Graduate Student Handbook

Carleton University
Department of Chemistry



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Director:

Professor Jeff Smith
227 Steacie
jeffCSmith@cunet.carleton.ca

Administrative Staff:

Chantelle Gravelle
Departmental Administrator and Graduate Administrator
203A Steacie
chantellegravelle@cunet.carleton.ca

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1. Program Requirements

Master of Science

Admission Requirements

The normal requirement for admission to the program is an Honours BSc degree in Chemistry, with a B+ average in the last two years of full-time study and acceptance into a research group of a member of the Department of Chemistry at Carleton University.

Program Requirements

M.Sc. Chemistry

1. A research thesis defended at an oral examination (CHEM 5909, 3.0 credits)
2. CHEM 5810 (0.5 credit) Seminar
3. CHEM 5804 (0.5 credit) Modern Scientific Communication
4. 1.0 credit in CHEM at the graduate level, which may include up to 0.5 credit in another discipline, with permission of the department.

M.Sc. Chemistry with Collaborative Specialization in Biochemistry

1. A research thesis defended at an oral examination (CHEM 5909, 3.5 credits)
2. BIOC 5804 (0.5 credit) Modern Scientific Communication
3. 1.0 credit in BIOC 5800 (0.5 credit) Seminar in Biochemistry and BIOC 5806 (0.5 credit) Advances in Applied Biochemistry

M.Sc. Chemistry with Collaborative Specialization in Chemical and Environmental Toxicology

1. A research thesis defended at an oral examination (CHEM 5909, 3.0 credits)
2. CHEM 5804 (0.5 credit) Modern Scientific Communication
3. 1.0 credit in CHEM 5708 (0.5 credit) Principles of Toxicology or CHEM 5705 (0.5 credit) Ecotoxicology and CHEM 5805 (0.5 credit) Seminar in Toxicology
4. 0.5 credit in: CHEM at the graduate level, which may include up to 0.5 credit in another discipline, with permission of the department.

M.Sc. Chemistry with Collaborative Specialization in Data Science

1. A research thesis defended at an oral examination (CHEM 5909, 3.0 credits)
2. CHEM 5810 (0.5 credit) Seminar
3. CHEM 5804 (0.5 credit) Modern Scientific Communication
4. DATA 5000 (0.5 credit) Data Science Seminar
5. 0.5 credit in CHEM at the graduate level, which may include up to 0.5 credit in another discipline, with permission of the department

M.Sc. Chemistry with Concentration in Food Science (5.0 credits)

1. A research thesis defended at an oral examination (FOOD 5909, 3.0 credits)
2. FOOD 5810 (0.5 credit) Seminar
3. FOOD 5804 (0.5 credit) Modern Scientific Communication
4. 0.5 credit in FOOD at the graduate level

5. 0.5 credit in graduate level CHEM or FOOD, or in another discipline, with permission of the department.

Guidelines for Completion of Master's Degree

Full-time students in the master's program will normally complete the degree requirements in two years. Part-time students will normally complete the degree requirements in four years.

Doctor of Philosophy

Admission Requirements

The normal requirement for admission to the PhD program is an MSc degree in Chemistry with a B+ average in the last two years of full-time study and acceptance into a research group of a member of the Department of Chemistry at Carleton University. For fast-tracking from the MSc program, please see section 13 below.

Program Requirements

Ph.D. Chemistry

1. A research thesis defended before an examination board which includes an external examiner (CHEM 6909, 0.0 credits)
2. A comprehensive examination in chemistry. (No credit. Pass or Fail) The examination will consist of a short presentation given by the student to an examining committee on a topic in his/her research area.
3. A research proposal. The proposal topic can be in the same research area as that of the student's thesis supervisor but should be significantly different from the student's thesis research project and any research being conducted by any faculty member of the Ottawa-Carleton Chemistry Institute. See below for more details.
4. 2.0 credits in CHEM at the graduate level, which may include up to 0.5 credit in another discipline, with permission of the department.
5. CHEM 5810 (0.5 credit) and CHEM 5804 (0.5 credit)

Ph.D. Chemistry with Collaborative Specialization in Biochemistry

1. A research thesis defended before an examination board which includes an external examiner (CHEM 6909, 0.0 credits)
2. A comprehensive examination in chemistry. (No credit. Pass or Fail) The examination will consist of a short presentation given by the student to an examining committee on a topic in his/her research area.
3. A research proposal. The proposal topic can be in the same research area as that of the student's thesis supervisor but should be significantly different from the student's thesis research project and any research being conducted by any faculty member of the Ottawa-Carleton Chemistry Institute. See below for more details.

