

1. INTRODUCTION

1.1 Graduate Programs in Chemistry:

The Department of Chemistry offers Ph.D. and M.S. degrees in Analytical Chemistry, Biochemistry, Inorganic Chemistry, Organic Chemistry and Physical Chemistry. The graduate programs are designed to provide a solid background in the area of specialization, and emphasize the acquisition of skills that enable students to obtain further knowledge in their research, and later, in their professional careers. For this reason, the graduate degree programs are research oriented; seminar attendance and familiarization with the chemical literature are building blocks of the programs. Course requirements offer a wide variety of intermediate and advanced courses in related areas. Students may take graduate-level courses (**5000 and above**) in related areas such as physics, biology and computer science, if they are deemed valid electives by the graduate committee (see below).

1.2 Purpose and Content of the Handbook:

The purpose of this handbook is to clearly state requirements for the M.S. and Ph.D. degrees offered by the Department of Chemistry. Upon request, an electronic copy of the handbook can be emailed to any first semester graduate student.

This information is intended to help you progress smoothly through your chosen graduate program. Read the handbook upon receipt and make yourself familiar with the information inside, as you will find a detailed description of the graduate program. The information supplied will answer many of the questions that you may have during your graduate career. While reading you will notice that M.S. and Ph.D. degrees, have calendar deadlines. Please refer to the Registrar calendar and Graduate School for additional deadlines. <http://www.temple.edu/registrar/documents/calendars/> and <https://grad.temple.edu/resources/graduate-calendar>

The handbook is our way of making you aware of the various program requirements and deadlines. However, ultimately, it is YOUR responsibility for finishing requirements on time. Departmental rules and regulations are outlined below. Stating these rules and regulations in written form is done to promote consistency in the application of departmental policy. In addition, all departments are subject to the academic regulations and procedures of the University and are in the University Graduate Bulletin <https://bulletin.temple.edu/graduate/scd/cst/chemistry-phd/> The Graduate Bulletin offers additional information that will help you answer other questions you might have. Finally, as a matter of procedure, any additional questions concerning the requirements, policy etc. as outlined in this handbook should be directed to the Graduate Committee Chair.

2. GRADUATE REQUIREMENTS AND TIMETABLE

Students are admitted into the M.S. or Ph.D. program. Students admitted to the M.S. program may petition or apply to the Graduate Committee to be transferred to the Ph.D. program. The following table summarizes the degree requirements for the M.S. and PhD degrees offered by the Department of Chemistry. The table below reflects the PA Department of Education requirement that master's degree programs be a minimum of **30 credits**. (This requirement is effective for all students entering Fall 2013 and beyond.)

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M.S. with Thesis (Option One)	Six formal lecture courses (18 course credits) One literature seminar CHEM 9900 (2 credits) Research - CHEM 9996 (6 credits) Any additional combination of an approved graduate course or research (CHEM 9996) for a total of 4 credits Thesis defense (all the requirements stated above for this degree must be satisfied before the defense)
M.S. based on Coursework (Option Two)	Ten (10) formal lecture courses (3 credits each) Master's Exam
M.S. "+1 option" (Option Three)	Same requirements as option one Must have begun research no later than undergraduate senior year
M.S., Research track (Option Four) <i>Previously called MS Along the Way</i>	At least six formal lecture courses (18-21 credits) One Literature seminar CHEM 9900 (2 credits) Research – *CHEM 9901, 9991 (6-10 credits) Approval from Research Advisor and Graduate Committee 30 credit minimum is required for graduation *optional

DEGREE REQUIREMENTS

- **Option One** designed for students that are not full-time. The student cannot be receiving financial support from the Chemistry Department when completing this option. Any student wanting to pursue this option must receive prior approval from the Graduate Committee.
- **Option Two** designed for those students who already have extensive experience in the laboratory and is exercised by students currently employed in local chemical industry. Students must get permission from the Graduate Committee to pursue this program.
- **Option Three** designed for current Temple undergraduates who wish to spend an additional year to obtain the M.S. degree. (Depending on the progress of the research, it may take longer to obtain the degree.) These students generally begin their undergraduate research during their junior year. At the time of entry into the program, the student's transcript must show a grade point average (GPA) of at least a 3.0.
- **Option Four** is intended for students in the Ph.D. program who wish to obtain a M.S. degree.

Note: The Master's exam in Option Two is given in the student's area of interest. It is written by a group of faculty and/or the research advisor (if applicable). All preliminary requirements (i.e., courses, seminar etc.) must be satisfied before scheduling the exam.

Please refer to the Graduate Bulletin (<https://bulletin.temple.edu/graduate/scd/cst/chemistry-ms/#programrequirementstext>) for specific program requirements for the MS Degree. If a student wishes to take a graduate level course that is not listed as an approved course in the bulletin, prior approval will be needed by the Graduate Chair and Instructor of Record for that course.

DEGREE REQUIREMENTS

Ph.D.	• Six formal lecture courses (18 course credits) • Teaching in Higher Education, CHEM 8985 (1 credit-3 credits) • Ethics in Research CHEM 5901 (1 credit) • Literature seminar CHEM 9900 (2 credits) • Original Research Proposal (ORP) Preparation CHEM 9901 (1 credit) • Research: Combination of CHEM 9991, 9994, CHEM 9998, or CHEM 9999. (11 credits if 3 credits of CHEM 8985 was chosen; 13 credits if 1 credit of CHEM 8985 was chosen) (*Note: A minimum of 2 credits of CHEM 9999 Doctoral Dissertation must be taken to fulfill a graduate school requirement.) • Thesis defense (all the requirements stated above for this degree must be satisfied before the defense) • Total Credits = Minimum of 36 In addition, the student must have: • Passed Five (5) cumulative exams • Taken at least one (1) semester of teaching • Successfully defended an Original Research Proposal (ORP) to be elevated to candidacy • Two (2) semesters of residency • Successfully defended a Thesis * CHEM 8985 Teaching Higher Education (Students may opt for 3 credits during the first semester.)
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With regard to Ph.D. coursework, please note the following:

1. The grade point average (GPA) must be at least a 3.0 at the time of graduation. However, to maintain a TA or RA, a GPA of at least 3.25 is required.
2. A grade of Incomplete (I) or No Record (NR) cannot be on the transcript.
3. There cannot be more than 2 grades below B- or any grade of F.
4. Please refer to the Graduate Bulletin (<https://bulletin.temple.edu/graduate/scd/cst/chemistry-phd/#programrequirements>) for specific program requirements for the PHD Degree.

