

## Purpose

The primary function of the Qualifying Examination (QE) is to determine the student's ability to conceptualize, present (both verbally and orally), and discuss a research project, which through scholarly research would lead to the dissertation required for a doctoral degree. The QE provides an opportunity for the QE committee to assess the student's understanding of their chosen research topic and, where appropriate, provide feedback on the proposed research. The QE also evaluates the student's command of the general food science fields of research, ensuring that the student has reached a breadth and depth of knowledge for independent research and professional readiness.

## Qualifying Exam Application and Committee Assignment

Information on the qualifying exam application and committee assignment procedures is provided in the "Guidance for Qualifying Exam Preliminary Proposals" and QE application form documents. These documents also outline the membership requirements for the QE committee and process for students to suggest their committee composition. The Student Advancement Committee (SAC) reviews and provides feedback on the preliminary proposal, as well as decides and communicates to the student the final membership of the QE Committee. As part of this process, SAC is responsible for confirming the availability and willingness to serve of each QE Committee member ahead of notifying the student. If the QE Committee membership changes within one month of the examination date due to unexpected changes in member availability, the student may have the examination rescheduled.

## Exam Structure

The QE consists of written and oral components. As detailed in the subsequent sections, each component entails specific timing, content, and purpose within the overall evaluation of the student. For the written element, students prepare a research proposal that describes a relevant and novel research question in food science, related hypotheses, and the experimental and analytical plans to test the hypotheses. The proposal is developed by the student with guidance from the Major Professor. The research proposal provides the foundation for much of the oral examination. The oral examination is intended to facilitate dialogue between the student and the committee. The oral examination consists of two parts. For the first part, students are required to present and defend their research proposal, including experimental design and methodology, actual and expected results, and their connection to resolving the stated hypothesis. For the second part, students are tested on their breadth of knowledge in

the three core areas of food science: chemistry, microbiology, and processing/engineering.

## Written Exam Component

Following approval of the preliminary proposal and assignment of the QE committee by the SAC, students prepare a full research proposal. The proposal is expected to be an original and well-developed description of the proposed research (4 to 5 single-spaced pages, 0.5 to 1-inch margins, minimal font size 11 in Arial or size 12 in Times New Roman). The proposal must be centered around a well-stated hypothesis concerning a problem in food science, or one of the disciplines related to food science. The proposal must include these components:

- **Background:** Description of the relevant concepts and systems that underly the project and the current state of knowledge related to the research topic.
- **Justification:** Description of the need for the research in terms of addressing an existing or emerging issue, enabling useful technologies and practices, or improving fundamental understanding of a food-related system.
- **Hypothesis and Specific Aims:** Statement of a clear, testable central hypothesis for the proposed research that frames the specific aims. Description of the specific aims for the work, which should each enable or directly address testing of the central hypothesis. The specific aims should be logically connected while avoiding critical interdependency.
- **Experimental Procedures and Methods of Data Analysis:** Description of, and justification for, the appropriateness of the experimental designs to be used in the research. Description of the treatments, controls, replication, and responses associated with proposed experiments. Explanation of the data analysis approach, include statistical methods, and indications of how data will ultimately be used to accept or reject the central hypothesis.
- **References:** Inclusion of appropriate citations for literature sources that inform the background, justification, and methodology of the project. Note that references do not count against the page length suggestion of 4-5 pages.

Students may also include the following optional elements:

- **Preliminary data:** Existing data may be included to demonstrate the feasibility of the project or inform the project's design.
- **Anticipated Problems and Alternative and Solutions:** Students may address any possible issues in the research plans and potential solutions or alternative approaches that may be used. This section is particularly encouraged if preliminary data is not available to validate proposed methods or confirm expected phenomena.

The Major Professor is expected to assist in defining the general research area of the proposal. However, the proposal should not merely be a restatement of the Major Professor's ongoing or proposed research programs. It is recognized that the student may be working on a project that has been proposed by the advisor, but the advisor should be careful to allow the student to have significant creative input and to support the student in developing a proposal that is appropriate for doctoral research. The written proposal should be prepared by the student. The Major Professor should provide guidance, but the final document is expected to be the product of the student.

## Oral Exam Component

The oral portion of the QE will demonstrate the student's critical thinking skills, ability to synthesize and address new information, and broad knowledge of the field of study. The QE Committee evaluates the student's general qualifications in food science and preparation towards a doctoral degree in a special area of study based upon relevant portions of the student's previous academic record, performance in the examination, and the student's potential for scholarly research as indicated during the examination.

The oral portion of the QE is comprised of two segments, an oral presentation of the research proposal and an oral exam on general knowledge in food science, that together are expected to require 2 to 3 hours to complete. The oral exam is conducted in-person and attendance by all committee members is expected. In exceptional cases, such as campus closure or unforeseen extended travel by a committee member, remote attendance may be permitted with advance approval from Graduate Studies.

