**Design Project**

Data Structure and Algorithms

Instructor: Engr. Naureen Shaukat

Course Code: EE-253

Semester: 04

Credit Hours: 4 (Theory: 3, Lab: 1)

**Project Statement:**

Design a program that can manage a library's catalog system. The program should allow library staff to add, remove, and modify books in the library's collection. The program should also allow users to search for books based on title, author, or subject.

The program should have the following features:

1. The books in the library's collection should be stored in an array, and information about each book, such as the title, author, and subject, should be associated with it.
2. The program should include a search algorithm that allows users to search for books based on title, author, or subject. The program should display a list of matching books and their availability status.
3. The program should allow staff to add, remove, or modify books in the library's collection. When a book is added or removed, the program should update the array accordingly.
4. The program should use a sorting algorithm to sort the books in the library's collection based on title or author.
5. The program should have a graphical user-friendly interface that is easy to navigate and use.

**Deliverables:**

Following are the deliverable of the project,

1. A fully functional program that can manage a library's catalog system.
2. A user manual that explains how to use the program.
3. A test plan that includes test cases to ensure the program works correctly and efficiently.
4. A project report that explains the design and implementation of the program and includes screenshots of the program in action.

*By working on this project, students will be able to apply the data structures and algorithms they learn in the lab sessions to a real-life scenario. They will also develop skills in designing and implementing a complete program using Python programming language.*

**Marking Scheme:**

Total Marks: 100

1. **Program Code**: 20
2. **Software Manual**: 10
3. **Test Plan**: 10
4. **Project Report**: 15
5. **Viva**: 45

**Characteristics of CEP:**

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| **Course Name** | **WK** | **PLO (WA)** | **WP** | **Blooms Taxonomy Level** |
| ***Data Structures and Algorithms*** | WK2 | PLO5, PLO3 | WP3: Depth of knowledge required, | P1, C3 |