Typical PhD Timeline

Year	Fall Semester	Spring Semester
1	Two Core Chemistry Courses (6 credits) Chemistry 8985 Teaching in Higher Education (1 credit) Research: Chem 9991 (1 credits)	One Core Chemistry Courses (3 credits) One Elective Chemistry Course (3 credits) Research: Chem 9991 (1 credits)
2	Two Elective Chemistry Courses (6 credits) Ethics in Research Course 5901 (1 credit) Research: Chem 9991 (1 credits)	Seminar: Chem 9900 (2 credits) Research: Chem 9991 (4 credits)
3	Research: Chem 9994 (1 credit) ORP Prep: Chem 9901 (1 credit)	Dissertation Research: Chem 9998 (1 credit) Dissertation /Original Research Proposal for Elevation to Candidacy
4	Dissertation Research: Chem 9999 (1 credit)	Dissertation Research: Chem 9999 (1 credit)
≥5	Thesis Defense Dissertation Research: Chem 9999 (1 credit)	Thesis Defense Dissertation Research: Chem 9999 (1 credit)
	TOTAL CREDITS = 36	

The above schedule is to be used as a guide. We intend that students complete their Ph.D. within five (5) years. Students may finish course requirements, graduate seminar, and cumes faster than indicated on the schedule. Be aware of the continuous enrollment requirements as outlined in section 9.2. Summers are not indicated on the schedule, but students are expected to continue to carry out their research during this period. Details about each of the requirements mentioned are explained in more detail in the remainder of this handbook.

3. TEACHING ASSISTANTSHIPS

3.1 Responsibilities and Evaluation

All graduate students in the Ph.D. program must be a teaching assistant (TA) for a least one (1) semester. Since a significant amount of learning accompanies teaching, serving as a TA is an important educational experience for graduate students. Many students who serve as a TA do so for more than one (1) semester. Students serving as a TA should realize that it is an important professional responsibility. We expect that all TAs will take the following points very seriously.

- The TA must be competent with the concepts and materials being taught in his/her course. If the TA is unfamiliar with the material they should attend course lectures, do the assigned homework and experiments (if a laboratory course). Faculty members in charge of the course may require this.
- Laboratory TAs must take their safety and the safety of their charges seriously. The TA must enforce safety standards set by the department and individual instructors. The TA has the obligation to remove a student from the laboratory environment if that student is posing a safety risk to him/herself or to anyone else in the laboratory. All TAs are required to take EHS safety courses yearly. Individual laboratory rules are set by each course coordinator.

- Attendance is expected in classes, proctoring assignments and in meetings relevant to the course. The TA should tell the faculty or staff member in charge in advance if they cannot attend a course-related function.
- The TA must treat students equally, regardless of sex, race, or ethnicity.
- The TA must have English skills sufficient for two-way communication with the students.
- The TA must complete grading and other assignments promptly according to course requirements. The TA must recognize the authority of the faculty instructor responsible for the course.
- To be eligible for maintaining an assistantship, graduate students must retain a 3.25 GPA.
- Deficiencies in any of the above areas will be discussed with the student by the faculty or staff member in charge. These discussions are meant to aid the student in overcoming these deficiencies. Repeated deficiencies in any of the above areas or ones deemed serious by the faculty could lead to the student losing the status of Good Standing (section 11) and TA support.

3.2 English Certification for International Students

All international students must demonstrate to the University that their English is at a level consistent with that expected for a TA who will be teaching undergraduates. International students must take a "Speak Test" upon arrival, prior to orientation, at the University (consult www.temple.edu/ita/ for details). Students passing the "Speak Test" will appear before University Panel to further evaluate their English. If a student fails the initial "Speak Test", then that student is required to take one (1) or two (2) semesters of the ED 5221 course. Whether the student is required to retake the "Speak Test" or not, they are required to appear before the University Panel as the last step in the English certification process. International students should be sure to take these tests promptly and seriously. Failure to complete the English exams and/or courses satisfactorily will result in that student not being eligible for a TA position.

4. INITIAL ACADEMIC ADVISEMENT AND COURSE PROGRAM

4.1 Advisement during First Academic Year

The Graduate Committee or a subset of this committee will advise all new graduate students until they have selected a research advisor. The committee helps the student plan a program that will provide the background needed in the student's area of concentration.

4.2 Courses

4.2.1 Requirements for the Ph.D. Program

Satisfactory completion of thirty-six (36) credits which must include:

- Nine (9) credits of core course work, exclusive of laboratory courses, in the major subject (see below).
- Nine (9) credits of course work in other fields (electives); with advisor approval, numbered **5000 and above** can be used to satisfy the "major" requirement.
- Eleven (11) – thirteen (13) credits of research are required. (The number of research credits is based on the number of credits taken in course CHEM 8985. Research credits for the Ph.D. degree are earned by registering for CHEM 9994, CHEM 9998 and CHEM 9999 for 1-6 semester hours). At least two (2) credits of CHEM 9999 are required by the Graduate School.
- Two (2) credits of literature seminar (including a seminar lasting thirty (30) minutes).
- One (1) – three (3) credits of CHEM 8985 Teaching for Higher Education.
- One (1) credit of "Ethics in Research (CHEM 5901)
- One (1) credit of "Original Research Proposal (ORP) Prep" (CHEM 9901)

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The specified core courses are listed below:

Analytical:	CHEM 5305	Chemical Kinetics
<i>Any two (2) of the following:</i>		
	CHEM 8601	Analytical Separations
	CHEM 8310	Special Topics in Analytical Chemistry (Mass Spectroscopy)
	CHEM 5201	Physical Methods in Organic Chemistry
	EES 5625	Electron Optical Techniques

Biochemistry:	CHEM 5401	Biochemistry I
<i>Any two (2) of the following:</i>		
	CHEM 5402	Chemical Biology
	CHEM 8400	Special Topics in Biochemistry
	CHEM 8401	Bioinorganic Chemistry
	BCMS 5003 or MEDS 5003	Fundamentals of Biochemistry
	BCMS 8702	Enzymes and Proteins

