

Math 498 – Spring 2018 – Senior Research I

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What is this course? This is the first semester of a 2-semester course designed to let you work on a large project. You are expected to find an advisor in the department to work with on your research, pick a research project, begin your research, write a research proposal, and give a talk about your chosen topic. You will receive one course unit for your proposal. While we won't meet as often as a traditional class, you should expect to work at least as much as you would in such a class, and most of your work will be done independently.

What is math research? This differs widely by field. Pure mathematicians often experiment, conjecture, and then prove their guesses. Applied mathematicians often do statistical studies, optimize a system, or generate algorithms with fewer proofs. Some projects will require a large literature search or learning a lot of background material. Some projects will require computer programming. Whatever your project is, you will be working on your own and should do your own work.

Why is this course required? Most of the math curriculum studies mathematics that was created hundreds of years ago. But you cannot fully understand what mathematics is all about unless you take part in the process of creating some. It can be scary and frustrating doing new mathematics, but it can also be rewarding, and looks very good on your résumé.

How do I find an advisor and a research problem? You can make the rounds and talk to the math faculty to see what sort of expertise they have, what sorts of projects they are interested in, and whether they are interested in working on what you are interested in. You might find a problem on the internet, from one of your upper division courses, from a math meeting you attended, or from a department colloquium you went to.

How will this work? We will not be meeting as a class. You will schedule weekly meetings with your advisor. You should set weekly goals, and keep to them. As coordinator, I will meet with you about once a month as a group. During those meetings, I will ask for a brief update on the work you have done. You should report successes and issues regarding your research. I will also ask your advisors for updates regarding your progress. Our meetings will be in the Seminar Room on the Mondays indicated on the schedule on the next page. Failure to attend these meetings will be penalized 5% of final grade per meeting. This is a one unit (4 credit hours) course, so plan to spend at least 8 hours per week on your research outside of your meetings. Most students spend more.

Am I expected to have original results in the fall? Not necessarily. Some projects require more learning up front. But the more you get done this fall, the more you will have done by the end of Math 499. If you don't have results this fall, you have a heavier burden to demonstrate that you understand and can succeed with your project.

Am I expected to publish my results? There are undergraduate math journals that would publish good research projects. This is something to strive for, but it is not required.

How do I write my proposal? Templates are available in Word and LaTeX format. You should use this template for both your proposal this semester and research project next semester. You should write results as you get them rather than wait for the end of the semester. This way you can get feedback as you go, and won't be as busy at the end of the semester. You should be formal and precise in your paper. Versions of the paper that are submitted should be converted to "pdf" format so that they can be shared electronically.

What guidelines I should follow in giving credit? If you use someone else's idea, you should give that person credit. This could happen because you read a paper, attended a talk at a conference, found material on a web page, or talked with a faculty member. See the template for examples of citations. You can also give more general thanks to others on your acknowledgement page.

To whom do I present the proposal? Many of the department faculty will be there, and all the students in the department are invited. You should feel free to invite other visitors. You are required to attend all the proposal presentations of your fellow math majors.

What sort of presentation is expected? You should use PowerPoint (or other software). You should plan to talk for 20 minutes about your problem, what you did this semester, and what you plan to do next semester. Your presentation may be less formal and less complete than your paper, but you should still be precise. You should be prepared to answer questions and get constructive feedback on your proposal. You should practice your presentation before you give it – a talk gets better every time you give it.

What's the timeline for this course?

Select Advisor & General Topic	Midnight, Monday, January 22
Proposal Abstract (1–2 paragraphs) Due	Midnight, Monday, February 5
Proposal Summary (1–2 pages) Due	Midnight, Monday, February 19
Rough Draft of Final Paper Due	Midnight, Friday, April 13
Final Research Paper Due	Midnight, Friday, April 20
Research Presentation	Afternoon of Wednesday, April 25 or Friday, April 27

How am I graded? You will be graded on how well the faculty think you understand your problem, and how much progress you have made on it this semester. Things that will negatively impact your grade: not having significant mathematical content, not keeping to the deadlines above, missing meetings with your advisor, making little or no progress on a weekly basis, not making the indicated changes in your rough draft, writing a sloppy or incomplete paper, giving a poor presentation, or being unable to answer questions about your project. Your advisor and the coordinator will determine your midterm grade. Your final grade in Math 498 will be determined by vote of the entire math faculty.

Can you give me some percentages? Your grade will be determined 60% on your written paper, 30% on your presentation, and 10% on meeting regularly with your advisor and the coordinator. Failure to meet the above deadlines will be penalized 5% per day.

What if I'm afraid? Don't be. Every graduate from our program has lived through this, and the vast majority of them enjoyed the experience. Don't get discouraged if you don't get results right away. A year is a long time.

What about Accommodations? If you anticipate barriers related to the format or requirements of a course, you should meet with the course instructor to discuss ways to ensure full participation. If disability-related accommodations are necessary, you must register with Academic Success through the Accessibility Services Center (<http://www.stetson.edu/administration/academic-success/> , 209 East Bert Fish Drive, 386-822-7127) and notify the course instructor of your eligibility for reasonable accommodations. The student, course instructor, and Academic Success will plan how best to coordinate accommodations.

What About the Honor System? The Stetson University Honor System states:

Academic dishonesty invalidates this experience, in that it rejects the substance of the academy (that of learning and inquiry) and substitutes for it a superficial focus on externalities (e.g., passing the course, getting the diploma, etc.). Further, breaches of academic integrity rob both the individual and the institution and are antithetical to all that the university represents.