

CHEMISTRY DEPARTMENT

Ph.D. Guidelines & Requirements

INTRODUCTION

The Department of Chemistry accepts applications for its graduate program leading to the degree of Doctor of Philosophy in Chemistry. Research specialties comprise both traditional and interdisciplinary areas, which include, but are not limited to, catalysis, synthesis, materials science, chemical biology, environmental chemistry and nanotechnology. A Master of Science in Teaching (M.S.T.) is offered in cooperation with and administered by the Lynch School of Education.

GENERAL REQUIREMENTS

GPA

Every student is expected to attain a grade point average of at least 3.0 at the end of his or her second semester in the Graduate School and to maintain it thereafter. If this standard is not met, the student may be required to withdraw from the graduate program.

Coursework

All entering graduate students are required to take several core graduate courses which provide a reasonable and broad level of proficiency in various chemistry disciplines, in addition to a students' chosen focus of research.

There is no total credit requirement for the Ph.D. degree.

Oral Exams (Doctoral Comprehensive Exam)

Each Ph.D. candidate must take an oral exam that covers fundamental concepts in chemistry as well as advanced areas of chemistry critical to his/her research project. This exam is usually taken during May or June of the second year. In preparation for this exam, a student should meet with his/her research advisor before the end of the third semester in the program and organize a group of topics and a reading list to make sure the student knows what material must be mastered for this exam. Questions will be asked relating to this chemistry and ultimately will cover topics the examiners believe the student should know about, including but not limited to, topics from recent seminars and coursework. In addition, the students should become familiar with the discipline specific requirements for the oral exams, as noted by their research advisor. A core thesis committee is established at this time, although these members may change by the time of the actual Ph.D. defense.

At the oral exam, the committee also judges the candidate's research and academic progress. A 3.0 GPA is the minimum requirement. After passing the oral exam, the student is recommended as a candidate for the Ph.D. degree. Students who have not mastered the necessary material at this time and/or have not made significant progress in the research component of the program may be asked to do one of the following; repeat the oral exam (for a final time), complete the requirements for an M.S. degree or withdraw from the program.

Teaching

Some teaching or equivalent educational experience is required. This requirement may be satisfied by a minimum of one year of service as a teaching assistant or by other suitable teaching duties. Arrangements are made with each student for a teaching program best suited to his/her overall program of studies. Waivers of teaching requirements may be granted under special circumstances with the approval of the Graduate Program Director.

Evaluation

A student's teaching/research performance will be monitored and evaluated in the following manner: by the student's advisor and the Graduate Studies Committee prior to completing oral exams and by their oral/thesis committee and the Graduate Studies Committee thereafter.

Financial Support for Students

Most first-year students will begin their Ph.D. program as full-time teaching assistants (TAs) and will be involved in all aspects of teaching, grading and administering undergraduate laboratories and/or recitation sections for introductory lecture courses. Some students may be supported by fellowships. TA stipends provide support for the nine-month period from September 1 through May 31. Summer support usually comes from the faculty in the form of a research assistant stipend. A few full-time summer TA positions are available. However, full-time summer TA positions require daily laboratory teaching and are not an effective mechanism for support of students wishing to make progress in the research component of their degree program.

Second year students typically are half-time and, in some cases, full-time TAs. Teaching is an important activity of the department, but students working as teaching assistants must budget their time effectively so that they can still maintain adequate progress in their experimental work.

Research Assistantships (RAs) are stipends offered which fund a student's work in the laboratory. Funds for RAs come from grants awarded to individual faculty members. These funds, which come from the federal government or other, sometimes private, sources, are difficult to obtain and are typically awarded for a short period of time (*ca.* three years). The renewal of three to five- year grant awards is largely dependent on the success of the work accomplished during the initial award period. Therefore, a research advisor usually offers such positions to those students likely to have a strong commitment to their work and who can contribute to the successful awarding of additional funds.

