Guidelines for the Preliminary Examination
Department of Biomedical Engineering
Duke University
Updated: 1/14/15, by the DGS and BEPSA

The Duke University Graduate School recognizes only those students who successfully pass the Preliminary Examination as candidates for the Ph.D. degree. The biomedical engineering (BME) department does not conduct qualifier examinations to assess basic knowledge of the field; therefore, the Preliminary Examination is the only official assessment of student suitability and preparedness for seeking a Ph.D. in BME.

In addition to being familiar with Graduate School requirements for the Preliminary Examination (http://gradschool.duke.edu/academics/degree_reqs/phd_reqs/index.php), it is also critically important for each student to work closely with his or her research advisor, departmental advisor, and thesis committee in preparing for this examination.

In the BME graduate program, all students who stand for the Preliminary Examination must have a thesis committee comprised of at least five persons. Please note that this is one more committee member than the Graduate School’s requirement of four committee members. The committee must be comprised of:

- The research advisor (typically the chair of the committee), who must have a primary or secondary appointment in BME.
- At least three BME faculty members (including the committee chair), one of whom must have a primary appointment in BME.
- At least one cognate member from outside the department (typically from a clinical or basic medical science department). The fifth committee member is at the student’s discretion.

The Preliminary Examination assesses a student’s ability to conduct doctoral research. Successful completion of the Preliminary Examination will demonstrate:

- Technical competence.
- Critical thought, communicated both orally and in writing.
- The ability to generate a plausible, relevant, and rigorous research plan.

Preliminary Exam Timeline

1. The Committee Approval Form must be submitted through the BME Director of Graduate Studies Assistant (Kristen Rivers) and approved by the graduate school no less than 30 days prior to the oral component of the preliminary exam. It is recommended to submit the form to Kristen Rivers 60 days prior to the oral preliminary exam. http://gradschool.duke.edu/documents/policies_and_forms/committee_approval.pdf
2. The written document must be distributed to the committee at least two weeks prior to the oral examination.

Content of the Preliminary Examination

The Preliminary Examination includes both written and oral components that must be assessed by the full thesis committee.
**Written Component – Research Proposal**

The written component assesses the student’s ability to prepare a cogent scientific argument. It must include five key components:

1. A literature review from which the key hypotheses and experimental design are justified.
2. A list of hypothesis-, design- and/or discovery-driven objectives proposed for study.
3. A detailed methodology by which the hypotheses or designs are to be tested.
4. A preliminary data section that demonstrates the feasibility of the proposed research including the student’s ability to perform the necessary work.
5. A timeline with the best estimate of how long it will take to complete the proposed work.

The written document must be sufficiently detailed so that each of the above areas can be fully evaluated by the thesis committee prior to the oral examination. The written proposal should be confined in scope to the proposed research area, and the “sufficiently detailed to evaluate” criterion should be applied to all sections of the document (e.g. do not recount all prior accomplishments in graduate school, and avoid overly detailed and lengthy literature reviews).

The document length **shall not exceed single-spaced 30 pages** including figures and tables, but not including references or appendices. Different research groups expect different formats for this document. It is important that these expectations be discussed with the research advisor prior to preparing the document.

**Oral Examination – Presentation of Research Proposal to Full Thesis Committee**

The oral component consists of a presentation of the proposed research and questioning to assess the following:

1. Understanding of the proposed research area, and why the proposed research plan is the most appropriate and practical approach plan given the current state of scientific understanding and the available resources.
2. Competence in technical areas including prior coursework, knowledge relevant to the proposed research, and broad understanding of the scientific method.
3. The student’s ability to respond to questions with rational and considered answers founded in the scientific method. Questions may be asked to probe the student’s depth and breadth of understanding beyond that included in the written document.

**What to Bring to the Oral Examination**

- Required forms:
  2. Evaluation Rubric for the Preliminary Exam Proposal.
- Copies of your CV including publications and conference proceedings.
- Copies of your transcript.
- Check with your advisor for suggestions of what else to bring (i.e. printed copies of research proposal, printed handouts of your slides).

**Results of the Oral Examination**

- The outcome of the oral and written components (pass or fail) must be determined at the time of the oral examination.
- Revisions to the proposed research plan are also determined at the time of the oral examination. This research plan serves as a set of guidelines for completing the Dissertation. **While the natural course of the subsequent research trajectory may**
deviate from this plan, the thesis committee should be apprised of any significant deviations in a timely manner.

**Achieving Candidacy: Passing the Preliminary Examination**

At the conclusion of the oral examination, the committee will discuss the outcome of the exam and each member will vote to pass or fail the student. The following forms will be required:

- **Report of the Doctoral Preliminary Examination.** The outcome of the exam is documented on this form, which requires signatures from all 5 members of the committee.
- **Evaluation Rubric for the Preliminary Exam Proposal.** This is a department-specific rubric for the committee to evaluate the student and suggest future actions.

Both forms should be **signed and returned to Kristen Rivers after the exam.** Students should make and retain a photocopy of both forms.

In the event that a committee member cannot attend the oral examination, contact the DGS immediately. Permission may be granted for one committee member to attend the meeting via conference call. In this case, the absentee committee member must still sign the Report of the Doctoral Preliminary Examination Form.

Graduate School requirements state that: “Successful completion of the Preliminary Examination requires at least three affirmative votes and no more than one negative vote. The sole exception to this policy is that a negative vote cast by the chair of the examining committee will mean a failure on the examination. A student who fails the preliminary examination may apply, with the unanimous consent of the supervisory committee and the associate dean of The Graduate School, for the privilege of a second examination to be taken between three and six months after the date of the first. Successful completion of the second examination requires the affirmative vote of all original committee members. Failure on the second examination makes a student ineligible to continue a program for the PhD degree at Duke University.”

In BME passing the exam is not sufficient grounds for garnering a MS degree en route to the Ph.D. Students who wish to obtain a MS in BME must comply with the departmental requirements of presenting a written thesis (thesis option) or presenting a poster (coursework option) as described on the BME web site at [http://www.bme.duke.edu/grads/curriculum.php](http://www.bme.duke.edu/grads/curriculum.php).