



# **Princeton University**

## **Department of Geosciences and Geological Engineering Program**



### **Senior Thesis Guide Academic Year 2007-2008**

**THIS IS AN IMPORTANT INFORMATIONAL DOCUMENT**

**KEEP IT HANDY!**

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## INTRODUCTION

This guide is intended to inform students of what to expect when writing a senior thesis. The thesis is a full year effort and you should budget your time accordingly. To this end, we have introduced a timetable for handing in a Fall semester progress report and rough draft. The goals are to facilitate advisor/student feedback, help minimize the unavoidable thesis rush at the end of the year, and most importantly ensure that the final product be of the highest quality. The interim reports have been designed in the hope that we can achieve these goals without an undue increase in the overall writing burden on the student.

## TIMETABLE

**Mon., Oct. 8, 2007** (3+ weeks after classes begin) - Thesis Proposal form due.

**Mon., Dec. 3, 2007** (2 weeks before classes end) - Fall term progress report due.

**Mon., April 7, 2008** (four weeks before thesis due date) - Rough draft due to the advisor only for comments not graded.

**Mon., April 28, 2008** (one week before senior thesis due date) - Thesis due.

**Mon-Fri., May 5-13, 2008** - Senior Thesis Oral Presentations - (3 consecutive days will be chosen depending on Jr/Sr Class Schedule).

**ALL GEOSCIENCES AND GEOLOGICAL ENGINEERING STUDENTS ARE REQUIRED TO PRESENT THEIR SENIOR THESIS (15 MINUTE PRESENTATION AND 5 MINUTE QUESTION/ANSWER).**

## LOGISTICS

Hand in all assignments to Sheryl Rickwell in Room 110 Guyot by 5:00 pm of the due date. **Consider your advisor's mailbox to be as reliable as an un-backed-up computer file.**

Four copies of the final senior thesis must be handed into the **Geosciences Department office on April 28 to be logged in.** One "original" should be bound in leather to be turned in to the Geosciences Library. The second "original" should be unbound (this copy is given to Mudd Library for black and white microfilming). For these two copies, the photos must be originals along with drawings, etc. Paper size is 8 ½" x 11". Text should be double spaced with a margin of 1.25" left (for binding) and 1" right. Make sure you have: a Table of Contents, Abstract, Acknowledgements, References and all with page numbers and the honor code stating this is your work with your signature. The third and fourth copies are for your Faculty Advisors. See the Geosciences Librarian if you have some questions, she can let you review past Senior Theses for examples.

## GRADING GUIDELINES & POLICIES

Thesis Proposal Form:	3% of grade
Fall Term Progress Report:	10%
Rough Draft	10%
Thesis:	50%
Oral Presentation:	27%

Details concerning the various reports are given in the following sections. However, you should discuss with your faculty advisor exactly what is expected for each deadline. Every attempt will be made to return the graded Fall progress report and rough draft within 1 week of their receipt.

Note that the final grade is assigned at a meeting of the full faculty in late May. At this time some renormalization is done to ensure uniform and equitable grading. The percentages quoted above are to be interpreted as general guidelines.

Occasionally it may be necessary to change a thesis topic or even advisor after the proposal form is handed in (as a result of an expected dataset not materializing, an unexpected one arising, etc.). Under such circumstances, and with the agreement of all concerned, it is possible to change without penalty; grades for work already submitted will be simply carried over. One of the goals of the Fall progress report is to force the student to face potential difficulties early, rather than discovering in February that something is not going to work out.

### **Departmental policy on late submissions:**

1. Late theses will be penalized at the rate of 1/5 of a letter grade (2%) per weekday; all interim assignments at the rate of one letter grade (10%) per weekday.
2. Extensions are given only by the Departmental Undergraduate Representative with the agreement of the principal advisor, and only under exceptional circumstances (typically serious illness or family emergencies). Lost computer files, printer problems, experiments not going exactly according to plan, etc. do not qualify; such pitfalls come with the territory and you should budget your time accordingly.
3. Beyond the date set by the Dean of the College for submission of senior theses (May 5, 2008), the University requires that the student must request and receive an incomplete from the Dean or receive an F.