Because of the competitive nature of external funding, students who receive an RA should not assume that they will automatically receive such support for the entire time of their study. Thus, students supported as RAs should make the most of their time in order to finish their degree program as rapidly as possible, while contributing to the overall success of the research group by providing the results necessary to continue externally supported research projects. RA/TA split positions are especially common for second-year students. In this appointment, the student is a half-time RA and a half-time TA. A half-time TA usually involves the teaching of one laboratory period each week (full-time involves two laboratories) or two discussion sections. If a second-year student budgets time well, most of the TA-related work can be done in an effective and efficient manner on the evening before and the day of the laboratory or discussion sections. With this approach, the student can still devote a majority of their time during the week plus weekends to the Ph.D. project and make sufficient progress.

It is typical that as a student becomes more adept and more successful in the laboratory, he/she will be supported as a full-time RA. By the third year, the student's financial support is normally the responsibility of the faculty advisor.

Joining a Research Group

During the fall semester, all first- year students, including those who have already undertaken some preliminary research during the summer, will begin the research advisor selection process. An exploration period follows orientation week, during which students are required to meet with all research faculty either in small groups or one-on-one. Many labs will offer an "open house" event where students can learn about research opportunities in the group. No one is permitted to join a research group during this initial exploration period. After the exploration period, the student will submit their top three choices for the selection of faculty advisors to the Associate Director of Administrative and Graduate Student Services. Based on their choices and space availability, students will be assigned research groups. Every effort is made to accommodate the students' choices, but sometimes that is not possible. In such cases, the department will work with the student to explore options and to find a solution that works for all concerned.

While there is no mandated deadline by which time graduate students in Chemistry must have joined a research group, it is nevertheless important that doctoral students reach a mutual agreement with a research advisor about joining a group by the end of their second semester in the program. The reason for this is two-fold. First, in order to qualify for available financial support beyond the first year, a doctoral student must be an active member of a research team. Second, because the primary component of the graduate program in Chemistry is the research project, in almost all circumstances, academic progress towards a degree cannot be made without participation in such a group.

Research

The research project is the primary component of graduate study in chemistry. While a first-year student may take courses during the second semester of the first year of study, it is also a time to begin preliminary experiments in the laboratory. A research project usually begins with a significant amount of library research, and this work should be pursued during the first and second semesters, even for students with full-time teaching and course loads. All students should become familiar with the research laboratory in which they will work so that when classes terminate in May, full-time experimental work can begin in an efficient manner.

Student Department Seminar

This one-credit course, offered in the spring semester, is for students in their 3rd year. Each class member will present a 30-minute long seminar followed by a Q&A period. The Graduate Studies Committee will approve topics in advance. The student's presentation will be assessed by their Thesis Committee.

Original Research Proposal

The original research proposal will be completed in the student's fourth program year. Written proposals are submitted to the student's thesis committee and presented to them orally. Original research proposals do not exceed six pages and contain a statement of the research

objective, significance of the problem, ideas for developing a research plan, a summary and references.

DISSERTATION DEFENSE

The preparation and defense of a thesis is the last step in obtaining a Ph.D. degree. The defense consists of two parts: a public defense (a formal seminar open to the entire community) and a private defense open to members of the thesis committee.

In the private defense, the student typically gives a short summation of his/her work and is then required to answer questions about the work and defend the conclusions reached.

With the completion of both defenses, and the submission of the approved thesis to the graduate school, the Ph.D. degree will be granted at the next graduation date provided the Graduate School of Arts and Sciences deadlines are met.

Thesis Committee

The thesis committee will be constituted as follows:

The Ph.D. thesis examination committee shall consist of at least three Ph.D. panelists who are tenure track members of the Boston College chemistry faculty. All members of the committee are expected to read and vote on the acceptability of the thesis.

Dissertation Submission

The formatted dissertation and the signed Signature Page should be submitted by in advance of the deadline for December, May and August graduation. The specific submission dates can be found on the Academic Calendar

<http://www.bc.edu/offices/stserv/academic/current/calendar/>.

