CS 558: Software Foundations
Fall 2026

Matthew R. Lakin

March 23, 2026

1 Course information

1.1 Lectures

Lecture day/time: Tuesdays and Thursdays 3:30–4:45pm
Lecture location: Centennial Engineering Center room 1030

1.2 Instructor

Matthew Lakin
Email: `mlakin@unm.edu`
Office hours: T.B.A.
Office hours location: Farris Engineering Center room 3240

1.3 Course topics and format

This course studies the theory used to describe and define programming languages and to guide their implementation. Our approach is type-based, in the spirit of our textbook, Pierce's Types and Programming Languages (TAPL). As a prelude, the course offers a brief overview of functional programming techniques and of programming language features found in the purely functional programming language Haskell.

The course is intended for first-year graduate students, but advanced undergraduates are welcome as well. No specific courses are prerequisites, but programming experience and mathematical maturity are necessary. Experience with functional programming (at the level of UNM CS357) and discrete mathematics is strongly recommended.

The course will provide students with the background they need for CS550.

The course consists of lectures, exercises, two in-class mid-term examinations, and a final examination. Exercises will primarily consist of programming executable implementations of the theoretical concepts studied, to aid in the understanding of the concepts.

1.4 Course objectives

At the completion of this course students will be able to:

1. Construct computer programs in a functional programming language to solve various application problems.
2. Apply compiler algorithms to symbolic input data processing in various application domains.
3. Evaluate a static and a dynamic semantics of a programming language with respect to type soundness properties.
4. Design and program a definitional interpreter for a programming language.

1.5 Textbook

- Benjamin C. Pierce, Types and Programming Languages, MIT Press, 2002, ISBN-10: 0262162091.

1.6 Other useful books

- Graham Hutton, Programming in Haskell, 2nd Ed., Cambridge University Press, 2016, ISBN-13: 978-1316626221.

1.7 Grading

You are expected to attend class regularly, read any assigned reading before class, and participate in class discussion. Grades will be determined as follows:

- First midterm exam (late September [exact date TBD], in class, 75 minutes): 30% of total
- Second midterm exam (early November, [exact date TBD], in class 75 minutes): 30% of total
- Cumulative final exam (during the scheduled finals' week slot, 120 minutes): 40% of total

The purpose of exams is to test one's knowledge of the material at a specific moment in time. As such, unofficial requests for accommodations or delays will not be granted except in circumstances that make sitting the exam in person on the exam date impossible (e.g., prearranged conference travel or a serious medical problem). Requests for a delay for medical reasons must be accompanied by a valid medical note presented at the time of the initial request. In such cases, students will be required to sit a catchup exam as soon as possible after the main exam date. Questions on a catchup exam may differ from those on the original exam. All exams must be taken in person and cannot be taken remotely.

No requests regarding grading, such as grade mode changes, will be considered after the final class period. There will also be no extra credit assignments or "do-overs" for exams.

1.8 Communication

The Loboweb email list functionality will be used for administrative announcements. Lecture notes and exercises will be uploaded to the UNM Canvas page for the class.

2 Credit-hour statement

This is a three credit-hour course. Class meets for two 75-minute sessions of direct instruction for fifteen weeks during the Fall 2025 semester. Students are expected to complete a minimum of six hours of out-of-class work (or homework, study, assignment completion, and class preparation) each week.

3 Academic integrity statement

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

4 Accommodations (Fall 2025 wording)

UNM is committed to providing equitable access to learning opportunities for students with documented disabilities. As your instructor, it is my objective to facilitate an inclusive classroom setting, in which students have full access and opportunity to participate. To engage in a confidential conversation about the process for requesting reasonable accommodations for this class and/or program, please contact Accessibility Resource Center at arcsrvs@unm.edu or 505-277-3506.

5 UAP 2720 and 2740 (Fall 2025 wording)

Our classroom and university should foster mutual respect, kindness, and support. If you have concerns about discrimination, harassment, or violence, please seek support and report incidents. Find confidential services at LoboRESPECT Advocacy Center, the Women's Resource Center, and the LGBTQ Resource Center. UNM prohibits discrimination on the basis of sex (including gender, sex stereotyping, gender expression, and gender identity). All instructors are "responsible employees" who must communicate reports of sexual harassment, sexual misconduct and sexual violence to Compliance, Ethics and Equal Opportunity. For more information, please see UAP 2720 and UAP 2740.