

Computational Thinking and Programming

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Course Description:

An introduction to computational thinking to solve problems. In this course, students learn the logical approach to problems using programming concepts, such as variables, functions, input, output, decision structures, and iterations. Choice of language(s) varies with software development trends (We will mainly use Python for this semester)..

Learning Outcomes: As a result of successfully completing this course, cadets will:

- Analyze a problem and write an algorithm (pseudo code) to solve the problem [SLO2].
- Apply the most suitable programming structures and control flow to problems.
- Program simple solutions in Python using knowledge and skills on computational thinking.

Materials/Text:

- **[Optional]** David I. Schneider, An Introduction to Programming using Python, Pearson, 2016. ISBN-13: 978-0-13-405822-1
- **[Optional]** Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, 9th Edition, Pearson, 2012. ISBN-13: 978-0-13-249264-5

Requirements:

Prerequisite: **None**

Schedule:

Note: The schedule may be adjusted appropriately as the class progresses.
Each class is three hours long.

Week	Topics	Assignments
July 14	Introduction to the class/syllabus & [Solving] Ch.1 Problem Solving	
July 15	[Solving] Ch.1 General Problem Solving concepts Hands-on: Real-world problems and solutions	HW1
July 16	[Solving] Ch.2 Problem Solving Concepts for Computer Hands-on: Algorithms for real-world problems	
July 20	[Solving] Ch.2 Problem Solving Concepts for Computer Hands-on: Algorithms for real-world problems	HW2
July 21	Midterm 1 & [Solving] Ch.3 Planning your solution Hands-on: Python Installation	Midterm 1
July 22	[Solving] Ch.3 Planning your solution Hands-on: Simple Python practice	HW3

July 23	[Solving] Ch.4 Programming Structure Hands-on: Python practice with functions	
July 27	[Solving] Ch.4 Programming Structure Hands-on: Python practice with functions	HW4
July 28	Midterm 2 & [Solving] Ch.5 Problem Solving with Sequential Logic Hands-on: Flowchart and Pseudo Coding	Midterm 2
July 23	[Solving] Ch.5 Problem Solving with Sequential Logic Hands-on: Flowchart and Pseudo Coding	HW5
July 30	[Solving] Ch.6 Problem Solving with Decisions Hands-on: Python practice on Selection Structures	
August 3	[Solving] Ch.6 Problem Solving with Decisions Hands-on: Python practice on Selection Structures	HW6
August 4	Midterm 3 & [Solving] Ch.7 Problem Solving with Loops Hands-on: Python practice on Loops	Midterm 3
August 5	[Solving] Ch.7 Problem Solving with Loops Hands-on: Python practice on Loops	HW7
August 6	Final Exam	

Assignments:

In-class discussion, in-class practices, homework, quizzes, midterm tests, and a comprehensive final test.

Evaluation:

Grading Scale: A+ = 95–100, A = 90–94.99, B+ = 85– 89.99, B = 80–84.99, C+ = 75– 79.99, C = 70–74.99, D+ = 65– 69.99, D = 60–64.99, F = under 60

Grade Distribution:

- In-class Participation 15%
- Homework & Quiz 15%
- Mid-Term Tests (1st, 2nd, and 3rd) 40%
- Final Test 30%

Total 100%