Department of Biomedical and Molecular Sciences

BIOCHEMISTRY
GRADUATE PROGRAM GUIDELINES

2013 - 2014

DEPARTMENT OF BIOMEDICAL AND MOLECULAR SCIENCES

BIOCHEMISTRY GRADUATE PROGRAM GUIDELINES 2013-2014

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All correspondence, enquiries, academic change forms and registration forms should by directed to the Program Assistant in the School of Graduate Studies.

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I. INTRODUCTION

Welcome! The Graduate Program in Biochemistry at Queen's University offers programs of study leading to the Master of Science (M.Sc.) and Doctor of Philosophy (Ph.D.) degrees. This handbook serves as a guide for students enrolled in both the M.Sc. and Ph.D. programs and as information for others who are considering graduate work in this Program. Graduate studies at Queen's University are administered under the regulations of the School of Graduate Studies, as described in the *Graduate Studies Calendar* and in the documents *Guide to Graduate Supervision* and *Guide for Graduate Departments*. You should become familiar with those general requirements in addition to the policies and information provided in this guide. The *Biochemistry Graduate Program Guidelines* are designed to provide information specific to the Biochemistry graduate program relating to a student's appointment and to the operational and administrative aspects of the program.

If you would like to discuss any policy or procedure found in this handbook or offer suggestions for improving its content, feel free to contact your adviser, the Coordinator of Graduate Studies and/or the Graduate Program Assistant, Diane Sommerfeld.

Program Goals and Priorities

1. Both the Master of Science and Doctoral degrees in Biochemistry are research degrees, and the goal of the Graduate Program is to provide the student with the optimal conditions under which she or he can develop into an independent, productive, research scientist.

2. The result of this development should be an individual who, based on solid, advanced knowledge and practical experience, has the ability to
   a) recognize and define significant problems and design the proper experiments through which problems can be solved,
   b) assess the time and effort required to solve problems,
   c) communicate the resulting scientific advances in seminars and journal papers
   d) operate as a member of a research community in which the productivity of the entire group depends on proper handling of common research facilities (i.e. equipment, library) and has the breadth of interest, creativity, and confidence required to be an active and productive scientist.

3. The activities in the Program include courses, seminars, journal clubs, and examinations, all of which are designed to help the student develop the above traits.

II. APPLICATIONS AND ADMISSION

Application Procedure

The Graduate Program Assistant deals with all enquiries about the graduate program. Individuals interested in graduate studies are emailed on-line application instructions. Applications and reference letters are submitted electronically and accompanying documents, ie. official transcripts, English testing results, are submitted directly to the School of Graduate Studies.

Acceptance

When an applicant's file is complete, it is circulated amongst the members of the Graduate Program Committee. In making this decision the Graduate Program Committee carefully examines the reference letters, transcripts and all other information submitted by applicants. The Graduate Program Coordinator is responsible for establishing a consensus view and for seeking approval from the School of Graduate Studies for accepting the applicant. Official letters of acceptance are sent only by the Dean or the Registrar of the Graduate School.

Academic Qualifications

The academic qualifications for admission established by the School of Graduate Studies are adhered to plus additional Departmental requirements. The minimum qualification for admission to the Master's program is normally an upper second class Honours B.Sc. degree (average above 75% in the final two years) or its equivalent.

The minimum qualification for admission to the Ph.D. program is one of:

1. An M.Sc. in biochemistry or a related science.
2. Successful completion of the Mini-Masters exam.
3. Students with a first-class Honours B.Sc. degree may be considered for direct admission to the Ph.D. program.

In addition to these requirements, proficiency in English is a prerequisite for admission. International students whose native languages do not include English are required to obtain satisfactory standing in the Test of English as a Foreign Language (TOEFL). The minimum acceptable TOEFL score for the Department is 600 paper-based and 88 computer based. Graduates of an international university are required to obtain a minimum equivalent of 80% in the Graduate Record Examination (GRE) test, 80 in the MELAB test or an academic module of 7 in the IELTS test.

In cases where the applicant does not have a sufficiently strong background in biochemistry, the Committee may make acceptance conditional on the student successfully completing certain double-numbered biochemistry courses (e.g. BCHM 410/810 or BCHM 411/811).

Research Supervisor

Once a student is accepted into the graduate program, he or she must identify a faculty member in the Department who is willing to act as a research supervisor. An offer to recruit a student into a research laboratory must be made in writing by the prospective research supervisor. In cases where financial assistance is to be provided from research grants or contracts, the research supervisor must communicate clearly and in writing to the student the terms - amounts, length of time, conditions - of their financial commitment. For additional details of the responsibilities of supervisors, access the School of Graduate Studies *Roles and Responsibilities in Graduate Supervision,*

available at www.queensu.ca/sgs/orientation/support.html#supervision. The student must accept the research supervisor(s) offer in writing, stating the date that they will start graduate studies. The originals of both letters should be given to the Graduate Program Assistant who will place them in the student's file.

III. FINANCIAL SUPPORT

Stipend

The Graduate Program Committee reviews annually the minimum stipend to be paid to graduate students, taking into account increases in tuition and the cost of living. The Committee's recommendations are presented for approval at the departmental level, where a final decision on the amount of the minimum stipend is made. The current amount of the minimum stipend can be obtained by contacting the Graduate Program Assistant. For those students who have been awarded scholarships at the university, provincial or national level, the stipend reflects the relative level of that success. Remuneration received by students for undertaking Teaching Assistantships in the Biochemistry graduate program is **not included** in the minimum stipend. Tuition and student fees are paid by the student (see the Graduate Calendar for details).

Most students receive financial support from scholarships and fellowships, Queen's Graduate Awards and from their supervisor's research grants. In the situation where a supervisor is unable to meet their financial commitment to a student, the Department will make its best effort to secure alternative supervision and help the student to complete his or her program, but cannot guarantee that the student will receive the minimum stipend.

