

Procedures for the Chemistry Ph.D. Qualifying Examination

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I. Guidelines for Faculty

A. Constitution of Qualifying Exam Committee

Graduate Advisors assign the chair and two other Chemistry Graduate Program faculty members to serve on the qualifying exam committee. These committee members come from within the graduate program in chemistry. The Graduate Advisors, working together with the Graduate Program Coordinator, balances the assigned workload so that no faculty member is overly burdened. The Graduate Program Coordinator notifies graduate students by letter regarding the make-up of their committees. A student may ask to have one member removed and replaced for any reason. The student, in consultation with their Research Director and with the concurrence of the Graduate Advisor, chooses a fourth member from outside the graduate program in chemistry. It is the student's responsibility to notify the Graduate Program Coordinator concerning the identity of the fourth person.

B. Scheduling the Qualifying Examination

It is the responsibility of the student to schedule the qualifying examination and inform the graduate student coordinator and the qualifying exam committee members of the scheduled date time and location, preferably no later than four weeks before the qualifying examination.

C. Role of the Research Director in the Qualifying Examination

The Research Director will sign the doctoral research report (described below) to indicate that it was written by the student and is a reasonable description of the research project(s) to be examined. This will be done at least two weeks prior to the qualifying examination. The Research Director should not initiate contact with any member of the qualifying exam committee on the subject of the qualifying examination until the results have been sent to the graduate division. Any challenges to the outcome of the qualifying examination should be addressed through the Office of Graduate Studies rather than the committee.

D. Role of the Chair of the Qualifying Exam Committee

The qualifying examination chair is expected to be available to meet with the student once the committee has been formed. The chair will meet with the student again two weeks prior to the qualifying examination to receive and review the doctoral research **report** and to inform the student of the importance of the five-minute introduction to part I of the qualifying examination (see **E.3**). The committee chair will review the doctoral research **report** for completeness and clarity, and return it to the student within three days with suggestions for appropriate modification. The chair can obtain the student's folder from the Graduate Program Coordinator prior to the qualifying examination. The doctoral research **report**, Research Director's letter (if available), graduate studies required documents, and student folder are required for the qualifying examination to proceed.

A document that provides the exam format and responsibilities of the chair listed below will be provided in each student's folder. The chair will use this information in administering the exam.

- Format of the Qualifying Examination
 - Exam parts I and II are each approximately 1 1/2 hours in length
 - Part I - student allowed at least five minutes to introduce their research project before questions begin.
 - At end of Part I, student excused while qualifying exam committee discusses performance (see **E.6**)
 - Part II – broadly addresses area of specialization as well as deficiencies identified in Part I
- Role of the Chair
 - Meet with student at least two weeks before the scheduled exam to discuss QE procedures, format, general content, etc., and address any concerns or questions from the student, and shall provide the student with clear guidelines on these matters.
 - Approve written proposal at least two weeks before the QE, which should be signed by the research director.
 - Send email a day or two before the exam to the qualifying exam committee to remind the location and time of the exam
 - Attempt to put the student at ease in order to focus on the subject matter of the examination
 - Ensure student gets at least five minutes of uninterrupted presentation at start of exam before questions are asked, to help put the student at ease.
 - Ensure the qualifying exam committee is fully engaged during the exam and giving the student their undivided attention
 - Moderate the committee to ensure that one examiner does not ask questions that are either trivial or too difficult, and that any one examiner is neither too friendly nor too obstreperous.
 - Keep the examination on schedule to the degree practicable
 - Lead the committee to ensure that the examination is conducted fairly
 - Seek to identify successes as well as shortcomings of student
 - Assure that separate objectives of Part I and II are met
 - Part I: explore research project (see **E.3**)
 - Part II: lead discussion and maintain focus on area of specialization
 - Mediate questioning and provide clarification in the event of language barrier or other issues
 - Lead pre-vote discussion following guidelines in **E.6, 8-10** and make every reasonable effort to reach a unanimous decision

E. Conduct of the Qualifying Examination

1. It is the responsibility of all members of the committee to be in attendance for the entire examination. Unanticipated or unavoidable absence will be explained in detail by the Chair in the report of outcome of the examination, and a specific plan for completion of the examination

within 72 hours by ALL members of the committee will be detailed. If one member of the QE committee has an unavoidable absence, the student is given the option to either: a.) reschedule the QE to a later time where all faculty members can be present (ideally within two weeks), or b.) proceed with the QE exam with three faculty members and be examined the independently by the absent member within 72 hours of the exam. If the QE chair is absent from the QE, the exam will be rescheduled for a later time. If two or more faculty members are absent from attendance, the exam should be rescheduled for a later time.

