



**Graduate Program and
Departmental Regulations for Ph.D.
M.S. and M.A. Programs in
Chemistry**

GRADUATE STUDENT HANDBOOK

Department of Chemistry, Binghamton University

Checklist for Completion of Milestones in the PhD Program

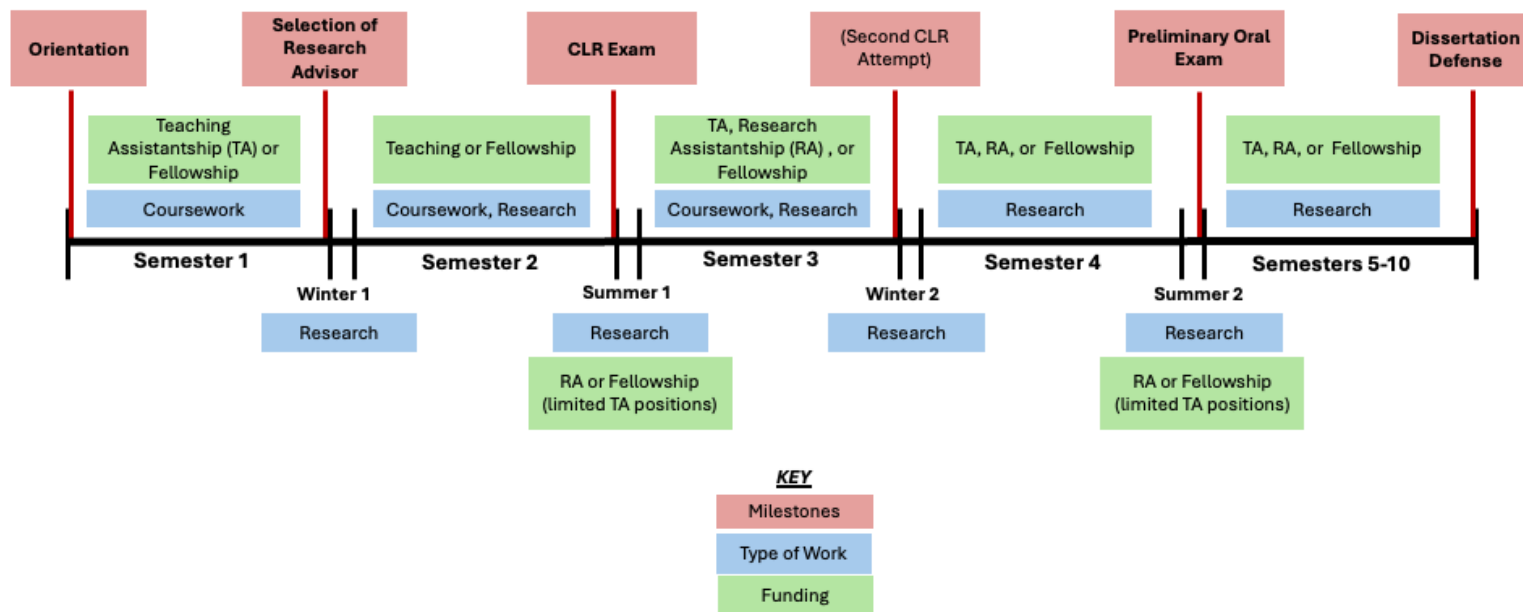
Timeline	Milestone	Checkbox
Semester 1	Grad Course 1 (4 cr.) Grad course 2 (4 cr.) Chem 593 (1 cr.) Chem 597 (1 cr. if teaching; 3 cr. if not teaching) Chem 591 (2 cr. only if teaching)	☐
Before the Beginning of Semester 2	Selection of research advisor	☐
Semester 2	Grad Course 3 (4 cr.) Grad course 4 (4 cr.) Chem 593 (1 cr.) Chem 591 (1 cr.) Chem 592 (2 cr.) Chem 597 (1 cr. only if not teaching)	☐
End of Semester 2	CLR exam	☐
Semester 3	Grad Course 5 (4 cr.)* Grad course 6 (4 cr.)* Chem 597 (1 cr.) or Chem 591	☐
End of Semester 3	Course complete	☐
Beginning of Semester 5	Preliminary Oral Exam (Prospectus due 2 weeks before exam)	☐
Semester 5 – End	Dissertation Defense	☐

* If received 2 course reduction: register for only 1 credit of Chem 597

* If received 1 course reduction: register for 1 Graduate Course (4 cr.) and Chem 597 (5 cr.)

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PhD Program Timeline



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(updated 10/2024)

1. The Ph.D. Program

The department seeks to achieve an average time to earn a Ph.D. degree of not more than 5.0 years. All students are expected to make satisfactory progress toward their degree. This includes progress on research, publications, presentations, and department activities as directed by the research advisor. Specific expectations in each of these areas vary depending upon the nature of the research program and should be discussed with the advisor regularly during the course of the student's graduate work.

The following represents typical departmental expectations for satisfactory progress towards the degree and is designed to help meet the time to degree completion:

- a. Attend the department seminar program throughout their career. Attendance is mandatory for all graduate students without ABD status (before reaching Admission to Ph.D. Candidacy) and at least 50% of the colloquia for students who have ABD status.
- b. Work in the laboratory on their research throughout the year, even when classes are not in session, as long as the campus is open and accessible. This includes winter break and summer session when large blocks of time become available for graduate students to make substantial progress on their work.
- c. If they are going to be away from the lab for a period of time, get permission from their research advisor, the instructor of the course for which they are a teaching assistant, and the Director of Instruction. This includes winter and summer breaks.
- d. Discuss with their research advisor the amount of vacation time per year. As a representative example, two weeks of vacation time is recommended by many faculty advisors.
- e. Publish their research results together with their research advisor. The number of publications will vary by discipline and research group.
- f. Communicate with their advisor and the department on any other items that may impact their satisfactory progress or time to degree completion.