Teaching Assistants

A certain amount of money is available per year for Teaching Assistants (TAs). Graduate students may TA in the third year and fourth year biochemistry course laboratories (BCHM 310, 317 and 421, 422), mark reports and examination papers (BCHM 310, 315, 316, 411) or act as tutors (BCHM 102 and MBIO 218). Payment is at an hourly rate, which can be obtained by contacting the Graduate Program Assistant.

It is not required that any student undertake employment as a TA, although it is highly recommended that all students participate at least once during their degree program because of its value as a teaching experience. In any one year, not all graduate students are necessarily offered the opportunity to demonstrate, however, the department will attempt, to the extent possible, to distribute these types of student employment fairly. The criteria used for the selection of TAs in are outlined in the Collective Agreement between Queen's University and PSAC Local 901, representing graduate Teaching Assistants and Teaching Fellows. This document contains important information on the rights of graduate students employed as TAs and also provides details of the grievance mechanism to be followed by a graduate student who feels that a University policy has not been appropriately or fairly applied.

Vacations

Each graduate student receiving a stipend from the supervisor is allowed to take two weeks of paid vacation per year. The supervisor and graduate student should agree upon a mutually suitable time. The period between Christmas and New Year's Day,

when the University is closed, does not count toward this vacation time, whereas time off taken during other university closings (such as Reading Week) will be counted as vacations, except for statutory holidays.

IV. RESEARCH ADVISORY / SUPERVISORY COMMITTEES

The role of the research advisory committee is to assist supervisors in their monitoring function and also to provide guidance and advice on the student's research, complementing the expertise of supervisors. All new and continuing Master's and Doctoral students should have a Research Advisory Committee composed of (1) their supervisor(s), (2) a Biochemistry faculty member, and (3) a faculty member from either Biochemistry or another research related program.

The membership of the Research Advisory Committee will be selected by the student in consultation with their supervisor(s) and the Graduate Program Coordinator and must be chosen by the beginning of the third week of study. The Graduate Program Coordinator must be informed of the composition of their Research Advisory Committee by the student. The committee is required to meet at least once a year and complete a progress report that will be submitted to the Graduate Program Coordinator. A copy of the report will be sent to the student, committee members and to the Graduate Program Assistant for the student file.

At the beginning of a student's graduate program, the Research Advisory Committee acts as a Proposal Review Committee to ensure that students have embarked on a sound research project. In addition, an orientation session for new graduate students is scheduled in September, outlining the degree programs and graduate student requirements. The Research Advisory Committee will form the core of the student's examining committee for the required Research Proposal Review (see below), as well as Mini-Master's, Comprehensive and thesis examining committees.

V. REQUIREMENTS FOR THE M.Sc. DEGREE PROGRAM

The requirements of the M.Sc. program must be completed satisfactorily within five years from the time of initial registration in the program. In most cases it is expected that an M.Sc. degree can be completed in 2 years. The following are the Departmental requirements that must be met to obtain a Master of Science degree.

1. **Course Requirements** - Students must complete a minimum of **three half-credit courses** at the 800 level, **two** of which must be chosen from the graduate half-courses offered by the department (BCHM 820, 822, 823, 824, 828, 841 and 875). Dual-numbered courses offered by the Department (e.g BCHM 410/810, 411/811, 432/832) must not be taken unless recommended by the Graduate Program Committee. Graduate courses and dual-numbered courses from another graduate degree program may be acceptable provided that it can be shown that the work required of graduate students is of graduate caliber and that the course is appropriate for the program in which the student is registered. The particular courses taken must be authorized by the Graduate Program

Committee in consultation with the research supervisor. BCHM 828/928 is highly recommended to be taken in the first year of study. When taking a dual-numbered course along with BCHM 828/928, the third required course must be a Biochemistry graduate course, and not one from another graduate degree program.

2. **Animal Care** - Students who will be working with animals must take the Introduction to Animal Care Moodle based course, QACS 799 course code. Credit for this course does not count towards the course requirements listed above.

3. **Research Proposal Review** - The Research Proposal Review should take place **6 to 9 months** after the student has entered the M.Sc. program and must be completed prior to registration for the second year of the M.Sc. program. This timing will be rigidly enforced by the Graduate Coordinator.

The purpose of the Research Proposal Review is to ensure that the student has decided on a thesis research project that is at the appropriate level for the degree sought, has formulated a reasonable hypothesis or hypotheses, has mapped out specific objectives and has chosen an experimental approach that is reasonable and feasible. The review provides the committee with an opportunity to discuss these matters with the student and to provide advice if necessary. It is important to note that the research plan approved by the review committee **may be altered** as the student's research progresses and new results become available.

The Research Proposal Review Committee will consist of the student's Research Advisory Committee. The student and supervisor are responsible for choosing the members of the committee. The student is responsible for contacting the members of the review committee to ensure that they are available for the date and time the student has chosen. At least two weeks prior to the expected review date, the student must inform the Graduate Program Assistant of the arrangements that have been made so that she can confirm them in writing with the committee members and reserve a room for the presentation.

The Research Proposal Review consists of:

(a) submission of two pages (maximum) letter-sized, single-spaced (font no smaller than 12 point) exclusive of figures and references. The document should be set up with the following headings: (1) Background (2) Hypothesis (or Hypotheses) (3) Specific Objectives and (4) Experimental Approach. This document must be submitted to the examining committee members **at least 2 days** prior to the review meeting.

(b) an oral examination. The oral defense will begin with a brief (20 minute) presentation by the student summarizing the proposed research project and the research progress that has been made to date. The student will then defend/discuss the project with the review committee. Each examiner usually is allowed 20 minutes to question the student.

The results of the research proposal review will be communicated to the student immediately following the examination. In addition, the student's supervisor will

write a synopsis of the meeting which will be copied to the student, the members of the review committee and the Graduate Program Assistant. A copy of the report will be placed in the student's departmental file.