2. The examination is scheduled for three hours and consists of two parts. Part I addresses the student's research as outlined in the doctoral research **report**. Part II addresses broader aspects of their area of specialization in chemistry (analytical, biological, inorganic, organic, physical) as well as any deficiencies identified in Part I. Each part would normally last up to 1.25 hours, with a short break between Parts I and II.

3. Before the student enters the room, the qualifying exam committee will review the student's progress in the program. This review normally will include the summary document provided by the Graduate Program Coordinator, the Research Director's letter (optional), the student's communication skills (including speak test if taken—optional), and the Research Director's willingness to continue mentoring the student (optional). The details of the review may be modified to suit individual circumstances; for example, members of the committee may choose to consider the Research Director's remarks at a later stage of the exam.

4. In Part I of the qualifying examination, the student will present a description of their research project(s). The research presentation style and scope should be similar to the brief talks given at ACS meetings. Detailed descriptions of experimental procedures and methods should be kept to a minimum. The presentation should define the main scientific questions under investigation and explain how answers to these questions will be relevant to the field of study. The overall goal is to communicate the research results in a concise fashion to a non-specialist audience, and to demonstrate the broader impact and significance of the work. During questioning, members of the qualifying exam committee may ask about specific details of the experimental procedures and the student should be prepared to explain the rationale behind the experimental design. The student may use up to five PowerPoint™ (or equivalent) slides to present complex formulas, graphical material, and other details that would be difficult to reproduce by hand on the blackboard. Normally, no other materials are allowed.

5. The student will be allowed at least five minutes to begin to introduce their research before questions begin.

6. When the qualifying exam committee has concluded Part I, the student will be excused until Part II.

7. At the Part I break, the committee chair will lead a brief discussion of the student's performance by addressing questions such as:

- a. Has the student presented their research project(s) in a clear and knowledgeable fashion?

- b. Has the student answered questions about the research in a knowledgeable fashion?
- c. Has the student made satisfactory research progress?

At the end of the entire examination, the committee has the choice to recommend that the student has either Passed, Not Passed, or Failed the exam. The committee will take a preliminary vote after Part I. If this optional Part I vote is that the student's performance is satisfactory, the qualifying examination will proceed to Part II and the committee generally expects that the student will not fail the examination. If the Part I performance is clearly unsatisfactory, Part II should not take place and the committee should consider appropriate options. For example, a second qualifying examination may be held, usually in the following quarter.

8. In Part II of the qualifying examination, the questioning will broadly address the student's area of specialization (analytical, biological, inorganic, organic, physical). Also, areas of weakness evident from Part I may be addressed.

9. At the conclusion of the qualifying examination, the chair will assist the discussions by the committee members to reach a final recommendation. In reaching their decision, members of the committee will consider all areas of the student's progress including the graduate academic record, performance on specific parts of the qualifying examination, and an overall evaluation of the student's performance and potential for scholarly research. Possible outcomes are **Pass**, **Not Pass**, or **Fail**. A vote of Fail at the first qualifying examination would be an unusual outcome. As appropriate, the chair will record the comments of the qualifying exam committee members and incorporate them into a written report to be shared with the student.

10. While Pass or Fail are final decisions for the committee, in the case of a **Not Pass**, the qualifying exam committee has several options. These include: (i) reexamine the student (this option spans a partial or full Qualifying Examination retake); (ii) make a writing assignment, which the student should submit by an agreed date – the product must be examined by all members of the Committee and a joint decision reached (typically such an assignment addresses shortcomings pertinent to research but outside the immediate area of specialization); (iii) any other option within graduate studies guidelines.

11. In all but exceptional cases, the qualifying exam committee will arrange to make a final **Pass** or **Fail** decision no later than the end of the academic quarter immediately following the quarter in which the examination was originally administered.