For Ph.D. students, satisfactory progress toward their degree also includes completing degree requirements in a timely fashion (see **Appendix 1** for a recommended timeline for the Ph.D. program):

- a. Select a Research Advisor (**section 1.1**)
- b. Complete Required Courses (**section 1.2**)
- c. Pass the Comprehensive Literature Review Examination (**section 1.3.1**)
- d. Pass the Preliminary Oral Examination and Admission to Ph.D. candidacy (**section 1.3.2 and section 1.3.3**)
- e. Oral Progress Report (**section 1.3.3**)

- f. Defend the Dissertation (**section 1.4**)
- g. Submit Dissertation to the Graduate School (**section 1.5**)

1.1 Selecting a Research Advisor

1. The selection of a faculty research advisor is required at the beginning of the second semester after entering the program.
 - The student is required to explore research possibilities with at least three faculty members.
 - The student will make a final selection of a research advisor, from among the consulted faculty. The student will email the completed google form to the faculty advisor and graduate program director for approval. <https://forms.gle/PLYd48a6xURECTBW8>
2. The student may not register for thesis or dissertation research until selection of a faculty research advisor is approved by the GPC.
3. Any student who is unable to find a research advisor by the end of the second semester in the program, or whose research interests cannot be fulfilled by the current faculty, will be advised to receive a terminal MA degree and will not be eligible for financial support after the third semester of residence.

A student who decides to change research groups must be accepted into another group within one semester to remain in the Chemistry Program. Students must complete a new “Selection of Research Advisor Form” (see 3.1.1) and submit a written notice to the previous advisor to officially resign from the prior research group. The student and new research advisor must submit a timeline for completion of the preliminary oral exam to the GPC at the time of the advisor change.

1.2 Graduate Coursework Requirement

1.2.1 Summary of Coursework Requirement

1. All Ph.D. students in the Chemistry Program must complete at least six graduate-level courses (exceptions may be made with a course-load reduction petition, upon approval by the GPC, **see Section 1.2.2**). At least two of these courses must be selected from the pre-approved core courses listed below, based on the students’ areas of research interest. Of the remaining four courses, only two of the courses may be chosen from the fields of Biology, Mathematics, or Physics. (A Guide to PhD Graduate Coursework Registration can be found in **Appendix 2**)

Table 1 Pre-approved Core Courses in Chemistry

Subdivision	Course #	Title
Analytical	CHEM 521	Advanced Analytical Chemistry
Analytical (can choose one of the three courses)	CHEM 582B or CHEM 582E or CHEM 582C	Surface Chemistry Electrochemistry Environmental Chemistry
Biological	BCHM 507	Advanced Biochemistry
Biological	BCHM 508	Advanced Biochemistry Methods
Inorganic	CHEM 542	Physical Inorganic Chemistry
Inorganic/Materials	CHEM 544	Chemistry of Solids
Materials	CHEM 511	Techniques for Studying Solids
Organic	CHEM 531	Physical Organic Chemistry
Organic	CHEM 532	Organic Synthesis
Organic	CHEM 534	Bioorganic Chemistry
Physical	CHEM 551	Quantum Chemistry & Spectroscopy
Physical	CHEM 554	Computational Chemistry

- In addition, all Ph.D. students must complete one semester of Graduate Seminar (CHEM 592) and two semesters of Frontiers in Chemistry (CHEM 593).
- Students who plan on specializing in a particular subdivision (Analytical, Biological, Inorganic/Materials, Organic and Physical) may be advised to take certain combinations of the above core courses, followed by a list of sequential courses suggested by their research advisors. The required courses for each subdivision can be found in the appendices of this handbook (see **Appendix 3**).

1.2.2 Course Load Reduction

- Upon petition to the GPC, graduate courses previously taken elsewhere, or in another graduate degree program at Binghamton, may be used to satisfy the Chemistry Department's course requirements. The course-load reduction will not count towards the required residency requirement.
- In line with the above general guideline, graduate-level courses taken by students with only undergraduate degrees from Binghamton University can be used for course load reduction petitioning. For students with only undergraduate degrees from other institutes, supporting evidence (e.g., supporting letters from the students' undergraduate program and/or instructors) must be provided to demonstrate the presented courses were taken as graduate-level courses.
- The GPC may grant a maximum reduction of two graduate-level courses.
- Courses presented for the course load reduction petitioning must have a grade average of at least 3.0 (i.e., a letter grade B or better).

5. Students are required to discuss their plans for course load reduction petitioning with their research advisors before the advisor submits a petition to the GPC. The courses presented for the petition should be relevant to the student's research area.
6. For the GPC to consider a course-load reduction petition, the research advisor must submit a course-load reduction package to the GPC containing the following documents:
 - Transcripts that show the presented courses have a grade average of 3.0 or higher (i.e., letter grades B or better).
 - Syllabus of the presented courses.
 - Supporting documents to approve the presented courses were taken at the graduate level.
 - Written approvals from research advisors.

The package will be reviewed at the next GPC meeting, and the student and the research advisor will be informed about the decision.

1.2.3 Unsatisfactory Cumulative GPA and the Probation Status

Ph.D. students must maintain a satisfactory cumulative GPA above 3.0. Students with an unsatisfactory cumulative GPA in a particular semester will be put on probation status until their coursework is complete and will be informed by the GPC. Students on probation must resume a satisfactory cumulative GPA (above 3.0) for the remainder of their coursework. Failure to resume a satisfactory cumulative GPA will be grounds for dismissing the student from the Ph.D. program.

1.3 Comprehensive Examinations

1.3.1 Comprehensive Literature Review (CLR) Examination

1. The CLR examination consists of an oral (CLR-o) and a written (CLR-w) part and is administrated at the end of the spring semester, no later than four weeks from the completion of the Graduate Seminar course (CHEM 592). A second CLR exam is offered, as needed, at the end of the fall semester.
2. The CLR examination committee administrating the exam in a relevant topic area/subdiscipline is appointed by the GPC and consists of at least three faculty members, including the student's research advisor or a proxy chosen by the advisor. The committee must include one tenured professor besides the student's advisor (or their proxy). The advisor (or their proxy) is present but does not participate in the exam evaluation process.
3. All PhD students **are required to pass the CLR exam by the end of their third semester in the program**. PhD students who join the Chemistry Program in the fall semester must enroll in CHEM 592 in the spring semester and take their first CLR exam at the end of the spring

semester. PhD students who join the Chemistry Program in the spring semester must enroll in CHEM592 that semester and take their first CLR exam at the end of the following fall semester.