If the proposal is deemed unsatisfactory, the student will be required to re-attempt the review within one month; a revised document may or may not be necessary. One member of the Graduate Program Committee will act as Chair only in the event that a Graduate Program Committee member is not part of the Research Advisory Committee. If a Graduate Program Committee member is included among the student's Research Advisory Committee, then another Biochemistry faculty member can act as Chair. If this second attempt is unsatisfactory the student will be required to withdraw from the program. Students taking BCHM 828/928 are not required to present a Research Proposal Review. For both the Research Proposal Review and BCHM 828/928 course, the student's supervisor is responsible for taking all marks forms to the presentations and reviews.

4. **BCHM 830 Seminar Course** - The requirements for BCHM 830 are:

   (a) students *must attend* all Visiting Speaker and BCHM 830/930 seminars. Attendance may be taken from time to time to monitor student participation. Please note that lack of attendance may result in the student not receiving credit for the course.
   (b) students must present a seminar to the Biochemistry faculty and graduate students. The seminar should be 20 minutes in length leaving 10 minutes available for a question/answer period. The seminar must be presented at least four months prior to the submission of the M.Sc. thesis. A seminar date can be arranged by contacting the Program Assistant for the Visiting Speaker and BCHM 830/930 seminar programs. Members of faculty will grade the seminar based on the clarity of the presentation (20 marks), the scientific content (50 marks) and student's response to questions (30 marks). Comments on the seminar will be communicated to the student in a letter from the Graduate Program Coordinator that has been approved by both the Graduate Program Committee and the supervisor.

5. **Master's Thesis (BCHM 899)** - The student must prepare a satisfactory thesis and successfully defend it. Details for preparation of a M.Sc. thesis are given on pages 15 to 23. Composition of the examining committee will be suggested by the student and supervisor; the Graduate Program Coordinator will approve the final committee membership.

VI. REQUIREMENTS FOR THE Ph.D. DEGREE PROGRAM

The requirements of the Ph.D. program must be completed satisfactorily within seven years from the time of initial registration in the program. In most cases it is expected that a Ph.D. degree can be completed in 4 to 5 years. The following are the Departmental requirements that must be met to obtain a Ph.D. degree.

1. **Course Requirements** - Students must complete a minimum of **four half-credit**

courses at the 800 level, **two** of which must be chosen from the graduate half-courses offered by the department (BCHM 820, 822, 823, 824, 841, 875 and 928). Dual-numbered courses offered by the Department (e.g. BCHM 410/810) must not be taken unless recommended by the Graduate Program Committee. Graduate courses and dual-numbered courses from another department may be acceptable provided that it can be shown that the work required of graduate students taking the course is of graduate caliber and that the course is appropriate for the program in which the student is registered. The particular courses taken must be authorized by the Graduate Program Committee in consultation with the research supervisor. BCHM 828 is an exclusion to BCHM 928.

For students who have successfully completed the Mini-Masters examination or have already obtained an M.Sc. degree, the Graduate Program Committee, in consultation with the research supervisor, may grant up to **three half-credit courses** for appropriate courses taken prior to entering the Ph.D. program. At least one of the half-courses taken for the Ph.D. program must be a core seminar-style Biochemistry course (ex,. BCHM 820, 822, 823, 824, 841).

2. **Animal Care** - Students who will be working with animals must take the Introduction to Animal Care Course, QACS 799. Credit for this course does not count towards the course requirements listed above.

3. (a) **Research Proposal Review** - The procedure to be followed for the Research Proposal Review for Ph.D. students is identical to that described above for M.Sc. students. **Note that students who enter the Ph.D. program via the Mini-Master's route or who take BCHM 928 are not required to present a Research Proposal Review.**

(b) **Combined Research Proposal Review / Comprehensive Examination** - If students complete their M.Sc. degree and transfer to the Ph.D. degree program under the same supervisor, they have two options:
1) have the Ph.D. Research Proposal Review and Comprehensive Examination separately or
2) combine the Ph.D. Research Proposal Review and Comprehensive Examination.
If the second option is chosen, the student must abide by the same time-lines as for the Research Proposal Review, which is 6 to 9 months after entry into the Ph.D. program. The student also requires their supervisor's authorization before a combined Research Proposal Review/ Comprehensive Examination can be arranged.

Submission of the 20 page document should include the following headings: (1) Background, (2) Hypothesis (or Hypotheses),
(3) Specific Objectives, (4) Experimental Approach

All other document specifications, submission and distribution deadlines, are as per the Ph.D. Comprehensive Examination instructions and procedures.

Ph.D. Comprehensive Examination - This examination will test the student's comprehensive knowledge of their research area. As such, students are encouraged to understand all aspects of their research area, ranging from specific details of their proposed studies to broad-based knowledge.
Direct entry Ph.D. students as well as Ph.D. students with an M.Sc. will have essentially the same examination within 18 months of entering the program that will constitute the requirement for the Comprehensive examination in the Biochemistry Ph.D. degree program.
The composition of the Examining Committee will be the student's Research Advisory Committee plus a Chair (selected from the Graduate Program Committee if a GPC member is not part of the Research Advisory Committee) and one additional member. This can be a member Biochemistry graduate program or a member from another graduate program who has special expertise in the research subject area; approval for inclusion of a member of the Examining Committee from another department must be obtained from the Graduate Program Coordinator in consultation with the student and research supervisor. Not more than one member of the Examining Committee should be external to the Biochemistry graduate program. Any concerns that the student has about the composition of the Comprehensive Examining Committee should be brought to the attention of the Graduate Program Coordinator or the Head of the Department as soon as possible.

The Comprehensive Examination consists of:

(a) **submission of a double-spaced, type-written document no longer than 20 letter-sized pages in length, exclusive of figures and references.** Pages should have 1" margins all around and be numbered. The font size must be no smaller than 12 point.
Note that 30% to 40% of the document will consist of background / introductory material.
The remainder of the document will be divided equally between the research work accomplished to date, and the research proposed for the remainder of the Ph.D. program.
The proposed research should be divided into a set of 2-4 clearly defined objectives which would correspond to chapters in a thesis. For each objective, the rationale for carrying out the proposed experiments should be clearly presented and the experimental procedures to be used should be briefly described.
The student must submit this document to the Graduate Program Assistant at least **two weeks** prior to the expected examination date so that members of the Examining Committee can be contacted to arrange a date, time and location for the examination.