F. After the Qualifying Examination

The chair must inform the student of the decision – **Pass**, **Not Pass**, or **Fail** – at the conclusion of the committee discussion and voting. The chair must complete the qualifying examination report and return it to the Graduate Program Coordinator within 72 hours of the examination so it can be forwarded to the graduate division. The chair will inform the Research Director of the decision, preferably in writing. In the case of a **Pass**, the chair must sign the Advancement to Candidacy form and refer the student to the Graduate Program Coordinator for additional instructions. In the case of a **Not Pass**, the chair must clarify for the student and the Research Director the nature of

the deficiencies identified, and must provide a written description of the requirements that should be met and the time-line for meeting them. This must be done within 72 hours of the examination. In the case of a **Fail**, the student cannot remain in the Ph.D. program; the qualifying exam committee has the option of recommending in the report that the student be allowed to pursue an M.S. degree in chemistry. In the case of a **Not Pass** or **Fail** the Chair of the Committee shall inform the student of the right to appeal the committee's decision for cause.

II. Rules for the Student

1. The student should meet with their qualifying examination chair once the committee has been formed.
2. In consultation with their Research Director and with the concurrence of the Graduate Advisor, the student should make a recommendation to the Graduate Program Coordinator for appointment of the fourth member of the qualifying exam committee. If the student is part of a Designated Emphasis (DE), at least one committee member must be affiliated with the DE (GC1988-03).
3. Once the QE committee has been assigned, the student may request that any one member of the qualifying exam committee be changed. Such a request should be made within three days of the student being informed of the composition of the proposed committee.
4. Student is responsible in scheduling a date, time, and location for their own QE. It is recommended the student create a web-based survey (like Doodle poll or Google forms) to send to QE committee members for selecting potential dates and times of your QE. The student should notify either the Graduate Program Coordinator or the Graduate Program Chair if any faculty member is unresponsive to student's requests for QE scheduling. Once a QE date and time are identified by the survey, notify all the QE faculty members, and the Graduate Program Coordinator. Additionally, with the assistance of the Graduate Program Coordinator, the student is responsible in reserving a room for their QE.
5. The student should meet with the chair of the qualifying exam committee at least two weeks prior to the qualifying examination to discuss any concerns or questions about the examination and to deliver the doctoral research report (signed by the Research Director).

The doctoral research report provides the qualifying exam committee with the:

- a. background,
- b. research plan,
- c. significance of research,
- d. status of research progress, and
- e. expected future directions.

That description should be in the form of a Journal of the American Chemical Society communication having a three-page limit, as formatted for journal publication using the journal [template](#) for communications (references are required

and are not counted in the page limit). The document should utilize color-coding as appropriate: black = introduction and work done by others; blue = accomplishments of the student; red = planned work and expectations; green (if applicable) = work to be done by collaborators.

The doctoral research report should be approved and signed by the Research Director as valid and representative. The qualifying exam committee chair should review the doctoral research report for clarity and completeness, and return it to the student within three days with suggestions for appropriate modification.

At least one week prior to the qualifying examination, the student should submit (preferably in PDF format) the following documents to qualifying exam committee members: (i) the approved doctoral research report; (ii) copies of any publications or manuscripts submitted or in press that have resulted from their research at UC Davis.

6. In Part I of the qualifying examination, the student should present a description of their research project(s). The research presentation style and scope should be similar to the brief presentations given at ACS meetings. The objective of the research presentation is to clearly explain the broad importance of the scientific work, with particular emphasis on communicating the big picture to a non-specialist audience. Detailed descriptions of experimental procedures and methods should be kept to a minimum.

The presentation should define the main scientific questions being addressed and explain how answers to these questions will be relevant to the field of study. The overall goal is to communicate the research results in a concise fashion, as well as to demonstrate the broader impact and significance of the work. Note, however, that during questioning, members of the qualifying exam committee may ask about specific details of the experimental procedures and the student should be prepared to explain the rationale behind the experimental design.

7. The student may use up to five PowerPoint™ (or equivalent) slides to present complex formulas, graphical material, and other details that would be difficult to reproduce by hand on the blackboard. Normally, no other materials are allowed.
8. In Part II of the qualifying examination, the questions will broadly address the student's area of specialization (analytical, biological, inorganic, organic, physical). Also, areas of weakness evident from Part I of the examination may be addressed.
9. The student should respect the decision of the QE committee. If needed, ask faculty members for clarification. The student has right to appeal the committee's decision with the Dean of Graduate Studies. More information on Graduate Studies official QE policy document can be found [here](#).