

Senior Experience in Mathematics: Independent Study

Overview: The Mathematics Senior Experience is your opportunity to spend one term studying mathematics *independently* under the supervision of a faculty member – it should be the high point of your mathematical career at Lawrence. While specific goals and structures vary, all Senior Experiences consist of independent work tailored to the interests and ambitions of the student. Here are some possible formats, with examples of recent topics:

- learn a new subject or continue work in an area where previous coursework has piqued your interest:
 - *Lebesgue Measure and Integration*
 - *Differential Geometry*
 - *Multivariate Statistical Analysis*
- employ mathematical techniques to solve an applied problem:
 - *Applied Optimization and Statistics*
- work on a research project in pure mathematics:
 - *Discrete Dynamics*

Throughout your term-long independent study, you will meet regularly with your faculty supervisor. Depending on the professor and your topic, you may make informal presentations or give formal lectures, and you may produce a variety of written work, ranging from problem sets to lengthy expositions of advanced material. No matter the format, you will be expected to express mathematics clearly and cogently.

Preparation: *You* must take responsibility for the development of your Senior Experience. The faculty is here to help you with the challenges of planning a course of study or defining the scope of a project, but a successful outcome depends on you. Below is a list of preparatory steps, together with a suggested timeline:

1. (*Winter Term of Junior Year*) Begin to think about topics: which courses have been your favorites? Were there topics mentioned in those courses that seemed fascinating but weren't pursued? Are there subjects you haven't studied but that you feel mysteriously attracted to? You will probably want to spend some time browsing in the library at this point.
2. (*Beginning of Spring Term of Junior Year*) Once you have some candidate topics, go talk to some faculty members and share your ideas. They will help you focus your enthusiasm, and will probably send you back to the library.
3. (*End of Spring Term of Junior Year*) At this point you may have several ideas, and you may have talked to several faculty members – it is time to commit. Ask a faculty member to supervise your independent study, and come to an agreement about which term it will take place. The professor may ask you to write a brief proposal describing your goals and outlining your plans to achieve them.
4. (*Summer before Senior Year*) Talk to your supervisor about possibilities for summer reading and preparation.

Interdisciplinary Majors: If you are a Mathematics-Economics or Mathematics-Computer Science major, the process of planning and completing a Senior Experience may differ substantially from that described in this document.

- Mathematics-Computer Science majors should consult with Professor Gregg or Professor Krebsbach. Your Senior Experience will consist of an independent research project during Fall or Winter Term together with participation in the Senior Seminar during Winter Term.
- Mathematics-Economics majors typically choose between completing i) an independent study as described above and ii) the workshop model of the Economics Department's Senior Experience. In either case, your Senior Experience must be approved by a member of each department and supervised by a member of one department. Consult with both of your academic advisors in the Mathematics and Economics Departments for details.