

CLIM 997 Doctoral Qualification - Syllabus

Catalog Course Description

Students develop a project in order to demonstrate their potential to do scientific research. The project is a research proposal that can lead to a scientific article in a peer-reviewed journal, and may include a manuscript of the article itself. Grading is based on an oral presentation and written document.

3 credits.

1 Relationship to Climate Dynamics Doctoral Program

Eligibility A CLIM student who starts in Fall is expected to take CLIM 997 in Spring of their second year. A CLIM student who starts in Spring can elect to take CLIM997 in the Spring of their second or third academic year. To prepare for CLIM997, students are expected to do scientific research with their advisor during the previous semesters and summer.

Grading and Candidacy The final grade in CLIM997 is assigned by the instructor based on faculty feedback. A grade of C indicates that the student performed below the level expected of a CLIM doctoral candidate. The final decision of whether a student can continue with the doctoral program is made by the Climate Dynamics Director, in consultation with each student's advisor and taking into account grades in CLIM997 and other courses. If a student cannot continue as a doctoral candidate, s/he might have the option of completing an MS degree.

2 Course Format

The course's main activity is to work on the research project, in consultation with his/her academic advisor. During the semester, course instructor will meet with students on a semi-regular basis to give guidance on student presentations and to discuss best practices for conducting scientific research, writing good proposals, and interacting with other scientists.

Course grade is based on (1) a Final Document and (2) a Final Presentation. Students can choose one of two options:

- **Manuscript Proposal:** Student submits a Final Document that presents a convincing proposal for a publishable scientific paper. The Final Document should contain original research from the student and be no more than 4000 words, excluding references, figure captions, and tables.
- **Original Manuscript:** Final Document may be a manuscript at the "revisions" level of a peer-reviewed journal. The word limit should be consistent with the intended journal.

The Final Document is likely to be part of the student's doctoral dissertation.

Two Panel Meetings The student presents an initial version of the proposal or research article to a Faculty Review Panel of AOES Climate Dynamics scientists, who provide feedback on the project. The student revises the project based on faculty feedback and presents the new version at a Second Faculty Review Panel, which also provides feedback. Students will be evaluated in part by how they

use Panel suggestions to improve their projects. The Second Panel will include faculty members who were not on the First Panel, so to some extent it is a clean slate. Students should recognize that a different panel may react differently (positively or negatively) to the same material. Performance in panel meetings does not count towards the final grade.

In each Faculty Review Panel, the student has 15 minutes to present the project, after which a question-and-answer session (for a maximum total time of one hour and 30 minutes) allows faculty to ask questions and to offer constructive criticism. Students in CLIM997 give their presentations on the same day. First-year students are invited to attend student presentations. Each panel member completes an evaluation form that will clearly communicate any concerns about the student's project. A CLIM 997 moderator schedules and administers all presentations and meets with the student shortly after each panel to share faculty evaluation forms and discuss takeaways.

Final On or before exam period, the student gives an oral Final Presentation of the project to the entire Climate Dynamics faculty. The student submits the slides of the Final Presentation one day before the oral presentation, and submits their Final Document one week before the oral presentation. The Final Presentation consists of a student presentation followed by a question-and-answer session. The student presentation is 25 minutes long, followed by 20 minutes of Q & A. The student is expected to answer critical questions about the Final Document and Presentation, including questions about their understanding of basic physical concepts. Immediately after the final presentation, faculty meet privately to decide student grades (see Expectations and Grades below).

3 Proposal Generation Process

The student is expected to work with his/her advisor to formulate a paper idea that is likely to be part of the student's doctoral dissertation. A reasonable starting point is a topic relevant to the grant that supports the student. The student's project may be based on the grant's project description, but the student is expected to make independent contributions to the project and, most importantly, to be able to defend the ideas on his/her own. If the student project is a research proposal, it should briefly describe student's past research results in the Climate Dynamics program. If the student project is a draft of a publishable paper, this draft can be submitted as the final document for the course.

4 Expectations and Grading

The Final Document and Presentation should provide evidence of the student's ability to:

- critically read scientific literature
- formulate physically consistent expectations
- analyze climate data sets
- understand and explain an open scientific question
- present and defend a research plan to advance scientific knowledge
- explain ideas to other scientists
- incorporate feedback from other scientists to improve their work.