Inorganic:	CHEM 5001	Advanced Inorganic Chemistry I
	CHEM 5201	Physical Methods in Organic Chemistry
	CHEM 8401	Bioinorganic Chemistry

Organic:	CHEM 5201	Physical Methods in Organic Chemistry
	CHEM 5202	Organic Reaction Mechanisms
	CHEM 5205	Organic Synthesis

Physical:	CHEM 5301	Quantum Chemistry
	CHEM 5302	Statistical Thermodynamics or Molecular Spectroscopy
	CHEM 5305	Chemical Kinetics

Research Credits:

CHEM 9994	Preliminary Exam Preparation (Credits are taken while passing cumes and before elevation to candidacy.)
CHEM 9991/9998	Masters Research Projects / Pre-Dissertation Research (Register after passing cumes but before elevation to candidacy.)
CHEM 9999	Doctoral Dissertation (Dissertation Research limited to Ph.D. students after giving their Original Research Proposal.)

Graduate School Requirement: Doctoral Examinations/Culminating Experiences require a minimum of six (6) semester hours (s.h.), with at least two (2) s.h. of the six (6) semester hours (s.h.) required to be in course number CHEM 9999. The remaining four (4) s.h. can be a combination of the following courses: CHEM

9994, CHEM 9998, or CHEM 9999. Departments may require additional semester hours to fulfill Doctoral Examinations/Culminating Experiences since six (6) s.h. constitute the minimum requirement. Doctoral students must maintain continuous enrollment from matriculation to graduation. Please refer to the Graduate School Policies Page, section 02.27 at <https://grad.temple.edu/resources/policies-procedures>.

4.2.2 Requirements for the M.S.

Option One M.S. with Thesis

Satisfactory completion of thirty (30) credits (semester hours) which must include:

- Eighteen (18) credits of formal lecture courses
- Six (6) credits of research (associated thesis is required). Research credits for the M.S. degree are earned by registering for CHEM 9996 (1-6 s.h.).
- Four (4) Any combination of approved graduate course or research (CHEM 9996)
- Two (2) credits of seminar (either research or literature lasting thirty (30) minutes).

Option Two M.S. based on Coursework

Ten (10) formal lecture courses (3 credits each) for a total of 30 credits and a final Masters' Exam in the student's area written by a group of faculty and/or the research advisor (if applicable). Courses should be selected in consultation with a member of the Graduate Committee or the student's advisor in consultation with the Committee. This option is intended for entering students with sufficient research experience as evidenced by, for example, current employment in the chemical (or related) industry.

Option Three M.S. "5th year"

The course requirements are as stated in *Option One*.

Option Four (M.S. "Research Track")

Please see requirements on page 2.

4.2.3 Satisfactory Completion of Course

The student's Grade Point Average (GPA) must be at least a 3.0 at the time of graduation. The grade of I (incomplete) or NR (no record) cannot be on the transcript. Furthermore, there cannot be more than two (2) grades below B⁻, or any grades of F. As stated in the University Graduate Handbook, "Except by permission of the Graduate Dean, no graduate student who has two (2) or more incompletes, each of which is at least a year old, may register until the total number of incompletes has been reduced to no more than one." Having two (2) or more incompletes, which are more than two (2) years old, is grounds for dismissal. Students may repeat a course to improve a grade, but the old grade will remain on the student's record. GPA calculations, however, will only utilize the highest grade obtained.

4.2.4 Transfer of Credit into Master's and Doctoral Program

All graduate credit earned by a student prior to matriculation into the Chemistry Graduate Program is first subject to evaluation and approval by the Chemistry Graduate Committee, and then by the assistant/associate dean of graduate studies. The following guidelines must be followed:

- A Transfer of Credit Form must be completed. The form can be found in the forms section in the TU Portal under Student Tools.
- The Transfer form must be supplemented with an official transcript that was sent directly by the Registrar of the institution where the credits were earned.
- All transfer credits must be of "B" or higher.
- All transfer credits must be from an accredited institution.

For a M.S. student, only three (3) transfer credits can be applied to the M.S. course requirement. For students in the Ph.D. program, the amount of transfer credit cannot exceed the number of course credits required for the M.S. in Chemistry at Temple. In either case, the Graduate Committee of the Department of Chemistry will decide:

- Whether the transfer of credit request is approved.
- How much of the approved transferred credit will be applied to the student's course requirements.

4.2.5 Currency of Courses

Courses taken at Temple University, or at another accredited graduate institution, more than five (5) years before matriculation into the Chemistry Graduate Program cannot be used to meet the program's degree requirement.

4.3 Residency

All students entering the Ph.D. program are required to fulfill a residence requirement of not less than one (1) academic year or two (2) consecutive semesters. A student is considered in residence if the following conditions are satisfied:

- He/she is a full-time student on campus enrolled in six (6) semester hours (credits) of graduate credit for two (2) consecutive semesters. Students generally fulfill this requirement while they are taking coursework (i.e., two (2) courses at three (3) credits/course) in their 1st year.
- His/her total time commitment is to the graduate degree.

5. THE RESEARCH ADVISOR, ANNUAL REVIEW MEETING, FACULTY OVERSIGHT COMMITTEE, AND ADVISORY COMMITTEE

5.1 Selection of Research Advisor

Students are required to attend faculty research seminars offered every fall to learn about faculty interests. All graduate students choose an advisor by the end of their first semester. Once chosen the research advisor takes over all advising duties for the student from the Graduate Committee until the student graduates.

Students receive a form during their first semester that indicates which faculty members would like to meet with them. The students then make an appointment with each faculty member who has asked to meet with them and student should, in turn, feel free to reach out to other faculty

members whose research interests them. At the conclusion of each meeting, the student must have the faculty member sign the form. Once all of the interviews have taken place, the student submits the fully completed form to the Graduate Secretary. Students should clearly indicate their preferences for working with each faculty member, indicating their top choice with the number one (1), and so on. The Graduate Committee will make the final assignment after consulting with the potential research advisors. Every attempt will be made to accommodate each student's top choice.

