

Biology Department Guidelines for Senior Theses

Some pointers for students and mentors

What is a Senior Thesis Project?

Senior theses in biology typically involve a written report based upon original empirical research carried out by the student. Most students begin their thesis research during the summer prior to the senior year (if not earlier) and continue into the fall semester, completing the writing in time for an April defense. Thesis projects are expected to be original investigations of a novel problem that have the potential to lead to publishable results. Because the projects are relatively brief in duration, it is always possible that even a well thought-out project might not yield results suitable for publication. Nevertheless, even projects that do not produce the anticipated results can lead to fine theses.

Examples of senior theses in biology can be found on the College's publications website: <http://publications.lakeforest.edu/>

How much time does it take to do a thesis?

The amount of time necessary to complete a thesis varies in different areas of biology. At a minimum, most students spend at least 10 weeks of full-time data collection during the summer, and often additional time collecting data during the senior (and sometimes junior) academic year. Students register for one credit of senior thesis research during each of the fall and spring semesters of the senior year. This implies a time commitment of at least 10 hours per week in addition to the three other courses per semester throughout the academic year. The total time commitment required to complete the thesis project should be discussed between the student and mentor.

How many experiments are necessary for a thesis project?

Research progresses in different ways in different areas of biology. In some cases, a thesis might be based upon a single main result, whereas in other cases, several experiments may contribute to the conclusions of the thesis. Students and mentors should plan the scope of the data collection carefully to ensure that enough time is allowed for writing the thesis. In most cases, this means that students will need to finish their research no later than early in the spring semester, if not the fall semester, and to devote the remaining weeks to analyzing data, writing and preparing tables and figures for the thesis.

How many pages long does a thesis have to be?

There is no set answer. A thesis may incorporate a single major result, or several related results, reported in writing in the format of a published primary literature paper, usually with the addition of a more extended literature review on the main topic of the project. This could comprise as few as 30 or as many as 80 or more pages of text, references,

figures, and tables. Keep in mind that this is a major undertaking! In other words, it will be essential for you to start early and practice good time management (writing a thesis will take significantly more time than most students anticipate).

What is a thesis advisor and how do I obtain one?

A senior thesis requires one Lake Forest College Biology department faculty member to serve as the thesis advisor. The advisor's primary role is to mentor the student in conducting the research, analyzing the results, and producing the written thesis. Although faculty members are not obligated to serve as thesis advisors, many are willing to take on the role of advisor when they are confident in the student's ability to successfully complete the project. Potential advisors will assess their confidence in a thesis project by considering the student's academic record, previous research experience, and strength of the research plan, as well as by student progress at a variety of deadlines (i.e., end of junior summer; end of senior fall). Faculty workload also will play a critical role in the decision of whether or not to advise a thesis.

Most thesis projects originate from research conducted on campus with a Lake Forest College faculty member. In these instances, the research mentor is the obvious choice for the thesis advisor. In the spring of the junior year, the student should meet with the potential thesis advisor to discuss the process and determine whether a senior thesis is the appropriate course of action.

Some thesis projects might originate from research conducted off campus (such as, RFUMS, Chicago Botanic Garden, or the Field Museum). In these cases, the off-campus research mentor cannot serve as the senior thesis advisor. Instead, a Lake Forest College faculty member must serve as the thesis advisor. Securing an on-campus thesis advisor for an off-campus thesis project can prove to be a bit more difficult because not all faculty members are able to advise an off-campus thesis since they must allocate their limited resources to conducting research and mentoring students in their own research labs. Historically, off-campus theses have been less successful than on-campus theses, especially when the student's off-campus research is limited only to the summer prior to senior year.

If a Lake Forest College faculty member agrees to serve as the advisor for an off-campus thesis, then the student, off-campus mentor, and on-campus advisor must all meet to discuss the process and subsequent research plan by mid-summer. In addition to mentoring research, the off-campus supervisor should be prepared to provide as much input as possible in the analysis of the results and writing of the thesis (subject to college deadlines), as well as serving on the thesis committee and attending the defense.

In the spring of the junior year, the Chair of the Biology Department will contact all the rising seniors to assess their interest in pursuing a thesis and to gather information about potential thesis advisors. Students interested in doing a senior thesis should always take the first step in contacting their potential thesis advisors. In particular years when there are a large number of senior theses in the department, The Chair of the Department may

help assign the Biology faculty who serve on thesis committees to maintain faculty work equity.

What is the composition of the thesis committee and what is its role?

The thesis committee consists of the thesis advisor plus two other faculty members. In the junior spring semester, the Chair of the Biology Department will help to create a draft of a thesis committee in consultation with the student and thesis advisor. The committee should be finalized near the start of the senior fall semester.

The committee includes the thesis advisor, a second member from within the Department, and at least one faculty member from outside the department. When there is an off-campus research mentor, the mentor will serve as an additional fourth member of the thesis committee.

It is the responsibility of the student (and the on-campus thesis advisor) to make sure that all deadlines are met. Other members of the thesis committee normally provide at least one set of comments on the thesis itself and further discussion at the defense. If committee members are willing, they can also provide comments and suggestions on earlier drafts of the thesis. A complete draft of the thesis should be distributed to all committee members at least one week before the thesis defense.