4. The following procedures must be followed to take the CLR exam:
 - Eligible students will inform the CHEM592 instructor about their intent to take the exam by submitting a form that includes information about their choice of advisor along with the identified field of research and topic for the exam. The topic may be related to but not exclusively focused on their intended/planned/ongoing research project activities. The advisor must co-sign this form as well.
 - The work on the written component and the preparation for the oral part of the CLR exam should both be exclusively that of the student only.
 - The student must submit a written report (CLR-w) on the comprehensive literature review to the committee and the GPC (gpcchem@binghamton.edu) no later than one week before the scheduled CLR-o exam. The written report should be five to six pages, single space, font size 11, and 1" top-bottom-side margin. References and figures are not included in the page count. At least 20 references (reviews and primary research papers) should be included.
 - Students must submit their presentation slides 24 hours before the scheduled CLR-o exam.
 - The CLR exam consists of a 20-minute oral presentation followed by a discussion of up to 40 minutes. The total allotted time for the oral examination is one hour.
 - The CLR examination committee will ask questions regarding the specific topic of the exam as well as general knowledge of the subdiscipline of the topic. The student performance is assessed by the committee members based on the established evaluation criteria that incorporate both the CLR-w and the CLR-o components of the exam (see **Appendix 4** for the CLR Exam evaluation form). The CLR-w will be factored with a weight of 25% in the overall exam evaluation.
5. Students who have registered for the CLR exam in a particular semester must complete both the written and oral parts of the exam. Exceptions (e.g., due to a medical emergency) must be pre-approved by the GPC. Students who fail to complete a registered CLR exam without approval will receive one "fail" on that exam. In the case of an approved exception, the student must reschedule the CLR exam within a month. A granted exception does not extend the final deadline for passing the CLR exam specified in Paragraph 3.
6. Students who fail their first CLR exam will have the opportunity to retake it in the following semester. Failing the CLR examination a second time will be grounds for dismissing the student from the Chemistry PhD Program.

1.3.2 Preliminary Oral Examination

1. The preliminary oral examination where the student reports for the research project results for the first time to a committee **must be completed before the beginning of the fifth semester**. Failure to do so will be grounds for dismissal from the PhD program. Students who have changed research groups (Section 3.1.3) or need an extension for extenuating circumstances must petition the GPC with a formal research plan, including the timeline for completing the preliminary oral.
2. For all Chemistry PhD students, the preliminary oral examination committee will consist of at least four tenured or tenure-track faculty members, including at least three chemistry-tenured or tenure-track faculty members. The committee must be chaired by a tenured chemistry faculty member other than the dissertation research advisor. The advisor does not participate in the exam evaluation process.
3. For students in the Biological Chemistry and Materials Chemistry emphasis program, one member of the examination committee may be a tenured or tenure-track faculty member outside the Chemistry Department but in the corresponding field.
4. The following procedures must be followed to take the preliminary oral exam:
 - Student should confirm the membership of the committee with the dissertation advisor and Graduate Program Director.
 - Student should arrange a date and time acceptable to committee members and reserve a room for the examination with the Department Secretary. Deliver (by email) an abstract (of approximately one page, with information about committee members, date, time and room) to the Department Secretary at least one week before the scheduled examination date. The secretary will prepare a notice of the examination, send copies to all department faculty members, and post notices in public places in the department.
 - **Student should submit a written dissertation prospectus to the committee and the GPC (gpcchem@binghamton.edu) two weeks before the preliminary oral examination.** The preliminary oral examination may not be scheduled until the prospectus is submitted. The dissertation prospectus is typically three to five pages long including figures, not including references, and should contain the following sections:
 - (1) An introduction to the big picture of the project, usually no longer than one page.
 - (2) An outline of key progress at the time of preliminary oral examination. The student may include figures for the presentation of key results. This section is typically two to three pages.
 - (3) A brief discussion about future directions after preliminary oral examination. The students are encouraged to discuss with their advisors to construct this section. The typical length will be less than one page.
 - (4) A list of essential references must be provided.

In addition, the dissertation prospectus should include a list of the committee members' names in the end of document for later signatures. The following format is recommended to meet the page length: single space, 1" top-bottom-side margin, font size 11.

5. Following the preliminary oral examination, the committee will provide the student with a written evaluation of the student's performance based on the established criteria (see **Appendix 5** for the Preliminary Oral Exam evaluation form). Possible outcomes are:
 - A pass at the Ph.D. level that normally warrants an oral progress report in 18 months
 - A weak pass that calls for an oral progress report within 12 months
 - A failed attempt, with an option to retake the exam in three months
 - A terminal failed attempt, where the committee will advise the student to receive a terminal Master's degree and the student will not be eligible for further financial support.

1.3.3 Admission to Ph.D. Candidacy and Oral Progress Report

1. After the student passes the oral examination, committee members should sign the dissertation prospectus.
2. Student should submit the approved dissertation prospectus to the Department Secretary. The student will be admitted to Ph.D. candidacy and achieve ABD (All But Dissertation) status.
3. In special circumstances, two credits of the Graduate Seminar requirement (CHEM592) and two credits of the Frontiers in Chemistry (CHEM593) requirement may be postponed until after admission to candidacy.
4. Satisfactory progress toward the degree will require the student to present an oral progress report to the Dissertation Committee at a time that is determined by the Dissertation Committee. Following the presentation of the oral progress report, the Chair of the Dissertation Committee will provide the student with a written evaluation of the student's performance with the aim of advising the student on how to progress to Dissertation. The Committee will also determine the date of the next required oral progress report.
5. Failure to present a progress report at the scheduled time or an unsatisfactory evaluation of any oral progress report will reflect unsatisfactory progress toward the degree and may result in termination of financial support. The Dissertation Committee may also advise the student to receive a terminal Master's degree.

1.4 Dissertation Defense

1.4.1. Dissertation Committee

The dissertation defense committee will normally include the Dissertation Committee plus an outside examiner. The committee will be chaired by a tenured chemistry faculty member who is not the dissertation advisor.

1.4.2 Outside Examiner

The outside examiner is either a) a Binghamton faculty member from a related area outside the student's major program department or division or b) someone from a related discipline outside the University. Normally, the outside examiner will have no involvement in the supervision of the student's dissertation. The outside examiner reads the dissertation and participates fully as a dissertation-examining committee member during the dissertation defense. The outside examiner's function on the examination committee is to render an independent judgment and to assure that the dissertation satisfies Graduate School standards.