The term "research advisor" is a very misleading one in the context of the research oriented graduate programs of the Chemistry Department, but a longstanding tradition forces its use. It should be realized from the outset that this term is perhaps appropriate only in fields such as the Humanities, in which a student often generates the idea and carries out the research project independently of his/her advisor (the advisor is only expected to advise and guide the student through to the end). Research in chemistry operates in quite a different manner, in that the student's research and that of the advisor are very often the same thing. The research advisor provides the initial idea for the project, most often as a result of a longstanding interest and expertise in the field. As the student attends seminars by invited outside speakers, he/she will often hear them say things such

as “My graduate student(s), X, Y, and Z, are the people who actually did all the work.” This is meant seriously, since without the graduate students’ intelligence, skill, and hard work, the professor can accomplish relatively little. Thus, while the student will depend largely on the ideas, facilities, and support provided by the advisor, the advisor depends on the students to further their research.

Your search for a research advisor should be primarily a choice of one among a number of research projects offered to you to carry out during your graduate career. Thus, your first consideration should be your interest in the field in general and the research project in particular. You should begin by reading publications describing research projects. This information is located on the [Chemistry Department Website](#). However, because of the constant evolution in the status of the faculty's research, the website will often not be completely up-to-date. For this reason, it is imperative that you talk at some length with the faculty, so that they can discuss with you the current status of their research. Reading the description of each faculty member’s research before you, talk with him/her is advisable. Many questions that you might on first impulse hesitate to ask are usually in the minds, and eventually on the lips, of a majority of new graduate students. Examples, “How long will it take for me to complete this research?” or “If this project does not work out, then what?” Many faculty members also will arrange for you to talk to their graduate students; it is always a good idea to do this before choosing a research advisor. Most faculty members will give you a tour of their lab(s) and will give you reprints or preprints of their most recent publications or suitable literature references, all of which you may consult at your leisure.

In addition to providing you with the means to carry out your research project, your advisor will assist you in making sure that all degree requirements are fulfilled. Ultimately, **this responsibility is your responsibility**. Furthermore, the advisor will help you select the courses you take, help you practice for seminars and help prepare your Original Research Proposal (ORP). After you have narrowed down your list of potential research advisors, you may choose to talk with that faculty member again. Be thorough in your deliberations before you submit your prioritized potential research advisor list.

5.2 The Annual Review Meeting (ARM)

Students are evaluated by the Graduate Committee once a year, usually in the beginning of the Spring Semester. At this time, the student’s status - Good Standing/Probation/Dismissal - is determined (further discussed in section 11). In the event that the student’s progress is deemed unsatisfactory in coursework, cumes, or research they will be required to meet with the Graduate Committee. The Graduate Committee will determine the requirements and time of this mandatory meeting. Receiving an unsatisfactory review may lead to losing the status of Good Standing (section 11). This loss of status can result in a demotion to the Master’s program or even removal from the graduate program. All unsatisfactory reviews will be documented and kept in the students file.

5.3 The Advisory Committee (AC)

In consultation with their advisor and the Graduate Committee, students select their AC in the second semester. **The Graduate Committee must confirm members of the AC by semester's end such that the student can successfully complete his/her first annual check-up by July 31 (deadline).** The committee must include at least two (2) chemistry department faculty and at least three (3) graduate faculty from Temple University. Typically, the research advisor will not chair the committee, but will serve on the committee. The committee may be expanded to include additional graduate faculty from Temple University or from other universities. A list of approved Temple University faculty is at <https://grad.temple.edu/about/temple-faculty>

Doctoral level expert advisors from outside the university setting can be considered as members of the AC, but must be approved by the graduate committee of the department and the Dean of the Graduate School. To nominate an outside member, you must fill out the **Nomination for Service on Doctoral Committee Form**

which can be found in the forms section in the TU Portal under Student Tools.

5.3.1 Role of the AC

A quorum of the AC meets periodically with the M.S. or Ph.D. student to review the candidate's progress and to provide advice to the candidate. The AC will serve as the Thesis Defense Committee for M.S. students. For details of the Ph.D. thesis committee, refer to section 8.2.1.

5.3 The Faculty Oversight Committee (FOC) – *Please see addendum at the end of handbook.*

Effective 1 July 2018, each student must meet annually with their Faculty Oversight Committee (FOC). The FOC is defined as two faculty members on the AC and excludes the student's advisor. A progress report is submitted annually to CST by one of the FOC members.

5.3.1 Role of the FOC – *Please see addendum at the end of handbook*

Much like the AC, the role of the FOC is to guide the student on their trajectory toward the PhD and ensure students finish their degree in a timely fashion (ideally five but no more than six years). The absence of the advisor at this meeting is critical to address any issues the student may be experiencing. The absence of the advisor at this meeting is critical to address non-research related issues the student may be experiencing.

6. CUMULATIVE EXAMINATIONS (CUMES) AND SEMINARS

6.1 Cumulative Examinations [CUMES]* *(students who entered Fall 2012 and beyond)*

Five (5) cumes must be passed within a two-year period (starting at the time of matriculation). Cumes are written exams given in the areas of Analytical, Organic, Physical, Inorganic, and Biochemistry. Students must pass at least three (3) cumes in their chosen area of interest. For example, an organic student can satisfy the cume requirement by passing five (5) organic cumes, or by passing three (3) organic cumes and two (2) cumes in subjects other than organic. Cumes are given in November, January, March, May, June, and July for a total of six (6) cume dates per academic year. A student can take any of the exams given on a particular test date. The faculty writes cumes on a rotating schedule. Students are notified of the cume topic at least five (5) working days before the examination. The exact format of the cume is up to the faculty member writing the examination. It is up to the cume writer to determine how much information is given to the student for a particular exam. For example, a generic title is sometimes given (e.g., Organic Mechanisms) while in other cases a specific title might be given, including recommended reading material.

While the specific motivation for giving cumes might vary between areas, the common motivation is that the department wants to graduate students who have a working basic knowledge of their chosen area and are familiar with relevant scientific concepts deemed universally important by the faculty - even if the concepts are not directly related to the student's area of study. Organic cumes, for example, are typically given to determine a student's knowledge of reaction mechanisms not taught in a specific course. The exam might be designed to test whether the student is reading the literature and learning current state-of-the-art chemistry. Physical Chemistry cumes, for example, are often based on current literature and test whether a student can read and understand a journal article. Some cumes do not test students on the literature, but concentrate on determining whether students have retained important chemical concepts learned in coursework or through Department Seminars.

