

**Graduate Studies in Chemistry**  
Department of Chemistry  
The University of Wyoming

A Guide for Graduate Students  
AY2022-2023



## **CHEMISTRY GRADUATE PROGRAM**

### **1. ADMISSION**

In addition to the **minimum** requirements of UW's Graduate Student Regulations and Policies, [www.uwyo.edu/registrar/university\\_catalog/grad\\_students.html](http://www.uwyo.edu/registrar/university_catalog/grad_students.html), the department requires that a student has taken the following undergraduate courses: one year of general chemistry; one semester/quarter of quantitative analysis; one year of organic chemistry plus laboratory; one year of physical chemistry plus laboratory; one year of physics; and mathematics through multivariable calculus. As appropriate, one or more of these course requirements may be waived at the discretion of the graduate admissions committee. All applicants must take the General Graduate Record (GRE) examination. The verbal and quantitative scores are evaluated.

Admission to the Graduate Program can be initiated only by the Graduate Admissions Committee upon receipt of a completed application.

### **2. ADVISEMENT OF GRADUATE STUDENTS**

Prior to the student's first registration, he/she will meet with the Graduate Admissions Committee. The Committee will inform the student about registration at the University and give assistance in the selection of courses for the first semester. Typically, students will register for twelve (12) credit hours for their first semester; thereafter students may be asked to register for less than twelve (12) hours. The Graduate Admissions Committee will consist of one representative from each of at least three major field areas, who will be appointed by the Department Head.

An M.S. student must choose a research advisor by no later than the last month of his/her first semester, and a Ph.D. student within the first month of his/her second semester. It will then be the joint responsibility of the student and the research advisor to promptly determine faculty membership of the student's M.S. or Ph.D. committee in the form of a recommendation to the department head. The Head will then make a final recommendation to the Registrar.

*A graduate student shall not drop or withdraw from any course without the approval of his/her departmental advisor and the chair of the Graduate Program Committee.*

### **3. PROGRAM OF COURSE WORK**

An M.S. or Ph.D. program as discussed below can be approved only at a formal meeting of the student's M.S. or Ph.D. committee. Copies of the program must be circulated to the members of the committee at least one week prior to the meeting. Subsequent meetings of the M.S. or Ph.D. committee for discussion of the student's progress or lack thereof will be held only at the request of the Research Advisor, the Graduate Committee, or the Department Head.

### **4. M.S. PROGRAM**

The Department offers programs of study leading to the M.S. and M.S.T. degrees and cooperates with the M.S.N.S. degree program. The M.S. degree is offered routinely under Plan A. A student may petition the Graduate Committee for permission to pursue an M.S. degree under Plan B. Plan A and B programs are defined in the Graduate Bulletin.

All UW graduate student requirements and regulations apply, except that the M.S. degree must be earned within a total time of two (2) calendar years, or within one (1) calendar year for students

who transfer 6 or more credits, to remain in good standing.

#### **A. Program of Course Work**

A student planning to pursue an M.S. degree should inform the Graduate Admissions Committee of this intention and of any graduate course work he/she has taken at another institution. The Committee will help plan the first semester's course work and take measures to transfer appropriate previous graduate course work in accordance with UW graduate student regulations and departmental policy. During the first semester in residence, the student will choose a research advisor. The remainder of the student's program will then be planned by the student and his/her advisor and M.S. committee. The complete program must be filed with the Registrar at or before registration for the second semester (see 6.D). Following the formation of the student's M.S. committee, each student must fill out and submit a Program of Study (see 6.E.).

A MS candidate must take a minimum of 3 graduate level (5000 and above) lecture courses, for a total of at least 9 credits, normally from 3 different divisions (Inorganic, Organic, Analytical, Physical, Biochemistry). Additional 21 credits are obtained through dissertation research for a total of 30 credit/hours (at a minimum). Courses should be chosen in consultation with their advisor and approved by the graduate committee, which may approve a set of courses outside these guidelines (e.g., inclusion of graduate level courses offered by other departments).

#### **B. Other Regulations**

One departmental seminar is required on the student's research project. The student must register for CHEM 5000.