How do I ensure that my thesis is on track? What happens if I have not made enough progress?

Our top priority is to ensure that you are on a path to graduate on time. A successful senior thesis will fulfill the senior studies requirement for the biology major, as will successful completion of a senior seminar, or two semesters of a senior research project.

To ensure that thesis students are on track to graduate, the Chair of the Biology Department will check in with the students and their thesis advisor at two distinct points: after the summer research session (in mid- to late-August) and after the fall research session (in late-November to early-December). At these check points, the thesis advisors will assess their confidence in the thesis project and determine, in consultation with the student, research mentor, and Department chair, whether or not the project should move forward. In the absence of sufficient progress, the thesis committee will recommend that the thesis be discontinued. Depending on the level of progress made by that point, it may be sufficient for the student to satisfy the Senior Studies requirement for biology, or the student will be required to sign up for a senior seminar in spring to fulfill the senior studies requirement.

When does the thesis have to be finished?

The Biology Department has established a deadline of **April 1** for students to turn in completed drafts of their theses to their thesis advisors. However, some advisors will expect a completed draft before this time, or a series of drafts of sections of the thesis (see

below). The official College deadline for final versions of the thesis to be turned in to the dean's office is generally the second to last Friday before the last day of classes in the spring semester. The defense and any resulting corrections to the thesis must be completed before this due date. Thus, defenses are usually scheduled during the middle two weeks of April. In addition, the dean's office requires that a draft of the thesis be turned in for a "form check" early in April. All students registered for a thesis will receive an information sheet ("Preparation of the Senior Thesis") from the dean of faculty's office, with all the official deadlines and requirements for copies, paper type, and format.

Students are also expected to make substantial progress on writing their theses during the senior fall semester and to complete their data collection in reasonable time to allow for writing to be completed in a timely manner. In particular, students should aim to complete as many sections of the thesis as they can during the fall semester, especially the literature review and introduction, and materials and methods, with as much progress on results and discussion and production of graphs and figures as possible. Thus, during the fall semester, students who are still obtaining data will also need to spend substantial time on the writing process.

What happens at the defense?

The exact format of the defense may vary depending on the thesis advisor's expectations and the student's wishes. However, students can expect to do an oral presentation of their thesis work. This public presentation will be followed by a period of questions from the audience about the presentation. At the end of the question period, the audience will be asked to leave the room and the thesis committee will meet in private with the student, continuing the question period. Questions from the committee members will be on topics ranging from general knowledge to specific aspects of the thesis work.

Once the committee members finish their questioning, the student is sent out of the room, and then the committee discusses the defense and comes to agreement on two points: whether the work meets expectations as a thesis, and if so, whether the thesis should earn distinction (see below for a definition of distinction). In cases of a truly exceptional thesis, the committee has the option to nominate it for the *Phi Beta Kappa* award for best senior thesis.

The student is then invited back and given the results of the committee's discussion. In addition, committee members generally provide their marked-up copies of the thesis to the student with recommendations or requirements for revision, and indicate whether they want to see the revised version before it is submitted to the Dean. Finally, the chair of the committee informs the dean's office of the outcome of the defense and later assigns a grade to the project.

More details:

What are the criteria for awarding distinction to a senior thesis?

According to the student handbook, "If a student's senior thesis is judged by an examining committee to be an outstanding and original piece of research, Distinction in Senior Thesis is awarded." In practice, there are no set guidelines for awarding distinction, except to realize that "outstanding" implies that only a small fraction of theses are likely to receive distinction. In the discipline of biology, the quality of a thesis is based upon the conduct of the research, as well as the written thesis, and its successful defense with the committee.

Honors in the major

Honors in the major will be awarded to students who complete a senior thesis (with or without distinction) and also attain a GPA of 3.5 or higher. (This is in contrast to general College honors, which is based on GPA only.)

A Split Thesis option with Neuroscience

For the right type of project, completion of the two-credit senior research can satisfy senior studies requirement for both BIOL and NEUR majors, if you sign up for one research project credit as BIOL 493 and the other credit as NEUR 493. If at the end of fall semester, the decision is to discontinue the senior research project, then you *must complete senior seminars in NEUR and may need to do the same in Biology (unless if fall progress in your project was enough to allow the completion of Senior Studies requirement in Biology)* to complete both majors, which, it should be noted, may be difficult to schedule and complete. Your thesis committee composition would need to meet the requirements for both majors.

What if I am a double major in another area? Will a BIOL senior thesis satisfy the senior studies requirements in both majors?

Generally, not. You must complete a senior studies requirement for each major. Your 2-credit senior thesis in biology will only count for senior studies requirement in the biology major, with the exception of projects that may be suitable for a split with neuroscience.

On rare occasion, however if you think that your proposed thesis project truly spans both your majors and you want to propose a split 2-credit thesis project, it would require the approval of the Chairs of both departments and your thesis advisor. Your thesis committee composition would need to meet the requirements for both majors.

Can I do a one-credit senior thesis and count it for a senior studies requirement?

No. The only exception to this rule is the split-2-credit thesis with neuroscience for those double majoring in biology and neuroscience explained above.