4. 1.0 credit in CHEM at the graduate level, which may include up to 0.5 credit in another discipline, with permission of the department.
5. BIOC 5806 (0.5 credit) and BIOC 5800 (0.5 credit)
6. BIOC 5804 (0.5 credit).

Ph.D. Chemistry with Collaborative Specialization in Chemical and Environmental Toxicology

1. A research thesis defended before an examination board which includes an external examiner (CHEM 6909, 0.0 credits)
2. A comprehensive examination in chemistry. (No credit. Pass or Fail) The examination will consist of a short presentation given by the student to an examining committee on a topic in his/her research area.
3. A research proposal. The proposal topic can be in the same research area as that of the student's thesis supervisor but should be significantly different from the student's thesis research project and any research being conducted by any faculty member of the Ottawa-Carleton Chemistry Institute. See below for more details.
4. 1.0 credit in CHEM at the graduate level, which may include up to 0.5 credit in another discipline, with permission of the department.
5. CHEM 5705 (0.5 credit), CHEM 5708 (0.5 credit), and CHEM 5805 (0.5 credit)
6. CHEM 5804 (0.5 credit).

Ph.D. Chemistry with Concentration in Food Science

1. A research thesis defended before an examination board which includes an external examiner (CHEM 6909, 0.0 credits)
2. A comprehensive examination in chemistry. (No credit. Pass or Fail) The examination will consist of a short presentation given by the student to an examining committee on a topic in his/her research area.
3. A research proposal. The proposal topic can be in the same research area as that of the student's thesis supervisor but should be significantly different from the student's thesis research project and any research being conducted by any faculty member of the Ottawa-Carleton Chemistry Institute. See below for more details.
4. 0.5 credit in graduate level FOOD
5. 1.5 credit in graduate level CHEM or FOOD or in another discipline, with permission of the department.
6. FOOD 5810 (0.5 credit) and FOOD 5804 (0.5 credit).

If a student is fast tracking from the M.Sc. program to the PhD program and has previously taken CHEM 5801/FOOD 5801 (1.0 credit) and obtained a grade of A-, the student will be given credit for CHEM 5804/FOOD 5804 (0.5 credit) and CHEM 5810/FOOD 5810 (0.5 credit). Additionally, up to 1.0 credit of graduate courses may be transferred from the M.Sc. provided a grade of at least A- was obtained in each of the courses.

Guidelines for Completion of Doctoral Degree

Full-time students in the doctoral program normally will complete the degree requirements in four years. Part-time students will normally complete the degree requirements in six years.

Full-time students who enter the doctoral program via fast tracking from the MSc program normally will complete the degree requirements in five (total time including year as MSc student). Part-time students normally will complete the degree requirements in nine years.

2. Graduate Courses

A listing of the graduate courses which can be offered in Chemistry is found in the graduate calendar. Delivery of these courses in an academic year is dependent on faculty availability.

3. Student Status

Full-Time Students

Students enrolled in the theses who are on campus and therefore making full use of the university facilities must enroll as full-time students. Students who are funded with a funding package (TA etc.) must be full-time. For further information please refer to https://gradstudents.carleton.ca/.

Part-Time Students

Part-time students are allowed to enroll in a maximum of two half credits per term including audit courses.

4. Change of Status from Full-Time to Part-Time

Students who wish to change their status from full-time to part-time for a term must discuss the matter with the Graduate Administrator and Graduate Director. Final decisions on whether a status change will be granted are made by FGPA.

5. Continuous Registration in Thesis

Students must register during all successive terms (fall, winter and spring/summer) after initial registration in the thesis CHEM/FOOD 5909 or CHEM/FOOD 6909. If this does not happen, they will lose their graduate student status.

