University of Pittsburgh

Outlier

Computer Science I

CS 0109

3 Credits

Instructors

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Course Description

This course introduces students to computer science through object-oriented programming, covering topics from the basic "Hello, World!" program to recursion. Students will learn how to "think like a computer" to solve problems in the digital and non-digital world. They will become familiar with essential concepts and algorithms in the Java programming language and apply them to analyze, write, and test code. Additionally, students will develop a growth mindset when it comes to programming and build skills for debugging, error handling, and defensive programming. They will also recognize the social impact and power of computer science within our modern society.

Course Learning Outcomes

- Demonstrate familiarity with the essential computer programming concepts
- Apply the basic concepts and principles of structured programming and object-oriented programming
- Apply computational thinking, common data structures, and algorithms to designing problem solutions
- Formulate test cases, test, and debug a program
- Translate a well-posed problem into a functioning program in order to analyze or solve the problem

Course Materials

This is an online course. All course materials (including lecture videos, interactive textbook, and practice exercises) are provided by Outlier.org through its course website, computerscience-i.ext.outlier.org. Additional tools will be made available, incorporated into, or linked to from Outlier.org.

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Class Policies

1. **Attendance & Attention to Course Materials** – As an online course, attendance is asynchronous and is tracked by students viewing the required lectures, engaging with interactive online materials, and completing practice exercises. Each student will also have the option to spend as much time as needed learning and practicing with additional materials and practice questions; the level of their understanding will be demonstrated by their performance on a set of mastery assessments in the form of quizzes, exams, a cumulative final exam, and capstone assignments.
2. **Access to Online Course Platform** – All course materials will be accessed through the course website computerscience-i.ext.outlier.org. Course progress, lectures, active learning, practice exercises, and quizzes will be tracked and saved once you log in. The Course Homepage allows students to view graded assignments and course progress.
3. **Assessment Completion & Late Work** – This course's assessments include quizzes, exams, a cumulative final exam, and a three-part capstone assignment. Exams and capstone assignments must be completed by their due dates, as indicated on Outlier.org. Extensions must be requested via your school's Outlier facilitator. Without an approved extension, late work will not be accepted. Failure to complete an assessment by the indicated due date will result in a grade of 0 for that assessment.
4. **Quizzes** – Each chapter provides multiple opportunities to complete quizzes. Only the highest grade of any completed instance of that quiz will count towards the student's final grade. Students may not use any kind of notes, websites, books, or any other type of aid on course quizzes. Unlike other assessments, quizzes can be completed at any time once their corresponding chapter has been unlocked. Make sure to complete at least one quiz per chapter before the final exam.
5. **Exams** – Depending on if you are an in-classroom learner or a remote learner, you will experience exams differently. If you are unsure which type of learner are, ask your school's Outlier facilitator.
    a. **For in-classroom learners:** In order to maintain high standards of academic integrity, exams are proctored by your school's Outlier facilitator in the classroom. Exams should only be taken in the classroom on the predetermined exam dates and must be completed in a single contiguous sitting, while proctored by your school's Outlier facilitator. Refer to the Academic Integrity Policy for more information.
    b. **For remote learners:** In order to maintain high standards of academic integrity, we use online technology to proctor exams. Students will be asked to confirm their identity with a photo ID, and students will be required to grant access to their computer, including its webcam, screen, and microphone, for the duration of the exam. Each exam can be taken anytime during the exam open period but must be completed in a single contiguous sitting. Refer to the Academic Integrity Policy for more information.
6. **Exam Materials** – Students may not use any notes, websites, books, cell phones/tablets, or any other type of aid on course exams. This article includes a full list of exam requirements for both

in-classroom and remote learners. Reach out to your school's Outlier facilitator if you are unsure which type of learner you are.