(b) **completion of an oral examination**. At the beginning of the examination the student will present a 15-20 minute summary of the proposed research project including work accomplished to date. Subsequently, each examiner will be allowed approximately 20 minutes for questions. This may be followed by a supplementary round of questions. The questions asked during the examination can be wide-ranging in nature, but will be focused on determining the **general**

knowledge that the student has of their research area, both in terms of the experimental design as well as more broad-based questions about the research area.

The Examining Committee will determine whether the student passes or fails based on both the written proposal as well as the student's performance in the oral examination. The student will be informed of the Committee's decision immediately after the examination. In the case where a decision of "fail" is returned by the Examining Committee, the Committee and the student will identify the areas that need improvement. The notes of these deliberations will be placed in the student's departmental file. The student will have 30 days to re-attempt the examination. A revised document may or may not be requested at the discretion of the Committee. A second failure will result in withdrawal of the student from the Ph.D. program. Where applicable, as in the case for students who enter the Ph.D. program without an M.Sc. degree, students will have the opportunity to complete an M.Sc. degree at this point. In the event that a student wishes to appeal the outcome of the examination, this must be done in writing to the Head of the Department within five working days after the examination.

5. **BCHM 930 Seminar Course** - The requirements for BCHM 930 are:

(a) students *must attend* all DBMS Plenary Visiting Speaker and Biochemistry 830/930 Seminars. Attendance will be taken from time to time to monitor student attendance. Please note that lack of attendance may result in the student not receiving credit for this course.

(b) students must present a seminar to the Biochemistry faculty and graduate students. The seminar should be 45-50 minutes in length leaving 10-15 minutes available for a question and answer period. The seminar should be presented at least two months prior to the submission of the Ph.D. thesis. A seminar date can be arranged by contacting the secretary or faculty member responsible for organizing the BCHM 830/930 Seminar Program. Members of faculty will grade the seminar based on the clarity of the presentation (20 marks), the scientific content (50 marks) and the student's response to questions (30 marks). Comments on the seminar will be communicated to the student in a final grade assessment letter from the Graduate Program Coordinator that has been approved by the Graduate Program Committee and the supervisor.

NOTE: Students who enter the Ph.D. program directly from a B.Sc. Honours program are required to give **two** seminars. The first seminar should be presented no later than the end of the first term in the third year and will be evaluated by faculty, but only for the benefit of the student. The mark is not entered on the student's transcript. The second seminar is presented at least four months prior to submission of the Ph.D. thesis. The mark obtained for the second seminar is used as the final grade for BCHM 930.

6. **Doctoral Thesis (BCHM 999) -** The student must pursue original academic concepts in the field of study and be able to defend the subsequent presentation of them in a thesis. Details for preparation of a Ph.D. thesis are given on pages 15 to 23. Composition of the examining committee will be suggested by the student and supervisor; the Graduate Program Coordinator will approve the final

committee membership.

VII. THE MINI-MASTER'S ROUTE

Purpose and Procedure

The Mini-Master's allows a student enrolled in the M.Sc. program to proceed to the Ph.D. program **without completing a Master's thesis**. Admission to the Ph.D. program via the Mini-Master's route requires the recommendation of the student's Research Advisory Committee and approval by the Dean of the School of Graduate Studies.

Students registered in a Master's program at Queen's University, with first-class standing, and who show exceptional promise in their research may apply for admission to a Doctoral program. The application may be made following two terms of full-time enrolment, and prior to the fifth term of study. All requirements for completion of the Mini-Master's must be satisfied within 40 business days following the School of Graduate Studies approval of the request for promotion. Failure to complete the Mini-Master's requirements within the 24 month time limit will preclude enrolment as a Ph.D. student until such time as the deficiencies have been cleared. Students accepted for acceleration into the Ph.D. program without completing the Master's thesis must also meet the following criteria:

1. must have **completed two terms, full-time in the M.Sc. program** and **have completed at least one full graduate course**, or equivalent.
2. should have an **undergraduate Honours degree** with **a minimum upper second class standing** or equivalent.
3. must have an **overall first class average in graduate courses** completed.
4. must meet departmental criteria for demonstrating promise and ability at research. This may take the form of oral or written presentations as well as letters of support from faculty familiar with the student's progress.
5. must have permission from the Research Advisory Committee and Graduate Program Committee to pursue the Mini-Master's route prior to application to Graduate Studies.

The Department will not normally recommend a student for the Mini-Master's to the School of Graduate Studies who does not fulfill these criteria.

If the student and their Research Advisory Committee agree to apply for acceleration into the Ph.D. program by the Mini-Masters, an application is first made to the Graduate Program Coordinator on behalf of the Graduate Program Committee. The application must include:

1. an application for the Ph.D. degree program (see Graduate Program Assistant for form).
2. **two letters of reference** (one from the student's supervisor and one from another faculty member) outlining the student's qualifications.
3. an outline of the student's current and proposed research.
4. an up-to-date **transcript of both undergraduate and graduate studies,**

(internal copies acceptable)

5. Material such as publications or draft manuscripts may be appended to the application, but the timetable for the Mini-Master's thesis decision (18-24 months) is such that many students may have had time to display exceptional initiative and competence in the laboratory, but not necessarily to have accumulated sufficient results for a publication.

The application is reviewed by the Graduate Program Committee and if the decision is to proceed with the application, a brief justification outlining the student's qualifications, and a signed decision sheet for acceptance to the Ph.D. program (Pending successful completion of the Mini-Master's examination), will be submitted to the School of Graduate Studies for approval. Note that the examination must be completed within 40 working days of receiving approval by the School of Graduate Studies.

Biochemistry Mini-Master's and Comprehensive Examinations

Prior to completion of the Mini-Master's and Comprehensive examinations, the student is required to present a half-hour BCHM 830 seminar (a 20 minute talk followed by a 10 minute question and answer period). The seminar must take place at least 3 weeks prior to the Mini-Master's and Comprehensive examinations. Please refer to section above on the process for seminar grading and providing feedback for BCHM 830. Mini-Master's students are encouraged to include a brief plan for Ph.D. studies in their seminars.