## GENERAL CONSIDERATIONS

One of the most important components of a successful senior thesis is choosing an appropriate topic. This means, among other things, that the topic is intellectually challenging, that the student is able to perform original research or (less frequently) compose an original synthesis and critical evaluation of existing work, and that the topic is sufficiently well defined that the work can be accomplished on a one-year time scale. The Department publishes a “Shopping Guide” that is distributed in the Fall and Spring semesters. In it you will find topics that various faculty have listed as being appropriate subjects for a senior thesis. Treat this as a guide and not an exhaustive list. Feel free to discuss ideas of your own with various faculty members or tell them your interests and ask for additional suggestions.

Once an advisor is chosen, you should meet with him/her on a regular basis throughout the year to apprise him/her of your progress, discuss research strategies, ask questions, and get feedback. Because your primary advisor is responsible for grading the interim report and rough draft, you should also make sure you understand what is expected here. **YOUR THESIS WILL HAVE A SECOND READER WHO SHOULD BE CONSIDERED AS A SECOND ADVISOR.** He/She may choose to give you feedback on your interim reports in addition to grading the final thesis. Do not overlook your second advisor as a source of helpful advice. **IF YOUR PRIMARY ADVISOR IS OUTSIDE THE DEPARTMENT** your second advisor must be a faculty member in the department, and both advisors will be responsible for grading the interim report. In consultation with your primary advisor you can select the second advisor. Or your primary advisor or the Department Undergraduate Representative will select the second advisor.

One of the most common pitfalls encountered by seniors is underestimating the time required to complete certain tasks, in particular the actual writing of the thesis. Conceptually, it may be useful to think of the thesis as consisting of three separate tasks:

- Defining the problem and reviewing the literature
- Collecting and analyzing the data
- Writing (including data synthesis and interpretation)

If your research is initially well defined (usually with the help of your advisor) the first task might be reduced considerably, but otherwise you can expect each of these to comprise a significant fraction of the total effort. The three tasks will naturally overlap in time; for example, the results of initial experiments might redefine the problem somewhat and require additional literature review, and it is very useful to begin writing long before the research is completed because the process of writing often exposes weaknesses in reasoning and may lead to new ideas to explore further.

## FUNDING

Limited funds are provided by the Dean of the College's office for acquisition of data, travel needs, or other special requirements of a student's thesis. Keep an eye out for an announcement of the deadline; this is usually in mid-October and Sheryl Rickwell will place a notice in your mailboxes when it is announced. You will be asked for a proposal consisting of a 1-2 page description of the thesis and a detailed budget. Your advisor must also write a letter of support, which is then passed onto the Departmental Representative. Awards are typically around \$500, which may be less than what you require. It is the Department's practice to make up the difference between what the Dean's office provides and what the student reasonably requires, through either the advisor's research grants or departmental funds. **All students hoping to receive Departmental funds MUST first submit the request to the Dean of the College's office by the deadline.** This helps free up departmental funds for all students. Students will be issued cards validated for 100 photocopies for research purposes; for photocopying needs beyond these you should include this item in a second budget request to Debbie Fahey in room 114 (photocopying costs are not picked up by the Dean's office). Costs for reproducing the thesis are the responsibility of the student.

## GUIDE TO THE WRITTEN ASSIGNMENTS

It is as difficult to come up with a "one-size-fits-all" policy for grading each of the required items as it is to come up with a "one-size-fits-all" policy for thesis length and format. With the exception of the thesis Proposal below, you should discuss these issues with your primary advisor before each assignment is due, because he/she will be the one grading them. Your second advisor will read them as well, but, except for the final thesis, will not be asked to contribute a grade.

