MCA-26 Data Structures and Algorithms Lab.

General Course Information

Course Code: MCA-26 Course Credits: 2 Type: Professional Core Lab. Course Contact Hours: 2 hours/week Mode: Lab practice and assignments	**Course Assessment Methods (internal: 30; external:70)** The internal and external assessment is based on the level of participation in lab. sessions and the timely submission of lab experiments/assignments, the quality of solutions designed for the assignments, the performance in VIVA-VOCE, the quality of lab. file and ethical practices followed. The internal examination is conducted by the course coordinator. The external examination is conducted by external examiner (appointed by the Controller of Examination) in association with the internal examiner appointed by the Chairperson of the Department.

Pre-requisites: Programming in C/C++ language.

About the Course

This lab. course involves implementation of basic and advance data structures and various operations on these data structures. The objective of the lab course is to train the students to solve the problems related to data structures and choose the appropriate data structure for solving computational problem efficiently.

Course Outcomes: By the end of the lab course a student would be able to:

CO1. **Implement** various data structures and the related operations.

CO2. **Analyse** space and time complexity of algorithms.

CO3. **Compare** solutions on the basis of the appropriateness of data structure used and the efficiency of the operations implemented.

CO4. **Integrate** knowledge of data structures to solve real world problems related to data structure and algorithms.

CO5. **Create** written records for the given assignments with problem definition, design of solution and conclusions.

CO6. **Demonstrate** ethical practices while solving problems individually or in groups

List of experiments/assignments

1. Two assignments related to creating and manipulating matrices and linear lists.
2. Two assignments associated with linked list, operations on linked lists and their applications.
3. Two assignments on array and linked implementation of stacks and queues.
4. Two assignments on trees and their applications.
5. Two assignments on graphs and their applications.
6. Two assignments on different searching and sorting methods with their complexity analysis.
7. One assignment on challenging problems on data structures to be given in groups.

Note:

The actual experiments/assignments will be designed by the course coordinator. One assignment should be designed to be done in groups of two or three students. The assignments must meet the objective of the course and the levels of the given course outcomes. The list of assignments and schedule of submission will be prepared by the course coordinator at the beginning of the semester.

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Pre-requisites: Basic programming skills

About the Course:
Python is a scripting programming language known for both its simplicity and wide breadth of applications. For this reason it is considered one of the best languages for beginners. Used for everything from web development to scientific computing Python is referred to as a general purpose language by the greater programming community. The major objective of Python language is to make the students solve real word problem efficiently using python library.

Course Outcomes: By the end of the course students will be able to:
    CO1. **Implement** solutions to the given assignments in Python.
    CO2. **Use** various Python packages for solving different programming problems.
    CO3. **Devise** solutions for complex problems of data analysis and machine learning.
    CO4. **Evaluate** the output of data analysis and machine learning models.
    CO5. **Create** lab records of the solutions for the given assignments.
    CO6. **Demonstrate** use of ethical practices, self-learning and team spirit.

List of experiments/assignments
1. Install Python and explore various popular IDE like IDLE, PyCharm, andAnaconda.
2. Assignments to perform various number operationslike
    a. Find maximum from a list ofnumbers
    b. GCD of two number
    c. Square root of anumber
    d. Check number is prime ornot.
    e. Print first N primenumbers
    f. Remove duplicate numbers fromlist
    g. Print the Fibonacciseries.
3. Assignments to perform various operations on Strings like creation, deletion,concatenation.
4. Create a List L = [10, 20, 30]. Write programs to perform followingoperations:
    a. Insert new numbers to listL.
    b. Delete numbers from listL.
    c. Sum all numbers in list L.
    d. Sum all prime numbers in listL.
    e. Delete the listL.
5. Create a Dictionary D= {'Name': 'Allen', 'Age': 27, 5:123456}. Write programs to perform following operations:

   a. Insert new entry inD.
   b. Delete an entry fromD.
   c. Check whether a key present in D.
   d. Update the value of akey.
   e. Clear dictionaryD.
6. Two assignments on Sets to perform various operation like union, intersection, differenceetc.
7. Two assignments related to searching operation like linear search, binarysearch.
8. Three assignments related to sorting like selection sort, bubble sort, insertionsort.
9. Demonstrate the use of dictionary for measuring student marks in five subjects and you have to find the student having maximum and minimum average marks.
10. Two assignment on usage of different available packages like random package toperform
   a. Print N random numbers ranging from 100 to500.
   b. Print 10 random strings whose length between 3 and5.
11. Two assignments on usage of package such as Numpy, Pandas.
12. Implement and demonstrate the functions of a simplecalculator.
13. One assignment on implementing object oriented concept such as classes, inheritance, and polymorphism.
14. One assignment on file handling that how data is read and written to afile.

Note:

The actual experiments/assignments will be designed by the course coordinator. One assignment should be designed to be done in groups of two or three students. The assignments must meet the objective of the course and the levels of the given course outcomes. The list of assignments and schedule of submission will be prepared by the course coordinator at the beginning of the semester.

MCA-28: Artificial Intelligence Lab

General Course Information:

Course Code: MCA-28 Course Credits: 2 Type: Professional Core Lab. Course Contact Hours: 2 hours/week Mode: Lab practice and assignments	**Course Assessment Methods (internal: 30; external:70)** The internal and external assessment is based on the level of participation in lab. sessions and the timely submission of lab experiments/assignments, the quality of solutions designed for the assignments, the performance in VIVA-VOCE, the quality of lab. file and ethical practices followed. The internal examination is conducted by the course coordinator. The external examination is conducted by external examiner (appointed by the Controller of Examination) in association with the internal examiner appointed by the Chairperson of the Department.

Prerequisite
Basic knowledge of HTML, XML, ASP, JSP and Web Designing.

About the Course
In this course, the learners will be able to develop expertise related to general purpose problem solving, Representation of knowledge, Reasoning under uncertainty, Planning and Natural Language processing

Course Outcomes: By the end of the course students will be able to:
CO1. **Outline** various Artificial Intelligence techniques.
CO2. **Illustrate** reasoning under uncertainty.
CO3. **Apply** search and knowledge representation techniques to solve AI problems.
CO4. **Compare** strengths and weaknesses of AI algorithms.
CO5. **Combine** various AI techniques to solve intelligent systems' problems.

List of Experiments:
1. Write a program to implement BFS/DFS Traversal?
2. Write simple facts for the statements and querying it.
3. Write a program for Family-tree.
4. Write Program for Monkey-banana Problem.
5. Write a program to implement Tic-Tac-Toe game.
6. Write programs for computation of recursive functions like factorial Fibonacci numbers, etc.
7. Write program to solve 5-queens problem.
8. Write a Program for water jug problem.
9. Write a program for travelling salesman problem.
10. Write a program to implement all set operations.

Note:
The actual experiments/assignments will be designed by the course coordinator. One assignment should be designed to be done in groups of two or three students. The assignments must meet the objective of the course and the levels of the given course outcomes. The list of assignments and schedule of submission will be prepared by the course coordinator at the beginning of the semester.