Ph.D. PROPOSAL-STYLE WRITTEN QUALIFYING EXAMINATION EXPANDED GUIDELINES

GENERAL INTRODUCTION

Each student must successfully complete a qualifying examination (both written and oral) administered by his or her Ph.D. Advisory Committee. The written examination can be either 1) a set of questions given and graded by each member of the student's committee, or 2) a proposal written using the strict guidelines given in Appendix 7. It is understood that the student and his or her Ph.D. Advisory Committee will agree to the form of the written examination (i.e., whether it will be in the Option 1 [Traditional] format or the Option 2 [Proposal-based format]). The student's major advisor will have the final authority to determine the type of exam taken by the student.

This proposal-based examination is to be written in a style typical of an NSF or NIH grant proposal. Your Ph.D. Advisory Committee will assess the quality of your proposal as if you were submitting the proposal to such an agency. In general, the proposal-based examination consists of a document that demonstrates the following:

1. The ability to identify a substantive proposal topic
2. The ability to formulate valid and testable hypotheses
3. The ability to identify the importance of and justification for the proposed research, by preparing a comprehensive review of related research literature and presenting the proposed project in that context
4. The ability to prepare a sound research plan that includes both appropriate techniques and approaches suitable for the testing of the hypotheses and alternative strategies and hypotheses.

There will also be a comprehensive literature cited section. Proposals must conform to all stated guidelines, including page limits, to be acceptable for review.

Refer to Section 7. a. ii (p.32) for the procedures for the proposal-based Written Preliminary Exam. All students should discuss with their major advisor whether to take the proposal-based examination and how to determine the specific topic of the proposal, especially if students have a major advisor that spans both EES and MCB.

Because one of the primary goals of the Written Examination is to test the student's competence in their general area of study, a satisfactory performance requires that the student demonstrate a comprehensive and in-depth knowledge of the concepts and methodologies of the disciplines comprising the major area of research interest. The student will also be expected to demonstrate an authoritative and up-to-date grasp of the literature in their area of specialization and to be able to discuss in detail the experimental design, rationale, and methodology used in their proposed research program. Proposals will be returned without review if guidelines are not followed and/or if the writing (irrespective of content) is unacceptable.

A. GENERAL INSTRUCTIONS

1. **Read and follow the instructions carefully to avoid delays and misunderstandings.**

In preparing the proposal, use English and avoid jargon. For terms not universally known, define the term the first time it is used, with the appropriate abbreviation in

parentheses; the abbreviation may be used thereafter. When using scientific names, add the common name in parentheses during the first mention.
Observe type size and format specifications throughout the proposal, or the document will be returned without review.

Prepare the proposal using uniform 2.5 cm margins at the top, bottom, and sides of each page. Use Times or Times New Roman 12 point font and single space line spacing in the main text of the proposal. Figures, charts, tables, figure legends, and footnotes may be smaller than 12-point font, but everything must be readily legible. Use black letters that can be clearly copied. Do **not** use photo reduction. You should prepare all graphs, diagrams, tables, and charts in black ink. However, if a figure would be significantly clearer if presented in color, you may do so. You should not use color simply to make the document look "pretty".

2. **Observe page limitations, or the proposal will be returned without review.**
The proposal must not exceed 15 pages, including text plus all figures, charts, tables and diagrams. This page limitation does not include **Literature Cited** (see Specific Instructions in Section B).

3. **Make the proposal easy to read and follow.**
The proposal must be well written using proper English grammar, but it also must be well organized and presented in an easy to read manner. You should imbed figures and tables within the document, next to the relevant section where they are first mentioned. Use bold, italics, boxes, etc. to highlight particular sections. Your submitted proposal should be written as if it will be submitted straight to NSF or NIH. Reviewers do not want to see a book report, and such proposals will be returned without review.

B. SPECIFIC INSTRUCTIONS *Sections of the Proposal*
For sections 1-4, do not exceed 15 pages. The face page, project summary, table of contents, and project description, tables, graphs, figures, diagrams, and charts must be included within the 15-page limit. Only the literature cited section (section 5) will not be included in the 15-page limit. **This page limit will be strictly enforced. Proposals that do not conform to the guidelines as outlined in this document will be returned without review, thus resulting in a failed written examination.**

1. **Face Page**
Include the following information:

Title of Project Do not exceed 56 characters, including the spaces between words and punctuation. Choose a title that is specifically descriptive, rather than general.
Your Name
Date
List of Ph.D. Advisory Committee Members (indicate major advisor).

2. **Project Summary** The proposal must contain a summary of the proposed activity not more than one page in length. It should not be an abstract of the proposal, but rather a self-contained description of the activity that will take place during the research

period. The summary should be written in the third person and include a statement of objectives, methods to be employed, and the significance of the proposed activity to the advancement of knowledge. It should be informative to other persons working in the same or related fields and, insofar as possible, understandable to a scientifically or technically literate lay reader.

