

Senior Project Guidelines

Preamble. The Chemistry Senior Project is a two-semester independent research project conducted in collaboration with a research advisor. The project is completed as a two-course sequence: CHEM 600 (2 credits, usually taken in the fall semester) and CHEM 610 (4 credits, usually taken in the spring semester).¹ It is best to think of the Chemistry Senior Project as a single undertaking spanning an entire academic year. It is NOT constructing a proposal in the first semester, followed by executing the project in the next; nor is it all library work in the first semester, followed by lab work in the next. The expectation is that substantial results will be generated in the first semester, the momentum of which propels the project into the next semester.

Project scope. The goals and boundaries of the project are established in frequent consultation with your research advisor. This is not a “one and done” exercise—it is not a decision made in the first week of the first semester, never to be revisited. Rather, real-time research findings continually inform considerations of which pathways are most interesting and/or promising. The responsibility for setting, modifying, and achieving these goals lies with the student. You should not expect to receive a complete set of marching orders from your advisor, but instead you should work with your advisor as a resource in setting goals.

Library research. The early weeks of a project are certainly associated with intense library research, but consulting the literature spans the entire project. Making sense of your results is facilitated by knowing how others have interpreted similar outcomes. You will likely encounter unexpected barriers, and the literature is the first stop in developing workarounds. This means you will need to cultivate a constant conversation with the primary literature. Finding appropriate sources is your responsibility. Your research advisor can help point you in a good direction, but do not expect your advisor to simply provide you with all the literature references relevant to your project.

Laboratory research. Clocking productive time in the lab is essential for a successful project. For CHEM 600, the departmental expectation is a *minimum* of eight hours on task per week devoted to the Senior Project, most of which is spent in the lab. For CHEM 610, this expectation rises to a minimum of 16 hours per week. Lab times are established in consultation with the research advisor in such a way that a) maximizes the availability of the advisor during the student’s active lab times, and b) minimizes equipment conflicts with fellow researchers. Lab times should be comprised of large, unbroken blocks (ca. three hours). Lab times are agreed upon at the beginning of the semester, and students are expected to be active in the lab during those times. On the rare occasion that you are unable to be in lab during the scheduled time, you should make this known to your research advisor in advance.

Communication. Each semester has a time for formal communication of results (outlined below), but your project’s success also depends upon maintaining robust lines of communication with your research advisor. Share the progress (and challenges) of your research frequently, and always be prepared to talk about your findings. Bring your lab journal and all relevant data to group meetings, and make sure you are familiar with your experimental data at all times. Above all, do not wait passively for your advisor to initiate discussions about your research—instead, take the initiative to touch base frequently.

Written report. A formal report is submitted each semester: an Interim Report for CHEM 600 and a Final Thesis for CHEM 610. Both reports contain the following sections:

- Abstract
- Introduction and Background
- Experimental Section (or Materials and Methods)
- Results and Discussion (these may be separate sections)
- References
- Supporting Information (e.g., spectroscopic data, more detailed experimental data, etc.)

¹ These guidelines also apply to Biochemistry majors completing a Senior Project with a research advisor in the Chemistry Department, the only difference being the designation of the courses (BCHEM 600/610).

In matters of formatting (and identity & order of sections), the report should follow that of a full article in the flagship journal of the discipline (i.e., the *Journal of Organic Chemistry* for projects in organic synthesis—if in doubt, please ask your research advisor). The two reports differ in the following way. Just before the References section, the Interim Report (CHEM 600) ends with a Future Directions section, which contains a detailed plan for the work to be done the following semester, whereas the Final Thesis (CHEM 610) ends with a Conclusion section (which may still offer perspectives on interesting future work, if appropriate).

Since a project constantly evolves, the Final Thesis may be substantially different from the Interim Report. At the very least, the Final Thesis should treat the project as a cohesive whole, not just the work done in the second semester. It should NOT be just a reiteration of the Interim Report with a few additional results.

Submission and due date. Reports are submitted electronically (as a single PDF file) to the appropriate module on the Senior Project Canvas site. The Interim Report (CHEM 600) is due by 4:00 PM on the Friday before Thanksgiving Week. The Final Thesis (CHEM 610) is due by 4:00 PM on the Friday three weeks before finals begin. It is your responsibility to verify that the file has uploaded properly.

Not submitting a report on time will result in a failing grade for the Senior Project for that semester.

Oral presentation. Each semester concludes with an oral presentation, which is scheduled during the last two full weeks of classes. The presentation is given to the Senior Project committee, and it launches from the assumption that the committee has read the written report beforehand. Questions may be asked both during and after the presentation, and students should be prepared to respond to specific questions about the project, as well as general questions about fundamental chemical principles. Presentations are usually closed, although a limited number of guests may attend with prior approval by the entire committee.

Times for oral presentations may be changed only under extenuating circumstances. Any change of time must be approved by the entire committee. It is then the student's responsibility to coordinate the new meeting time and to reserve the room.

Grading. The Senior Project grade is dependent upon three broad categories (investment, expertise, and communication), and a [rubric](#) has been established for the purpose of evaluating student performance according to these categories. The “developing” threshold must be achieved in all categories for a passing grade. Midway through the semester, the research advisor meets with the student to provide an informal evaluation of the student's progress in the context of the rubric.

At the end of the semester, immediately after the oral presentation, the committee confers in private to discuss student performance in the context of the rubric and to determine a tentative grade. The research advisor then meets with the student, using the rubric to summarize the committee discussion, and communicates whether a passing grade was achieved (but not a specific grade). Tentative grades are reviewed by the entire department after all oral presentations have been completed—only at this time are final grades determined, and they are communicated to the student through the normal means of the end-of-semester grade report. The release of the Senior Project grade for CHEM 610 is contingent upon uploading the Final Thesis to [DSpace](#). Neither written reports nor oral presentations may be repeated for regrading.

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