The Mini-Master's qualifying examination is completed at the same time as the Comprehensive examination. The Mini-Master's component of the examination is distinct from the Comprehensive examination component; the former will be focused on assessing the competency of the student for transfer into the Ph.D. program based on work accomplished to date and their defense of the proposed research program, and on assessing the quality of the proposed research. The Comprehensive examination component will test the student's knowledge in the more general aspects of their research area and will proceed immediately following successful completion of the Mini-Master's component of the examination.

Organization of the document (one document is required for both the Mini-Master's and Comprehensive Examinations):

- Will be 20 double-spaced pages (12 point font) exclusive of references and figures/tables.
- 30%-40% of the document will consist of background/introductory material.
- The remainder of the document will be divided equally between the research work accomplished to date, and the research proposed for the remainder of the Ph.D. program.
- The proposed research should be divided into a set of 2-4 clearly-defined objectives which would correspond to chapters in a thesis. For each objective, the rationale for carrying out the proposed experiments should be presented and the experimental procedures to be used should be briefly described.

Procedure:

The examination must take place within 40 working days following approval by

Graduate Studies.

In all cases, the thesis document must be provided to the examination committee members no later than 10 working days prior to the examination.

Examining Committee Composition:

The Examining Committee will comprise the Research Advisory Committee,(i.e., supervisor and two internal examiners), a Chair (in this case must be the Head of the Department or his/her delegate) and one additional member external to the Department but internal to Queen's. The Graduate Program Committee Coordinator will provide approval for the Examining Committee composition.

Mini-Master's and Comprehensive Examination Procedures:

1. Student's will deliver a short (approximately 10 minutes long) summary of their written document, focusing on research objectives and data results obtained up to date.

2. The Mini-Master's examination will follow. During this examination, students will be tested on their research results to date, and methodologies that they have employed. As well, the proposed research plan may be explored in more detail. The questions will be limited to not longer than 10 minutes per examiner.

3. At the conclusion of the examination, the student will be asked to leave the room at which point the Committee will deliberate as to whether or not the student has met the requirements for the Mini-Master's. If the decision is "fail", the Committee and the student will identify the areas that need improvement. The notes of these deliberations will be placed in the student's departmental file. The student will have 30 days to re-attempt the examination. A revised document may or may not be requested at the discretion of the Committee. Failure at this point will result in denial of entry of the student into the Ph.D. program.

4. If the student passes the Mini-Master's examination, a Comprehensive examination will occur following a 15 minute break. The examining committee will remain the same.

5. No additional presentation is required by the student. Examiners will focus their questions on the broader implications of the student's research, and will delve into more background aspects of the project and related research themes. The Comprehensive examination should normally not be longer than 90 minutes in duration.

6. At the conclusion of the examination, the student will be asked to leave the room and the Committee will deliberate as to whether or not the student has met the requirements for the Comprehensive Examination. If the decision if "fail", the Committee and the student will identify the areas that need improvement. The notes of these deliberations will be placed in the student's departmental file. The student will have 30 days to re-attempt the examination. A revised document may or may not be requested at the discretion of the Committee. A second failure will result in withdrawal of the student from the Ph.D. program.

A successful Mini-Master's examination takes the place of the **Ph.D. Research**

Proposal Review. Thus, students who enter the Ph.D. program via the Mini-Master's route will not be required to present a Research Proposal Review or the **Ph.D. Comprehensive Examination**.

VIII. THESIS GUIDELINES

The General Regulations for M.Sc. and Ph.D. theses are laid down by the School of Graduate Studies and Research (Section 8.6 of the School of Graduate Studies and Research calendar). It is the responsibility of the supervisor to inform the student of the standards for quality and style to which theses must conform and advise their students accordingly. In particular, supervisors should advise their students on whether or not a thesis, in their opinion, meets the necessary standards prior to its submission. For further information see 'Guidelines on the Roles and Responsibilities in Graduate Supervision' which is available at www.queensu.ca/sgsr/files/gradsupguid.pdf.

In preparation for the thesis examination, the candidate must submit one paper copy of the thesis, in temporary binding to each member of the Thesis Examining Committee including the Chair. As well, the candidate must submit by QShare to the School of Graduate Studies an electronic copy for formatting review.

As the final requirement of most degree programs, a degree candidate registered in 899/999 must submit one electronic copy of the thesis, revised as recommended by the Thesis Examining Committee and finally approved by the supervisor/committee, to the School of Graduate Studies via the E-Thesis Submission process. For complete details of this process, go to the Thesis Submission Guidelines.

At the end of the E-Thesis submission process, the archival copy of your thesis is
a) loaded in QSpace, Queen's institutional repository
b) catalogued in the library catalogue
c) transmitted by Queen's Library to Theses Canada.

The School of Graduate Studies acknowledges that students write using a variety of word processors and editors. For this reason, SGS does not stipulate the use any particular authoring format in the creation of theses and dissertations. However, there are a couple of templates that have been designed to assist students in formatting their theses according to the Thesis Formatting and Preparation guidelines.

If you elect to use the templates provided, the formatting automatically conforms as required to the 'General Forms of Theses'.

Templates

For MS Word users: **Guide to the MS Word Template & MS-Word Template**. Please retrieve the **Guide** before downloading the template.

For LaTeX users: quthesis.sty. This template is supplied and maintained by the Queen's School of Computing.

The School of Graduate Studies recognizes that the form of the thesis may vary dependent upon the discipline and degree sought but that the following provides the minimum acceptable standards for all theses submitted.

The thesis must be expressed in a satisfactory literary form consistent with the discipline concerned and display a scholarly approach to the subject and a thorough knowledge of it. Parts of the thesis may be prepared in a form suitable for separate publication, but it must comprise overall a coherent account of a unified research project rather than a collection of loosely connected studies. A critical review of previous work related to the subject and a concluding summation of the School of Graduate Studies General Forms of Theses contribution made in the thesis to scholarship in the chosen field must be included in the thesis.

