BME Qualifying Exam
Mutual Expectations Document

The purpose of this document is to align expectations between the graduate student and qualifying exam committee. Any question or concern that arises may be directed to either the Associate Chair for Graduate Studies or Director of Graduate Training.

Policies:

- Students must be in good academic standing (i.e., minimum 3.0 GPA; no more than two 'I's; no 'F's or 'U's) to complete the written and oral exam.
- Students may discuss the scope of the project and relevant literature with an advisor and/or colleague.
- Students may not share the written exam with an advisor and/or colleague or receive verbal/written comments in advance of evaluation by the qualifying exam committee.
- If a student is submitting a grant and requires feedback and guidance from his/her advisor in advance of the qualifying exam, he/she may submit the individually-prepared written exam to gradstudies@bme.gatech.edu prior to receiving feedback on the document.
- Students may meet with members of the qualifying exam committee in advance of the exam; committee members may *not* reveal specific exam questions in advance of the oral portion of the exam.
- Advisors should attend the oral portion of the exam as an observer to ensure that the student receives a fair examination.

Timeline:

- Oral and written portions of the exam must be completed between August 1 and November 1 of the student's second year.
- The committee chair must receive the written portion of the exam at least three weeks prior to the scheduled oral exam.
- In the event that the written portion is not received by the required time, the Associate Chair for Graduate Studies or Director of Graduate Training must be notified and the exam must be rescheduled.
- Students who fail to complete the written and oral portion of the exam by November 1 will be placed on academic probation, ineligible for program support funds, and forfeit financial support. Sanctions will be lifted when the exam is completed.

Exam Format:

- The exam should not exceed 4-pages and should include the following sections:
  - Project Summary/Abstract
  - Specific Aims (2-3)
  - Research Strategy:
    - Significance
    - Approach (1 specific aim in detail)
  - Bibliography and References Cited (not included in 4-page limit)
- The following formatting rules apply:
  - Font must be 11 points or larger.
  - Type density must be no more than 15 characters per linear inch.
  - Line spacing must be no more than six lines per vertical inch
  - Arial, Georgia, Helvetica, and Patino Linotype recommended to meet above requirements.
  - Figures must be readable and included in page limit.
  - Paper size must be 8 1/2" x 11".

    - Margins must be at least one-half inch (top, bottom, left, and right) for all pages.
    - No headers or footers.
    - Single-column page format recommended for ease of reading.
    - Four pages total limit (not including citations).
- The exam contains an oral portion (60-90 min) that addresses fundamental engineering and bioscience concepts relevant to the student's research, as outlined in the written exam.

Assessment:

- Committee members will assess both the written and oral portion of the exam.
- Written exams are pass/fail and serve to narrow the scope of questioning for the oral exam.
- Only oral exams are assessed using the milestone rubric form – see below. Written exams have no separate rubricand are evaluated as pass/fail on the Decision Form.
- Results for written and oral portions are compiled by the chair, who will facilitate a *separate* pass/fail vote for the written and oral portion of the exam.
- Votes may be open, but must be a secret ballot if requested by any committee member. The vote is binding and voting must take place prior to the exam committee's adjournment.
    - PASS:
        - If the vote is 3/0 or 2/1 in favor, the student passes that portion of the exam.
        - The committee may make conditions (required within the following academic term, or next term of course offering) with the pass, and those must be recorded on the Qualifying Exam Decision Form completed by the chair.
    - FAIL:
        - If the vote is 1/2 or 0/3 and conducted for the first time, the student must retake the exam.
        - The committee may fail either the written or oral portion, or both written and oral portions.
        - The student is required to retake only the portion with a fail decision.
    - RETAKE:
        - A student may retake the written and oral exam only once.
        - At the time of the retake, the student must be in good academic standing.
        - Oral exam retakes should be scheduled as early as possible contingent upon readiness of the student and meeting any conditions, not to exceed 3 months.
        - Written exam retakes should be submitted as early as possible, not to exceed 1 month.
        - A student must pass both the written and oral portion of the exam.
        - If the committee votes to fail on either the written or oral exam retake, the student may elect to complete a terminal thesis-based Master's degree or be withdrawn from the program.

