

## **PROCEDURES FOR THE PRELIMINARY EXAMINATION OF DOCTORAL STUDENTS IN THE DIVISION OF BIOLOGY**

The format of the preliminary examination is divided into three phases:

1. initial student evaluation
2. the written examination, and
3. the oral examination.

### **(1) Student Evaluation**

The purpose of this assessment is to assure that only qualified students are admitted into candidacy. The evaluation should be based on the cumulative results of all meetings of the student and supervisory committee. In this respect, both the supervisory committee and the student play a role in establishing the potential for success.

The supervisory committee should assess two crucial student attributes: (a) the breadth and depth of the knowledge that the student maintains in the major field, and (b) the potential and capacity the student displays for research. The committee will strive to make the process fair and equitable across examinations as possible and will provide as much information as each student needs about the examination process.

The supervisory committee bears the responsibility of ensuring the breadth and depth of the student's preparation, which is determined by the subject content of the courses listed in the program of study and activities related to their research focus. The supervisory committee shall, at a minimum, meet annually with the student to adequately monitor the student's growth in research potential and the progress of the dissertation research. Any member of the supervisory committee or the student has the right to call for a committee meeting. The student is expected to demonstrate motivation, dedication and research potential by attendance at journal club meetings, Division seminars, local scientific meetings, the annual Forum for Student Research, and participation in research efforts. Although all factors will be considered, the latter item is the most important criterion because the Ph.D. degree is a research degree.

Prior to the examination the supervisory committee will meet to discuss the student's total performance and to decide on the readiness of the student to proceed in the preliminary examination. This meeting can be held in conjunction with or in addition to the (minimal) annual committee meeting. This meeting, considered the first step in the preliminary examination process, should be held at least 3 months prior to the anticipated examination date. The student has the right to request information on expectations of the committee for the preliminary examination in any meeting held prior to the examination. The following should be accomplished by the time of the last meeting before the preliminary examination (by the beginning of the 5<sup>th</sup> semester):

(a) If the committee is in agreement, the examination process shall continue. If the committee does not agree that the student is ready to proceed with the preliminary examination, a written statement to this effect, outlining the remedial steps to be followed from that time, or recommending alternatives to the PhD program, is to be forwarded to the chair of the Graduate Affairs Committee and the Director of Graduate Studies of the Division of Biology.

(b) The committee will also outline the general requirements and expectations that the supervisory committee will have of the student for the examination during this meeting. In particular,

the committee will provide the student with their expectations about the depth of general knowledge to be examined during the oral exam as well as guidance for the expected format of the proposal. This should include general guidance about the degree of similarity or dissimilarity of the abstracts compared to the student's dissertation research project (see below). The student also has the right to request and schedule individual meetings with committee members to further solidify expectations on general knowledge prior to the exam. The committee will also provide details about what form the oral examination will take. During or following this meeting, the student will be responsible for scheduling a date when the abstracts will be due, the date when the written proposal will be due, and the exam date. The student will confirm that all committee members will be available at the times required to review abstracts and the written proposal, and will be present for the oral exam. The oral exam often takes over 3 hours, so a 4 hour block should be scheduled. The student shall notify the Graduate School one month before the exam is to be given and a ballot will then be sent directly to the major professor.

## **(2) Written and Oral Examinations**

The written and oral preliminary examinations shall be taken no later than the fifth semester of residence. Both written and oral examinations are required. The written examination shall consist of a research proposal and the oral examination shall be a more general discussion, based (in part) on the written examination and extending beyond it.

### ***A. The form and substance of the written examination: A research proposal***

The written preliminary examination shall consist of a proposal to investigate and answer one or a number of questions concerning an important biological area, generally within the student's major field. With the advice of the full supervisory committee, the student will prepare three one-page abstracts of possible proposal topics. Topics should be chosen to permit an evaluation of the depth and breadth of a student's knowledge of the major field, as well as the capacity to approach a new research topic. Although the topics are in the student's major field, the chosen topics will not be in the specific area of the student's doctoral research project (i.e. not the same experiments or observations, although similar tools (lab methods, statistics etc.) may be employed), since that project should already have benefitted from substantial input from the advisor and the committee by this time. The reason for choosing a new topic is that the written exam is designed to gauge the student's capacity for original research.