In detail the thesis shall consist of the following in order as given:

TRADITIONAL FORM	**MANUSCRIPT FORM**
Title Page (sample attached)	**Title page** (sample attached)
Abstract (not more than 350 words)	**Abstract** (not more than 350 words)
Co-Authorship (if necessary)	**Co-Authorship** (if necessary)
Acknowledgments	**Acknowledgements**
***Statement of Originality** (*Div.IV Ph.D. only)	***Statement of Originality** (*Div. IV Ph.D. only)
Table of Contents (including bibliography, appendices, etc.)	**Table of Contents** (including bibliography, appendices, etc.)
List of Tables	**List of Tables**
List of Figures and Illustrations	**List of Figures and Illustrations**
Chapt. 1: Introduction	**Chapt. 1**: General Introduction
Chapt. 2: Literature Review	**Chapt. 2**: Literature Review (optional)
Chapt. 3 to n: Body of Thesis	**Chapt. 3 to n**: Manuscripts
Chapt. n + 1: Summary, Conclusions	**Chapt. n + 1**: General Discussion
Bibliography or References	**Summary and Conclusions**
Appendices	**Appendices**

Publication or acceptance for publication of research results before presentation of the thesis in no way supersedes the University's judgment of the work at a thesis defence. A formal section, "Co-Authorship", following the abstract section in both forms, should delineate the candidate's contribution to knowledge, and should allow the contribution of co-authors (if any) to be discerned.

*The departments of Division IV require a "Statement of Originality" to appear in all doctoral theses, normally following the "Acknowledgements" section.

PRODUCTION OF THESIS

The type of font, font size, footnote/reference method, pagination, margins, and any other aspects of production are to be consistent throughout the thesis, in both forms, and are to follow the guidelines below.

The text must be double-spaced except for footnotes, figure captions and quotations of five lines or more that should be single-spaced. The inside margin (left) should be 3.8 cm. or 1 ½" (inches); other margins 2.5 cm. or 1 inch. This applies to figures and tabulations as well. Ornate type styles are not acceptable. Italics may be used only for emphasis, or where appropriate (e.g. scientific names). This production style applies to **both** the "Traditional" and "Manuscript" forms.

COPYRIGHT

The international copyright symbol © must appear at the bottom of the title page of every thesis (see example). The date of the copyright notation is the month and year the thesis is finally submitted.

Print/Type Size

The same type font and size must appear throughout. This applies to **both** the "Traditional" and "Manuscript" forms. A standard font, of at least 10-12 points is required, but a smaller type size may be used for graphs, formulas, and appendices.

Sheet Size

21.5 x 28 cm. (8 ½" x 11 inches)

Personal Computer

The School of Graduate Studies recognizes the vast number of word processing packages available. Most packages are acceptable, and the School does not recommend any one package over another. However, if a non-standard or specially adapted word processing package is used, the thesis must still conform to the minimum acceptable standards as detailed in this document. If there are any questions about the quality and format of a particular word processing package, the package should be checked by the School of Graduate Studies **before** the thesis is produced. A sample page may have to be produced for scrutiny.

Theses **must** be carefully proof-read so as to eliminate all typographical errors and mistakes in spelling or grammar **before** submission for examination. Theses which are rendered obscure or difficult to read because of such errors are unacceptable for examination and may be returned to the candidate for correction and resubmission.

Footnotes and References

Several footnote citation forms are acceptable. Space should be left on the page for any footnotes. There should be a line separating the text from the footnotes. Footnotes may also be collected separately at the end of each chapter of the thesis or immediately following the text, where they should be divided and numbered by chapter. The style of footnotes and/or references must be consistent throughout the thesis. This applies to **both** the "Traditional" and "Manuscript" forms.

Pagination

Introductory material before the first chapter must be separately numbered by small Roman numerals. The main body of the thesis, including the text, bibliography and appendices, must be numbered continuously by Arabic numerals. The main body of the thesis starts with the first page of the first chapter, and should be numbered accordingly.

This pagination style applies to **both** the "Traditional" and "Manuscript" forms. Page numbers should be positioned on the bottom centre of each page.

Tables, Figures, Photographs and Maps
These must conform to the previous regulations and be incorporated in relation to the text and pagination.

Computer tabulations, if printed on 11 x 17 inch computer paper, should be photographically reduced to 8 1/2 x 11 inch size.

Figures must have scales and symbols defined on them or in the figure legend and not in the text. Figure captions should normally appear on the same page as the figure.

For paper copies, maps which cannot be reduced should be submitted folded to the sheet size so that they can be inserted separately into an attached envelope. Fold-out figures that are to be bound into the text must be folded small enough so that they will not be cut apart in the binding process.

For more information on preparing the thesis copy, the student should consult the Chair of Graduate Studies in the degree program, or the Supervisor. The School of Graduate Studies suggests:

H.A. Becker, Thesis Manual, Queen's University, September 1969, for theses in the applied and natural sciences;

MHRA Style Book, Notes for authors, editors and writers of dissertations, (Second Edition), ed. A.S. Maney and R.L. Smallwood, London, Modern Humanities Research Association, 1978; or,
MLA Handbook, (most recent edition), Modern Language Association of America, 1984, for theses in the humanities or social sciences; and,

K.L. Turabian, A Manual for Writers of Term Papers, Theses and Dissertations, (Fourth Edition), University of Chicago Press, 1973, as a useful comprehensive guide.

The Reference Room of Stauffer Library holds alternative guides, which may be identified with the assistance of the staff at the Information Desk.