#### **C. Financial Implications**

M.S. students are required to pay graduate level tuition and fees. There is no guarantee of financial support for M.S. students. M.S. students, however, may be considered for Research Assistantships by their research advisor. It is the policy of the Department, however, that faculty must give priority for funding to their Ph.D. students. This policy can only be waived in special circumstances by approval of the Department Head.

#### **D. Transfer from M.S. to Ph.D. Program**

A student in an M.S. program who is in good standing with a GPA greater than or equal to 3.00 may petition to transfer into the Ph.D. program upon approval of his/her M.S. committee and recommendation of the Graduate Committee. No requirements for the Ph.D. program will be waived.

#### **E. Duration of the M.S. Program**

M. S students have two (2) calendar years from the beginning of the first course taken and listed on the Program of Study to complete the M.S. degree. Students who transfer in 6 or more credits have only one (1) calendar year to complete the degree. The student can petition for an extension for up to one (1) year with the approval of the research advisor and the Graduate Program Committee.

These requirements can be waived by the Graduate Program Committee if the Ph.D. candidate past his/her second year of a Ph.D. program elects to complete a M.S. degree instead. However, under no circumstances may the completing of the M.S. degree exceed six (6) calendar years.

#### **F. Dismissal from the M.S. Program**

Dismissal from the M.S. program in Chemistry can only come as the result of a majority vote of the faculty at a regularly scheduled meeting. Recommendations for dismissal shall be by authority

of the Graduate Committee. The only causes for dismissal shall be:

1. Unsatisfactory academic performance as defined in the University Graduate Student Regulations and Policies and/or failure to pass the final oral examination.
2. Unsatisfactory research performance as determined by the M.S. committee or failure to submit a satisfactory M.S. thesis (or Plan B paper).
3. Failure to complete the degree within the time allowed for the duration of the M.S. program (sec. 4.E above)
4. Causes defined in University Regulations on student conduct.

## **5. PH.D. PROGRAM**

The Department offers programs of study leading to the Ph.D. degree in the areas of analytical, inorganic, organic, and physical chemistry. All UW graduate student regulations and requirements apply, and in addition, the student must successfully complete major field cumulative examination requirements before being permitted to take the preliminary examination.

### **A. Program of Course Work**

A student planning to pursue a Ph.D. should inform the Graduate Admissions Committee of this intention and of any graduate course work he/she has taken at another institution. The Committee will help plan the first semester's course work and take measures to transfer appropriate previous graduate course work in accordance with UW graduate student regulations and departmental policy within their first semester. All students will choose a research advisor as soon as practicable, but no later than by the first month of their second semester. The remainder of the student's program will be planned by the student and his/her advisor and Ph.D. committee (see 6.D). Following the formation of the student's Ph.D. committee, each student must fill out and submit a Program of Study (see 6.E.).

Per UW regulations, a Ph.D. candidate must obtain a minimum of 72 credit hours, including at least 42 hours of graded coursework. The 42 hours of graded coursework are accumulated through the following:

- Four (4) lecture courses in the candidate's major area - 12 credit hours
- Three (3) lecture courses outside the candidate's major area - 9 credit hours
- A combination of seminar courses (5150, 5310, or 5501) and discipline-specific research courses (5190, 5290, 5390, or 5590) - 21 credit hours

An additional 30 credits are obtained through dissertation research for a total of 72 credit/hours (at a minimum). Also, each division will designate a list of graduate level courses which all students majoring in that particular area must take (see Divisional Requirements). The student advisor and committee may approve a set of courses outside these guidelines (*e.g.*, inclusion of graduate level courses offered by other departments).

During the first fall semester in the program, each student will register for three (3) graduate courses. During the first spring semester in the program, each student will register for up to three (3) graduate courses. A student who enters in the spring semester will be held to this requirement too. In addition to these coursework requirements, in their first semester Ph.D. students are required to participate in graduate student orientation, safety training, teaching assistant training, and faculty research presentations as deemed necessary by the Department of Chemistry and the Office of Graduate Education. Information about these requirements will be disseminated to students at the start of their first semester.

**A student may not drop or withdraw from a course for reasons of poor performance.**

However, under extraordinary circumstances, a student may petition his/her advisor and the chair of the graduate committee for permission to make a course withdrawal or receive an “incomplete” grade for the course (see section 2).