In order to graduate, your graduation date must match the graduation date listed in Agora. If it does not, see the Associate Director, Administrative and Graduate Student Services.

Refer to the Graduate School of Arts & Sciences dissertation checklist

(<https://www.bc.edu/content/bc-web/schools/mcas/graduate/current-students/dissertation-checklist.html>) for submission and format guidelines.

The following section lays out the normal timelines for progress through the Chemistry Ph.D. program.

Ph.D. Program - YEAR 1

Year 1

- **Fall Semester**
 - Two of three core classes (Physical organic, chemical biology and physical chemistry)
 - Maximum of four courses permitted (2 core courses and 2 elective courses)
 - Group selection process (Signatures from all faculty; signed forms due December 1st)
- **Spring Semester**
 - Enrollment in Science Communication in Chemistry is required
 - Elective courses based on student's research track
 - Maximum of four courses permitted (science communication and 3 electives)
- Students are required to maintain a cumulative GPA of 3.0

Year 2

- **Oral Candidacy Exam**
 - Scheduled towards the end of Year 2 (May/June)
 - Student is required to submit a written report summarizing research progress, and undergo an oral examination assessed by at least 3 faculty members (Thesis Committee)
 - Students are required to complete the Research and Scholarship Integrity Program by the time of their oral exam
 - One student in each division is selected for the Frank Tsung Graduate Fellowships

Year 3

- **Departmental Research Seminar**
 - Scheduled during the spring semester of Year 3 (Friday at 3pm)
 - Student presents a 30-min seminar to the department on their research project (background and progress), followed by a 15-min Q&A
 - Assessed by the student's Thesis Committee

Year 4

- **Original Research Proposal**
 - Scheduled towards the end of Year 4 (May/June)
 - Student is required to submit a written proposal on a research topic that is not directly related to their own research project
 - Student will defend their original proposal to their Thesis Committee

Year 5+

- **Thesis defense**
 - Student will submit a written thesis
 - Student will present a public seminar (~ 1hour) on their thesis
 - The public seminar will be followed by a private oral defense assessed by the student's Thesis Committee.

Advanced courses will be determined in collaboration with the student's faculty advisor and be consistent with the focus of their research. Any additional course work, outside of the required credits, must be approved by the Graduate Program Director (GPD).

Graduate level courses taken in other departments (physics, biology, etc.) or at other institutions can be counted as advanced electives only with approval of the GPD, in consultation with the student's research advisor. By the end of the first year, a student should have demonstrated proficiency in the core curriculum.

MASTERS OF SCIENCE DEGREE

In those cases where a student is completing an M.S. degree, a minimum of 18 graduate credits must be completed to fulfill university requirements. By the end of the second year, at the time of the oral exam, a student should have completed the core curriculum and taken at least one advance course. Often the M.S. lab work can be finished during the summer or during the first portion of the fall semester of the third year, and the thesis can be written and defended by the end of the fall semester. Students who have not amassed the necessary credits after two years of study, and who are working toward a master's degree, may have difficulty in obtaining the necessary credits during the fall semester and may not complete their degree requirements until the spring semester of the third year. Master's degree candidates are not guaranteed financial support, either TA, RA or tuition remission. Students completing the master's degree should discuss their funding status with their faculty advisor.

The M.S. degree requires a thesis and a private oral defense.

Thesis Guidelines

If you are in a Master's degree program that requires a thesis, you must deposit your completed thesis with the University by the date indicated on the [University Academic Calendar](#) in order to qualify for graduation.

Your graduation date listed in Agora must match the semester you plan to graduate. If not, contact the Dean's Office at 617-552-3268 or gsasinfo@bc.edu to have this corrected.

Follow the Thesis Checklist <https://www.bc.edu/content/bc-web/schools/mcas/graduate/current-students/thesis-checklist.html> to ensure you have completed all requirements.

