













## CS450 Fall 2025



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## CS450 :: Fall 2025

 <b>Class Time:</b>	Tuesday/Thursday 11:00-12:15pm <a href="#">[Catalog]</a>
 <b>Class Location:</b>	0035 Campus Instructional Facility (CIF)
 <b>Class URL:</b>	<a href="https://go.illinois.edu/cs450">go.illinois.edu/cs450</a>
 <b>Instructor:</b>	<a href="#">Luke Olson</a>
 <b>About the course:</b>	<a href="#">#about</a>
 <b>Homework:</b>	<a href="#">#homework</a>
 <b>Final Exam Guide:</b>	<a href="#">final guide</a>
 <b>Exams:</b>	<a href="#">#exams</a>
 <b>Lectures:</b>	<a href="#">#lectures</a>
 <b>Policies:</b>	<a href="#">policies</a>
 <b>Illness and Attendance:</b>	<a href="#">#illness</a>
 <b>Mental health and Wellness:</b>	<a href="#">#health</a>

## About the Course

What is this course about? Our focus for the semester is on "Numerical Analysis", or the study of numerical algorithms for solving mathematical problems that arise in scientific problems. We will survey a range of numerical algorithms, constructing and analyzing their use in practice. Topics include linear system solvers, optimization methods, interpolation,

differentiation, and integration. Ordinary and partial differential equations will also be studied.

### Learning Goals for CS 450:

- **Analyze** the conditioning of common numerical problems such as solving a linear system, finding eigenvalues, numerical differentiation and integration, etc.
- **Calculate** numerical approximations to solutions to linear and nonlinear systems, eigenvalues/eigenvectors, optimization problems, integrals, derivatives, and solutions to differential equations.
- **Compare** the accuracy and cost of different numerical methods for solving a numerical problem.
- **Estimate** the accuracy and efficiency of numerical approximations.
- **Develop** code to solve numerical problems.
- **Design** numerical experiments to test various numerical methods.

### FAQ

- **Q -- What is the format of the lectures?**
  - It is best to arrive say 5 minutes beforehand -- the lectures will start promptly at 11. They will include a combination of demos, hands-on activities, and discussion.
- **Q -- Are lectures recorded?**
  - Yes! Lectures will be posted on MediaSpace. (Note: this is not **guaranteed**, but I fully expect to post each lecture. In some cases there are technical issues such as audio -- we will try to address this promptly for the next lecture.)
- **Q -- Where do we take exams?**
  - Exams will be proctored through the Computer Based Testing Facility (CBTF).

### Homework

- [Homework set 1](#) (Due Friday, Sept 5, 5:59pm central)
- [Homework set 2](#) (Due Friday, Sept 12, 5:59pm central)
  - [Homework set 2 4-credit extension](#) (Due Friday, Sept 12, 5:59pm central)
- [Homework set 3](#) (Due Friday, Sept 19, 5:59pm central)
- [Homework set 4](#) (Due Friday, Sept 26, 5:59pm central)

- [Homework set 4 4-credit extension](#) (Due Friday, Sept 26, 5:59pm central)
- [Homework set 5](#) (Due Friday, Oct 3, 5:59pm central)
- [Homework set 6](#) (Due Friday, Oct 10, 5:59pm central)
- [Homework set 7](#) (Due Friday, Oct 17, 5:59pm central)
  - [Homework set 7 4-credit extension](#) (Due Friday, Oct 17, 5:59pm central)
- [Homework set 8](#) (Due Friday, Oct 24, 5:59pm central)
- [Homework set 9](#) (Due Friday, Oct 31, 5:59pm central)
- [Homework set 10](#) (Due Friday, Nov 7, 5:59pm central)
  - [Homework set 10 4-credit extension](#) (Due Friday, Nov 7, 5:59pm central)
- [Homework set 11](#) (Due Friday, Nov 14, 5:59pm central)
- [Homework set 12](#) (Due Monday, Dec 1, 5:59pm central)
  - [Homework set 12 4-credit extension](#) (Due Monday, Dec 1, 5:59pm central)
- No homework due Friday, Nov 28
- [Homework set 13](#) (Due Wednesday, Dec 10, 5:59pm central)

## Exams

All times central, from 00:01 - 23:59 (meaning all day)

CBTF Urbana times are below.