Notification:

- The chair of the qualifying exam committee must complete the Qualifying Exam Decision Form and collect Milestones Evaluation Forms from each committee member prior to adjournment.
- The chair should deliver evaluations to the BME Academic Office.
- Students and faculty advisors will receive the results of the qualifying exam via an electronic copy of the decision form, rubrics, and letter from the Associate Chair for Graduate Studies.
- Students may meet with their exam committee chairs to debrief the exam.
- Exam committee members may provide comments on the written exam, but this is not required.
- A student who does not pass will meet with the Associate Chair for Graduate Studies, exam committee members, and thesis advisor to discuss the results and make appropriate plans for next steps.

Rubric:

This rubric will be used for your QE, proposal and defense. Note that Criterion 4 is not part of the qualifying exam rubric. Use this link to access form: https://bit.ly/BMEmilestone

	Exceptional	**Proficient**	**Remedial**
Criterion 1: Applies a breadth & depth of advanced biological knowledge at the graduate level towards solving bioengineering problems	Consistently provides detailed answers on bio-mechanism without prompting. Able to explain the biological aspects of the problem with deep insight. Able to explain the biological system at the functional/structural/factual level.	Provides details but with some prompting. Demonstrates insight, but needs prompting to demonstrate deep insight. Able to explain the biological system at the structural/factual level.	Fails to articulate simple concepts in cell/tissue or physiology. Unable to explain how bio events inform design. Unable to explain a biological system at its functional level. Knows biological facts but can't apply at engineering /quantitative level.
Criterion 2: Applies a breadth & depth of advanced engineering skills and knowledge towards solving bioengineering problems	Consistently provides details of approach to problem without prompting. Able to explain engineering principles as relevant to the biological problem. Demonstrated the ability to gain insight into a biological problem using engineering principles.	Offers an approach but with some prompting. Offers some general detail of engineering knowledge. Able to identify engineering principles but not necessarily to solve a biological problem.	Unable to see relationship between engineering and biological formulations of a problem. Unable to solve basic engineering problems. Knows techniques but not how to use them.
Criterion 3: Integrates advanced biological and engineering concepts in solving complex biomedical problems	Consistently demonstrates awareness of how biology drives answers and checks that answers accurately reflect biological problem. Able to develop and explain an experimental design. Able to use new material to solve a problem on his/her feet.	Able to explain biological phenomena in engineering terminology. Offers a design but unable to clearly explain it, some information irrelevant. Slow to incorporate new material into the problem.	Unable to deal with or incorporate new information. Unable to demonstrate an understanding of the connections between an engineering and biological formulation of a problem.
Criterion 4: Demonstrates an ability to read, analyze, and synthesize literature	Routinely recognizes whether experimental approaches are rationally designed toward addressing hypotheses. Easily identifies errors & limitations. Able to interpret results objectively, consistently differentiates objective interpretation from conjecture & speculation. Regularly places body of work in larger contexts, typically integrates knowledge from multiple sources toward student's own approach & the field at large.	Often analyzes research critically. Mostly able to recognize errors & limitations. Needs some assistance in making objective interpretations of data; occasionally recognizes conjecture and speculation Shows some ability to place work in a larger context; occasionally able to integrate knowledge from other sources toward own work or field at large	Demonstrates general trust in all published literature. Cannot detect a study's limitations and errors. Unable to place body of work into the big picture; difficulty integrating knowledge from multiple sources toward his/her own work or the field at large.
Criterion 5: Utilizes a logical approach in the design, implementation, and evaluation of a research strategy to solve a complex biomedical problem	Able to clearly articulate rationale in defense of a claim without prompting.	Gives a partial chain of logic. Needs prompting to translate technical terminology into easily understandable terms. Demonstrates understanding of rationale but needs prompting to apply.	Unfocused responses. Makes vague statements with no clear tie to question Unable to defend statements.
Criterion 6: Effectively and efficiently communicates ideas in an organized manner to both engineers and scientists, as well as expert and novice audiences	Develops a chain of logic that is transparent & easy to follow. Offers only relevant, targeted information. Engages committee in the clarification process. Able to restate question in own words. Easily uses technical terminology and concepts to make points. Able to explain technical information in lay terminology.	Offers a chain of logic but it is not particularly transparent or easy to follow. Offers mostly targeted, relevant information Is aware of technical terminology but has difficulty connecting it to explanations.	Rambles and sidesteps the question. Unable to make list of clear goals and questions. Responds to different question than asked.

Overall Score: Exceptional /Very Good / Proficient / Needs Improvement / Remedial