1. The students are responsible for discussing the choice of the outside examiner with their dissertation advisors, establishing that the proposed outside examiner is willing to serve on the committee, and applying for the approval of the outside examiner from the Graduate Program Director (see below), **at least one month prior to the defense.**
2. If the proposed outside examiner is on the pre-approved outside examiner list (<https://www.binghamton.edu/grad-school/policies-and-procedures/manual/instructions.html>) the student should inform the Graduate Program Director and the proposed outside examiner by email. A request will be sent by the Graduate Program Director to the Graduate School for approval.
3. If the proposed outside examiner is not on the pre-approved outside examiner list. The students are responsible to submit the following documents to the Graduate Program Director:
 - The Outside Examiner Request Form (https://www.binghamton.edu/grad-school/pdf/outside_examiner_request.pdf)
 - The current CV from the proposed outside examiner
 - A statement explaining the relevance of the outside examiner's expertise to the student's dissertation topic

The Graduate Program Director will submit the above documents, with a statement that explains the relevance of the nominee to the student's dissertation research topic, and the nominee's experience in evaluating doctoral research to the Graduate School for approval.

1.4.3 Prior to the Dissertation Defense

1. The students are responsible for arranging for a date and time acceptable to committee members, reserving a room for the defense, and delivering (by email) an abstract (of approximately one page, with information about committee members, date, time and room) to the Department Secretary at least one week before the scheduled defense date.
2. The students are responsible for submitting copies of their dissertations to all the committee members at least two weeks before the defense. The committee may withdraw a scheduled defense if the submission deadline is not met. In such cases, the students are responsible to reschedule the defense.
3. The doctoral dissertation is expected to provide a substantive and novel contribution to the candidates' given field. The final dissertation documentation should demonstrate scientific

rigor and a scholarly standard of writing. We acknowledge the fact that each lab and each student have a unique project that requires individual tailoring of the final dissertation document. Therefore, the students are encouraged to discuss with their advisors about the final compositions in their dissertations. Instructions about the lengths of dissertation, the structures of individual chapters, the presentation styles for figures and tables and the number of literature references should be provided by faculty advisors. Acknowledgement of work done by other students and/or collaborators should be indicated.

4. Formatting guidelines and sample dissertations can be found on the Graduate School website: <https://www.binghamton.edu/grad-school/policies-and-procedures/manual/thesis-dissertation.html>

1.5 Graduation

1.5.1 Graduate Application for Degree (GAFD) and Recommendation for Award (RFA) Form

1. The GAFD and RFA are required to notify the University of a student's intent to fulfill their degree requirements at the end of the current semester.
2. The deadlines for submitting GAFD and RFA are posted and updated on the Graduate School website: https://www.binghamton.edu/registrar/student/grad_degree_completion.html
3. If a GAFD is submitted for a particular semester and the student does not defend by the end of the semester, a new GAFD must be submitted for a later semester.
4. Students must complete and submit the GAFD and RFA forms on BU Brain. Please follow the procedure specified on the Graduate School website: https://www.binghamton.edu/registrar/student/grad_degree_completion.html

1.5.2 Submission of the Dissertation to the Graduate School

1. The deadline for dissertation submission is posted and updated on the Graduate School website: https://www.binghamton.edu/registrar/student/grad_degree_completion.html
2. Follow the procedure on the Graduate School website to submit the dissertation electronically: <https://www.binghamton.edu/grad-school/resources/graduation/submitting-thesis-dissertation.html#step2>
3. Note that all students are required to also submit a **Survey of Earned Doctorates (SED)** and **processing fees** after the submission of dissertations. Students will receive Email notifications from the Graduate School for the acceptance or the requests for revisions of their dissertation.

1.5.3 Exit Form

An Exit Form (<https://www.binghamton.edu/chemistry/about/resources.html>) must be submitted by the students before leaving the program.

1.6 Requirement for the Teaching Assistantship

The following departmental guidelines have been established to ensure that you will have a successful instructional experience and that you will develop an excellent working relationship with the teaching faculty and the instructional staff.

As a Teaching Assistant, you must perform your teaching duties satisfactorily to remain in good standing. Teaching performance and laboratory safety are an essential part of the TA's training program. The GPC receives reports on TA's effectiveness and monitors their performance closely. Unsatisfactory teaching, unethical/dishonest practices and/or imprudent safety practices will lead to the loss of the TA assistantship and may lead to dismissal from the program.

It is also important to highlight that respect should be given to all students, whether they are in your lab section or not, and to the staff, faculty, and other TAs regardless of their age, gender, sexuality, race, ethnicity, or religion. During this time in the position of TA, the faculty and staff are preparing you for a future career as a researcher, instructor, etc. You must maintain a professional appearance in all of your teaching duties, including in the laboratory, as well as during discussion sessions, lectures and your help hours.

Your teaching assistantship will require that you be actively involved in the instructional program, discussion sections, grading and proctoring duties, help hours, meetings, and appropriate study preparation. These and any additional duties will be assigned by the Director of Instruction and Outreach.

The Instructional staff will work with you to help you succeed. To ensure that you are prepared for your initial instructional assignment, you are required to participate in the initial orientation program. This program involves both University TA programs, special programs administered through the International Student and Scholar Service (ISSS) office, and an intensive departmental training program. The second component of the TA training program concentrates on the development of effective instructional skills. As a TA, you are required to attend weekly group meetings for your individual instructional assignments. The mandatory meetings are attended by the graduate teaching assistants and the laboratory staff/faculty. The final and most effective part of our program is the ongoing evaluation of each teaching assistant. We have developed an informal observation process where every teaching assistant is observed on a weekly basis. TAs are involved in a critique of their instructional presentation individually. Once again, this open line of communication, illustrating a sincere interest in developing teaching skills of the TA in a non-threatening manner, will accomplish more in improving the graduate teaching experience than any group workshop or related activity.