Students should be familiar with the following cume-guidelines:

- **Students are strongly encouraged to begin taking cumes their first semester.**
- Cume Exams are offered in November, January, March, May, June, and July.
- A student must pass five (5) cumes by the end of their second academic year in area of concentration.
- Failure to satisfy cume guidelines will result in the student losing the status of Good Standing (section 11). The student may at that time petition the graduate committee for a change to the Master's degree program.

- <https://grad.temple.edu/resources/policies-procedures> A doctoral student who has completed all coursework for the degree, but has not passed the preliminary examination, must register each Fall and Spring semester for one (1) s.h. of course number 9994, "Preliminary Examination Preparation." The student must be registered for CHEM 9994 in the semester in which the examination is taken, including the summer session. A student who is required to retake the preliminary examination in whole or in part must re-register for one (1) s.h. of CHEM 9994 in the semester in which the examination will be retaken. Refer to the Graduate School <https://grad.temple.edu/resources/policies-procedures> at for additional information.

6.2 Proposals (Ph.D. only)

6.2.1 Dissertation Proposal (Thesis)

The dissertation proposal should contain a description of the research that the student will pursue for their Ph.D. The student must consult with their research advisor for guidance prior to writing this document. It is understood in writing this document that a general experience in research requires new chemistry will emerge as a consequence of observations made during the course of an ongoing research problem. Therefore, the objectives outlined in this proposal should be considered only as "proposed objectives" and new directions and new emphasis are likely to result during the course of this project.

6.2.2 Original Research Proposal (ORP)

A student seeking the Ph.D. is required to write, present, and defend an Original Research Proposal (ORP). The topic of the ORP can be related to the student's research, but must still be original. The proposal is an opportunity for the student to use his/her scientific knowledge to demonstrate their ability to formulate experiments, calculations, theory etc. to address an important scientific problem.

Effective Fall 2019, all third-year graduate students are required to take CHEM 9901 (Original Research Proposal Preparation), a one (1) credit course aimed at providing guidance for students on developing, refining and ultimately defending ideas for the ORP by the end of the third year.

Note—the proposal should not be an obvious, incremental extension or iteration of your own work nor other ongoing/past work in your research lab. Students will be expected to articulate how the proposal differs from their own work and the ongoing/past research from their research lab in order to demonstrate proposal originality.

- Your Original Research Proposal (must be completed within 30 months of matriculation into the program, and it is the last requirement before a student is elevated to Ph.D. candidacy). If the student does not satisfy this requirement in this period then there is the possibility that they will lose the status of Good Standing. <https://grad.temple.edu/resources/policies-procedures>

The student should determine their topic with their Advisory Committee. The AC will be responsible for the evaluation of the proposal. The student should schedule the exam in consultation with the AC. Students and faculty not part of the AC may attend. The following guidelines are to be addressed by the student who is preparing a proposal:

- The proposal concept must be original. The originality and creativity of the proposal must be evident in your proposal. Be sure to specify any background material that is needed for the readers and the audience to understand your proposal.
- You are free to consult with faculty or fellow students with regard to your proposal. The original

idea that forms the basis of the proposal must be your own.

- You must be certain that the types of experiments, theory, or calculations are clearly explained. You should discuss the results and conclusions that you might expect.
- The Original Research Proposal should be double spaced with 1 inch margins, written in Times or Times New Roman 12-point or in Arial 11-point font. **An appropriate breadth and depth of content would likely fill 10 pages (and may be as long as 15 pages)**, including schemes and figures but not including references. Proposals that do not adhere to these guidelines will be returned until proper formatting guidelines are followed.
- The posting must include the title and abstract of the proposal, and a list of the committee members. In addition, it also should include the time, date, and room number. The announcement must be posted at least ten (10) working days before the exam. Students should also make the appropriate room reservations.
- Registration for Proposal Preparation: A student who has passed preliminary examinations (cumes) but has not filed an approved ORP with the Graduate School by the last day to Drop/Add in the semester must register each Fall and Spring for course CHEM 9998.
- Time Limit to File Approved Proposal: Within 30 days all members of the AC signing the proposal, it must be filed with the student's Department and with the Graduate School. The proposal must include the **Proposal Transmittal Form (this form can be found in the forms section in the TU Portal under Student Tools)** that includes the signatures of the AC and the date approved and the student must submit a one or two- page summary of their intended PhD research project.

After the oral presentation, and subsequent discussion, the AC will discuss the quality of the presentation in private (the student is not present). The AC will notify the student of its decision concerning the proposal and transfer its results in written form to the Graduate Committee. If a student fails the oral proposal defense the AC may allow the student to prepare a new oral proposal or choose to remove the student from the Ph.D. program. If the student needs to prepare a new Original Research Proposal, the subject and time of the examination is approved by the AC. Often the subject of the re-test is different from the subject used for the first oral proposal.

6.3 Seminars

Seminars given by students fulfill an important educational function. Research chemists are called upon to give an oral presentation of research work, their own or others. Such seminars and the discussions that follow provide one of the most important means of communication in chemistry. It is necessary to learn how to give informative seminars and to benefit from the discussion. Like other things we learn, this takes some effort and practice. Students seeking the Ph.D. are required to give one (1) seminar during their graduate career and it is based on a current literature topic and approved by the seminar professor. Students seeking the M.S. are required to give one (1) seminar during their graduate career and it is based on a current literature topic or their research and approved by the seminar professor. The seminar is thirty (30) minutes and should include any background material needed to allow the audience to appreciate the topic(s) discussed. The presentation should demonstrate to the listeners a critical understanding of the topic. Students must submit a title and associated abstract (with any relevant references) at least ten (10) days before the seminar date. The student must email the

abstract to the graduate secretary the Friday prior to the seminar and post the abstract five (5) days prior to the seminar.