The student should submit abstracts to the committee. The advisor will then poll the supervisory committee to select one, which shall then be the basis for the proposal to be prepared for the preliminary exam. This can be accomplished in a direct meeting or via email, but all abstract votes should be copied to all committee members to assure transparency in the process. The supervisory committee will have one week to select one of the abstracts for further development into a full proposal. The committee may ask the student to discuss the abstract topics prior to committee selection during a committee meeting. If no abstract is deemed to be acceptable, the committee can ask the student to revise the existing abstracts or produce more. The core ideas in these abstracts should originate with the student. Once a topic has been selected, the student will proceed to write the proposal. It is expected that the body of the final proposal will be no longer than 12 single-spaced typewritten pages in 12 point font with 1 inch margins (main text, excluding any references, CV, budget or other extra requirements the committee asks for). The length of time taken to prepare the written examination is 30 days.

The committee will provide guidance on the specific format for the proposal (generally NSF, NIH, or some other funding agency), including instructions on how closely the student is to follow such format (e.g. abstract requirements, formatting requirements budget, required forms). The student should receive no intellectual input from others; any other input should be approved by the committee. Other acceptable input could include meeting with a statistician to clarify experimental design or permission to have the proposal checked for proper English usage. However, the student should keep in mind this is a written take-home exam and as such falls under the provisions of the Kansas State University Honor Pledge.

The student's proposal is expected to present concisely (1) a description of the current status of the work in the area of this proposal and why the particular problem is of importance, (2) the rationale behind the approach to the problem, (3) the specific aims of the project (including a clear statement of the hypothesis or hypotheses and sub-hypotheses that will be tested), and (4) the methods used to test the hypothesis including clear experimental design and analyses ( e.g. plans for appropriate statistical analyses of collected data).

The proposal should include some indication of the state of the field and the need to solve the problem. This will, in part, require review of the literature. The review should be selective and thoughtful, not necessarily exhaustive, but a critical review of the literature directly relevant to the scientific investigation of the problem. It should reflect considerations of "Up-to-date" literature and developments that are significant to the problem.

The proposal should give specific details of the research plan, including: experimental or sampling design (including replication and controls if applicable) or other work which may be appropriate; the methods, species, and techniques (techniques do not need to be in step-by-step detail) to be used; the kinds of data to be obtained; and the means by which data will be analyzed and interpreted to test the hypotheses.

The types of questions that a student might expect would be included in evaluating this stage of the proposal: (1) Overall, is the design logically sound and suited to the problem under investigation? (2) If there are known confounding variables (importantly correlated with the dependent variables), has the student made provision for either controlling or evaluating their effects? (3) Does the student tell how he or she proposes to select a sample, build a preparation, perform a synthesis, sample natural phenomena or pick key species? (4) Does the student clearly identify the individual experimental unit and the level of replication where applicable? (5) Are there plans to deal with unanticipated problems (loss of replicates, unplanned disturbances to the project)? (6) Are methods of data collection and analyses appropriate? (7) Does the student understand the mechanisms behind the methods proposed?

Since it can be much easier to collect data than to analyze them, the committee is likely to look carefully at the plans for data reduction, interpretation of results with respect to hypotheses, and for signs that the student can carry the project to completion and report the findings. Evaluation of the student's ability to analyze and interpret data is based on the proposed plan for data analysis. The clarity with which the proposal is presented is critically important, both from the standpoint of effectively communicating ideas to the committee as well as an indication of the student's understanding and grasp of the problem proposed. Obscurity in writing often reflects that the student has not thought through the problem sufficiently.

