

CSc 335 Programming Language Paradigms
Spring Semester 2024
Professor Troeger

Catalog Description Aspects of the design and implementation of functional, imperative and object-oriented programming languages, presented via a sequence of interpreters. Topics may include abstraction, parameter passing, type checking, inheritance, and continuations. Substantial programming assignments.

Course Goals (i) introduce Scheme - a wide-spectrum language supporting functional programming; (ii) introduce basic ideas for proving correctness of functional programs; (iii) impart a working knowledge of some of the essential concepts of (mostly functional) programming languages, forming a basis for understanding future developments.

Required Texts: (i) Abelson and Sussman: The Structure and Interpretation of Computer Programs; (ii) Friedman and Felleisen: The Little Schemer. Depending on our progress, I may later ask you to obtain another text – Friedman and Felleisen: The Seasoned Schemer.

Required Software Please download and install DrRacket, as per instructions in the handout Getting Started in CSc 335.

Prerequisites (i) discrete mathematics and data structures; (ii) algorithms; (iii) experience constructing programs of some size. That is, CSc 104, 212, 220 and 221.

Major Topics Covered in the Course (i) introduction to Scheme, functional programming and program proving; (ii) interpreters as mechanisms for explaining the run-time behavior of languages. Roughly speaking, we will focus initially on developing programs in Scheme, and later in the course on interpreters.

Homework Programming problems and reading will be assigned regularly. Some homework problems will be discussed in class, with feedback on individual solutions available in office hours. As it is by design essentially impossible to even pass the quizzes or exams without having solved the homework problems on your own, you are strongly encouraged to take the homework assignments seriously. Give your mind a chance to wrap itself around this challenging material! Put in the time!

Grading There will be an in-lab **midterm** (25%), three half-period **quizzes** (15%), a (2-person) team **project** with defense (30%), and an in-person **final** (30%). The quizzes will be given in the classroom (paper and pencil), while exams will be held in the department labs (internet disconnected, but with full access to DrRacket). Homework will not be graded, but see above.

Exam and quiz problems build on understanding gained in lecture and in doing the homework, and typically will NOT be problems you will have seen previously.

Details on the project defense will be given later. In the past, these have been both oral and written.

Quizzes will be held 2/14 (Class 6), 3/7 (Class 12), and 4/18 (Class 24) at the start of class. Missed quizzes will be made up only with a doctor's note or equivalent excusing the absence.

The midterm exam will be held 3/21 (Class 16), in the Windows Lab (NAC 7/118). A missed midterm will be made up only with a doctor's note or equivalent excusing the absence.

The final exam will be scheduled by the College.

The project will be released 4/18, and due on 5/16, and is to be completed in teams of two.

Office Hours My hours this term will be both in person and on line.

In-person hours: Tuesday 1300 – 1515 in my office, NAC 7/116.

On-line hours: *some* Mondays, *some* Wednesdays, 2000 – 2100 (in the evening), via Zoom. These will be announced, but will usually occur just before quizzes or exams.

Additions, cancellations, shortenings, lengthenings and/or shifts may occur – I will post these in advance.

Office hours will be used to discuss homework solutions, and to answer student questions.

Course Communication Announcements and course materials will be disseminated via Microsoft Teams, which also serves very well as a discussion platform. I ask, however, that homework solutions – even if incomplete - not be posted to Teams: for one thing, the bandwidth is too low for useful discussions of homework problems; for another, it is better if students develop their own solutions from scratch, rather than working off a posted solution or partial solution. That being said, I strongly encourage the formation of two or three person study groups which meet up regularly to solve problems collaboratively .

Course Delivery We will use Zoom for on-line office hours. I will post a fresh link (via Teams) ahead of each meeting. Lectures meet in person, as scheduled by the College.

The penalty for cheating The penalty for cheating on either exam or the project is to fail the course; the penalty for cheating on a quiz is a score of 0 on that quiz.