1.7 Dismissal from the Chemistry Ph.D. Program

Dismissal from the Chemistry PhD program occurs when:

- a. A committee judges the student to fail the Comprehensive Literature Review (CLR) Examination on the second attempt (see Section 1.3.1)
- b. A committee makes a termination decision that the student fails the preliminary oral examination (see Section 1.3.2)
- c. A student's cumulative GPA falls below 3.0 for two consecutive semesters (see Section 1.2.3)
- d. A student receives an unsatisfactory grade or failing grade in independent studies (including CHEM/BCHM 597, CHEM/BCHM 598, CHEM/BCHM 599, CHEM/BCHM 697, CHEM/BCHM 698 and CHEM/BCHM 699) for two semesters.
- e. A student is unable to obtain a research advisor by the end of the second semester in the program.
- f. If a student changes research advisors, a grace period of three months is permitted. If a student fails to secure a new research advisor within that grace period, they will be subject to dismissal from the program.
- g. A student's progress evaluation is assessed as failing to meet expectations, and a committee deems that the student should be dismissed from the program.
 - In the case, an annual review with an overall assessment of "Failed to Meet Expectations" should be submitted by the advisor, and a committee should be assembled to evaluate the student's academic progress.
 - The student will be given a one-semester period to make improvements, and the advisor should submit a second written evaluation to the committee for review. If the student receives a second "Failed to Meet Expectations" assessment, then the committee should meet again and make a decision regarding student dismissal from the Ph.D. program.
 - For students with ABD status, the evaluation and decision should be made by the students' preliminary oral examination committee.
 - For students that do not have ABD status, the research advisor will inform the GPC, and the GPC will assemble a committee consisting of the CLR committee members and one additional faculty member from the student's subdiscipline.

2. The Master's Programs

2.1 The M.S. Program Summary of Requirements

1. Four graduate courses (16 credits), at least three of which ordinarily are in chemistry, with the balance in related courses approved by the GPC.

Biological Chemistry emphasis: at least two courses in chemistry, and the remainder from the fields of biological sciences and other sciences (physics, computer science, geology, mathematics or engineering), as approved by the faculty advisor for individual student programs.

Materials Chemistry emphasis: at least two courses in chemistry, including Chemistry 544, and at least two courses from the fields of materials science and engineering, geology, physics, or engineering, as approved by the faculty advisor for individual student programs.

2. One semester of Chemistry 592 (Graduate Seminar).

3. Two semesters of Chemistry 593 (Frontiers in Chemistry).

4. Completion of an acceptable research thesis (Chem 599).

5. Passing an oral examination on the subject of the research thesis. The thesis defense committee will consist of at least three faculty members, including at least one tenured chemistry faculty member who is not the thesis research advisor. The committee will be chaired by a tenured chemistry faculty member who is not the thesis research advisor. In interdisciplinary programs, one member may be from another department.

6. A total of at least 30 graduate credits obtained under the above requirements.

(A Guide to M.S. Graduate Coursework Registration can be found in **Appendix 6**)

2.2 The M.A. Program Summary of Requirements

1. Six graduate courses (24 credits), at least four of which are in chemistry, the balance to be related courses approved by the GPC.

2. One semester of Chemistry 592 (Graduate Seminar).

3. Two semesters of Chemistry 593 (Frontiers in Chemistry).

4. Completion of an acceptable research project (at least four credits of Chem 597).

5. Public presentation of a seminar on the subject of the research project.

6. A total of at least 32 graduate credits obtained under the above requirements.

(A Guide to M.A. Graduate Coursework Registration can be found in **Appendix 7**)

2.3 Combined Awards (4 + 1) Programs in Chemistry

The 4+1 programs are designed for outstanding students who wish to combine a Bachelor of Science/Arts degree in Chemistry with a Masters degree in Chemistry. The combined program allows students who are interested in a Masters degree to complete two separate degrees in five years, saving time and tuition. This is achieved by completing two graduate courses (8 credits) in the senior year of undergraduate studies.

4+1 Programs in Chemistry offered at Binghamton University:

- BA/BS Chemistry + MA/MS Chemistry
- BS Chemistry + MS Materials Science and Engineering

You should consider the 4+1 program if:

- you are interested in a career in industry with experience and qualifications in addition to Bachelor's degree, but you do not want to commit to a PhD degree.
- you want to determine whether research, eventually pursuing a PhD degree, is the right career choice for you.
- you want to increase preparation for Medical School, for example, to increase your GPA or to gain more experience.
- you want to achieve a career in teaching, for example in High School, for which Masters degrees make applicants more competitive.

How does it work?

- You start on a regular track to the Chemistry BS/BA degree for the first three years. In your junior year, you declare your interest in the 4+1 program through an online portal in MyBinghamton. In your senior year (in late fall or early spring), you will formally apply for the program via an online portal in MyBinghamton. If accepted, you must confirm your intent to enroll in Slate (look for reminder emails about this!). Note: 4+1 students do not have to pay an enrollment deposit. Once you are accepted into the graduate program and you have completed your Bachelor's degree, you take graduate courses and perform graduate research in year five. The MA degree is the non-thesis option with more coursework, the MS degree requires submission and defense of a MS thesis.

The importance of research for the MS track:

- To complete the combined degree track within five years, it is important to begin undergraduate research (Chem 397 / 497 independent study) as soon as possible. In fact, experience in undergraduate research will be strongly recommended (MA track) or needed (MS track) when you

declare your interest in the program as your undergraduate research advisor will most likely serve as your MA/MS advisor.

A list of FAQs for the 4+1 Program can be found in **Appendix 8**

2.4. The Master of Arts in Teaching (MAT) in Chemistry Program Summary of Requirements

1. All of the general MAT requirements determined by the Department of Teaching, Learning, and Educational Leadership (see University Bulletin).
2. A minimum of 12 credits of graduate-level chemistry courses.

3. Policies and Regulations

3.1 The Graduate Program Committee

1. The Chemistry Department's *Graduate Program Committee* (GPC) is the departmental agent for administering the PhD, MS and MA degree programs. Its chair is the Graduate Program Director. The GPC does the following:

- (a) acts as student advisor and approves the student's course program until a faculty research advisor is chosen (see below),
- (b) monitors the progress and performance of each student throughout the student's graduate program, by soliciting course evaluations, teaching performance evaluations and research progress evaluations from faculty; (it also solicits teaching performance evaluations from the Director of Instruction and Outreach, and research progress reports from the student),
- (c) keeps the students apprised of their academic status and, in the case of teaching assistants, of teaching performance,
- (d) adjudicates all student petitions (petitions should be directed to the chair of the GPC).