A student in the Ph.D. program must satisfy the minimum GPA guidelines of the Registrar. At the end of the first academic year, on the basis of performance, a student will be (1) allowed to continue in the Ph.D. program if the GPA is greater than or equal to 3.00, (2) placed on academic probation if the GPA is less than 3.00, or (3) dismissed from the graduate program (see section 5-E). Action under (3) will be initiated by the Graduate Committee or the student's Ph.D. committee.

**B. Major Field Cumulative Examination Requirement**

The major field examination for Ph.D. students in Chemistry will be of the cumulative examination type. Students will take the cumulative exams in their second and third semesters, after the major area of study is determined. Each division will give six (6) examinations during the normal academic year (Sept., Oct., Nov. Feb. Mar. and Apr.). Each exam will be graded on a scale of 0 - 100 points. To satisfy the cumulative exam requirement the student must pass 3 exams with the pass or fail criteria determined by the division administering the examination. Failure to pass two exams within the two semesters will result in the dismissal from the program. A student that does pass two exams in the 2<sup>nd</sup> and 3<sup>rd</sup> semester may be granted one more attempt on the first round of exams given in the 4<sup>th</sup> semester to satisfy the requirement by the decision of the PhD committee.

The examination period will be three hours in length. The Graduate Program Committee will publish the location, dates, times, and authors of the cumulative examinations at the beginning of each academic year. The general topic of the examination will be announced 10 days prior to the examination. *Cumulative examinations must be taken in the student's major field of study or in another division with the written consent of their research advisor. The announced format of the examination is determined by the division administering the examination; this includes its topic, the number of questions, whether preparation involving literature or textbook reading is required or suggested or not, etc.* If a student is unable to take an examination at the regular time, he/she may be permitted to take the examination at an alternate time with permission of the Graduate Committee.

Students who transfer into the Ph.D. program from either the Master's program in Chemistry or from another graduate program can petition to transfer cumulative examinations in order to meet the major field requirement. Upon consultation with the student's Ph.D. Advisory Committee and the appropriate division, the Chemistry Department Graduate Studies Committee will decide on the petition request.

**C. Committee Meetings**

Students in the PhD program will schedule and hold annual meetings with their PhD committee in order that the committee is kept up to date and can assess the student's progress toward the timely completion on the degree. The students starting in the fall will have their committee meetings by the end of each spring semester; those starting in the spring by the end of the fall semester. The second committee meeting will normally be the preliminary defense, the final one the PhD defense.

Special committee meetings can be called by either the student, the student's advisor, or any member of the PhD committee if needed, e.g. if there are concerns about progress, personal problems, disagreements between the student and advisor, etc.

The students will bring to each committee meeting (if applicable): i) evaluation report from the last committee meeting, ii) semester progress evaluations since the last committee meeting, iii) course transcripts, and iv) a copy of the degree evaluation from WyoWeb. Committee meetings other than the prelim or PhD defense will consist of a short presentation (10 – 15 min) by the student summarizing the progress toward the degree, followed by the review of semester progress reports, Q/A, and committee discussion. The student progress and accomplishments will be evaluated at each committee meeting with a standardized evaluation form. The PhD committee meeting evaluations will be submitted to the department in the similar fashion as the semester progress reports. If the PhD committee deems the student's progress or performance to be unsatisfactory, it will be reflected in the summary evaluation and the committee will recommend steps to correct the situation. If deemed necessary by the committee, another meeting may be scheduled prior to the next annual meeting to re-evaluate the student's progress. Two consecutive unsatisfactory evaluations from these meetings will result in the dismissal of the student from the program. Likewise, failure to schedule the committee meeting by the deadline dates constitutes an unsatisfactory evaluation and may result in dismissal from the PhD program.

#### **D. Preliminary Examination**

Upon completion of the major field cumulative examination requirement, the student and the Ph.D. committee will make arrangements for him/her to take the preliminary examination for Ph.D. candidacy. Students entering the program in the fall semester are required to complete the preliminary examination by **March 15<sup>th</sup> in their fourth semester of residence** at the University of Wyoming. Students entering in the spring semester are required to complete the preliminary examination by **November 15<sup>th</sup> in their fourth semester of residence**.

