Biotechnology PhD Candidacy Examination

I. INTRODUCTION

The candidacy exam is designed to provide standardized criteria for the assessment of Ph.D. candidates and is a requirement for successful completion of the Ph.D. program. The exam combines a written component with an oral presentation and defense. The written component is a research proposal on a topic not directly related to the candidate's research prepared in the general format of an NSERC Operating Grant proposal. This format will encourage students to read rigorously in the scientific literature, to identify and elaborate on current research directions, and to prepare and defend a document describing a reasonable research goal. Such an exercise will provide candidates with an excellent preparation for writing their own thesis as well as beginning a practice of scientific writing and exposition that is a vital component of a professional scientific career.

II. TIMING OF EXAM

Students entering with an M.Sc.

Students who enter the Ph.D. program with an M.Sc. must pass the candidacy exam within one year of their initial registration.

Students transferring from the M.Sc. Program

Students in the Biotechnology or another appropriate Master's program (e.g. Chemistry or Biological Sciences) at Brock University who wish to transfer to the Ph.D. program must do so within four terms from their date of initial registration. Students who do not switch in this time frame can only enter the Ph.D. program after obtaining an M.Sc. After transfer to the PhD. program the candidate must write the Ph.D. candidacy exam within the first year of their registration in the Ph.D. program.

Approval to enter the PhD program may be given by the Director after having received a favourable written report from the student's supervisory committee, and after having consulted with the Biotechnology Program Committee. Typically, the acceptable candidate would have achieved the following: the successful completion of at least one full credit towards the degree with an average > 75%; presentation of one hour-long seminar as part of the seminar course BTEC 5P95, BIOL 5P95, or equivalent. Some accommodation may be given in particular instances.

For all candidates the following conditions must be met:

1. The candidate should notify the designated Chair of the Examination Committee at least 8 weeks prior to the end of their fourth term of registration in the Ph.D. program of their intent to write the candidacy exam.

2. Students in the M.Sc. program may write the candidacy exam at any time prior to the official deadline described above.

III. EXAMINATION PROCEDURES

Composition of the Examination Committee

The Examination Committee will be composed of the following members:

3. A Chair who will attend all the candidacy exams for a given academic year. The Chair need not be a member of the Biotechnology Program Committee, but could be any full-time faculty member from participating Departments in the program. The Chair does not vote.

4. One member of the Centre for Biotechnology or supporting department who is most familiar with the area of research. This faculty member will normally be one of the non-supervising members of the Supervisory Committee.

5. Two other faculty members from Departments supporting the Biotechnology program (not including the remaining member(s) of the candidate's Supervisory Committee).

6. The supervisor(s). The supervisor(s) will not ask questions and will not vote. The supervisor will be allowed to address the examination committee prior to the vote on the student's performance. No supervisor that has been named as a co-supervisor will be allowed to examine the candidate.

7. Examiners will complete an evaluation form and deliver it to the Administrative Assistant of the Centre for Biotechnology at least 48 hours prior to the exam.

Format of the Written Research Proposal

The exam will test the candidate's ability to put forward an hypothesis and defend the rationale for testing that hypothesis. It provides a forum to view the candidate's ability to describe a research goal based on literature precedent, to defend that goal and the methods by which the hypothesis is to be tested. As such the exam should also serve as a barometer of the candidate's capacity for independent thought. The proposal should be realistic such that a single researcher could hope to make significant progress on the topic in a few years effort.

The proposal will have the general format of an NSERC Research Grants proposal an will include:

1. An abstract of 250 words or less.

2. An introduction and background information that situates the topic in the literature.

3. A proposal describing new work to be performed and the essential design of experiments and methods to test the proposed hypothesis. The NSERC format allows a total of 5 pages of single-spaced text for the introduction, background

and proposal plus 1 additional page for references. The forms can be found on the Biotechnology web site.

4. A budget for personnel, equipment, materials, and any other necessary costs.

Students should be prepared to supply an electronic copy of the proposal upon request. Normally a proposal would include no more than two or three figures or tables. Figures should clarify, and not serve as a place for additional text. A copy for each member of the committee should be submitted the to Administrative Assistant for the Centre for Biotechnology two weeks prior to the examination.