6. Financial Awards

Scholarship Applications

All qualified students are urged to apply for internal and external scholarships. OGS and NSERC Scholarships competitions have internal deadlines. See https://gradstudents.carleton.ca/awards-and-funding/ for more details.

Chemistry Bursaries/Scholarships

A few bursaries and scholarships are specific to students in Chemistry. Nominations should be made by the supervisor to the Graduate Administrator in late September. A call for nominations will be sent by

the Graduate Administrator. See https://gradstudents.carleton.ca/awards-and-funding/ for more details.

7. Fees

Information regarding fees is available at https://graduate.carleton.ca/financial-assistance/cost-and-fees/ and https://carleton.ca/studentaccounts/
Please note that fees are subject to change during the course of a degree.

8. Teaching Assistants Mandatory Training Courses

All teaching assistants covered by the Collective Agreement CUPE 4600 (page 23) are required to successfully complete training courses as a condition of employment. This training shall be completed by **October 15th** of the fall term, by **February 15th** of the winter term and by **June 1st** of the summer term (dates are given according to what term of the academic year the graduate students start their program). This compliance training once completed, it has a specific expiry date, so it does not have to be taken at the beginning of each term.
Compliance training currently includes but is not limited to:

A.

1. Respect and Safety training online
2. Accessibility for Ontarians with Disabilities Act (AODA) training online
3. Employee Health & Safety Awareness Training online

https://carleton.ca/tls/teaching-assistants/training/

B. In Brightspace (under "Training" tab)

1. WHMIS
2. Supervisor Health and Safety Awareness
3. Respect and Safety

9. Thesis Advisory Committee (TAC)

TACs should be set up for MSc students, with one TAC meeting at the one-year mark, or as soon as the candidate and supervisor agree that they plan to fast-track. This needs to be decided at the 8-month mark to allow sufficient time for the comprehensive exam to be scheduled.

Within one month of initial registration in the PhD program, a Thesis Advisory Committee (TAC) will be appointed for each student. The committee will consist of a minimum of three members, including the thesis supervisor and two faculty members from the department of Chemistry at Carleton University. Committee membership may also include adjunct faculty members, faculty members from a different department in the Faculty of Science at Carleton University (the "internal/external member") or faculty members from the University of Ottawa that are a part of the Ottawa Carleton Chemistry Institute.

Each student will receive a **TAC meeting report dossier** and fill it out on an annual basis. Every year, the student will add to the dossier and meet with the TAC to present an oral update on their progress (15 minute presentation) and go over the report. The TAC will evaluate the report and presentation and indicate whether the student has made satisfactory progress. Additional meetings may be held at the request of the TAC, the student or the supervisor, especially if the TAC deems the annual progress to be unsatisfactory. The schedule of TAC meetings for full time PhD students is as follows:

Year 1	Term 1	Term 2 (TAC 1)	Term 3 (comprehensive exam)
Year 2	Term 4	Term 5 (TAC 2)	Term 6
Year 3	Term 7	Term 8 (TAC 3)	Term 9 (research proposal)
Year 4	Term 10	Term 11 (TAC 4)*	Term 12 (intended defence)
Year 5	Term 13	Term 14 (TAC 5)‡	Term 15
Year 6**	Term 16	Term 17 (TAC 6)†	Term 18

*If you are not going to defend in term 12, you should have a TAC in term 11 to inform the committee of your graduation plan. This is also a chance for the committee to make any last minute recommendations for shoring up the research and thesis plan.
‡If you are not going to defend in term 15, you should have a TAC in term 14, where serious and fulsome explanations of research problems/delays will be expected, as will thorough planning for degree completion.
**Year 6 has no funding left but you can stay and apply for a TA. You have 6 years to complete your degree.
†Last chance for you to make the case for completing your degree by the end of time limit.

10. COMPREHENSIVE EXAM

The Comprehensive exam is a qualifying exam to enter the PhD program. Failing this exam means that the candidate cannot continue in the PhD program, but they can finish an MSc program if they are presently enrolled in one. The exam at Carleton University consists of a research presentation (this is not a research proposal) to examine the student's depth and breadth of knowledge in his/her own research area.
It must be completed within the first 8 months of somebody joining the PhD already with a MSc.
The Comprehensive Exam needs to be undertaken at 8 months in the MSc for someone fast-tracking from MSc to PhD.