2. The GPC is made up of faculty representatives from the four subdisciplines (analytical, inorganic, organic and physical) and one graduate student chosen by the Graduate Chemistry Club.

3.2 University Regulations

1. *Transfer credit* is awarded by petition, using a specified petition form. Courses transferred will be above the introductory level in any sub-field; a grade of B or better is required. Transferred courses can be used to fulfill the department's required number of courses but cannot be used in determining the GPA graduation requirement of at least 3.0; they also cannot be used to satisfy the residency requirement.

2. New York State funds can be used to support the student's tuition for no more than four years in the Ph.D. program. For a student earning both an M.S. degree and a Ph.D. degree at Binghamton University, New York State funds can be used for no more than three years of tuition support beyond the M.S. degree.

A semester of Research Assistantship support is counted in this limitation if a tuition scholarship is awarded; semesters in which *any amount* of work/study support is received are also counted. Formal requests for exceptions will be considered by the GPC only for Ph.D. students, if accompanied by a written statement of justification from the research advisor. The GPC may endorse the request and submit it to the Graduate Office for its approval

3.3 Research and Publication of Research

3.3.1 Policy on the Responsible Conduct of Research

The University's Policy on the Responsible Conduct of Research can be found at <https://www.binghamton.edu/research/compliance/responsibleconductofresearch.html>. The policy defines research misconduct as fabrication, falsification, or plagiarism in proposing, conducting, or reporting research and creative scholarly activity. It does not include honest errors or honest differences in interpretations or judgments of data. Allegations of research misconduct are reported to the Vice President for Research who has primary responsibility for overseeing research integrity.

3.3.2 Policy on Intellectual Property

The University's policy on Patent and Inventions Policy and Computer Software can be found at <https://www.binghamton.edu/research/innovation/index.html>. All persons using the facilities of Binghamton University must abide by these policies. These policies define what intellectual property is, that in most cases, the State of New York owns the intellectual rights, and describe the rewards due the inventor of intellectual property.

3.3.3 Ethical Guidelines for the Publication of Research

guidelines for publication of research as asserted by the American Chemical Society (ACS). ACS guidelines related to publication can be found at <https://pubs.acs.org/page/policy/ethics/index.html>. These guidelines will be shared and discussed with all graduate students through the Graduate Seminar course (Chemistry 592). Students who do not adhere to these guidelines will be subject to penalties, which may include a recommendation to the Graduate School for dismissal from the program.

¹The American Chemical Society's Ethical Guidelines to Publication of Chemical Research include the following text:

"The co-authors of a paper should be all those persons who have made significant scientific contributions to the work reported and who share responsibility and accountability for the results. The author who submits a manuscript for publication accepts the responsibility of having included as co-authors all persons appropriate and none inappropriate."

Graduate students are required to sign a statement that they have read, understand, and agree to these policies and guidelines.

3.3.4 Policy on Sexual Harassment

The Department follows the University's Policy on Sexual Harassment, which can be found at <https://www.binghamton.edu/student-handbook/policies/sexual-harrassment.html>

3.3.5 Safety and Chemical Hygiene

Department of Chemistry is committed to providing and enforcing an atmosphere of good safety practice in our research and instructional laboratories for all faculty, students, and staff. Each laboratory worker has the responsibility for their own safety and the safety of co-workers.

A mandatory safety meeting will be held at the beginning of each semester. All graduate students, postdoctoral associates and staff members are required to attend the meeting.

All laboratory workers must satisfactorily pass the ACS safety certification examination before beginning work in any research laboratory. Study materials can be found on the Department Website: <https://www.binghamton.edu/chemistry/about/safety.html>.

The Environmental Health and Safety Office (EH&S) (<https://www.binghamton.edu/offices/environmental-health-safety/>) can be reached as a more general source for information on safety concerning chemicals, biological materials and hazardous waste management.

An injured employee or student must report any accident that requires medical attention and/or first aid or whenever the injured person receives any apparent bodily injury.

An accident in the instructional lab must be reported to the lab coordinator.

An accident in the research lab must be brought to the attention of the research advisor.

The form below can be found at the EH&S website:

<https://www.binghamton.edu/offices/human-resources/forms/pdf/workers-comp/accident-injury-report.pdf>

A near-miss is a potential hazard or incident in which no property was damaged and no personal injury was sustained but where, given a slight shift in time or position, damage or injury easily could have occurred. Near misses may also be referred to as close calls, near accidents, or injury-free events. For the sake of a safe work environment, EHS asks that all employees report and correct any of these potential hazards immediately. The form can be found at the EH&S website: <https://www.binghamton.edu/offices/environmental-health-safety/index.html>

3.3.6 Plagiarism

Plagiarism involves presenting the work of another as one's own. This includes copying information from technology such as ChatGPT and paraphrasing tools. Using technologies such as these to produce work that is expected to be completed solely by you violates the Student Academic Honesty Code. The graduate program committee checks all submitted work for plagiarism using Turnitin®. Any work submitted for a written exam, prospectus, or thesis must be completed by the student alone, without the aid of Artificial Intelligence.