The preliminary examination will have written and oral parts. The written part will be a research proposal in a standard format of a major federal agency grant (NSF, NIH, DOE, DOD, NASA etc.) including the page limit, fonts, spacing etc. and include:

- An introduction that includes an overview of the objectives, hypotheses, specific aims, justification, and expected outcomes of the student's research project.
- A review of relevant existing literature.
- A detailed research plan with experimental procedures, expected outcomes, anticipated problems and alternative approaches.
- Preliminary results.
- Timetable for the proposed research.
- Complete literature references.

The proposal must be written entirely by the student, **with minimum direct input (editing) by the research advisor**. The subject of the proposal must be approved by the student's Ph.D. committee and should be on the student's actual Ph.D. research problem. The Ph.D. committee will have at least two full weeks to review the proposal before the oral defense by the student.

The oral examination will consist of: i) a public seminar presenting the research proposal and ii) a closed session with the PhD committee that will focus on the proposal, but will also cover all related areas of chemical knowledge. Both the public seminar and the closed Q/A part will be evaluated using standardized forms by all faculty and students (public part) present.

Failure to pass the examination by the target date will generally result in a dismissal from the PhD program. A second attempt may be allowed only if recommended by the PhD committee. The second defense must be successfully completed by the next semester's deadline: the following November 15 if the original one was March 15, and *vice versa*. Failure to pass the preliminary

examination on the second attempt results in an unconditional dismissal from the program.

A student that passes the preliminary examination and subsequently decides to transfer to a new research group (*i.e.*, new research advisor) must re-take the preliminary examination covering the new research project within a 12 month period of changing groups.

#### **E. Professional Development Training**

Following the completion of the Preliminary examination, the Ph.D. candidates are required to take the Professional Development course (CHEM 5000-03, 1 credit).

#### **F. Seminars**

The student must complete two CHEM 5000 Graduate Seminar credits. The first credit will be given for a divisional or departmental seminar presentation or for an oral presentation at a regional or national research meeting. The second credit will be given for a final departmental seminar based on his/her Ph.D. dissertation research.

In addition, student attendance at departmental seminars is **required**, as they play a key role in exposing students to the breadth of chemical research being explored in the greater scientific community. Student attendance at seminars during each semester will be recorded on a sign-in sheet, and more than one unexcused absence will automatically result in an “unsatisfactory” rating on the offending student’s research performance evaluation for the semester (see 6. C. below). For attendance to count, students must (1) arrive on time, (2) personally sign the attendance sheet, and (3) remain until the conclusion of the seminar. Any exceptions to this policy (e.g., excusing excessive absences or allowing the attendance of out of department seminars to fulfill this requirement) must be approved by the graduate program committee.

#### **G. Financial Support**

Ph.D. students are guaranteed financial support either as a Research Assistant or Teaching Assistant as long as they remain in good standing in the Ph.D. program.

#### **H. Duration of the Ph.D. Program**

The Ph.D. degree must be completed within four (4) calendar years after the successful completion of the preliminary examination. If the degree requirements cannot be completed within 4 calendar years after passing the preliminary examination, the student can petition for an extension for up to one (1) year. The petition form is found at:

[www.uwyo.edu/registrar/students/graduate\\_student\\_forms.html](http://www.uwyo.edu/registrar/students/graduate_student_forms.html)

#### **I. Dismissal from the Ph.D. Program**

Dismissal from the Ph.D. program in Chemistry can come only as the result of a majority vote of the faculty at a regularly scheduled meeting. Recommendation for dismissal shall be by authority of the Graduate Committee.

