithms; sequential search, binary search, indexed sequential search, interpolation search, Hashing- Basics, methods, collision, resolution of collision, chaining; Internal Sorting, External sorting - Selection sort, Bubble sort, Merge sort, quick sort, shell sort, heap sort.

**UNIT – V Graphs:** 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 and Dijkstra’s algorithms. Basic idea of AVL Tree; Definition, insertion and deletion operations, Basic idea of B-tree definition, order, degree, insertion and deletion operations; B+ tree-definition, comparison with B-tree.

**Text Books:**
1. Data Structures and Program Design in C, Kruse R.L, PHI.
2. Data Structures using C and C++, Tanenbaum, PHI.
3. Data Structures, Schaum Series.

**Reference Books:**
2. Data Structures, Bhagat Singh.
3. Data Structures - Trembley and Sorenson.

**Course Outcome:**
1. Students will be able to make appropriate data structure and algorithm design decisions with respect to program size, execution speed, and storage efficiency.
2. Students will be able to understand common data structures (such as arrays, linked lists, stacks, queues, priority queues, trees, heaps, hash tables, associative containers)
3. Students will be able to write and implement various sorting, searching, and hashing algorithms.
### Course Objectives:

1. To make students learn to solve many types of problems such as roots of equations, system of linear simultaneous equations.
2. To make students learn the differential or integral of unknown function given a set of discrete measurement from the function.
3. To make students learn to select the appropriate methods to solve problems for a specific task.
4. To make student learn the limitation of each numerical methods especially the conditions under which they fail to converge to a solution.

### UNIT – I
**Numerical Solution of Algebraic & Transcendental Equations**  

### UNIT – II
**System of Linear Algebraic Equations**  

### UNIT – III
**Interpolation & Finite Difference**  
Finite difference, Difference of polynomial, Factorial notation, Other difference operator, Newton’s Forward, and Backward interpolation formula, Central interpolation formula, Lagrange & Newton’s Divided difference interpolation formula.

### UNIT – IV
**Numerical Differentiation**  

### UNIT – V
**Numerical Solution of Ordinary Differential Equation**  

### Text Books:

### Reference Books:

### Course Outcome:

1. Students will be able to numerically solve many types of problems such as Roots of equations, system of linear simultaneous equations. Interpolation of values of dependent measurements.
2. Students will be able to approximating the differential or integral of unknown function given a set of discrete measurement from the function.
3. Students will be able to select from alternative methods which most appropriate to solve problems for a specific task.
4. Student will be able to understand the limitation of each numerical methods especially the conditions under which they fail to converge to a solution.
Name of program: **Master of Computer Applications**

Subject: **Introduction to Management Function**

Semester: **II**

ESE Duration: **Three Hours**

Code: **521255(76)**

Total Theory Periods: **40**

Total Tutorial Periods: **10**

Class Tests: **Two (Minimum)**

Assignments: **Two (Minimum)**

Maximum Marks: **100**

Minimum Marks: **40**

---

**Course Objectives:**

1. To understand different aspects of management and administration
2. To understand the process and type of planning
3. To understand motivation and its theories
4. To understand importance of communication in organization.
5. To understand HRM process
6. To understand different aspects of individual behavior related to job
7. To understand different aspects of management functions such as marketing, production and financial management.
8. To understand how to make balance sheets, profit & loss and trial balance.

---

**UNIT – I Fundamentals of Management:** Management functions, Management and Administration, Principles of management. Planning – Nature of Planning, Types of Planning, steps in planning, advantages and limitations of planning

**UNIT – II Motivation:** Theories of Motivation, Need Hierarchy Theory, Maslow’s theory, Herzberg’s Theory. Communication – Meaning and Importance, Process of Communication, channel of communication, communication media, Communication networks, barriers to communication


**UNIT – V Concept of Marketing** - Importance of Marketing, managerial Function of marketing, marketing Mix, marketing and other functions, Nature and scope of Marketing Research. Production Management – Concept and scope, Production Planning, production control, organization for production planning and control, inter-relationships with other management functions,

**Text Books:**


**Reference Books:**

1. Understanding management : Richard L. Daft, Dorothy Marcic , Cengage Learning

**Course Outcome:**

1. The student will be able to understand the theoretical understanding of management and administration.
2. The student will able to develop insights into the step-by-step processes involved in the development of plan
3. The student will be able to adapt the concept of motivation and ways to apply motivation technique in real world.
4. The student will be able to use communication as an effective tool for management.
5. The student will be able to analyze formal and informal relation in an organization.
6. The student will be able to understand the basics of HRM
7. The student will be able to apply functional knowledge of management real world.
8. The student will be able to understand how to make balance sheets, profit & loss and trial balance.
List of Experiments/Programmes (At least Ten are to be performed/executed by each student)