7. ELEVATION TO PH.D. CANDIDACY

Candidacy is conferred by the Graduate Board, with the recommendation of the Department, upon those students who have fulfilled the following requirements within **30 months** of their matriculation into the graduate program:

- Achieved satisfactory grades in the prescribed areas with a minimum of 3.0 GPA and 3.25 for either a TA or RA
- Satisfied the residency requirement
- Presented the required literature seminar
- Passed the five preliminary examinations (cumes)
- Defended an Original Research Proposal (ORP)
- Made satisfactory research progress based on the evaluation of the Research Advisor and Advisory Committee
- A doctoral student is elevated to candidacy upon completion of all coursework and examination requirements for the degree after filing an approved dissertation proposal along with the **Dissertation Proposal Transmittal Form** (this form can be found in the forms section in the TU Portal under Student Tools)

8. POST PH.D. CANDIDACY REQUIREMENTS

8.1 Research Credits

Doctoral Examinations/Culminating Experiences require a minimum of six (6) credits with at least two (2) credits of the six (6) credits required to be in course CHEM 9999. The remaining four (4) s.h. can be a combination of the following course numbers: CHEM 9994, CHEM 9998, and/or CHEM 9999. Departments may require additional semester hours to fulfill Doctoral Examinations/Culminating Experiences since six (6) credits constitute the minimum requirement. Doctoral students must maintain continuous enrollment from matriculation to graduation.

Because these courses reflect continuing work on a single project, the student will receive a grade A, B, C, D, F or Pass/Fail, depending on the departmental grading system) for only the final semester after having fulfilled this requirement (by filing the final approved dissertation with the Graduate School). Note the course numbers may change from year-to-year, so verify the course numbers before registering for Doctoral Dissertation Research.

8.2 Thesis and Final Oral

The Graduate Bulletin specifies those regulations pertaining to theses, which have been set forth by the Graduate School. To guide you through manuscript preparation and to help you create a

uniform and visually clear document, the Graduate School has developed the [Dissertation and Thesis Handbook](#) and **Dissertation Handbook Checklist (Page 27 of the Dissertation Handbook)**. Other important thesis-related resources can be found at the Graduate School's **Dissertation and Thesis website**. If questions arise while you are working on your dissertation or

thesis, contact the Graduate School at (215) 204-1380.

8.2.1 Composition of Thesis Committee

The Thesis Committee typically consists of the student's AC and an additional member outside the department. The additional member can be from Temple University or from an outside academic or industrial institution. A list of approved Temple University faculty can be found at <https://grad.temple.edu/about/temple-faculty>. The outside examiner may not be a faculty member in the candidate's degree program. The examiner must be doctorally prepared and, if s/he is from Temple University, must be approved by the Dean of the Graduate School at least two (2) weeks prior to the oral defense.

If the outside examiner or any other proposed member of the Dissertation Examining Committee is not a member of the Graduate Faculty of Temple University, the Chair of the Doctoral Advisory Committee must request approval by submitting the **Nomination for Service on Doctoral Committee Form** (this form can be found in the forms section in the TU Portal under Student Tools) that is located on the graduate school website forms section. A current curriculum vitae needs to be submitted to the Dean of the Graduate School at least four (4) weeks in advance of the scheduled defense. Graduate school approval must be received prior to posting the oral defense.

8.2.2 Evaluation of the Thesis

The Dissertation Committee has the following choices in evaluating the thesis:

- Accept with no changes.
- Accept, with minor changes: Typically, but not always, this means that everyone except the research advisor will sign. The advisor will sign when the changes are made.
- Accept, but with major changes: The Ph.D. candidate will make all the changes and resubmit the thesis to the committee member(s) who requested the changes. Only after the changes are satisfactory will the members sign. A second oral presentation is typically not needed.
- Reject - The student is required to prepare a new thesis. Typically, this means that the student will need to perform additional research.
- The Dean of the Graduate School and the Graduate Board has the authority to review and approve all doctoral dissertations prior to awarding the degree.

8.2.3 Revisions

- Thirty (30) day Limit for Revisions: Doctoral candidates who pass the oral defense may be required to revise the dissertation as a condition of completing the degree. The Chair of the Doctoral Advisory Committee is typically responsible to review and approve revisions, although any member of the Dissertation Examining Committee may require the candidate to submit a final draft for approval. The final revised dissertation must be submitted to the Graduate School within thirty (30) calendar days of the oral defense or the defense is nullified and another oral defense must be scheduled.

- **Major Revisions:** If a Dissertation Examining Committee requires substantial revisions that cannot be made within thirty (30) calendar days, the Committee must suspend the defense until a majority agrees that the dissertation is sufficiently revised to be defensible. A candidate must repost the oral defense with the Graduate School. The Chair of the Doctoral Advisory Committee is responsible for notifying the Graduate School that a defense was suspended.

8.2.4 Scheduling

The student in consultation with his/her research advisor should initiate the appointment of the thesis examination committee. The student should be aware that he/she wishes to receive a degree at a specific commencement, and then he/she must take the responsibility for learning about the deadlines for the various stages in the completion of the work and for informing the

Research Advisor and the Chair of the thesis committee of these matters. It is important for the student to appreciate the fact that faculty members are not always available due to prior commitments (such as travel) and this may put constraints on when a thesis defense may be held. Faculty schedules, therefore, should be taken into consideration when choosing a committee when it is important to meet certain deadlines.

8.2.5 Announcement and Posting

You are required to distribute a written announcement of your Dissertation Defense to the Graduate School (501 Carnell Hall), Dean's Office of CST Student Services (400 Carnell Hall), and to the graduate faculty in the Department of Chemistry.

- To be eligible to post, the candidate must have:
 - an approved Dissertation Examining Committee
 - distributed a complete copy of the final dissertation to all members of the Dissertation Examining Committee
 - identified the Chair or the person responsible for the Dissertation Examining Committee in accordance with the policies of the School/College
- **Ten (10) Day Notice:** The Announcement of Oral Defense form must be submitted to the Graduate School a minimum of ten (10) days before the Defense. A defense cannot be held without written confirmation of approval and receipt of the defense paperwork from the Graduate School.
- **Announcement:** The announcement of the oral defense must be posted publicly **(this form can be found in the forms section in the TU Portal under Student Tools)**. Any member of the Graduate Faculty has the right to request a copy of the dissertation from the Dean of the School/College in advance of the defense and may participate in the defense.

8.2.6 Submission of Thesis to Graduate School

All dissertations must be completed in an electronic format approved by the Graduate School and the School/College. Approved formats are listed in the [Dissertation and Thesis Handbook](#).