Upon completion of the proposal, it should be submitted to the entire supervisory committee by the student. The committee will have 1 week to convey to the major professor whether the proposal is broadly acceptable or not. If so, the student will continue with the oral preliminary exam no earlier than two weeks from the acceptance date. If the supervisory committee does not find the proposal satisfactory, the supervisory committee will meet within 1 week to determine if the student has failed the exam or if minor revisions to the proposal are required. For the latter, the supervisory committee will provide a written list of criticisms that will be addressed in a period of no greater than two weeks. If the student is failed, the graduate school will be informed by submitting the ballot and graduate school procedures for retakes will be followed (see below).

### **B. The Oral Examination**

The student's major professor will conduct the meeting. The meeting will begin with a short (no longer than 15 minutes) presentation by the student outlining their proposal, which can be used by the committee to begin their questions. Each member of the supervisory committee will be called upon to question the student. Although the research proposal may serve as the foundation of questions, any examiner may cover any topic broadly related to the student's proposal and course materials from their program of study or research during the course of questioning. Moreover, the supervisory committee may choose to conduct the oral examination on other topics previously communicated to the examinee as outlined in the meeting to set examination content or subsequent meetings with the student that occurred at least 3 months prior to the examination date.

One goal of the oral examination is to determine the breadth of background of the student. This portion of the period is open-ended and will proceed until no further questions arise. The student will then be excused to allow the committee to reach a decision. Once a decision has been reached, the student is invited back to the examining room and informed of the results of the deliberation.

A decision to pass the student shall automatically convey recommendation of admission to candidacy for the degree. Therefore both areas of the graduate school ballot must be signed affirmatively.

The committee will follow the KSU graduate school guidelines upon a first failure. These are ([https://www.k-state.edu/grad/graduate\\_handbook/chapter3.html#Preliminary%20Examination](https://www.k-state.edu/grad/graduate_handbook/chapter3.html#Preliminary%20Examination)) *"In case of failure of the first preliminary examination, the supervisory committee may approve a second examination with no more than one dissenting vote. A second examination can be taken no sooner than three months following the initial failure. Once the supervisory committee and the student decide when the second examination is to be taken, the student should notify the Graduate School one month before the scheduled date. The composition of the supervisory committee shall not be changed before a final decision is reached on admission to candidacy. A second failure constitutes denial of admission to candidacy for the doctoral degree in the field of study of the graduate program. As with the first examination, the signed ballot must be returned to the Graduate School within one week of the determination of the results of the examination."*

### **Timetable for Ph.D. students in the Division of Biology at Kansas State University**

1. By end of Second Semester: Selection of a major professor.
2. By end of Second Semester: Formulation of the supervisory committee and establishing a program of study.
3. Annual Supervisory Committee Meetings: Evaluation of the student's potential, their progress and suggestions for the student research program. Although annual meetings are the minimal

requirement, a student or supervisory committee member may call a meeting at any time. These meetings are to help and assure the student is making adequate progress. In general, the more difficulties a student encounters in their progress should be correlated with the number of committee meetings.

4. Fourth or Early Fifth Semester: The supervisory committee will meet to evaluate the student's readiness to proceed to the preliminary exam. The specific format of the examination will be confirmed at this meeting (see above).
5. No Later than Fifth Semester: Administration of the written and oral examinations.
  - a. Start: Student's preparation of 3 abstracts. Submit to supervisory committee.
  - b. One week after submission to committee: Selection of one abstract by the committee.
  - c. One Month Prior to Oral Examination Date: The student shall notify the Graduate School. A ballot will then be sent directly to the major professor.
  - d. 30 Days After Abstract Selection: Submission of full research proposal.
  - e. One week After Proposal Submission: Supervisory committee will determine if the written proposal is acceptable. The oral portion of the examination can proceed in two weeks. The committee will meet within 1 week if the quality of the proposal is not viewed as acceptable.
  - f. Two weeks after Receipt of Proposal: Oral examination.

*Approved by vote of the graduate faculty in Biology, November 2013*