Choice of Topic

Understanding that the choice of suitable topic places an inordinate amount of responsibility on the candidate, the topic of the Research Proposal may be arrived at as follows: Once the candidate has announced their intention to take the examination, the Examination Committee will solicit topics from the candidate and vet them, rejecting grandiose or trivial topics, as well as those deemed too similar to the candidate's thesis research. It is assumed that the student may receive some help in this regard from their supervisory committee. No student should proceed with preparation of a Research Proposal without having received permission to do so from the Examination Committee.

Format of the Oral Presentation

The candidate will give a brief oral presentation of the hypothesis and the rationale for testing the hypothesis. This presentation may be no longer than 20 minutes. Presentations longer than 20 minutes will be stopped by the Chair.

Format of the Questioning

There will be two rounds of questions by the examiners. The Chair may also participate in the questions but is not required to do so. Questions must relate to the proposal, but can cover any aspect of the proposal and the background to it. They are expected to be wide-ranging, but if questions stray too far from the topic or serve no obvious assessment purpose, then the opinion of the Chair will determine whether the discussion shall continue.

IV. ASSESSMENT PROCEDURES

The examination is to assess whether the candidate has the ability to synthesize a coherent, potentially achievable research proposal, and to defend that topic and the chosen methods for the experiments and the evaluation of results. The candidate's performance will be based on the following criteria:

1. The understanding of basic principles, including (but not limited to) principles behind the methodology and the background to the phenomenon or topic being investigated.

2. The feasibility of the project and the approach chosen by the candidate. Consideration will be given for the relative speed of various types of research.

3. The clarity of communication, both in the written research proposal and during the oral presentation and questioning.

4. The adequacy of the introduction and the literature review.

Method of Assessment

The candidate will be asked to leave immediately following the questioning and wait at some location removed from the examination room. The supervisor(s) will be invited to make comments on the candidate's performance and on the appropriateness of the direction of questioning. The supervisor(s) will be asked to leave prior to the discussion of the candidate's performance. The Examination Committee will discuss the candidate's performance taking into consideration the supervisor's comments. The members of the committee will vote and the results of the vote will indicate in the first instance whether the candidate will be allowed to proceed in the PhD program. If the vote does not favour continuance in the PhD program the committee will recommend whether the student will be invited to write an M.Sc. thesis or will be asked to leave the program.

The vote will be confidential.

The Examination Committee may request that a passing performance for the candidate be recorded only after completion of remedial work, which may include tests, essays or courses, and is at the discretion of the examining committee.

V. ROLE OF THE CHAIR

The Chair of the Examination Committee has the following responsibilities:

1. To choose the committee members

2. To note the areas where the candidate excels or has difficulty, and the supervisor's comments.

3. To ensure that the questioning remains on time and on track.

4. To count the vote of the final assessment.

5. To note the final results and to assess the candidate's performance relative to his or her peers.

6. To communicate the final result (pass or fail, and whether any remedial work is required) to the student, the supervisor and the Director of the Centre for Biotechnology.

VI. APPEALS PROCEDURE

1. To appeal the result of a Candidacy Examination, the candidate must provide a written request to Director of the Centre for Biotechnology (or designate, if unavailable) stating the basis for the action within one week following the exam. Only in exceptional circumstances will an appeal based on arguments of scientific merit be considered. It is not the purpose of the appeals committee to re-do the exam.

2. The Director of the Centre will then form a three-member appeals committee to consider the request. This committee will be chosen from among the members of the Biotechnology Program Committee who have no direct involvement with the student or other conflict of interest. If it is impossible to find three such individuals, other faculty, from outside the committee may be asked to serve.

3. The appeals committee will receive a written report from the Chair of the Examination Committee as well as the request from the candidate. The candidate's supervisor may also elect to submit a letter to the committee. Any other relevant documentation must be submitted to the committee. At its discretion the committee may also interview the participants; first the examining committee, then the student and supervisor.

4. The appeals committee will meet within one week to arrive at a judgment. A brief report must be written dealing with the acceptability of the grounds for the appeal and whether the appeal is denied or approved.

5. A successful appeal will result in a repeat of the qualifying exam with the same examination committee (if possible) unless specific circumstances dictate otherwise. The appeal committee report will be provided to all members of the examining committee, the appeals committee, the appellant and the Director of the Centre for Biotechnology.

6. Further appeals must be directed to the Graduate Studies Office.