### *Oral exam on research proposal*

During the first part of the examination, the student delivers an oral presentation of their proposed research. The QE Committee evaluates how the student constructs scientific questions, considers the experimental methods needed to resolve those questions, and interprets the impact of those answers to the field of food science. The student's presentation of the research proposal is expected to last approximately 20 to 30 minutes. The presentation can use written notes, including the chalk board (or white board). The QE Committee Chair should be consulted if critical information for the oral portion of the QE can only be communicated in a digital format. Including discussion, this portion of the exam typically lasts for 1.5 to 2 hours. The presentation should be clearly organized, with emphasis on the central aspects of the project. The objective of this portion of the examination is to use the presentation as the foundation for a comprehensive and critical evaluation of the student's understanding of the problem, the hypothesis, and appropriate experimental methods designed to resolve the hypothesis.

### *Oral exam on general knowledge*

The general knowledge portion of the exam typically takes between 1 to 1.5 hours. The goal of this portion of the examination is to evaluate the student's general understanding of important principles and issues in food science. Regardless of area of specialization, students are expected to demonstrate knowledge on the fundamentals of food chemistry, food processing and food microbiology at the level of the core graduate courses or, if the material is outside the scope of the core courses, at the level of relevant advanced undergraduate courses. Students should consider the graduate core course material as advisory rather than prescriptive to the breadth and depth of the body of knowledge.

## Exam Outcome

After completion of the oral component of the exam, the QE Committee discusses the student's performance and returns their decision. The three possible outcomes are:

- **Pass** – The student's performance is satisfactory. No conditions may be appended to this decision. However, the QE Committee may provide feedback and guidance that they feel will benefit the student's research and education.
- **Not Pass** – The student's performance is not satisfactory. Some or all of the examination must be retaken. The QE Committee Chair communicates the requirements for obtaining a "pass" decision and the timeline for completion to the student and the Major Professor. Following a decision of "not pass", the only possible outcomes for the reattempted QE are "pass" and "fail".
- **Fail** – The student's performance is not satisfactory and the QE Committee sees no possibility for rectification. The QE Committee Chair discusses the decision with the student and the Major Professor. The student may be eligible to receive a M.S. degree if all requirements for the M.S. have been fulfilled (see Food Science Graduate Group Degree Requirements document). Otherwise, the student is disqualified from the graduate program.

## Advancement to Candidacy

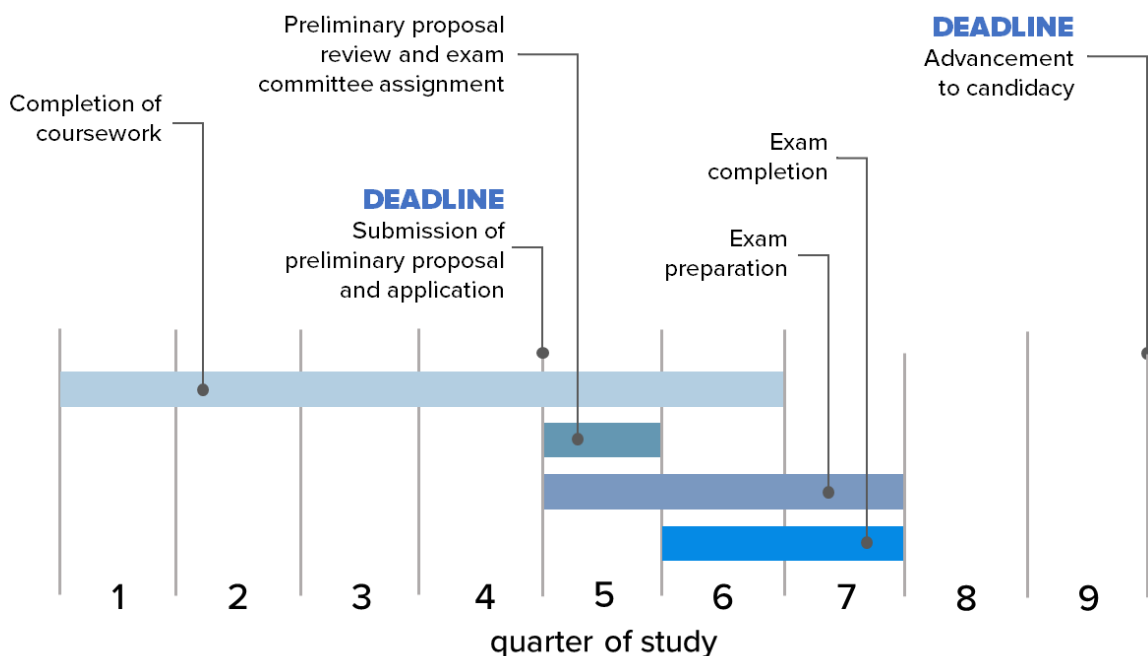
Successful completion of the QE typically marks the final requirement to file for advancement to candidacy. The student must submit the appropriate paperwork to Graduate Studies and pay the Candidacy Fee in order to be officially promoted to Ph.D. Candidacy.