1. Write a program to implement a stack and its operations.
2. Write a program to implement a linear queue, circular queue using an array.
3. Write a program to convert an infix expression into its equivalent postfix expression using a stack.
4. Write a program to evaluate a postfix expression using a stack.
5. Write a program to create and display a linked list of integers.
6. Write a program to create two linked list and append one list at the end of another using function.
7. Write a program to implement a stack and queue of strings using a linked list.
8. Write a program to implement a priority queue using linked list.
9. Write a program to create and display a circular linked list of integers without and with a header node.
10. Write a program to define functions to add a node (at the beginning, end and middle), delete a node, search a node and display all the nodes in a header circular linked list.
11. Write a program to demonstrate the Josephus problem using a circular linked list.
12. Write a program to create and display a doubly linked list.
13. Write a program to define the following functions to add a node (at the beginning, end and middle), delete a node (from the beginning, end and middle) from a doubly linked list.
14. Write a program to create and display a doubly circular linked list.
15. Write a program to sort an array of integers using the techniques of Selection sort, Bubble sort, Insertion sort, Quick sort, Shell sort, Heap sort.
16. Write a program to search for a particular element in an unsorted array of integers using linear search technique.
17. Write a program to traverse a graph in Depth first technique using a Stack.
18. Write a program to traverse a graph in Breadth first technique using a Queue.
19. Write a program to implement Topological sort over a graph.
List of Experiments/Programmes

1. Definition of Database (create, desc, alter, creating duplicate tables, constraints (primary key, foreign key, check, not null)
2. Creation and modification of Database (insert & interactive input, update, delete)
3. 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, self join, outer join)
4. Views(create,update,drop),sequences(create,alter,drop), synonyms(create, drop), index(create, drop)
5. Transaction control (commit, rollback, save point)
6. Data control (grant, revoke)
7. PL/SQL programming:
   (Exceptions, cursors, records, tables, triggers, procedures, functions)
List of Experiments/Programmes

.NET Programming
2. WAP to find the Average, Total Grade of student using if else statements (In Console).
3. WAP to input any number between (0—6) and print appropriate day, week.
4. Print the patterns using For loop.
5. WAP to input numbers in 1D array and print in ascending & descending order.
6. WAP to input number in 2D array and perform the following operations
   a. Sum of all number
   b. Forward Diagonal & Backward diagonal
   c. Print Upper & Lower triangle matrix.
7. WAP to input number in 2D array and perform the following operations
   a. Sum of two matrices.
   b. Multiplication of two matrices.
8. WAP to explain Class, Constructor & Inheritance.

GUI Programming
1. Design simple calculation to implement Addition, Subtraction and Multiplication and division.
2. Design the marks sheet of student. Which Display all details including the total marks of student and percentage.
3. Create a from using check box & option box to give the effect of fonts such as Bold, Italic, underline, strike through respectively for the text entered in the Rich Text Box.
4. Demonstrate use of Data Environment; add tables and queries, place field on form, report etc.
5. Create simple Notepad application, which contains menus, Rich Text Box, Common Dialogs Box, formatted text, using toolbar and Replace text, window, status bar and scroll bar.
6. Develop three different programs which use different Data Access Components ODBC, OLE DB-ADO
7. Modify the Practical on 7 to all following Button FIND, ADD, DELETE, MODIFY, CANCEL. Give proper code to perform the activity described by the buttons.

Problem Based Learning:
(Design the and develop one of the following three case studies)

1. Design a program for online examination system, which include database and record facility.
2. Develop a program for telephone bill generation, which include database and record facility.
3. Develop a program for super market, include the database and record facility.

List of Software required:
1. MSDN Library
2. Database (Oracle/MS Access/ Sql. Server)

Recommended Books:
1. Microsoft Visual studio .NET 2008
3. Beginning VB.NET Database, By: Willis, Theoron, Wiley publication
4. Visual Basic .Net, By: Schneider, David I., PHI
5. Visual C++.NET How to Program: Introducing .NET framework class lib, By: Deitel, Detiel and Liperi, Pearson Education Asia