

Math 498: Senior Research Seminar I

Fall 2023

Syllabus

Professor: Josh Laison

he/his/him, Ford 215, jlaison@willamette.edu

Student Hours:

Monday and Wednesday 9:30-10:30

Tuesday 10:30-11:30

Friday 2:00-3:00

You are very welcome to talk with me at other times. If I'm in my office or in a student hours Zoom meeting you can drop by without an appointment, or you can schedule an appointment via email. My available times are on my webpage <http://www.willamette.edu/~jlaison>

Class Meetings: Ford 202, Mondays 1:10-2:10 and group meetings once a week

Course Web Page: <http://www.willamette.edu/~jlaison/thesis1.html>

Graded Components of the Course

Preparation for group research meetings	30%
Literature review:	
– Presentations	10%
– Written report	10%
Math colloquium presentation	20%
Draft of research paper	20%
Peer feedback on presentations and editing of written work	10%
Total	100%

Course Goals:

In this course students will

- Gain skills in communicating mathematics, formally and informally, verbally and in writing.
- Gain skills in reading mathematics and understanding professional mathematical writing.
- Bring together mathematical content knowledge from multiple courses to use in understanding new ideas.
- Gain experience producing a professional-level mathematical document and presentation that may be presented to the larger research community.
- Take part in an active mathematical research community.
- Gain experience producing original mathematical research.

Course Content: In teams of two, you will conduct an independent research project. You will obtain new results, present them to the campus community in the mathematics colloquium, and write up your results in a professional-quality paper.

Literature review: Your team will find, work to understand, summarize, present and write about articles related to your research topic. In the first month of class, each student will give a short informal presentation about a part of an article you've worked on each week. After we've covered enough of the literature, you'll write a summary of these articles that will eventually become the background section of your research paper.

Group research meetings: Your team will meet with me once a week for an hour throughout the semester to discuss your research. During many of our meetings, we'll work on your research project. Some of the work of your group will be conducted with me during the meeting, but I'll also expect you to make progress outside of these meetings, and you will be assessed on this progress at each meeting. I will look for evidence of time spent working hard on your project, not necessarily goals achieved. Progress you make that you bring to the meeting should include at least one of the following:

- Passages of an article or text you have read, with explanations of the parts you have understood and questions about the parts you haven't
- New articles that might be relevant to your work you have found
- New questions or conjectures you have posed, with time spent trying to confirm or disprove your conjectures
- Examples that are evidence in support of your questions or conjectures
- Proof ideas or progress on a proof, including failed proof attempts
- New code written or old code updated
- Sections of your paper you have written, or editing and revisions of previous drafts.

Research paper: Your team will write a paper in the style of a journal article that includes the results you have found in your research. You should model your writing on research papers you have read this semester and in your previous mathematical career. We will spend several days of class revising and editing our work.

Collaboration: In this course, most of your work will be in collaboration with others. It is very important to your success in this course and the success of your research project that you support your collaborators by committing your time and energy to your project. It is unethical, and a violation of the Willamette University Honor Code, to put your name on work that you have not contributed to.

If all members of your research team are working hard and taking this commitment seriously, you should treat results obtained by your research group as belonging to the group – be generous with credit as well as effort.

Attendance at the Math Department Colloquium: According to math department policy, since you are enrolled in a 400-level mathematics course, you are required to attend at least 4 mathematics department colloquium talks.

Course Policies

Community: (Adapted from Federico Ardila) This course aims to offer a joyful, meaningful, and empowering experience to every participant. As a community of scholars, our work gets better when we're all invested in a common effort of learning and discovery. We will build that rich experience together by supporting each other. Please be prepared to take an active, critical, patient, and generous role in your own learning and that of your classmates.

Anti-racism: (Adapted from the Office of Equity, Diversity and Inclusion) I declare and affirm our commitment to anti-racist action in the coming semester and beyond. I stand in solidarity with those who have been calling for justice and working to end institutionalized racism and white supremacy across the country and at Willamette.

Systemic racism at Willamette University is not an issue that can be addressed superficially. It will take a deep commitment from all parts of our community to make the changes that are necessary, and that is what I offer here: a commitment to gather, build, and act on a clear anti-racist agenda together.

Land Acknowledgement: (Adapted from the Dean's Office) Willamette is built on the land of the Kalapuya, who today are represented by the Confederated Tribes of the Grand Ronde and the Confederated Tribes of the Siletz Indians. We offer gratitude for the land, for those who have stewarded it, and for the opportunity to work on it. We acknowledge that our University's history is fundamentally tied to the first colonial developments in the Willamette Valley.

Diversity and Accessible Education Statement: (Adapted from the Accessible Education Services Office) Willamette University and I value diversity and inclusion. We are committed to a climate of mutual respect and full participation. My goal is to create a learning environment that is usable, equitable, inclusive and welcoming for people of any gender identity or expression, race, color, national or ethnic origin, religion or religious belief, age, marital status, sexual orientation, or ability.

If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, please notify me as soon as possible. Students with disabilities are also encouraged to contact the Accessible Education Services office in Smullin 155 at <https://willamette.edu/offices/accessibility> or accessible-info@willamette.edu to discuss a range of options to removing barriers in the course, including accommodations.

Religious Accommodations: (Adapted from the Office of the Chaplain) Willamette University and I recognize the value of religious practice and strive to accommodate students' commitment to their religious traditions whenever possible. If you anticipate missing class for religious reasons, please contact me to discuss your needs.

Academic Integrity: (Adapted from the Dean's Office) As members of the Willamette University community, students are expected to display honesty, trust, fairness, respect, and responsibility in their academic work. Plagiarism and cheating involve intellectual dishonesty, deception, and fraud, which inhibit the honest exchange of ideas.