Course content

This course provides an introduction to the field of computer science, focusing on self-directed learning and practical programming exercises. Instead of traditional knowledge transmission, students are encouraged to engage in hands-on learning, collaborate with peers, and design and implement a fun game program as a final project. The course covers fundamental topics in computer science and programming using Python.

Key topics covered include:

1. Introduction to computer science and its applications
2. Basic programming concepts and Python syntax
3. Algorithms and problem-solving strategies
4. Data representation and logical operations
5. Understanding how programs execute on hardware
6. Recursion and common algorithms such as dynamic programming and divide-and-conquer
7. Introduction to operating systems

Course objectives

Knowledge

1. Understand the fundamental concepts of computer science, including its applications and history.
2. Learn Python programming basics, including data types, variables, control structures, and functions.
3. Comprehend key algorithms and problem-solving techniques such as recursion, dynamic programming, and greedy algorithms.
4. Grasp the basics of how programs execute on a computer and interact with hardware, including binary arithmetic and memory storage.

Skills

1. Develop practical programming skills through hands-on exercises and projects.
2. Apply problem-solving techniques to solve algorithmic challenges in Python.
3. Implement and optimize algorithms using Python to solve real-world problems.
4. Work effectively in teams to design and implement a final project, a simple game using Python.

Competencies

1. Demonstrate the ability to work independently and in teams to solve programming problems.
2. Analyze and optimize the performance of algorithms in practical scenarios.
3. Collaborate with peers to share ideas, solve problems, and create innovative solutions.
4. Communicate technical concepts clearly, both in written documentation and verbal presentations.