**THESIS PROPOSAL (3%)** – A copy of the form is attached at the end of this document. It must be signed by your advisor. Any form handed in on time receives an "A".

**FALL TERM PROGRESS REPORT (10%)** – The goal of the Fall term progress report is to ensure that a substantial effort is put into the thesis before Winter break, and to allow for feedback from the advisor before the end of classes. As was noted above, the expectations may vary from thesis to thesis, but here are some suggested guidelines to discuss with your advisor: The report should include a clear statement of the question to be tackled, why it is important, a reasonably thorough review of the existing literature (with reference list), and either a description of the investigation to be carried out (datasets to be used, experimental procedure to be followed, computer programs to be written, etc.) or, if significant work has already been conducted, a summary of the research to date. An estimated schedule for completion of the thesis should also be included. The report should be written in clear English but the format is fluid. It is difficult to prescribe a suggested length, but 8-10 pages double-spaced might be a good guess. A successful Fall term progress report could serve as an early rough draft of the Introduction and References sections of the final thesis.

**ROUGH DRAFT (10%)** – You should consider the rough draft deadline to be the target date for completing your thesis. The rough draft serves several purposes. It gives your advisor(s) a chance to comment with enough time remaining for you to address any significant issues or concerns that arise. It ensures that in a mad scramble to finish your research you will not leave the writing for the last week before the thesis is due. In practice, it is fine if you are still awaiting the results of that last experiment or computer run. As the name implies, the rough draft need not be a polished document, but the more complete it is the more useful you may find your advisor's comments.

**THESIS (50%)** – **Your advisors are probably your best source of information if you have questions about format or content. Don't forget to use your second reader as a resource.**

**ORAL PRESENTATIONS (27%)** – All students give a public presentation of their thesis shortly after the due date. The format is 15 minutes for presentation and 5 minutes for questions. A presentation schedule, arranged by Sheryl Rickwell through e-mail consultation with advisors and students, will be circulated about one week in advance. The presentation should include clear graphics (overheads or PowerPoint) that succinctly convey the major points of the thesis. For the benefit of those not directly involved in advising, a clear distinction should be made between the background material and the work the student has conducted. The oral grade will be based on the quality of the presentation, the quality of the thesis work, and the student's mastery of the basics of subject as evidenced during the question-and-answer period. A tentative or sample analysis sheet used by the faculty is shown at the end of this document. The department will provide laptops both mac/pc for your oral presentations.

**Geological Engineers** are also required to present oral presentation on their senior thesis. For questions, contact class advisors Prof. James Smith (GE) (Room C319G, E-Quad, telephone – 8-4615, e-mail: [jsmith@princeton.edu](mailto:jsmith@princeton.edu)), Professor Satish Myneni (GEO) – (Room 151, Guyot Hall Telephone – 8-5848, e-mail: [smyneni@princeton.edu](mailto:smyneni@princeton.edu))

*Tips for a successful oral presentation are as follows-*

1. Students can use Powerpoint presentations or overhead transparencies.
2. **Avoid the temptation to include too much material.** Concentrate on getting your main points across (this is all your audience will remember after they listen to a half-day of presentations anyway). A good rule of thumb is 12 overheads for a 15-minute talk, but this will vary (some overheads may require 2-3 minutes; others 20-30 seconds).
3. Think about what you would like to say as you prepare your figures, and use your figures as a guide to help you through your talk. This will minimize the amount of rote memorization required. If you have to say a lot that is not directly related to the figure on the screen, your job will be more difficult. If you find yourself in this position, consider adding another figure or editing what you say.

4. **Make text legible from the back of the room! This includes axis labels!** For an overhead transparency, this probably means at least a 14-point font (but check it out; the projector in room 155 is pretty close to the screen).
5. Avoid an abundance of “text-only” slides. These put the audience in the position of having to decide whether to read them or to listen to you read them. If you have a few such slides, it is a good idea to state the points that appear on the screen in a different way.
6. **Practice your talk beforehand.** In a 15-minute talk there is not much margin for “hemming” and “hawing”.
7. Use your advisor as a resource. He/she has many years of experience in giving short talks, and probably has a good view of the “big picture” surrounding your work (hopefully by this point you do as well).