3.3.7 Clarifications on the use of Artificial Intelligence (AI)

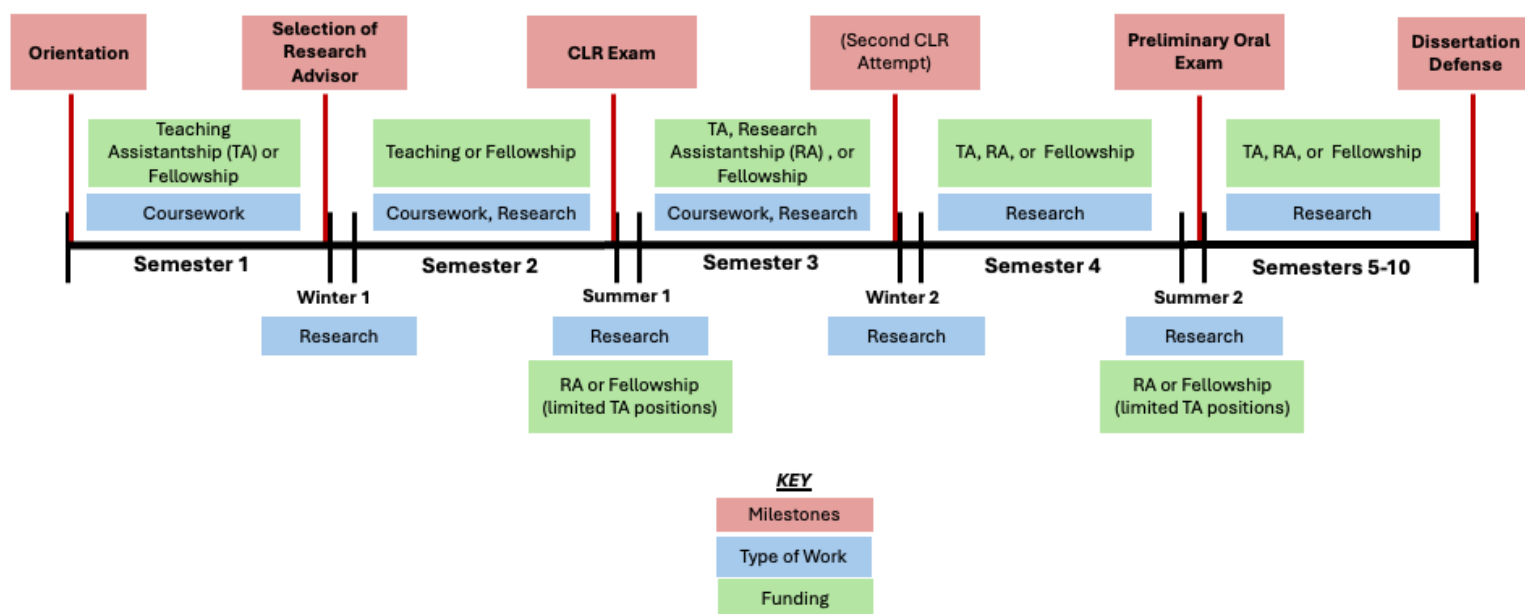
It is crucial to understand that direct copying information from generative AI tools in professional writing is considered plagiarism. It is also important to realize that generative AI can lead to incorrect information and non-existent sources.

In addition, the Graduate School policies on generative AI use can be found in the following webpage: <https://catalog.binghamton.edu/content.php?catoid=5&navoid=186#policy-on-generative-ai-use>. A declaration statement page must be included in all submitted written work and please follow the format provided in the link.

A. Appendices

A.1 Appendix 1 – PhD Program Timeline

PhD Program Timeline



A.2 Appendix 2 – Graduate Program Registration Timeline

Graduate Program Registration Timeline

Semester 1 (12 Total Cr)		CLR Exam	Second CLR Exam, if needed	Preliminary Oral Exam	Dissertation Defense
Semester 2		Semester 3	Semester 4	Semester 5-End	
- Grad Course (4 cr.) - Grad Course (4 cr.) - Chem 593 (1 cr.) (<i>Frontiers</i>) - Chem 591 (2 cr.)* (<i>Teaching Practicum</i>) - Chem 597 (1 cr.) (<i>Independent Research</i>) (Instructor: GPC director) * If not teaching, register for 3 credits of Chem 597		- Grad Course (4 cr.)* - Grad Course (4 cr.)* - Chem 597 (1 cr.) (<i>Independ. Research</i>) OR Chem 591 (1 cr.) (<i>Teaching Practicum</i>) (for teaching certification) - Attend Frontiers * If received 2 course waiver: register for only 1 credit of Chem 597 * If received 1 course waiver: register for 1 Graduate Course (4 cr.) and Chem 597 (5 cr.)	- Chem 697 (1 cr.)* (<i>Independent Research</i>) - Attend Frontiers * Student is Course Complete and has passed CLR, but has not yet passed Preliminary Oral Exam	- Chem 698 (1 cr.)* (<i>Independent Research</i>) - Attend Frontiers * Student is ABD Status: Course Complete and has passed Preliminary Oral Exam *Average Dissertation Semester = 10th	

****Students must complete Google Registration Form for every semester****

<https://forms.gle/8J69ZUXZiPbNEKrc6>

A.3 Appendix 3 – PhD Coursework Requirements by Division

Course Requirements by Subdiscipline

Research track	Core course 1	Core course 2
Analytical	CHEM 521 Advanced Analytical Chemistry	One of the following CHEM 582B Surface Chemistry CHEM582E Electrochemistry CHEM582C Environmental Chemistry
Biological	BCHEM 507 Advanced Biochemistry	BCHEM 508 Advanced Biochemistry Methods
Organic	CHEM 531 Physical Organic Chemistry	One of the following CHEM 532 Organic Synthesis CHEM 534 Bioorganic Chemistry
Physical	CHEM 551 Quantum Chemistry & Spectroscopy	CHEM 554 Computational Chemistry
Inorganic	CHEM 542 Physical Inorganic Chemistry	CHEM 544 Chemistry of Solids
Materials	CHEM 511 Techniques for Studying Solids	CHEM 544 Chemistry of Solids

A.4 Appendix 4 – CLR Exam Evaluation Form

Department of Chemistry, Binghamton University
Evaluation Worksheet for the Comprehensive Literature Review Examination

The chair of the committee must fill out the GOOGLE FORM online for the CLR to be properly recorded! <https://forms.gle/9eZuNuA3hHv6k2XR8>

Student Name: _____ Date: _____

1. Quality of the written report.

0 1 2 3 4 5 6 7 8 9 10

Comments:

2. Quality of oral presentation.

0 1 2 3 4 5 6 7 8 9 10

Comments:

3. Understanding of scientific foundation, progress, consensus, debates/knowledge gaps and future directions on selected topic.

0 1 2 3 4 5 6 7 8 9 10

Comments:

4. Ability to defend and discuss on selected topic.

0 1 2 3 4 5 6 7 8 9 10

Comments:

A grade of 10 represents the best performance, and a grade of 0 represents the worst performance. The student must receive at least a 6 on each grading category AND an overall minimum average 6.6 on the exam to pass.