The procedure:

The candidate will submit three research papers from their field following the guidance of their supervisor: these papers should have a paragraph describing the topics and content pertinent to their field of study/experience. The graduate advisor will select one of these papers for the comprehensive examination committee to use as guidance in the exam. The candidate will be told in advance which paper was selected. However, the examination can interrogate any topic included up to the third year of the pertinent program (CHEM, NANO, FOOD, BIOC, toxicology) from the Chemistry department, and the candidate should prepare broadly for this exam." These papers must be those published within the previous 24 month period, in journals that have an impact factor greater than 5. These must be full papers,

not Notes, Communications or Reviews. The student will present the research paper as if it were their own work and then defend it in front of the committee.

The Examining Committee is formed by the GS. The supervisor is not part of the committee. Following a 15 min presentation, the committee can ask questions on any aspect of the presentation, to any depth and breadth. The questions need not be confined to the particular journal paper, and can extend to the whole research area of the student. There will be two rounds of questions for the examination committee; the first round will be between the student and questioner with no input/interruptions from the other examiners and the second round may be more of a discussion amongst the whole group.

Roles and Responsibilities of Examining Committee:

The committee's decision will be one of the following:

(a) pass the student or

(b) pass conditional upon the student completing additional courses (undergraduate or graduate). In this case, the Graduate Supervisor, in consultation with the committee, will assign appropriate courses (that specifically address the concerns of the committee) for the student to complete. A minimum grade of A- is required, before the student is allowed to proceed to COMP Part 2, The Research Proposal. The recommendations of the committee will be strictly followed.

(c) Pass conditional upon a re-examination. In this case, the student has to make a research presentation on a different topic (in his/her research area), within three months of the first presentation

(d) Fail a student if it is felt that (b) and (c) above will be of no consequence. In this case, the student will not be allowed to continue in the PhD Program. However, the student may request permission to submit an MSc thesis.

11. RESEARCH PROPOSAL

The topic of the proposal can be in the same area as that of the supervisor, but cannot overlap with the supervisor's research program and cannot be on any topic that the student has actively conducted research in. The proposal loosely follows the NSERC Discovery Grant format, but is limited to 10 pages and it must be finished before the end of the 9th term.

The procedure:

The student chooses a topic for the Research Proposal in consultation with the Graduate Supervisor; during this meeting the format of the proposal document will be explained. The Examining Committee is formed by the GS, with one of the members as the Chair. The supervisor is not part of the committee. Following completion of the first draft of the proposal the committee will meet with the student to provide feedback to strengthen it. These meetings can happen as many times as required before the committee and student are confident the proposal is sound. The student will then meet with the committee to defend the proposal. Following a 15 min presentation, the committee asks questions. The exam is very much like the thesis defense, with each of the members of the committee taking turns in examining the student.

Roles and Responsibilities of Examining Committee:

The Committee's decision will be one of the following:

a) The proposal is accepted as presented.

b) Proposal needs minor revision. Revised proposal must be submitted to the Chair of the Committee for approval within one week.

c) Proposal needs major revision. In this case, the committee can request a second oral exam, or approve the revised proposal. The revised proposal must be submitted to the Chair of Committee within one month.

d) Proposal is rejected. This means Fail. In this case, the Graduate Supervisor, in consultation with the committee, may allow the student to prepare a new proposal on a different topic and go through the process from the beginning. There will be no more than one such repeat attempt permitted. Upon failing a second time, the student will not be permitted to continue in the PhD program. The student may request permission to submit an MSc thesis.

12. Departmental Policy on Directed Special Studies [CHEM 5900; 0.5 credit]

1. Directed Special Studies courses are meant to be a last resort for students who cannot find courses to take in the normal stream of OCCI offerings. It should be assigned only if the lack of availability of courses would prevent the student from submitting the thesis and qualifying for the degree. Approval of the Graduate Supervisor is required.

2. If there is a need to educate the student because of the research project for the thesis, then this should not be used for credit. It is rather a part of the background needed to do the project.

3. The Directed Study should not overlap with or related to the thesis material.

13. Guidelines for Fast Tracking MSc students to PhD Program

If a student who was admitted to the MSc program is interested in pursuing the PhD program, the student can be "fast tracked" subject to the guidelines listed below.

