CS 4392. Programming Languages

Course Information

Instructor: Jacob Laurel (jlaurel6@gatech.edu)
Course Prefix and Number: CS 4392 A
Term: Fall 2026

Course Description

This class is an advanced undergraduate course on the principles of programming languages. We will study the foundations of different programming language paradigms from a design and implementation perspective.

Starting from the basics of programming language syntax we will progress into programming language semantics and the various ways to define and implement them. The topics we will study include: functional programming, lambda calculus, logic programming, type systems, Floyd-Hoare logic, object-oriented programming, and program verification. Concepts will involve a mix of theory and application and will be reinforced through multiple programming assignments.

Course Learning Outcomes

By enrolling in this course, students will:

1. Learn the structure of programming languages, their design and implementation, as well as different programming language paradigms
2. Learn the principles of programming language syntax through lexing and parsing
3. Learn the semantics of programs as well as the design and implementation of an interpreter
4. Learn to program in a functional programming language and understand the evaluation of functional programs
5. Understand the principles of type systems and how to implement a type checker
6. Understand techniques to semantically analyze program source code and logically reason about program properties

Required Course Materials

No textbooks are required. The instructor will instead use self-contained, freely accessible materials for the course.

Grading Policy

This course is graded on a letter grade basis subject to the following cutoff:

A - 90-100+%
B - 80-89%
C - 70-79%
D - 60-69%
F - <60%

The grading will be relative to the above set of standards and not on a competitive performance relative to classmates.

Attendance Policy

Students are expected to attend class and ask questions, all of which contribute to the participation portion of the grade. If students need to miss a class due to an excused reason (e.g., a family emergency) then students should contact the instructor as soon as possible to arrange any accommodations.

Academic and Research Honesty/Integrity Statement

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review the Student Code of Conduct and the Academic Honor Code, especially Appendix A: Graduate Addendum to the Academic Honor Code.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Students are not permitted to use LLMs on any programming assignment.

Core IMPACTS

Not applicable

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services as soon as possible to make an appointment to discuss your needs and to obtain an accommodations letter. Please also e-mail the instructor as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgment, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulates some basic expectations that you can have of me and that I have of you. Additional information for research-related work is given in The Expectations of Advisors and Advisees. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.