A.5 Appendix 5 – Preliminary Oral Exam Evaluation Form

Department of Chemistry, Binghamton University
Evaluation Summary for the Preliminary Oral Examination (updated 10/10/2023)

Must be submitted as a google form: [Preliminary Oral Exam Evaluation Google Form](#)

(the Committee Chair should also submit a final form with average scores and a summary of comments)

Student Name: _____ Date: _____

1. General knowledge of scientific background and relevant literature. **Average = _____**
Comments:

2. Knowledge of techniques in the field of proposed research. **Average = _____**
Comments:

3. Quality of oral presentation, organization, and research summary. **Average = _____**
Comments:

4. Research progress and potential for future research. **Average = _____**
Comments:

5. Ability to defend and discuss their research. **Average = _____**
Comments:

Overall Average = _____

A.6 Appendix 6 – MS Program Registration Timeline

MS Program Registration Timeline

Selection of Research Advisor	Semester 1 <i>(13 - 15 Total Cr)</i>	Semester 2 <i>(15 Total Cr)</i>	Semester 3	Semester 4	MS Thesis Defense
	• Grad Course (4 cr.) • Grad Course (4 cr.) • Chem 593 (1 cr.) <i>(Frontiers)</i> • Chem 597 (4 to 6 cr.) <i>(Independent Research)</i> <u>potential course waiver petition</u>	• Grad Course (4 cr.) • Grad Course (4 cr.) • Chem 593 (1 cr.) <i>(Frontiers)</i> • Chem 592 (2 cr.) <i>(Graduate Seminar)</i> • Chem 597 (4 cr.) <i>(Independent Research)</i> <u>potential course waiver petition</u>	• Chem 597 (1 cr.) <i>(Independ. Research)</i> • Attend Frontiers • Full-time research	• Chem 599 (1 cr.) <i>(MS Research Thesis)</i> • Attend Frontiers • Write and defend MS thesis	

****Students must complete Google Registration Form for every semester****

<https://forms.gle/8J69ZUXZiPbNEKrc6>

A.7 Appendix 7 – MA Program Registration Timeline

MA Program Registration Timeline			
Selection of Research Advisor	Semester 1 (13 Total Cr)	Semester 2 (13 Total Cr)	Semester 3 (9 Total Cr)
	• Grad Course (4 cr.) • Grad Course (4 cr.) • Chem 593 (1 cr.) (Frontiers) • Chem 597 (4 cr.) (Independent Research) <u>potential course waiver petition</u>	• Grad Course (4 cr.) • Grad Course (4 cr.) • Chem 593 (1 cr.) (Frontiers) • Chem 592 (2 cr.) (Graduate Seminar) • Chem 597 (2 cr.) (Independent Research) <u>potential course waiver petition</u>	• Grad Course (4 cr.) • Grad Course (4 cr.) • Chem 597 (1 cr.) (Independent Research) • Attend Frontiers
			MA Research Presentation
			Semester 4
			• Chem 597 (1 cr.) (Independent Research, if need more time) • Attend Frontiers
			MA Research Presentation

****Students must complete Google Registration Form for every semester****

<https://forms.gle/8J69ZUXZiPbNEKrc6>

A.8 Appendix 8 – FAQs 4+1 Program

FAQs for 4 + 1 Programs in Chemistry

Junior Year

Is there a process for "declaring interest" in the program during the junior year?

- Yes. You can declare your intention to join the 4+1 program through an online portal in MyBinghamton. Your major code will change to the 4+1 code.

Do I need an undergraduate research advisor in the Chemistry department?

- Yes

For the 4+1 MS degree, should I be enrolled in independent study (research), with a project underway during my junior year?

- Yes

What is the role of my undergraduate research advisor in this process? Should I have a letter from my advisor during the junior year that (a) attests to the student's qualifications, and (b) commits to serving as MS/MA advisor?

- The application process requires only an advisor from the Department of Chemistry to be chosen at the time of application and then the advisor to support the application. No other formal letter is required at this point.

How many courses should I have completed by the end of my junior year to be eligible?

- There is no exact requirement that defines eligibility as the progress to degree of each student often varies. At the same time we generally recommend for successful applicants to have completed most of the core courses in the undergraduate chemistry curriculum like Chemistry 107 & 108, 221, 231, 332, 341, 351 or 361, Mathematics 224 & 226, and Physics 131 & 132. For students pursuing combined BS + either MA or MS degrees we recommend to have complete also Chemistry 422, 451, 455, and Inorganic Chemistry II (one of 442, 443, 444, 445, or 484).

Senior Year

Can I start taking graduate level classes in Chemistry as a Senior?

- Undergraduate students should register for up to two graduate-level courses (8 credits of 500-levels) and receive graduate credits, provided that the graduate courses are not used to fulfill an undergraduate degree requirement.

For the 4+1 MS degree, should I be enrolled in independent study (research), with a project underway during my senior year?

- In your senior year, for those pursuing an MS degree, yes, you should be enrolled in independent research with a faculty member in the Chemistry department.

How do I formally apply during my senior year?

- It is highly recommended to apply by the end of the first semester of the senior year. The application is submitted through an online portal in MyBinghamton.

What is the deadline for formally applying during my senior year?

- The deadline is the end of the senior year.

Is the GRE required?

- The only requirement is GPA of 3.2 or better. GRE is not required.

+1 Year**Once in the program, how do I form a MS committee?**

- It is a good idea to first discuss the MS committee membership with your research advisor. Once you agree on the best membership, you will need to contact the faculty members you wish to serve on your committee and ask for their agreement. Please remember that the thesis defense committee should consist of at least three faculty members, including at least one tenured chemistry faculty member who is not your advisor. The committee will be chaired by a tenured chemistry faculty member who is not your advisor. In interdisciplinary programs, one member may be from another department.

When would I hand in and defend my MS thesis?

- The thesis (for MS degree only) must be defended during a regular semester time (Fall, Spring, or Summer), preferably at least a week before the official dissertation submission deadline. Copies of the thesis must be delivered to the members of the thesis defense committee at least two weeks before the defense.

What happens if my thesis work is not complete by the end of the +1 academic year?

- Normally, students in such situation decide to register for one (or more) additional semester(s). Another option is to finish with a MA degree if all course requirements are met.