3. **Table of Contents** Provide the page number for each category listed on the Table of Contents. Number pages *consecutively* at the bottom of each page throughout the application. Do not include unnumbered pages.

4. **Project Description (see Section C)** The Project Description should include sufficient information needed for evaluation of the project, independent of any other document. Be specific and informative; avoid redundancies. The main body of the proposal should be a clear statement of the work to be undertaken and should outline the general plan of work, including the broad design of research activities and adequate description of experimental methods and procedures. Organize items in the Project Description to answer these questions: (1) What do you intend to do? (2) Why is the work important? (3) How are you going to do the work?

5. **Literature Cited** List all references. ***(This is the only section that can be of any length and that is not included in the 15-page limit.)*** Each reference must include the title, names of all authors, book or journal, volume number, page numbers, and year of publication. They should conform to a standard format. The references should be limited to relevant and current literature. While there is no page limitation in this particular section, it is important to be concise and to select only those literature references pertinent to the proposed research. You should pick key papers to the field and review articles. ***NOTE***: You should read every paper that is cited in this section. It is not ethical to simply cite what other people have cited.

C. RECOMMENDED PAGE DISTRIBUTION FOR THE *PROJECT DESCRIPTION*

1. Specific Aims List the broad, long-term objectives and what the proposed research is intended to accomplish. State the hypotheses and predictions to be tested. ***One page is recommended.***

2. Background and Significance Briefly sketch the background leading to the present proposal, critically evaluate existing knowledge, and specifically identify the gaps that the project is intended to fill. State concisely the importance and scientific relevance of the research described in this application. Why and/or how will it lead to a significant advancement of the field? ***Three pages are recommended.***

3. Preliminary Studies/Data Describe or present data of any preliminary studies that suggested models/hypotheses presented in the specific aims or that support the feasibility of the proposed experimental approach. A proposal must present research that is both significant and feasible. Present only those studies that are directly relevant to the rationale and/or design of the proposed research. Usually you or your major advisor will have done these studies. ***Two to three pages are recommended.***

4. Research Design and Methods Describe the research design and the procedures to be used to accomplish the specific aims of the project. Include how the data will be collected, analyzed, and interpreted. Describe any new methodology and its advantage over existing methodologies. Discuss the potential difficulties and limitations of the proposed procedures and alternative approaches to achieve the specific aims. As part of this section, provide a tentative sequence or timetable for the project; this timetable should be no more than ½ a page. ***Five pages are recommended.***

NOTE:
Proper scientific writing is an extremely important part of science. Whether you become involved in teaching, academic or industrial research, or government policy, your job will include writing technical documents, proposals, and reports. The success of your career will depend not only on the creativity of your research, but also on your ability to communicate your ideas and results. The proposal-based Written Examination provides you the opportunity to work on your scientific writing, and garner the help and suggestions of experienced faculty members. We look at this proposal-based option as an opportunity to help you grow and mature in your chosen field, and as an important step in ensuring your success as an investigator.

PH.D. WRITTEN EXAMINATION PROPOSAL-BASED TIPS

Summary: Browse examples of abstracts of funded proposals at NSF: http://www.nsf.gov/awardsearch/ or NIH: https://projectreporter.nih.gov/reporter.cfm

Specific Aims
□ Somewhat of a misnomer, since you DO NOT want just a specific list of experiments to perform.

□ Need to convey critical scientific questions/rationale that prompt each set of experiments proposed.

□ Often easily expressed as questions.

□ Best if expressed as hypotheses to test.

□ Following each scientific question/hypothesis, cite experiment(s) that will answer/test.

□ Format as actual listing/outline.

□ Numbering/lettering of individual aims and experimental strategies should correspond to the numbering/lettering of subdivisions in Project Description.

□ Debatable point: For this section & throughout (except in Project Summary), first person writing is more readable than passive voice.

Project Description
□ State explicitly what you plan to/will do.

□ Avoid conditional phrases, such as “We could…” or “Another experiment that could be done…”

□ For techniques that are not commonly performed, be sure to provide sufficient details to convince reviewers that you will be able to carry out the proposed experiments.

□ Avoid proposing significant bodies of work that would require making or acquiring any specific reagent.

□ For example, if your entire proposal depends upon having a specific antibody reagent, and your first step is to generate that antibody, your review committee will be skeptical of your likelihood of success.

□ Be sure to present predicted outcomes of experiments, together with their interpretation relative to your specific aims.

□ If alternative outcomes are possible, consider each and describe your subsequent experimental direction given either outcome.

□ Be sure to consider the possibility of experimental failure/malfunction.

□ Be realistic about what can be reasonably accomplished in the time proposed.

It is strongly recommended that each student discuss in detail the format requirements and expectations of his/her major advisor and committee members for the proposal.

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