## **SAMPLE OUTLINE OF WRITTEN SENIOR THESIS**

**A. Title page** with the following information shown as illustrated (condensed)

Fossil plants of Argentina

by

John F. Jones '07

Senior Thesis Work

Advisor: John P. Stevens

Department of Geosciences

Princeton University, Princeton, NJ 08544

DUE DATE

**B. Abstract**

**C. Introduction** (purpose and scope of study, background information, etc.)

**D. Main text**, subtitled as necessary.

**E. Conclusions** (sometimes Summary and Conclusions).

**F. References cited** using citation style of the GSA Bulletin. ***Do Not Use Footnotes!!***

**G. Acknowledgments** to people who helped you.

**H. Student Acknowledgment of Original Work** sentence:  
*This paper represents my own work in accordance with University regulations, " plus your signature.*

# **SAMPLE OUTLINE ORAL PRESENTATION**

**Department of Geosciences**  
And **Geological Engineering Program**

**Date:**

**Senior Theses**

**Junior Paper**

**Oral Presentation**

**Comment and Grade Sheet**

**Student Name:** \_\_\_\_\_

**Topic:** \_\_\_\_\_

**Oral Grade:** \_\_\_\_\_

Circle following (5 = most favorable; 1 = unfavorable)

delivery tone	5	4	3	2	1	organization of material	5	4	3	2	1
mannerisms	5	4	3	2	1	illustrations	5	4	3	2	1
"ums" and "ahs"	5	4	3	2	1	ability to evaluate data	5	4	3	2	1
reliance on notes	5	4	3	2	1	handling of questions	5	4	3	2	1

**Comments:**

# **SAMPLE OUTLINE WRITTEN PRESENTATION**

## **Department of Geosciences and Geological Engineering Program**

### **Undergraduate Independent Work Evaluation Form - Written**

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**2007-2008 - Senior Thesis**

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**Student Name:**

**Faculty Advisor:**

**Paper Title:**

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- I. Performance in Areas (5=outstanding, 1=unacceptable, na=not applicable)  
(Grade is not an equal-weight average of these marks)

A. **Intellectual Content**

Literature survey and summary	5	4	3	2	1	na
Critical evaluation and a synthesis	5	4	3	2	1	na
Original contribution, where appropriate	5	4	3	2	1	na

B. **Writing and Presentation**

Abstract	5	4	3	2	1	na
Proper headings	5	4	3	2	1	na
Style	5	4	3	2	1	na
Organization as scientific paper	5	4	3	2	1	na
References properly handled	5	4	3	2	1	na
Figures, clear, properly called in text, sources cited	5	4	3	2	1	na

- II. **Faculty Comments:** (to be added to those made directly in the text)

Faculty Signature \_\_\_\_\_

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(Do not write comments for students below this line)

Overall Grade (not given to student)\_\_\_\_\_

## SAMPLE OUTLINE SENIOR THESIS PROPOSAL FORM

To: Geosciences and Geological Engineering Seniors

From: Sheryl Rickwell, Room 110

Subject: Senior Theses

Date: September 21, 2007

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Please fill in the form at the bottom of this sheet with the expected title of your senior thesis title and the names of your two advisors.

**Geosciences Seniors/Geological Engineers** must have two advisors. If you do not have a second advisor, one will be assigned. At least one must be a faculty member in Geosciences.

Please return the completed form to me by Monday, October 8th.

Thank you.

Senior Thesis Title: \_\_\_\_\_

\_\_\_\_\_

Advisors: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Signature of student

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Primary Advisor

\_\_\_\_\_  
Date

\_\_\_\_\_  
(Signature of second advisor if primary advisor is  
outside the Department)

\_\_\_\_\_  
Date