University of Pittsburgh

Kenneth P. Dietrich School of Arts and Sciences

College in High School

2024-2025

Introduction to Computer Programming (Java)

CS 0007--3 Credits

Description: This is a first course in computer science programming. It is recommended for students intending to major in computer science who do not have the required background for CMPINF 0401. The focus of the course is on problem analysis and the development of algorithms and computer programs in a modern high-level language.

Prerequisites: There are no formal prerequisites.

Grading: Grading will be based on programming assignments and exams.

Textbook: The preferred textbook is *Starting Out With Java From Control Structures through Objects*, by Tony Gaddis (any edition). Or, you may use any textbook as long as the material that is listed below is included in the book.

The following topics are covered in the University of Pittsburgh CS 0007 course. Some detail for each topic is also included. Topic 6 should only be covered superficially, to prepare students for CMPINF 0401 should they choose to continue with that course.

1. Introduction
- Algorithms
- Implementing algorithms in Java
- Why Java?
- The Web and GUIs

2. Program Fundamentals
- Compiling and running Java
- Lexical elements
- Data types and variables
- User input: from keyboard, command-line, file
- Predefined methods
- Number types
- Arithmetic expressions
- Assignment operators
- Increment and decrement ops
- Precedence and associativity

3. Statements and Control Flow
- Kinds of statements
- Boolean expressions
- The “if” statement (and “if-else”)
- The “while” statement
- The “for” statement
- Break and continue
- The switch statement
- Laws of Boolean Algebra

4. Methods: Functional Abstraction
- Method Invocation
- Static Methods
- Scope of Variables
- Top-Down Design
- Invocation and Call-by-value
- Recursion
- Method Overloading

5. Arrays

- One-Dimensional Arrays
- Passing Arrays to Methods
- Array Assignment
- Finding Min and Max
- Simple Sorting
- Searching an Ordered Array
- Two-Dimensional Arrays
- Arrays of Nonprimitive Types

6. Objects: Data Abstraction

- String: Using a Standard Class
- String Buffer
- Elements of a Simple Class
- Access public and private: Data Hiding
- Constructor Methods
- Static Fields and Methods
- Passing Objects: Reference Types
- Scope
- Keyword final and constants
- Arrays of Objects
- Object-oriented Design

7. Reading and Writing Files

- Reading and Writing Text Files
- Formatting Text Output
- Reading and Writing Binary Files
- Detecting end of Input Stream

Additional course credit information for CS 0007:

At the University of Pittsburgh, course credits can count in three ways: toward the requirements for a major, toward elective requirements, and/or toward the total number of credits needed to graduate. For this course:

- Majors: As CS 0007 is a preparatory programming course, it does not fulfill a major requirement in Computer Engineering, Computer Science, or Information Sciences (although it provides preparation for the courses needed for those major requirements)

- Electives: Individual Schools and Colleges of the University (such as Engineering, Arts & Sciences, Business, Computing & Information, and so on) have different policies about elective credits and may count this course as an elective. Students interested in studying at the University of Pittsburgh should contact their School/College of interest to see if this course would be counted

- Graduation: This course's credits count toward the number of credits needed for graduation

Academic Integrity: All College in High School teachers, students, and their parents/guardians are required to review and be familiar with the University of Pittsburgh's Academic Integrity Policy located online at https://www.as.pitt.edu/faculty/policies-and-procedures/academic-integrity-code.

Grades: Grade criteria in the high school course may differ slightly from University of Pittsburgh standards. A CHS student could receive two course grades: one for high school and one for the University transcript. In most cases the grades are the same. These grading standards are explained at the beginning of each course.

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Transfer Credit: University of Pittsburgh grades earned in CHS courses appear on an official University of Pittsburgh transcript, and the course credits are likely to be eligible for transfer to other colleges and universities. Students are encouraged to contact potential colleges and universities in advance to ensure their CHS credits would be accepted. If students decide to attend any University of Pittsburgh campuses, the University of Pittsburgh grade earned in the course will count toward the student grade point average at the University. At the University of Pittsburgh, the CHS course supersedes any equivalent AP credit.

Drops and Withdrawals: Students should monitor progress in a course. CHS teacher can obtain a Course Drop/Withdrawal Request form from the CHS office or Aspire. The form must be completed by the student, teacher and parent/guardian and returned to teacher by deadlines listed. Dropping and withdrawing from the CHS course has no effect on enrollment in the high school credits for the course.