ProctorU times are the same as below.

CBTF Chicago Times are shifted by one day: M-W -> Tu-Th

Exam	Exam Dates	Reservation Start Dates
Exam 1 (50 min)	M 2025-09-15 - W 2025-09-17	2025-09-04
Exam 1 (2nd Chance, 50 min)	M 2025-09-22 - W 2025-09-24	2025-09-11
Exam 2 (50 min)	M 2025-10-06 - W 2025-10-08	2025-09-25
Exam 2 (2nd Chance, 50 min)	M 2025-10-13 - W 2025-10-15	2025-10-02

Exam	Exam Dates	Reservation Start Dates
Exam 3 (50 min)	M 2025-10-27 - W 2025-10-29	2025-10-16
Exam 3 (2nd Chance, 50 min)	M 2025-11-03 - W 2025-11-05	2025-10-23
Exam 4 (50 min)	M 2025-11-17 - W 2025-11-19	2025-11-06
Exam 4 (2nd Chance, 50 min)	M 2025-12-01 - W 2025-12-03	2025-11-13
Final Exam (1 h 50 min)	M 2025-12-11 - W 2025-12-15	2025-10-17

**Exam 1:** Chapters 1 and 2

**Exam 2:** Chapters 3 and 4

**Exam 3:** Chapters 5 and 6

**Exam 4:** Chapters 7 and 8

**Final:** Chapters 9, 10, and 11, as well as 1-8.

## Team



**Luke Olson** (Instructor)

**Office Hours:** Monday 12-1pm [\[Zoom\]](#)



**Eli Gidron** (Teaching Assistant)

**Office:** Siebel Center Basement

**Office Hours:** Tuesday 3pm-4pm, Thursday 3pm-5pm [\[Zoom\]](#)



**Shawn Lin** (Teaching Assistant)

**Office:** Siebel Center Basement

**Office Hours:** Monday 1:30pm-3pm, Friday 9:00am-10:30am [\[Zoom\]](#)



**Jess Williams** (Teaching Assistant)

**Office:** Siebel Center Basement

**Office Hours:** Tuesday 9am-10:30am, Thursday 1:30pm-3pm [\[Zoom\]](#)

## Computing

We will be using [Python](#) with the libraries [numpy](#), [scipy](#) and [matplotlib](#) for in-class work and assignments. No other languages are permitted. Python has a very gentle learning curve, so you should feel at home even if you've never done any work in Python.

## Python Help

- [Python tutorial](#)
- [Facts and myths about Python names and values](#)
- [Learn Python the hard way](#)
- [Project Euler](#) (Lots of practice problems)
- [From Python to Numpy](#)

## Mental Health

Significant stress, mood changes, excessive worry, substance/alcohol misuse or interferences in eating or sleep can have an impact on academic performance, social development, and emotional wellbeing. The University of Illinois offers a variety of confidential services including individual and group counseling, crisis intervention, psychiatric services, and specialized screenings which are covered through the Health Service Fee. If you or someone you know experiences any of the above mental health concerns, it is strongly encouraged to contact or visit any of the

University's resources provided below. Getting help is a smart and courageous thing to do for yourself and for those who care about you.

- Counseling Center (217) 333-3704
- McKinley Health Center (217) 333-2700
- National Suicide Prevention Lifeline (800) 273-8255
- Rosecrance Crisis Line (217) 359-4141 (available 24/7, 365 days a year)
- If you are in immediate danger, call 911.

\*This statement is approved by the University of Illinois [Counseling Center](#).

## COVID, Illness, and Attendance

While face coverings are not required in classrooms (current as of 12/20/2023) we fully support your decision to wear one if you wish.

If you test positive for COVID, then you should not attend class.

**If you have any cold-like symptoms or do not feel well**, then you should not attend class, regardless of testing negative or positive for COVID.

In either case, your missed attendance due to illness will not impact your grade in the course.