ACADEMIC INTEGRITY

The chemistry department upholds the Boston College policy on academic integrity (see <https://www.bc.edu/bc-web/schools/mcas/graduate/current-students/policies-and-procedures.html>). The following are examples of violations of academic integrity:

Plagiarism. (a) Verbatim copying of material without stating sources; (b) blatant paraphrasing in major portions of a paper or other written work (e.g., Dissertation, book) without identifying sources; (c) having someone else write the work (either on a paid or unpaid basis).

Cheating on examinations. (a) use of any source (e.g., notebooks, crib notes, etc.) which is prohibited in that particular examination; (b) copying from another person's examination.

Falsifying data.

Blatant falsifying of data, such as inventing data or misrepresenting sample size.

Opinions differ among various faculty members regarding the propriety of the same or similar paper (or parts of the same paper) being submitted to more than one course. Graduate students must consult the faculty members involved prior to the submission of such papers.

In the unlikely event that a faculty member accuses a student of a violation of academic integrity, the following review process will take place:

- The individual professor or individual student who is making a formal accusation of cheating will bring the case to the attention of the Graduate School which will have responsibility for adjudicating the case. The Department Chair and Graduate Program Director would also be notified.
- In adjudicating the process, the Graduate School will normally involve the student's principal advisor and other Chemistry Department representatives as appropriate.
- The Graduate School has a grievance procedure available if the student feels s/he has been unfairly treated. <http://www.bc.edu/schools/gsas/policies.html#academic%20grievance>.

HARASSMENT

Students should familiarize themselves with the University Policy on Discriminatory Harassment, both with regard to their roles as student and as teacher. For further information, go to <http://www.bc.edu/offices/diversity/compliance/harassment.html>.

CONFERENCE TRAVEL EXPENSES

The Graduate School of Arts and Sciences provides partial funding for graduate students to travel to **one conference per year** with the authorization of the GSAS Dean. Details and forms are available on line at <https://www.bc.edu/content/bc-web/schools/mcas/graduate/current-students/policies-and-procedures.html>

LEAVE OF ABSENCE

Doctoral and Master's students in the Graduate School of Arts & Sciences who do not register for course work, Doctoral Continuation or Interim Study in any given semester must request a leave of absence for that semester. Leaves of absence are not usually granted for more than two semesters at a time. Students may obtain the Leave of Absence Form online at <https://www.bc.edu/content/bc-web/schools/mcas/graduate/current-students/policies-and-procedures.html> and submit it for the Associate Dean's approval.

Leave time will normally be considered a portion of the total time limit for the degree unless the contrary is decided upon initially between the student and the Associate Dean.

Students wishing to return from a leave must apply to the Associate Dean's Office at least six weeks prior to the semester in which they expect to re-enroll. Decisions for readmissions are

based on a consideration of the best interests of both the student and the University. Leaves of absence for students on Doctoral Continuation are rarely granted.

TIME LIMIT

All requirements for the Doctoral degree must be completed within eight consecutive years from the beginning of doctoral studies. Extensions beyond this limit may be made only with departmental recommendation and the approval of the Dean.

INTERDISCIPLINARY DOCTORAL PROGRAM

Where departmental doctoral programs are unable to satisfy the interests of the student, an interdisciplinary doctoral program remains a possibility; however, students must first be admitted to a departmental program. A student interested in exploring such a possibility should first make an inquiry to the Graduate School Dean's Office.

ACADEMIC GRIEVANCES

A student who believes he/she has been treated unfairly in academic matters should review the [Graduate School of Arts & Sciences Grievance Procedures, https://www.bc.edu/content/bc-web/schools/mcas/graduate/current-students/policies-and-procedures.html](https://www.bc.edu/content/bc-web/schools/mcas/graduate/current-students/policies-and-procedures.html), prior to consulting with the Associate Dean.

INCOMPETE POLICY

All required work in any course must be completed by the date set for the course examination. A student who has not completed the research or written work for a course taken in the fall or spring semester or is absent from the course examination in either semester, may, with adequate reason and at the discretion of the instructor, receive a temporary grade of Incomplete (I). All such I grades will automatically be changed to F on March 1 for the fall, August 1 for the spring, and October 1 for the summer.