Sample Title Page

CANADIAN LIBERALISM IN WARTIME

A Study of the Defence of Canada Regulations
and
Some Canadian Attitudes to Civil Liberties in Wartime
1939-1945

by

GEORGE RAMSAY COOK
(must be your full legal name)

A thesis submitted to the graduate program in Biochemistry
in the Department of Biomedical and Molecular Sciences
in conformity with the requirements for
the degree of Doctor of Philosophy
Queen's University
Kingston, Ontario, Canada

April, 2012
(must be the final submission month and year)

Page Limits
The length of an M.Sc. thesis should not exceed 100 pages and that of a Ph.D. thesis 175 pages, including everything but appendices. A request to exceed these limits must be made in writing by the supervisor to the Graduate Program Coordinator, well before the thesis has been submitted for examination. The reasons for the request must be clearly justified.

Reference Style
References in the text should be numbered in order of appearance. This method is chosen in the interest of brevity of the thesis. Note also, that for theses in Manuscript Form, all of the literature cited must be collected in one References section at the end of the thesis rather than at the end of each manuscript. Thus, citation style must be consistent in all manuscripts. The use of titles in the list of references is encouraged.

Manuscript Form
The School of Graduate Studies allows theses to be formatted in either Traditional or Manuscript format.
In Manuscript form, the student must be first author on the **majority** of manuscripts included in the thesis. Students who have collaborated on a manuscript may each include it in their own thesis. Chapters comprised of manuscripts with multiple authors should be preceded by a statement in which the student identifies the contribution of each author to the manuscript.
M.Sc. theses in the Graduate Program will normally be submitted in Traditional format.

Note the following from the general guidelines described in the calendar of the School of Graduate Studies:

> "Parts of the thesis may be prepared in a form suitable for separate publication, but overall it must comprise a coherent account of a unified research project rather than a collection of loosely connected studies. A critical review of previous work related to the subject and a concluding summation of the contribution made in the thesis to scholarship in the chosen field must be included in the thesis."

Procedures for Submission of M.Sc. and Ph.D. Theses

1. The School of Graduate Studies requires that the candidate submit one copy of the thesis to each member of the Thesis Examining Committee not later than:

Master's	two weeks ***(ten working days)*** before the tentative examination date
Doctoral	five weeks ***(twenty five working days)*** before the tentative examination date

2. To meet these deadlines, the supervisor must fill out a form (available from the Graduate Program Assistant) suggesting a date and time for the examination and listing two or three names for each external and internal examiner at least **one month in advance for an M.Sc. and two months for a Ph.D.**

3. The Graduate Program Coordinator will determine if the suggested external and internal examiners are appropriate

4. The Graduate Program Assistant will contact the potential examiners to obtain their agreement to attend the defense on the suggested date and time. Note that this process will **not** begin until the student has submitted the finished thesis to the Graduate Program Assistant, and that, because of scheduling conflicts, it often takes **1-2 weeks** to organize a Thesis Examination.

5. The Graduate Program Assistant will then send a M.Sc. or Ph.D. 'Oral Thesis Examination Form' authorized by the student and supervisor(s) to the School of Graduate Studies at least 10 working days prior to the scheduled thesis examination. The student is required to personally distribute the hard-copy thesis document to each Examining Committee member, including the Chair. When the School of Graduate Studies appoints the Chair for Ph.D. thesis examinations, a copy of the thesis document gets delivered to the Chair at least three or four days prior to the scheduled examination.

6. At the **Oral Examination,** when the examiners and the candidate have been introduced to each other, the candidate is asked to withdraw briefly, but to remain close to the examination room. The Chair then reads aloud the examiners' reports and asks if there are any general questions that the examiners wish to discuss before the candidate enters. The candidate is recalled. For the Oral Examination, the student gives a brief explanation of his or her thesis. This should take no longer than 20 minutes. Each examiner has a rough quota of 20-25 minutes, but the Chair guides the time limits that are deemed reasonable. At the conclusion of the Oral Examination, the Chair asks if there are any supplementary questions and, if not, the candidate is again asked to withdraw, staying within call. Once a thesis examination decision is made, the student is notified of the results immediately by the Chair of the committee.

7. If the student wishes to have an open exam (Ph.D. only) for interested individuals to attend, then the student and Department Head must sign a memo stating this fact and have it sent to the Chair of the examination committee. If the examination is open the departmental faculty and students will be invited by a public notice.

IX. RESEARCH ETHICS AND PUBLICATION

It is expected that graduate students will publish the results arising from their thesis research in the scientific literature. Since thesis research is usually supported through a research grant to the supervisor, and is normally a collaborative effort involving student and supervisor, some form of joint authorship is usually appropriate on all papers resulting from thesis research. Graduate students are encouraged to discuss such joint authorship arrangements with their supervisor at the outset of their graduate program. Queen's University has endorsed a general code of research ethics in the document entitled A Code of Research Ethics. The guidelines below are taken from that document (available at http://www.queensu.ca/secretariat/senate/policies/resethic.html) and also reflect the general procedures followed by the department.

Data

It is expected that data and research materials will be gathered consistent with the highest standards of ethical and scientific practice. The supervisor has a right to a copy of both raw data and any analyses of the data. Original data should be held in trust for the scientific and academic community and should normally be retained in the laboratory or department of the supervisor for a reasonable period. Decision about how, when and where to publish data and any conclusions therefrom, should be taken jointly by all who have made a significant intellectual contribution to its accumulation and analysis.

Collaborative Research

It is recognized that research in many disciplines is a collaborative effort which may involve students, staff and faculty. If they wish, all who have made a significant intellectual contribution to the research activity should be included as authors of its publication. The graduate student is usually first author on all publications in which the majority of the results arise directly from his or her thesis research. The

supervisor is usually a co-author on all publications arising from the thesis research. The authors should be able to vouch for the quality and integrity of their contribution to the work. All assistance in the research, including the gathering of data, should be appropriately acknowledged.

