

Policies for Undergraduate Research and Thesis

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The Senior Thesis is an important part of a student's scientific training in the School of Geology and Geological Engineering. It sums and implements the knowledge gained in various classes and shared experiences to date in a student's life. Senior thesis also introduces the student to a real-life scientific problem. Senior Thesis preparation follows the typical lifespan of a research project and consists of three separate segments: 1) development of the research proposal, 2) execution of the research plan, with field and/or laboratory analyses, and 3) communication of results.

Students will progress through the sequence of classes numbered: Geol 487 Research I, Geol 488 Research II, and Geol 494 Senior Thesis. Some of these classes may be taken concurrently depending on the type of research that is proposed. Therefore the full series typically requires two to three semesters to complete. We recommend, however, that a student should begin thinking early about their interests in a research project. Note, also Geol 356 (Geoscience Lectures), Geol 421 (Seminar I), and Geol 422 (Seminar II) should run concurrently with the research program.

It is recommended that the student start planning his/her research on year two and sign up for Geol 487 Research I in his/her third year of studies. The first task for the student is to consider a research problem. This should go hand-in-hand with contacting potential advisors (mentors) and discussing ideas and approaches. The Senior Thesis advisor is usually a faculty member from within the Department of Geology and Geological Engineering. Contact potential advisors early and often to discuss your ideas for a good project.

Geol 487. Research I

1 credit. Prerequisite: Senior standing in departmental major. Identification and proposal of research project. Includes literature review, feasibility review, and formal project identification and written proposal. Selection of faculty research advisor within first month of semester. F,S

A tentative research adviser must be selected before a class entry code is granted. No later than six weeks into the semester have your research topic worked out with your official research advisor. Turn in a one page typewritten description of the project at that time.

Be sure to visit regularly with your advisor. Typically, meet once-a-week or twice-a-month to review that your progress is adequate.

The feasibility review describes what methods you plan to use and provides some assurance that the methods you choose will actually work.

Turn in a completed draft of your research proposal no later than two weeks before the last day of classes. This should be about 5-10 typewritten double-spaced pages, font Arial 10 points or comparable, 1- inch margins on all sides. Figures, maps, tables, etc. do not count towards the number of pages. The research proposal should have the following parts:

- Title - brief and to the point
- Introduction - What is the problem you will address or question you plan to answer?
 - Why is it important? Why should others care?
 - What is your multiple-working hypothesis (see [Chamberlin, 1890](#))
- Previous Research - What is the state of knowledge on this problem, both indirect and direct?
 - Describe the work that others have carried out that bears directly on the problem you plan to address.
 - Briefly summarize the gap in knowledge that you will explore.
- Methods - Provide an overview of the methods you plan to employ, and then go into each step in detail.
 - Provide a time line - when will each part of the work you plan be completed?
 - Are there contingency plans? What will happen if the methods do not work as well as you hoped)?
 - How much will it cost and how will it be funded?
- Anticipated Results - What are the probable results based on current understanding of the system?
 - How will the results be presented (text, figures, tables, appendices, etc.)?
- List of References - Make sure that all references cited in the text are included and none others.
 - Pay strict attention to citation style.
 - Use citation style of any high quality scientific journal such as [Geology](#), [Journal of Hydrology](#), [Quaternary Research](#), [Journal of Geophysical Research](#), etc., but be consistent.

Typically, your draft will be read by your advisor and returned to you for improvement one or more times. The final draft, with all comments and problems satisfactorily addressed, must be turned in to your advisor no later than the last day of classes.

An **Oral Presentation** of your proposal will be required as part of Seminar I (Geol. 421). Please provide your advisor with the scheduled date and time as early as possible, but no later than one week before the presentation. Plan on one or more practice sessions with your advisor.