7. **Academic Integrity** – Students in this course will be expected to agree to and comply with the Outlier.org Academic Integrity Policy. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process as outlined in the Outlier.org Academic Integrity Policy. Graded assessments such as quizzes, capstones, or exams are to be completed independently and should contain students' own work.
8. **Content Questions & Requesting Assistance** – Your learning will happen within the Outlier course. Use the button in the bottom right corner to submit feedback or if you have a question(s) about any of the content in the lectures, active learning, or practice exercises. You can also reach a Support Specialist through the Student Success request form or by engaging in the academic discussion community. One of our subject matter experts will review your question and provide a response. You can expect a response within 2 to 3 hours during Outlier.org business hours.
9. **Course Participation** – You will join Outlier's academic discussion community and participate in weekly conversations with the course facilitators and your peers to earn the participation portion of your grade. Course participation could include responding to the discussion questions posed by facilitators, sharing an interesting article you read that pertains to the chapters you're working on, or asking a question of your fellow classmates to try to solve a difficult problem. You can also answer your peers' questions by starting a thread under their posts. Derogatory and sarcastic comments and jokes that marginalize anyone are fundamentally unacceptable, especially in the classroom. Offensive language—or language that could be construed as offensive—should be avoided (see the Outlier.org Academic Integrity Policy). Only participation points earned before the course closes will count toward your final grade.
10. **Administrative Drops** – Students who do not meaningfully participate by the eleventh week of the term will be administratively dropped from the course. Meaningful course participation includes regularly logging into the course, completing quizzes, engaging in the academic discussion community, and responding to Student Success outreach.
11. **Withdrawals** – If a student decides to exit from a course AFTER the drop deadline and BEFORE the withdrawal deadline, it is defined as a withdrawal. This is different from having dropped the course, as a grade of W will appear on your transcript. Withdrawals do not affect your GPA and do not count toward the number of credits attempted. Students will still have access to the lectures and active learning, but progress in the course will not be saved. Students who Withdraw are not eligible for a refund.
12. **Disability Accommodations** – Requests for reasonable disability accommodations must be made through your school's Outlier facilitator. Please include specifics regarding the accommodation you are seeking along with relevant documentation from your school, doctor, or healthcare provider. Outlier is

committed to ensuring that learners with accessibility needs have equal opportunity to succeed in our courses and will work with your school's Outlier facilitator to provide reasonable accommodations.

13. **Religious observances** – Outlier will make a reasonable attempt to accommodate student needs in the case of serious incompatibility between a student's religious creed and a scheduled test or examination. Requests for accommodations must be requested via your school's Outlier facilitator during the first two weeks of an academic term.
14. **Transfer Credit** – University of Pittsburgh grades and credits earned in this course appear on an official University of Pittsburgh transcript, and the course credits are likely to be eligible for transfer to other colleges and universities. College credit is earned with a passing grade (59.5 or higher). Individual colleges and universities may have additional policies regarding grade requirements for transfer credits. Students are encouraged to contact potential colleges and universities in advance to ensure their credits would be accepted. If students decide to attend any University of Pittsburgh campus, the University of Pittsburgh grade earned in the course will count toward the student grade point average at the University, and the earned credits will count towards the overall credits required for graduation. At the University of Pittsburgh, the grade from this course supersedes any equivalent AP credit.

Grading Criteria

A student's grade in this course will be comprised of the following elements:

- 17% Final exam (cumulative, presented in two parts)
- 36% Exams (four exams, 9% each)
- 27% Chapter quizzes (nine quizzes, ~3% each)
- 15% Capstone assignment (three parts, 5% each)
- 5% Participation in academic discussion community

At the end of each chapter, each student is required to complete a quiz designed to assess their mastery of the material covered in that chapter. Each student will be able to attempt three (3) versions of each chapter's quiz. All three versions will be made available to the student at the end of each chapter.

Each student is required to attempt and complete at least one version of each chapter's quiz. Failing to do so will result in a grade of 0% for that chapter. If a student completes more than one quiz for a chapter, only the highest grade achieved will be counted for that chapter. As such, the student is encouraged to use these multiple quiz attempts as opportunities to identify areas that are in need of further practice. This diligent effort will allow the student to improve their understanding, mastery of the material, and grade in the course.

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Grades

An official grade will appear on the University of Pittsburgh transcript for any student who continues their enrollment beyond the official drop date for the course. Outlier.org will publicize the official drop date for each semester.

