

# **Syllabus**

## **Add-on Course on Art of Problem Solving**

### **Course Code: CSAD05**

#### **Course Overview:**

This course will teach you the skills necessary to solve problems effectively using the C programming language. You will learn how to break down problems into smaller, more manageable steps, how to identify and apply the appropriate mathematical and algorithmic techniques, and how to test and debug your solutions in C.

#### **Prerequisites:**

This course is open to all B.Sc. Computer Science students. However, it is recommended that you have completed a course in linear algebra and a course in discrete mathematics.

#### **Course Objectives:**

By the end of this course, you will be able to:

- Solve problems using a variety of mathematical and algorithmic techniques in C
- Identify and apply the appropriate mathematical and algorithmic techniques to solve a given problem in C
- Test and debug your solutions in C
- Communicate your solutions effectively

#### **Course Content:**

The course will cover the following topics:

- Problem Solving Techniques
  - Problem Decomposition
  - Abstraction
  - Heuristics
- Mathematical Techniques
  - Linear Algebra
  - Discrete Mathematics
- Algorithmic Techniques
  - Greedy Algorithms
  - Divide-and-Conquer Algorithms
  - Dynamic Programming Algorithms
- Testing and Debugging in C
- Communication

**Assessment:**

Your performance in this course will be assessed through the following:

- Midterm Exam (30%)
- Final Exam (40%)
- Problem Sets (30%)

**Grading:**

The grading scale for this course is as follows:

- A: 90-100%
- B: 80-89%
- C: 70-79%
- D: 60-69%
- F: Below 60%

**Reference Books:**

- The Art of Problem Solving, Vol. 1: The Basics by Sandor Lehoczky and Richard Rusczyk.
- The Art of Problem Solving, Vol. 2: Intermediate Counting and Probability by Sandor Lehoczky and Richard Rusczyk.
- The Art of Problem Solving, Vol. 3: Advanced Problem Solving by Sandor Lehoczky and Richard Rusczyk.
- The Art and Craft of Problem Solving by Paul Zeitz.
- How to Solve It by George Polya.