Grading:

- **Fail:** No apparent logic or coherence in research plan, and/or the scope of research either too small or too large, and/or impossible to obtain the planned results, and/or missing literature review, and/or wrong formatting, and/or missing sections, and/or failure to improve the indicated shortcomings in writing or logic.
- **Satisfactory:** Otherwise excellent proposal but some gaps in logic, and/or incoherent style of research plan, and/or some sections missing critical information, and/or many factual errors or missing references, and/or some inconsistencies in formatting.
- **Excellent:** Clear scientific logic, plausible research plan of correct scope, coherent easy to follow writing style, all sections fully documented, and perfect formatting and references.

Geol 488. Research II

2 credits. Prerequisite: Geol 487. Execution of research plan developed in Geol 487.

Be sure to begin early! If you are enrolled in Geo 488, plan to turn in a written report of your results no later than two weeks before the last day of classes. This report will be the basis for the methods and results section of your thesis (see below).

Grading:

- **Fail:** No original research done, and/or substantial omissions or deviations from the research plan, and/or missing documentation of the results and analysis.
- **Satisfactory:** Otherwise excellent adherence to the research plan but with significant gaps, and/or failure to reach or fully document the results, and/or failure to adapt the plan in light of new findings.
- **Excellent:** Close adherence to the research plan, flexibility in adapting the project to emerging challenges, and conclusions reached and fully documented.

Geol 494. Senior Thesis

1 credit. Prerequisite or co-requisite: Geol 488. Written results of research conducted in Geol 489.

The thesis document should conform to the format guidelines of a major English-language journal in which the thesis could be published. A copy is to be provided in the F.D.Holland, Jr. Geology Library. F,S

No later than four weeks before the last day of classes, turn in a completed draft of your senior thesis. Note that much of it can be adapted from your proposal. The final paper should be 8-15 typewritten, double-spaced pages, font Arial 10 points or comparable, 1 inch margins on all sides. All figures, maps, tables, etc. are excluded from the page requirement. Here is an outline of the essential parts:

- Title - brief and to the point
- Abstract - A 250 word or less summary of your thesis. It should include a sentence or two on each part that follows.
- Introduction - What is the problem you will address or question you plan to answer?
 - Why is it important?
 - Why should others care?
 - What is your multiple-working hypothesis (see [Chamberlain, 1890](#))?
- Previous Research - What is our current understanding of the problem being addressed?
 - Describe the work that others have carried out that relates to the problem you addressed. Briefly summarize the gap in knowledge that you explored.
- Methods - Provide an overview of the methods you used and then go into each step in detail.
 - Provide sufficient detail to allow someone else to replicate your work.
- Results - What answers did you find?
 - How did the results address the question or hypothesis you presented? Present the results clearly and concisely using text, figures, tables, and appendices.
- Discussion - How do your results relate to the work that others have done?
 - Explain the answer to the question you posed.

- Conclusions - Summarize your findings.
- List of References - Make sure that all references cited in the text are included and none others.
 - Pay strict attention to citation style;
 - Use citation style of any high quality scientific journal such as *Geology*, *Journal of Hydrology*, *Quaternary Research*, *Journal of Geophysical Research*, etc., but be consistent.

Typically, your draft will be read by your advisor and returned to you for improvement one or more times. The final draft, with all comments and problems satisfactorily addressed, must be turned in no later than the last day of classes. The final accepted copy of your Senior Thesis is to be provided in PDF format to the department computer administrator for posting on the department web page.

An **Oral Presentation** will also be required as part of Seminar II (Geol. 422). Please provide your Senior Thesis advisor with the scheduled date and time as early as possible, but no later than one week before the presentation. Plan on one or more practice sessions with your Senior Thesis advisor.

Grading:

- **Fail:** No apparent logic or coherence in thesis, and/or the scope of the thesis is either too small or too large, and/or missing results, and/or missing literature review, and/or wrong formatting, and/or missing sections, and/or failure to improve the indicated substantial shortcomings in writing or logic.
- **Satisfactory:** Otherwise excellent thesis but some gaps in logic, and/or incoherent style of the thesis, and/or some sections missing critical information, and/or many factual errors or missing references, and/or some inconsistencies in formatting.
- **Excellent:** Clear scientific logic, well executed and documented research project of correct scope, coherent easy to follow writing style, all sections fully documented, and perfect formatting and references.