

## Syllabus

### Qualifying Examination (IBMS 7001)

(2016-2017)

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**Objective:** The purpose of the Qualifying Examination (QE) is to determine if a student has met programmatic expectations with regard to: i) Acquiring a level of scientific reasoning and a knowledge base in his/her field of study appropriate for a graduate student at the current stage of training; ii) Demonstrating skills of problem-solving and development of experimental strategies designed to test hypotheses associated with a specific scientific problem; and iii) Demonstrating the ability to defend experimental strategies proposed for solving scientific problems. Successful completion of the QE is required for Admission to Candidacy and continuation in the IBMS Ph.D. program.

**Modular Structure:** IBMS 7001 is divided into 7 modules that are overseen by the 7 IBMS Disciplines as follows: IBMS 7001-2BA Biology of Aging; IBMS 7001-3CB Cancer Biology; IBMS 7001-4CGM Cell Biology, Genetics & Molecular Medicine; IBMS 7001-5III Infection, Inflammation & Immunity; IBMS 7001-6MBB Molecular Biophysics & Biochemistry; IBMS 7001-7NS Neuroscience; IBMS 7001-8PP Physiology & Pharmacology. Each IBMS Discipline is responsible providing its students with a detailed description of the examination process, and for ensuring that the programmatic expectations and goals of the QE are met.

**Expectations:** The Qualifying Exam (QE) is an S/U graded course in the IBMS curriculum (IBMS 7001), is required of all IBMS Ph.D. students, and **must be completed during the Spring semester of a Ph.D. student's second year in the IBMS program.** This timeline may vary slightly for dual-degree students. A student's Discipline Director/Academic Advisor will indicate in which of the IBMS 7001 modules the student should enroll. Failure to complete the QE during the specified semester may result in an Unsatisfactory (U) being posted on the student's transcript and could delay the student's admission to candidacy. Deviation from the expected timeline is possible only if justified and approved by a student's Discipline leadership in consultation with the student's Dissertation Mentor. Therefore, a student who does not complete the QE in the appropriate semester may receive a grade of Incomplete (I) until the exam is completed. Each IBMS discipline may determine the detailed logistics required for the administration of the QE process for its students so as to achieve the goals of the discipline while satisfying the expectations of the IBMS graduate program.

Minimal expectations in the design and administration of the QE include the following: 1) Prior to initiation of the QE, the expectations and process of the exam will be provided to the students. 2) Members of the IBMS Graduate Faculty will be identified and approved by the Discipline leadership who will serve as the QE Committee and who will administer and report outcomes of the examination. 3) A relevant unsolved problem in the biomedical sciences will be identified that is approved by the Discipline QE Committee and will serve as the basis for the examination. The QE question must be based on an idea conceived and developed by the student, and must not duplicate any aims in his/her mentor's active or pending grants. A written declaration from the student should be submitted to the examination committee in order to clarify the relationship between the proposed research and that of the student's

Dissertation Mentor's research. 4) An hypothesis-driven research proposal will be written by the student that describes experimental strategies for solving the QE problem. 5) An oral defense-of-proposal will examine the student's problem-solving process, and the soundness of the student's experimental design. Student Dissertation Mentors may attend oral defenses, but are considered to be guests and not members of the examining committee; and should only ask questions when invited by the QE committee chair.

**Grading:** Following the oral defense of the proposal, and based on clear criteria set by the discipline to satisfy the expectations of the discipline and the IBMS graduate program, the QE faculty committee will discuss the outcome and determine if Honors, Satisfactory, or Unsatisfactory is to be recommended to the student's Discipline Director. This grade, posted for the IBMS 7001 course, should represent the consensus of the examination committee. In addition, **the eCOGS-approved QE reporting form should be submitted** by the chair of the QE committee to the Discipline leadership indicating any recommendations that may be required to enhance the academic progress of the student. The Discipline Director is responsible for ensuring that the report is filed with the Assistant Director of the IBMS Graduate Program. Successful completion of the QE is required for Admission to Candidacy and continuation in the IBMS Ph.D. program.

- In the event that a student passes the QE, a grade of Satisfactory (S) or a grade of Honors (H) will be posted for IBMS 7001 by the student's discipline director on the Registrar's grade site.
- In the event that a student fails the QE, a grade of Unsatisfactory (U) may be posted for IBMS 7001. Alternatively, a grade of Incomplete (I) may be posted, and a **maximum of one remediation examination** will be allowed (timing and logistics provided by discipline leadership, but generally within 60 days of the original exam). If a student successfully passes the second attempt, the grade of "I" will be changed to Satisfactory (S).
- If a student does not successfully remediate, a grade of Unsatisfactory (U) will be posted for IBMS 7001. The report from the QE committee to the Discipline leadership should include a recommendation regarding whether the student should be considered for dismissal from the program by the Dean of the GSBS, or that a transfer into a Master's level degree track should be considered.

**Preparing a Qualifying Examination Proposal:** The following outline is a general guide for preparing the research proposal for the Ph.D. Qualifying Examination. **It is advisable for a student to confer with the Discipline Director for additional specific criteria that may be added by a student's discipline leadership.** The format is similar to that required by most grant agencies. The **MAXIMUM** length of the proposal is **10 single-spaced pages** (excluding title page, abstract, illustrations and references).

**Title Page** - title; name of candidate; graduate program and discipline

**Abstract** (approx. 400 words) – summary of objectives, protocol, and significance of the proposal.

**Research Plan** - (limit to 10 single-spaced pages):

- 1. Specific Aims** (approximately ½ -1 page) - The overall hypothesis and objective of the proposal should be clearly stated. Present 2-4 testable hypotheses (*e.g.*, Specific Aims).
- 2. Background** (approximately 3 pages) - The work of others that led to the overall hypothesis should be described, citing the most relevant references. A clear rationale should be provided for the importance of solving the research problem, along with its potential impact on current perceptions in the field.
- 3. Experimental Design** (remaining pages) - Each Specific Aim that is outlined in the first section (above), should have a parallel section in the Experimental Design section. Describe experimental strategies designed to accomplish each aim. Possible pitfalls to the proposed design and alternative experimental strategies should be noted. Regarding methods, sufficient detail should be provided to allow the reader the opportunity to critically evaluate the experimental approach chosen. However, lengthy descriptions of methods common to the field (*e.g.*, details concerning the formulation of phosphate-buffered saline, or the performance of SDS-PAGE) should not be included.
- 4. References** - Citations should be numbered consecutively as they are cited in the text, and references should be arranged in numerical order. Use accepted formats be consistent. Use only standard accepted abbreviations for the names of journals.