

# Candidacy Exams for Chemistry Graduate Students

last modified 10/28/2011

## DRAFT DOCUMENT

See <http://www.esf.edu/graduate/docexam.htm> for college-wide requirements

### WHEN

- after you pass preliminary exam requirement
- by the end of your 6th academic semester
- pass at least one year prior to the dissertation defense
- two (2) attempts allowed

### WHO IS PRESENT

- Major Professor (MP) and Steering Committee (from form 3B)
- One examiner (although we often have 2, as are required at Ph.D. dissertation defences).  
Faculty or researchers not on Steering Committee recommended by the student (usually in consultation with their MP) and approved by Department Chair.
- Chair (from outside department). They are assigned by the Graduate Office. Their primary purpose is to ensure that the procedures are followed
- You, the student

### STRUCTURE

You file form Form 6B (Request for appointment of the candidacy exam committee). Once the "WHO" is set by the Office of Instruction and Graduate Studies (OIGS), it is the student's responsibility to find a date, time, and location for the Planning Meeting. Finding a date and a 2.5 hour block of time is often a challenge, so an online poll may be necessary.

Planning Meeting: The purpose is organizational:

- determine whether Format 2 or 3 will be used, how long the document should be, and any other issues of style or format
- determine the topic of the exam
- set the date the written document is due (usually ~1 month after planning meeting)
- time & location of the oral exam (at least 2 weeks after written document is due)

After the meeting, the Chair will file Form 6E (Request to schedule candidacy exam)

Written Portion: Format 2 or Format 3

Format 2: "...written report on a topic or problem assigned by the examining committee...cannot be directly related to the student's thesis research."

Format 3: "...a written proposal of future research likely to be carried out during [the] Ph.D. project."

With either format, you should clarify with your committee at the planning meeting if they want the document in a particular format!

The technical content of the written document must be your own work. If, during the time you are writing, you have questions about your instructions, you should consult with

the Chair or your Major Professor, unless specified otherwise at your planning meeting.

Oral Exam Lasts at least 2 hours.

Typically: each committee member has 15 minutes to ask questions. Then comes a second round of 5 minutes each, which may have more interaction among the members. The committee chair may ask questions.

You may have a silent observer present for the oral exam.

After questions are done, you (and the observer, if any) are excused from the room so the committee members can debate and decide whether you passed or not. The decision is based on the committee members overall impressions of the written and oral task.

Great strengths in one task can compensate, in part, for weaknesses in the other task.

You will be told the decision as soon as the committee decides, so wait near the exam room. Official notification from the Graduate Office will come in campus mail.

Candidacy exams can be stressful, since they determine whether the candidate is qualified to continue their work for a PhD degree. Oral exams are often very stressful, so figure out how you can deal with the stress.

## EVALUATION OF YOUR PERFORMANCE

You will be evaluated as to how well you have satisfied the OBJECTIVES of the candidacy exam, which are, broadly speaking, that you understand fundamental concepts and facts of your field of study and understand how to apply those concepts in the scientific process. More specifically, the exam will test the your ability to interpret scientific work in your area, and capacity to think and write independently and to present ideas orally in a clear manner.

**Show that you know what to do with data: either yours or someone else's.**

Analyze potential problems with the experiment or the interpretation of the data:

- Explain which issues might seem to be problems but don't affect the data or interpretation
- Explain how potential problems would affect the interpretation of the results
- Explain the major sources of uncertainties

## CONSEQUENCES

If you pass: Congratulations, you are on your way!

If you do not pass, you have a second chance. Take a couple days to deal with any negative feelings before talking to every member of the committee about what they saw as the primary weakness in your performance and how to prepare for the second attempt. Your MP should provide the most guidance, but they have only one vote on the committee and may not fully understand the concerns of the other committee members.

Your second attempt is generally at least 6 months after your first attempt. If you are using Format 2, you will probably have a new topic assigned. If you are using Format 3, then the topic of your research probably will not have changed much. If

you do not pass your second attempt, you are no longer in the PhD program. Most students chose to switch to the M.S. program.

#### ADVICE ON FORMAT 2 (Written Report)

The structure is more flexible than that of Format 3, so ask the committee at the planning meeting exactly what they expect. It is typically 25-35 double-spaced pages in length. There are five (5) major elements to the document, but it need not be formatted as suggested here.

1. The Introduction should describe the topic, its significance, and the scope of your report.
2. The Background should identify the key data and ideas that enable an analysis of the data.
3. The Analysis will present your qualitative and quantitative arguments and calculations, based on the data in the background and your knowledge of related science. It should include an analysis of the strengths and weaknesses of the data, prior arguments, and your own analysis. Do your own analysis or re-analysis of critical assumptions, data, or conclusions to check for problems not discussed in the prior literature.
4. The Conclusion will synthesize the individual arguments made in the analysis section
5. References

#### ADVICE ON FORMAT 3 (Research Proposal)

1. The Introduction should get the reader excited about your proposed work by showing its importance.
2. The Background should explain to the reader the details of why your topic is important and how it fits in with related science. Rather than convince the reader you *know* all the previous work related to yours, convince the reader that you can *evaluate* previous work (both its strengths and weaknesses). Part of your goal is to put your work into context.
3. The Methods section should convince us you have the tools, etc., to collect the data.
4. Preliminary Results: You should have some data of your own in addition to literature data to support the feasibility of your proposed research.
5. The Research Plan is the heart of the document. The Research Plan should indicate what particular experiments/research you plan to carry out, how you are going to analyze data, and how you are going to verify that your assumptions and expectations are correct. It should show the reader you have thought through how to obtain reliable data and *interpret* it to get the new information you want.
  - Explain what steps were/will be taken to avoid potential problems
  - Explain how your data analysis will identify problems that you could not prevent
6. The Conclusion should remind the reader of the implications of your research.
7. References