University of Pittsburgh

Kenneth P. Dietrich School of Arts and Sciences

# College in High School

*2024-2025*

## *Introduction to Computing for the Humanities*

*CS 0012--4 Credits*

**Description:** CS 0012 introduces students to the concepts of computing and computer programming. Students in this course learn how a computer works and how to write programs to use the computer as a problem-solving tool. A major focus of the class is developing problem-solving skills (e.g., how to decompose a problem into more manageable parts, and how to combine those parts into an overall solution). CS 0012 focuses on problems related to the humanities and allied social sciences. Domain-specific projects and labs will be assigned throughout the course to encourage students in these fields to apply computing to their studies.

**Prerequisites:** None. Students with no prior programming experience are encouraged to enroll.

**Textbooks:** *Starting Out with Python (5th Edition)* by Tony Gaddis. (4th edition also acceptable)

**Course goals:**

1. To promote computational thinking
2. To teach students the basics of computer programming
3. To prepare students to pursue a major or minor in computer science

CS0012 is offered for students who wish to utilize computing to study phenomena within the humanities and allied social sciences but have, as of yet, no background in computer programming. The projects and labs will present the students with computational approaches to problems with applications within the humanities, e.g.:

- Investigating the effect of different strategies for the Prisoner's Dilemma within the context of modelling historical human behavior
- Analyzing several months' worth of articles published by the New York Times
- Building a simulator to recreate the Schelling's models of segregation. (https://www.stat.berkeley.edu/~aldous/157/Papers/Schelling_Seg_Models.pdf)

**Grading:**

- 15% Midterm Exam 1
- 15% Midterm Exam 2
- 25% Final Exam
- 10% Project 1
- 15% Project 2
- 20% Project 3

**Course Topics:**

**1. Introduction (Gaddis Ch. 1)**
- Hardware and software overview
- Data storage
- Building and running computer programs

**2. Input, Processing, and Output (Gaddis Ch. 2, 8)**
- Designing computer programs
- Displaying output to the user
- Getting input from the user
- Using variables
- Basic mathematical operations
- Basic string operations

**3. Conditional Statements (Gaddis Ch. 3)**
- if … else structures
- Nested if … else structures
- Boolean logic

**4. Functions (Gaddis Ch. 5, 12)**
- Function definitions
- Scope
- Keyword arguments
- Recursion
- Input validation (using recursion)

**5. Repetition Structures (Gaddis Ch. 4)**
- while loops
- for loops
- Sentinel values
- Input validation (using iteration)
- Nested loops

**6. Files and Exceptions (Gaddis Ch. 6)**
- Basic file I/O
- File processing
- Handling Exceptions

**7. Lists and Tuples (Gaddis Ch. 7)**
- Python sequences
- Slicing lists
- List processing
- Two-dimensional lists
- Mutable and immutable data types
- Tuples vs lists
- Tuple packing and unpacking
- Tuples and functions

**8. Dictionaries and Sets (Gaddis Ch. 9)**
- Collections of key/value pairs
- Set operations (e.g., union, difference, etc.)

**9. Object-Oriented Programming (Gaddis Ch. 10, 11)**
- Overview of programming paradigms
- Designing classes
- Instantiating objects
- Inheritance
- Polymorphism
- Python modules

**10. Programming in other languages (No Readings)**
- Comparison of examples presented throughout the term in both Python in Java
- Preparation for students to be able to work with not only Python but to adapt the skills they have learned in this course for application with other programming languages throughout their careers

**Course Policies:**

Academic Integrity
All assignment submissions must be the sole work of each individual student. Students may not read or copy another student's solutions or share their own solutions with other students. Students may not review solutions from students who have taken the course in previous years. Submissions that are substantively similar will be considered cheating by all students involved, and as such, students must be mindful not to post their code publicly. The use of books and online resources is allowed, but must be credited in submissions, and material may not be copied verbatim. Any use of electronics or other resources during an examination will be considered cheating.

If you have any doubts about whether a particular action may be construed as cheating, ask the instructor for clarification before you do it. The instructor will make the final determination of what is considered cheating.

Cheating in this course will result in a grade of F for the CHS course and may be subject to further disciplinary action.

Respectful Discussion
This course may include open discussion or other interactions among students. To allow all participants to express their viewpoints, all discussion must remain civilized and respectful, and participants must avoid comments and behaviors that disparage others. A student who feels their viewpoints are not being respected is encouraged to contact the instructor, who will work to correct the situation without revealing the student's specific concerns to the rest of the class.

Audio/Video Recordings
To ensure the free and open discussion of ideas, students may not record lectures, discussion, or other course activities without the advance written permission of the instructor. Any recording properly approved in advance can be used solely for the student's own personal use.

Copyrighted Materials
All course material is subject to copyright, including notes, slides, assignments, and solutions. Students are allowed to use the provided material only for personal use, and may not share the material with others, including posting the material on the Web or other file sharing venues.

Collaboration
We believe that students should be able to distinguish between helping one another understand the core concepts of the course material and cheating. We encourage students to discuss the content of the course in ways that will improve understanding without violating academic integrity, such as clarifying the objective of an assignment or discussing general solution tactics.

Grade Records

All graded materials that a student receives back should be saved in a safe place until after the term has ended and they have received and accept their final grade. In this way, any grade discrepancies can be easily resolved.

***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.

***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.