Disputes

Any dispute or allegation of misconduct with regard to ethics in research must be dealt with promptly, in accordance with the following procedures:

1. Attempts should be made to resolve the matter by reasonable discussion among those involved.
2. If not resolved, the Graduate Program Coordinators or academic units concerned shall act as mediators to investigate and attempt to resolve the matter. If for any reason any party involved in the dispute should object to mediation by a Head, or if a Head is directly involved in the allegation or dispute, the Dean of the appropriate Faculty or School and the Dean of the School of Graduate Studies and Research shall be informed and shall nominate a senior researcher, who is acceptable to all parties, to act as mediator. If necessary, the Deans may take other steps to attempt to resolve the matter.
3. If not resolved the matter shall be considered a grievance, and handled under the procedures set forth in the Senate Statement on Grievance, Discipline and Related Matters or, if not within the jurisdiction of Grievance Board, the Dean of the School of Graduate Studies and Research or delegate shall chair an ad hoc committee, the proceedings, and recommendations of which shall be reported to the Principal.

X. REVIEW OF ACADEMIC DECISIONS

Failure in a Course

Failure at an undergraduate level (below 50%) in a required undergraduate or graduate course results in the automatic withdrawal of the student from the graduate program. If a student fails at the graduate level (below 65%) in a required undergraduate or graduate course, the Graduate Program Coordinator may recommend to the School of Graduate Studies that the student be required to withdraw from the program, or can recommend that the student remain in the program and either (a) write a supplemental examination or satisfactory alternative within one year after the original exam (b) repeat the course or (c) take a substitute course. Failure in the supplemental or alternative, or in a subsequent 800 level course, will result in the student being required to withdraw.

Review of an Academic Decision

The procedure for appealing a final grade for undergraduate courses is described in Sections 13a and b of the Faculty of Arts and Science Calendar. The procedure for appealing graduate academic decisions is described in Section 8.9 of the School of Graduate Studies and Research Calendar and are summarized below.

1. A student who wishes to question an academic decision should first appeal informally to the instructor or body whose decision is being questioned. This should normally be done within two weeks of the receipt of the decision. If the student is reluctant to approach the body or instructor personally, he or she may seek the assistance of a University Grievance Advisor to do so on his or her behalf.

2. If the student is unable to resolve the problem by informal discussion and the student is not satisfied, an appeal may be lodged with the Graduate Program Coordinator who will appoint two examiners to reconsider the decision; if possible, one examiner will be the original instructor. In

the case where course marks are appealed, the examiners will re-read the final examination, if any, and review the student's class record. In courses where there is no final examination, it will be the responsibility of the student to preserve all exercises, papers, reports and other graded material for the course and to submit a file of these documents with the appeal. The Graduate Program Coordinator must respond to the appeal within two weeks of receiving the appeal.

3. If the decision remains unchanged and the student is still not satisfied, he or she may, within two weeks of receiving the Graduate Program Coordinator's written response, ask the Registrar of the School of Graduate Studies to convene an Academic Appeal Board to hear the appeal.

Review of a Thesis Decision

To appeal the decision of a thesis examination committee, the appeal should be made in writing to the Dean of the Graduate School. The appeal should be made in writing and within two weeks of the examination. If the problem cannot be resolved within two weeks and the student is not satisfied a written request must be made to the Registrar to convene an Academic Appeal Board to hear the appeal. Further details are provided in Section 8.9 of the School of Graduate Studies and Research Calendar.

XI. THE GRADUATE PROGRAM COMMITTEE

Composition

The graduate program in Biochemistry is administered by the Graduate Program Committee, under the authority of the Head of Biomedical and Molecular Sciences. The Graduate Program Committee consists of the Coordinator and three members of faculty. Committee members are usually appointed by the Head of the Department, for a three year term.

The primary duties of the Committee are to:

1. review and make recommendations to the Biochemistry faculty on all aspects of graduate study, including departmental graduate degree programs, courses, regulations and requirements. These recommendations will follow discussion at the faculty level.
2. provide information to graduate students, both incoming and continuing, on all aspects of the Biochemistry graduate program, admission requirements, funding procedures and deadlines.
3. sets standards for admission to the graduate program and recommend students for admission to the School of Graduate Studies.
4. recommend specific courses to be taken by each student and review student progress.
5. nominate students, with ranking if need be, for University and external scholarships and awards and distribute funds available from the Queen's Graduate Awards.
6. conduct the Ph.D. Comprehensive Examinations and participate in the Research Proposal Reviews.
7. review with the supervisor the rating sheets for the BCHM 830/930 seminar courses, recommend the mark and provide feedback to the student on their performance.
8. make the recommendation to Division I of the School of Graduate Studies for students who wish to proceed to the Ph.D. program via the Mini-Master's route.
9. approve, in consultation with the student's research supervisor, the membership of M.Sc. and Ph.D. examination committees.
10. advise the Department on graduate student stipends.
11. advise individual students and staff members concerning specific matters related to graduate research and training.

XII. GRADUATE PROGRAM ASSISTANT

The primary duties of the Graduate Program Assistant are to:

1. assist the Graduate Program Coordinator with all matters related to the graduate program.
2. attend and take notes of Graduate Program Committee meetings.
3. prepare correspondence for the Coordinator's signature and forward the correspondence to the applicant and to the School of Graduate Studies.
4. communicate with applicants to the graduate program, mails out application packages, processes completed applications and maintains files on the applicants.
5. maintain files on all current graduate students
6. inform graduate students about awards, deadlines, pre-registration, orientation and provides information about administrative procedures.
7. prepare and process graduate student contracts, stipends, awards and teaching assistantships.
8. prepares documentation and files for ranking by the Graduate Program Committee and forwards results to the School of Graduate Studies.
9. schedules Research Proposal Review, Comprehensive, Mini-Master's and thesis examinations.
10. assists with the preparation of the Graduate Poster and Graduate Brochure.

XIII. OTHER RELEVANT DOCUMENTS

1. Roles and Responsibilities in Graduate Supervision: A Guide, SGS
2. A Code of Research Ethics, Queen's University Policies
3. Report of the Senate Ad Hoc Committee on Intellectual Property, Queen's University Policies
4. Procedures for the Treatment of Graduate Students on Non-Academic Matters, SGS
5. General Forms of Theses, SGS
6. Faculty of Health Sciences Graduate Council Manual
7. Constitution of the School of Graduate Studies
8. PSAC Collective Agreement for Graduate Teaching Assistants and Teaching fellows at Queen's University (Local 901)