9. TIME REQUIREMENTS FOR M.S. AND PH.D.

9.1 Time Limits and Extension of Time Requests

The time limit for the M.S. is three (3) years. Most students will complete all requirements for the Ph.D. within five (5) years from the date of matriculation in the Chemistry program, and no student will be allowed to continue study beyond seven (7) calendar years. Semesters in which a student is on a leave of absence (see below) does not count towards the time-to-degree requirement. A request for an extension of time must be endorsed by the student's AC (or research advisor for M.S. student) and Graduate Committee. The endorsed request must be submitted to the College Dean's Office and Graduate Board of the Graduate School, who ultimately decide whether the request is granted. The request for an extension of time must include a detailed research plan that clearly states the student's plan for finishing the degree program within the time covered by the extension of time request. Note, students who request such an extension of time are subject to a reevaluation and/or revalidation (by the Department of Chemistry and Graduate School) of all credits earned and examinations passed prior to the original time limits of three (3) and seven (7) years for the M.S. and Ph.D. programs, respectively.

9.2 Continuous Enrollment Requirement

Graduate Students who have must be enrolled in every Fall and Spring semester between matriculation and graduation, except for those semesters that the student has an approved leave of absence (see below). Without an approved leave of absence, a student holding a TA or RA must be registered for at least one (1) credit of research in course CHEM 9994, CHEM 9996, CHEM 9998, or CHEM 9999 from the semester of matriculation through the semester of graduation.

Students who have not yet advanced to Ph.D. candidacy and need one credit of research to stay registered should register for CHEM 9994 until they pass their cumulative exams and CHEM 9998 or CHEM 9999 after elevation. While students are taking courses, a student will take at least six (6) credits a semester. Students must be registered during the semester they defend and the semester they submit their completed thesis to the Graduate School. Students who are not registered and do not hold an approved leave of absence will lose the status of Good Standing (section 11). Students who do not register for two (2) consecutive semesters will be administratively withdrawn from the University. Students who complete all degree requirements after the deadline for receiving the degree in that semester (but prior to the first day of registration for the next semester) shall only be required to file a records fee, as indicated in the current Graduate School Bulletin.

9.3 Leave of Absence

A request for a leave of absence must be submitted to the Graduate Committee before the start of the semester for which the leave is requested. If endorsed by the Graduate Committee, the request is submitted to the dean's office of your school/college for processing, where the request must be approved for the leave to take effect. There is a records maintenance fee of \$25 that must be paid

by the student for each semester a leave of absence request is in effect. **(this form can be found in the forms section in the TU Portal under Student Tools).**

10. FINANCIAL SUPPORT

Entering and current graduate students (in Good Standing) in the Department of Chemistry typically receive both a stipend and funds to cover tuition costs (tuition remission). This support is typically given in the form of a Teaching Assistantship (TA) or Research Assistantship (RA). RAs are typically supported by a faculty member with external funding. These may be awarded to entering students, but typically, they are reserved for students who are making research progress in a particular research group. In this regard, students may request information concerning the financial aspects of working in a particular faculty member's research group. The department makes every attempt to continue to provide support for all full-time Ph.D. graduate students. However, many funding sources are outside of the control of the department so that support always depends on the availability of funds. For example, this department receives a TA

budget from the University that may vary from year to year. (TA support for a student beyond their first academic year is not guaranteed, but instead is based on the availability of department funds) Students, even if not in Good Standing, may receive support, but this is at the discretion of the Graduate Committee.

In the event that there are not enough funds to support every graduate student in the department, then the following criteria will be used to award those funds:

- New students admitted into the Ph.D. programs who have been admitted with a commitment from the department for support will receive priority support.
- Students currently in the Chemistry program in Good Standing and are not supported in RA positions will receive the next priority for support. Note: Previous poor performance as a teaching assistant can be used as a criteria to deny support even if the student is in Good Standing.
- Students not in Good Standing will receive the lowest priority for support.

11. GOOD STANDING, DEPARTMENTAL PROBATION, AND DISMISSAL

11.1 Good Standing

Students are in Good Standing (determined by the Graduate Committee) if they are making satisfactory progress in their degree program and are not in violation of any Department or University regulation. Students not in Good Standing are responsible for taking corrective action(s) to remedy the situation. The following (where applicable) are examples of requirements that must be met to maintain Good-Standing status.

- Satisfactory performance when serving as a TA
- Completion of Cumes on schedule
- Satisfactory completion of coursework

- Advancement to Ph.D. candidacy within thirty (30) months of matriculation in the Graduate Program
- Satisfactory research performance as determined by the student's research advisor or AC

11.2 Departmental Probation and Dismissal

Students who receive two (2) unsatisfactory reviews by their AC will lose the status of Good Standing, and will be placed on department probation. In this circumstance, the student will be

notified in writing and the notification will be placed in the student's file. The student must attempt to correct the problem(s) that led to this circumstance in a timely fashion. The time-frame to correct this problem, if applicable, will be determined by the Graduate Committee, student AC, and student. Failure to correct the problem within the stated time-frame will result in a third unsatisfactory review and a recommendation of dismissal from the graduate program. A recommendation of dismissal from the graduate program also will result in the event that the student corrects the problem in the stated time frame, but receives a third unsatisfactory review at a later time.

12. DEPARTMENTAL POLICY ON ACADEMIC HONESTY

Honesty is expected at all levels in the Chemistry Department as it is by the University as a whole. The Chemistry Department is obliged to uphold academic honesty and therefore reserves the right to pursue any allegations of its breach by any individual or individuals associated with the Department to the extent necessary to satisfy expert opinion.

In the event academic dishonesty is established by the appropriate University authority then the Department reserves the right to terminate its relationship with the individual(s) in accord with University policy. Acts of academic dishonesty include:

- Cheating on examinations: This can take the form of talking to or copying from a fellow student, using reference material when an examination has been posted (or announced) as "closed-book".
- Plagiarism of documents: Words of another author taken in context from any document, without attribution, is considered plagiarism. It does not matter if the document has been published or not. Reports, proposals, etc. are the property of the original author of the document.
- Falsification of research work: Fabrication of all or part of laboratory and or computational results as well as results generated by equipment interfaced with computers is unacceptable.
- Please note additional guidelines are listed on the Graduate School website.
<https://grad.temple.edu/resources/policies-procedures>

If a graduate student is accused of academic dishonesty by a faculty member(s), then the course of

action to be taken to rectify the situation is left to the discretion of that (those) faculty member(s). In circumstances deemed serious by the faculty member(s), the student suspected of academic dishonesty will be notified in writing by the accuser. Simultaneously, copies of the notification will be provided to the Department Chairperson, and to the Graduate Committee.