1. The student must be fast tracked before they complete the first year of their MSc.

2. An email should be submitted by the student's supervisor to the Graduate Administrator specifying that the student's academic and research performance is adequate (a minimum of A- average in any MSc courses).

3. A TAC should be formed immediately.

4. The student will be required to complete CHEM 5810 in their first year if they have not yet completed this course.

5. The Comprehensive Exam needs to be undertaken at 8 months in the MSc for someone fast-tracking from MSc to PhD.

14. Thesis Submission and Preparation for Defence

The examination copy is the version of the thesis that has been completed to the satisfaction of the TAC and has been certified by the supervisor as being ready for submission to the examining committee for purposes of the defence. The candidate is expected to consult with the Graduate Administrator when considering thesis submission for guidance on timelines and expectations.

15. Thesis Format

The Faculty of Graduate Studies has guidelines for the format of theses. For further information on format, preparation and presentation of the thesis, additional details are available on-line at:
https://gradstudents.carleton.ca/thesis-requirements/

16. Thesis Defense

The MSc Examining Board typically consists of four examiners:

- a member of the Chemistry Department
- an examiner from outside the candidate's department but from within the Faculty of Science
- the thesis supervisor
- the Department Chair, graduate supervisor or their nominee who acts as the Chair of the Examining Board. The chair of the examining board ensures an orderly and fair examination.

The PhD Examining Board typically consists of six examiners:

- the external examiner from another institution and not a part of OCCI
- an examiner from OCCI
- an examiner from outside the candidate's department but from within the Faculty of Science
- a member of the Chemistry Department
- a second member of the Chemistry Department
- the thesis supervisor

The exam also has a Chair of the Examining Board, appointed by the thesis supervisor

17. Format of Thesis Defence

After a brief in-camera meeting of the Examining Board at which time the external examiner will be acquainted with the normal procedures of the examination as conducted in the Department, the candidate will be invited to enter the room and to present an introduction to the thesis. This summation will normally be ten minutes in length. An initial round of questioning will follow with each examiner being allowed ten to fifteen minutes to pose questions concerning the thesis to the candidate. During this round of questioning the other examiners are not expected to interrupt the dialogue between the

candidate and the specific examiner. A second round of questions will follow, again with each examiner being allowed ten to fifteen minutes, but with the understanding that other members of the examining board may interject with comments or with related questions. In both the first and second rounds of questioning, the external examiner will normally be the first member of the examining board to pose questions and the thesis supervisor the last to ask questions. A final question may be solicited from each member of the board if the Chairperson deems it appropriate. The Chairperson will ask the candidate to make final remarks if desired. Following the conclusion of questioning the candidate and any observers will withdraw and the committee will arrive at its decision.

Comprehensive Examination Report
Research Topic/Paper Presentation

Candidate Name:

Topic of Presentation:

Date of Examination:

Committee Member	***Oral Presentation/ Response to Questions*** Satisfactory**?**		***Summary Rating*** Satisfactory?	
	Yes	**No**	**Yes**	**No**
1.				
2.				
3.				
Consensus				

Other Recommendations by the Committee including recommendations for additional courses (undergraduate or graduate) to be taken (attach additional sheets if necessary):

……
……
…….

Summary Recommendation:

[ ] Pass
[ ] Conditional Pass (additional courses to be taken)
[ ] Re-Exam (A different presentation within three months)
[ ] Fail

Signature of the Chair of the Committee:
(Please return the completed form to Chantelle Gravelle)

Research Proposal Report

Candidate Name:

Title of Proposal:

Date of Examination:

Committee Member	***Written Proposal*** Satisfactory**?**		***Oral Presentation/ Response to Questions*** Satisfactory**?**		***Summary Rating*** Satisfactory?	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**
1.						
2.						
3.						
Consensus						

Revisions Recommended by the Committee (attach additional sheets if necessary):

……
……
…….

Summary Recommendation:

[ ] Accept
[ ] Accept with Minor revisions
[ ] Accept with Major revisions
[ ] Reject

Signature of the Chair of the Committee:

(Please return the completed form to Chantelle Gravelle)