Grading Scale

A: 92.5 -100%
A-: 89.5 – 92.49%
B+: 86.5-89.49%
B: 82.5 – 86.49%
B-: 79.5 – 82.49%
C+: 76.5 – 79.49%
C: 72.5 – 76.49%
C-: 69.5 – 72.49%
D: 59.5 – 69.49%
F: 0 – 59.49%

Course Materials & Assessments

Chapter Assignments and Assessments are subject to change, and will be announced through Outlier.org as applicable within a reasonable time frame. Academic discussion community participation points accrue throughout the course duration until the scheduled course end date. Students should aim to keep up with weekly responses to prompts and comments on classmates' posts. Quizzes may be completed at any time during the course duration once their corresponding chapter has been unlocked. All active learning, practice terms, and lectures are provided for students' learning and practice and are not time-sensitive or graded but should be completed within each week if possible.

Chapter	Topics	Assessments
0 - Intro to Computer Science	• Defining computer science • Problem-solving process: design, implementation, testing, refinement	
	• Running programs • Programming languages	Chapter 0 Quiz

	• Stored program computers (CPU, memory, I/O) • Our language: Java	
1 - Basics	• Syntax and semantics • “Hello, World!” • Commenting • Keywords, identifiers, literals • Variables	
	• Primitive types and reference types • Declaration and assignment • Assignment and numerical operators • Order of precedence • Making mistakes and debugging	Chapter 1 Quiz
2 - Conditionals	• Logical operators • Comparison operators • Short circuiting •	
	• `if`, `else`, and `else if` statements • Nested `if` statements	Chapter 2 Quiz
0 - 2	**Exam 1** **Open Monday - Thursday**	Exam 1, Retake Ch 0–2 Quizzes as needed
3 - Loops	• `while` loops • `for` loops • Infinite loops • `do-while` loops	
	• Enhanced `for` loops • Nested loops • Problem-solving with loops • Scoping	

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Capstone Assignment Part I		
4 - Methods	• Defining and calling methods • Method signatures • Method overloading	**Discussion community participation point earning period 1 ends.**
	• Void methods • Methods that return values • Passing by value	Chapter 4 Quiz
3 - 4	**Exam 2** **Open Monday - Thursday**	Exam 2, Retake Ch 3 - 4 Quizzes as needed
5 - Arrays	• Creating and declaring arrays • Indexing arrays • Traversing arrays with `for` loops • Arrays with methods	
	• Multidimensional arrays • Getting and setting values in 2D arrays • Traversing 2D arrays with nested loops	Chapter 5 Quiz
6 - Strings	• Defining a String • Common String methods	
	• Arrays of Strings • Comparing and manipulating Strings	Chapter 6 Quiz
5 - 6	**Exam 3** **Open Monday - Thursday**	Exam 3, Retake Ch 5 - 6 Quizzes as needed
7 - ArrayLists	• Declaring and creating ArrayLists • ArrayList methods • Traversing ArrayLists with loops	

7 - ArrayLists (cont.)	• Binary search • Ethics of data collection and data privacy	**Discussion community participation point earning period 2 ends.**
Capstone Assignment Part II		
8 - Object - Oriented Programming	• Defining and creating classes and objects • Constructor method	
	• Main method • Accessor and mutator methods	
	• Data visibility • Libraries	Chapter 8 Quiz
7 - 8	**Exam 4**	Exam 4, Retake Ch 7 - 8 Quizzes as needed
9 - Classes and Inheritance	• Inheritance, superclass, subclass • Overriding methods • Polymorphism	
9 - Classes and Inheritance (cont.)	• Object class • Designing class hierarchies	Chapter 9 Quiz
10 - Error Handling and Exceptions	• Error handling • Defensive programming • Enumerated types	
	• Catching, throwing, creating exceptions • Checked exceptions	**Discussion community participation point earning period 3 ends.**
Capstone Assignment Part III		

11 - Recursion	• Defining recursion	
	• The Fibonacci sequence • Recursion and sorting	
	• Selection, insertion, quick, and merge sort	Chapter 11 Quiz
0 - 11	**Cumulative final exam parts 1 and 2 Open Monday - Thursday**	**Discussion community participation point earning period 4 ends.** Final Exams, Part 1: Chapters 0-7 Part 2: Chapters 8-11 Retake Chapter 0 - 11 Quizzes as needed

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