Following such notification, the Department Chairperson and/or a quorum of the graduate committee will mediate a meeting between the accused and accuser to discuss the alleged act(s). The purpose of the meeting is to establish, as dispassionately as possible, the factual matter(s) about which both the accused and accuser can agree and, should there be disagreement, the matter(s) about which the disagreement centers. The Graduate Committee (possibly in consultation with the Chairperson) will determine the position of the Chemistry Department with respect to the issues discussed in the meeting. At the discretion of the Department Chairperson and the Graduate Committee, the results of the hearing may be made available to other officers of the University.

13. APPEAL OF DEPARTMENTAL ACTIONS

Appeals of actions taken by the Department of Chemistry that are not concerned with dismissal should be initiated in the department. Specifically, a student who is appealing an action should notify the Graduate Chair in writing about the nature of the appeal.

- The Graduate Committee will review and consider the appeal. The Committee reserves the right to consult with the Department Chair as well as the student's research mentor if applicable. The student will be notified of such action if required.
- Pending the Department's decision, the student has the right to take the appeal to the college level.
- Appeals concerning academic dismissal by the Chemistry Department can be taken to the Graduate Board.

14. GRADUATION

All students must apply for graduation and pay the associated fees by the deadline listed in the University's [Academic Calendar](#). This is the only means by which a diploma will be produced and an awarded degree transcript. Also, refer to the version of the [Graduate School Calendar](#) adapted for graduate students.

A graduation application is available using Self Service Banner (SSB). To access the application, go to **TUportal** and select **Self Service Banner (SSB)**. When in SSB, select **Student** → **Student Records** → **Apply to Graduate**.

For both Master's and Ph.D. Candidates, the nonrefundable fees include:

Graduation	\$45.00
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Late Filing Fee, *if applicable* \$25.00

Doctoral graduates incur an additional \$50.00 fee for dissertation processing. Students are required to give a bound copy of their final Ph.D. thesis to their advisor.

15. Chemistry DEPARTMENT CHECKLIST

Every semester you must:

- Register for courses, sign your award letter if you are a TA or RA.
- Every **Fall** semester you must sign up for health insurance and attend EHS Training Sessions.

Addendum:

OVERVIEW OF ANNUAL AC/FOC MEETINGS

NOTE: This procedure is mandated by CST. Failure to complete this requirement will result in a hold on processing your appointment letter for the next semester.

- 1) Each graduate student is responsible for scheduling a formal meeting with his/her Advisory Committee (AC = research advisor, ORP Chair, Thesis Chair) **prior to the annual check-up deadline** (end of March for 5th years or more, end of April for 4th years, end of May for 3rd years, end of June for 2nd years, and end of July for 1st years). Scheduling a meeting with three faculty members can be challenging, so students must plan in advance and use helpful tools such as doodle polls (doodle.com).
- 2) Prior to the meeting, the student will prepare a PowerPoint presentation to update the AC on progress toward the PhD degree. Topics will include (as relevant):
 - a) **Progress Towards Degree (1-2 slides)**
 - i) Coursework (Years 1 and 2)
 - ii) Cumulative exams (Years 1 and 2)
 - iii) Timeline for ORP (should be in Spring or Fall, Year 2)
 - iv) Timeline for dissertation defense (Year 4)
 - v) Semester TA count to date (All Years)
 - b) **Research Progress (8-9 slides)**
 - i) Provide an overview of your PhD research project and highlight your key research accomplishments to date.
 - ii) List any products of your research (i.e., papers, oral presentations, poster presentations, meetings attended).
 - iii) Provide an outline of your next year of research with tangible goals.
- 3) Structure of the meeting:
 - a) Prior to beginning the presentation, the student will leave the room for <5 minutes while the AC discusses any pertinent issues (similar to ORP and PhD defenses).
 - b) Student presents slides and is expected to answer questions at the whiteboard/chalkboard (20 □ 30 minutes). *Feedback on presentation style, problem solving, etc. should be provided. This is a professional development opportunity!*
- 4) The student obtains signatures from his/her AC along with an evaluation (Rating of progress: E = Exceptional/VG = Very Good/G = Good/ U = Unsatisfactory) and returns the completed Annual Check-up form to Tanya Santiago, in addition to a hard copy of the PowerPoint presentation.
- 5) After the meeting, the research advisor leaves the room so that the student has the opportunity to address any issues or concerns he/she may have, or bring up questions that they did not wish to ask in the presence of the advisor, with the Faculty Oversight Committee (FOC). Dialog can be facilitated by having the FOC ask questions (e.g., are there any issues with your lab, research project, expectations, management, etc).
- 6) Tanya Santiago will submit the progress rating to the CST Office of Graduate Affairs.

- 7) If a student receives a U rating:
 - a) The student is provided with a clear outline of areas of deficiency. The deficiencies should be stated with respect to the topics covered in the PowerPoint presentation to the AC. Copies are provided to Tanya Santiago and the CST Office of Graduate Affairs.
 - b) A list of milestones (e.g., collect data needed for publication, compose a draft of a manuscript, pass an agreed number of cumes, complete ORP) that relate to the deficiencies outlined in part (a) are communicated to the student. At least three corrective actions are given to the student as recommended by the committee. A copy is provided to Tanya Santiago. Milestones should be achievable within 6 months [see part (c)].
 - c) A follow-up meeting of the FOC must be convened within **6 months**. Student should prepare a presentation outlining progress towards milestones outlined in part (b) and must provide evidence that corrective actions have been taken. If milestones have not been met, explanations may be provided by the student and evaluated by the FOC. If deemed appropriate, the FOC will offer an extension of specific milestones and/or provide additional corrective actions.
 - d) At the conclusion of the follow-up meeting, the FOC must assign a rating (E, VG, G, U) based on progress towards milestones. If necessary, a new set of milestones will be provided for the next regularly-scheduled annual meeting to ensure that sufficient progress is maintained.
- 8) If a student receives a second U rating, the process above will be repeated in **3 months**.
- 9) Students that receive three total U ratings are no longer eligible to remain in the PhD program.