Grades are assigned as follows:

- C: does not meet expectations described above
- B: meets expectations described above, and submits a manuscript proposal.
- A: meets expectations described above, and submits a manuscript that has a viable chance of publication (possibly with revision) in a peer-reviewed journal.

Process of assigning grades:

1. After final presentation, faculty meets to discuss student performance.
2. Each faculty member completes a CLIM 997 Evaluation Form and assigns a letter grade.
3. Course moderator assigns final grade based on faculty Evaluation Forms.
4. Course moderator submits grade to university.

5 Elements of a Successful Proposal

Oral panel presentations are very short (15min), so the student must pare down information to essentials and rehearse the talk before presenting. Student may choose format, but a good proposal answers the following questions:

- What are you trying to do? Articulate your objectives without jargon.
- How is it done today, and what are the limits of current practice?
- What is new in your approach and why do you think it will be successful?
- Who cares? If you succeed, what difference will it make?
- What resources are required? How long will it take?

For the final document, a good format¹ for answering these questions is

Title: brief, reflects paper content, avoids jargon, symbols, formulas and abbreviations.

Abstract: summarizes purpose and methodology of research in ≤ 250 words.

Introduction: states scientific question, explains importance, cites relevant previous work.

Proposed Work: description, how it will answer the scientific question, how it differs from previous work. Includes enough details to show exactly what will be done and why it is a good plan.

Accomplished Work: describe research results, including methods and significance.

Advisor should be cited as “advised by” and should not appear as a co-author on presentation or written report.

6 Faculty Roles

course instructor: organizes and moderates meetings/panels/Final Presentation, assigns final grade for each student in class.

¹Based on NSF Guide to Proposal Writing

student academic advisor: consults with student about project.

AOES climate dynamics faculty: Except as prevented by unavoidable schedule conflicts, all Climate Dynamics faculty are expected to attend two days of panel meetings and attend the final presentation. Faculty will fill out an evaluation form after each Friday panel and submit the form to the CLIM997 instructor by the following Tuesday. Faculty also will read each student's Final Document and provide input to course instructor for final grade.

7 Advancement to Candidacy

After the student has completed all coursework for CLIM 997 Doctoral Qualification, the Climate Dynamics Director decides whether the student continues in the doctoral program, based on performance in CLIM 997 and consultation with student's advisor and the instructors of CLIM 997 and Core Climate courses.

8 After passing CLIM 997

Dissertation Committee: Student should form a dissertation committee by the end of the following summer. The choice of committee members is based in part on faculty interest during the presentations. Thereafter, the student enrolls in CLIM 998 Doctoral Dissertation Proposal.

Submit Paper: Student is expected to submit a paper to a peer-reviewed journal before the subsequent Spring semester. If the paper is not submitted, the student submits a publication progress report to the committee and CLIM997 instructor at the end of every semester until the paper is submitted.

Proposal Defense At the end of the student's third year, the student is expected to present a Dissertation Proposal to his/her thesis committee. The dissertation proposal will generally be an extension of the CLIM997 proposal. Prior to the Dissertation Proposal, the student must submit a paper to a peer-review journal and to the thesis committee.

9 Details Specific to 2020

Panel meetings will be conducted in *two parallel sessions on a Friday*. Paul Dirmeyer and Tim DelSole will run the two parallel sessions. The panel meetings will be on Friday February 28 and April 3. The schedules for the Panel meetings and Final are given in tables 1 and ??.

The Final Presentation will be on Tuesday May 15. The written proposal/manuscript is due one week before that (May 8). Each student is allotted 25min for presentations and 20min for Q&A, for a total of 45min per student. The schedule will be given as the date approaches.

Table 1: 2020 Schedule of CLIM997: Doctoral Qualification

MONTH	DAY	ACTIVITY
January		
	23	<i>First Day of Class</i>
	31	
February	7	
	14	
	21	
	28	Panel-I TD & PD
March	6	
	13	<i>spring break</i>
	20	
	27	Panel-II TD & PD
April	3	
	10	
	17	
	28	written proposal/manuscript
May	1	
	5	Final Oral Exam (tentative)