## Timeline and Preparation

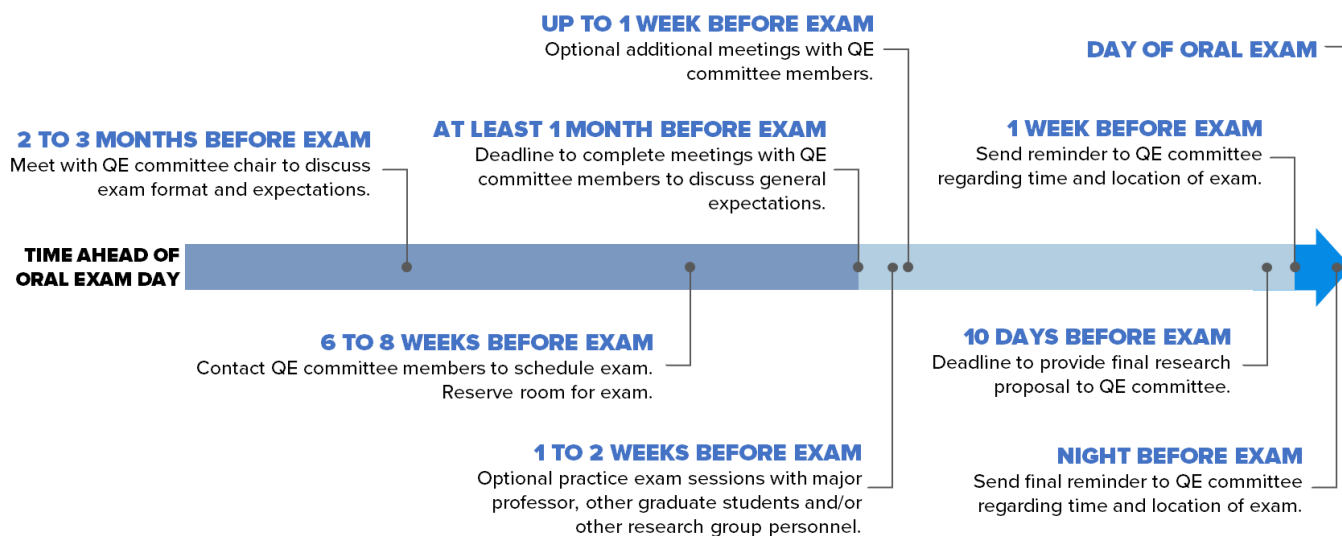
Figure 1 shows the normative periods of time and deadlines for completing each element of the QE process. All course requirements must be satisfied before taking the QE. This is expected to occur by the end of the sixth quarter of study. Students should discuss their course timeline with their academic advisor if it is expected to cause a conflict with the required exam completion deadline.

By the end of the fourth quarter of study, which is typically fall quarter of the second year, students must submit the preliminary proposal and QE application. Following approval of the preliminary proposal by the SAC, the student prepares the research proposal, meets with the QE committee to discuss general topics and expectations for the exam and, jointly with the QE Committee Chair, familiarizes themselves with exam logistics. Figure 2 provides a timeline for these activities.

Students may opt to provide a draft of the proposal to the QE Committee Chair or to the full committee to inform meetings to discuss expectations for the oral portion of the exam. Regardless of whether a draft proposal is provided, such meetings should occur with each committee member at least a month ahead of the oral exam. Additional meetings are possible, based on the discretion of the QE Committee. Students should not ask for a “pre-exam”-like critique. Rather, the meetings can be used to introduce the scope and direction of the project as well as to provide the opportunity to discuss specific bodies of knowledge that may be included in the exam. The final research proposal must be provided to members of the QE Committee at least 10 days before the exam. Following completion of the QE, students file for advancement to candidacy. To maintain satisfactory progress in the graduate program, students should advance by the end of the 9th quarter of study.



**FIGURE 1.** Schedule of activities leading to completion of the qualifying exam and advancement to candidacy. Quarters of study include Solid bars indicate the period of time in which a given activity is expected to be completed; the activity may not require the entire designated period.



**FIGURE 2.** Schedule of activities during exam preparation period.

### Oral Exam Location and Reservations

It is recommended that students reserve their exam room for a period of at least 4.5 hours, starting at least 30 minutes ahead of the intended start time. This will afford ample time for preparation, the exam, and QE Committee discussion of the exam outcome. If the oral exam is to be held at the RMI, room reservations can be made via the calendar website (<http://calendar.bftv.ucdavis.edu>). It is advisable for students to inspect their exam room ahead of the exam date, preferably at the time of day during which the exam will be held. This will allow identification of any lighting, white board accessibility, or room layout issues that should be addressed before the exam. Additionally, students should plan to bring their own dry erase markers and erasers as these materials are not reliably stocked in the conference rooms typically used for the QE. Students may also plan to bring water or snacks to the exam room. However, these items must only be for the student and not the faculty committee.

### *Practice Exams*

Students are encouraged to have at least one practice exam session with their major professor, lab mates, or fellow graduate students in preparation for the QE. The practice exam affords the opportunity to respond to field-specific and general food science questions in a format similar to the QE.

### *Notifications*

Students should remind their QE Committee members as a group via email of the date, time, and location of the oral portion of the QE. This should be done one week prior as well as the evening before the oral portion of the exam.