Causes for dismissal are (No exceptions):

1. Academic reasons:
  - a. Academic suspension, which can result from a GPA of less than 3.0 in a 12 month period.
  - b. Failure to pass 3 major field cumulative examinations within the timeline outlined in sec. 5. B.
  - c. Failure to replace a grade of “D” (by re-taking the course) in any course taken while in the Ph.D. program (University regulations)

- d. Failure to submit the preliminary research proposal and hold the oral defense by the dates specified in sec. 5. D.
  - e. Failure to pass the preliminary examination on the second try.
  - f. Failure to pass the final oral examination (*i.e.*, fail the Ph.D. defense).
  - f. Failure to complete the Ph.D. degree within four (4) years from passing the preliminary examination (see 5. G.)
2. Unsatisfactory research performance as evaluated by the Ph.D. committee, his/her major professor (See section 6-C) or failure to submit a satisfactory Ph.D. dissertation.
  3. Causes defined in University Regulations on student conduct.

## **6. OTHER GUIDELINES AND REGULATIONS**

### **A. Graduate Resources**

A copy of UW Graduate Student Regulations and Policies is included in this packet. This document defines all UW graduate student guidelines.

### **B. Teaching Performance**

Graduate assistants will be evaluated by both students and faculty supervisor(s) during each semester. Results of these evaluations are an important factor in decisions regarding continuation of financial support for teaching.

### **C. Research Performance**

A written report must be submitted to the Graduate Committee by the advisor at the end of the Fall, Spring and Summer semesters evaluating the research performance of a student to be either unsatisfactory or satisfactory. *An unsatisfactory rating from the student's research advisor for any two semesters within a period of 12 months (e.g., Fall-Spring-Summer) is grounds for dismissal from any degree program (See section 5-H.2).*

### **D. Graduate Committee**

Principal duties of the Graduate Committee are to advise the faculty on student petitions, recommendations from advisory committees, and general graduate policy.

It is the student's responsibility, in consultation with their major advisor, to form a viable committee within the first two semesters in the graduate program. The student must fill out and submit the Graduate Committee Assignment form ([Link](#)). The form must be on file with the Registrar before a Program of Study (see 6.E.) can be approved. It is also the student responsibility that the form is current and correct, e.g. to file and updated form if there are changes to the graduate committee.

### **E. Program of Study**

The Program of Study details the minimum coursework and credits that will apply in fulfillment of the graduate degree.

Each student must fill out and submit a program of study immediately following the approval of the graduate committee. The Program of Study form is available at [www.uwyo.edu/registrar/students/graduate\\_student\\_forms.html](http://www.uwyo.edu/registrar/students/graduate_student_forms.html). It is the student responsibility to ensure that correct and up-to-date Program of Study is on file with the Office of the Registrar.



Students should periodically check their Degree Evaluation page on WyoWeb (wyoweb.uwyo.edu) website to ensure all their degree information is up to date and correct.

#### **F. Outside Employment**

So that the student can devote full time to courses and/or research, GAs and RAs are not to have other employment beyond a very limited amount of tutoring of chemistry students, which can contribute to his or her teaching skills and knowledge of chemistry.

### **7. DIVISIONAL REQUIREMENTS**

- A. An M.S. candidate must take one three-hour graduate course in each of four areas, excluding special topics, tool courses 5130, 5320, 5560/4560, 5760, and research courses.
- B. All Ph.D. candidates must complete the major field cumulative examination requirement as defined in Section B of the Ph.D. program.

All Ph.D. candidates must complete course requirement as stated in Section 5A, "Program of Course Work". Additional division-specific course requirements are listed below.

#### Analytical Chemistry

All analytical Ph.D. candidates must take the following course:

- CHEM 5250 - Advanced Chemical Instrumentation

The student must also take an additional three (3) 5000-level graduate courses from either the analytical chemistry division (including Special Topics in Analytical Chemistry) or from any other department, with proper approval of advisor and graduate committee.

#### Inorganic Chemistry

All inorganic Ph.D. candidates must take four of the following courses:

- CHEM 5111 - Advanced Inorganic Chemistry
- CHEM 5115 - Descriptive Inorganic Chemistry
- CHEM 5120 - Chemical Applications of Symmetry Group Theory
- CHEM 5130 - Physical Methods of Inorganic Chemistry
- CHEM 5140 - Organometallic Chemistry

Other 5000 level graduate inorganic "special topics" courses include 5160 (Bioinorganic Chemistry), Structure and Bonding, Inorganic Photochemistry and Inorganic Reaction Mechanisms.

#### Organic Chemistry

All organic Ph.D. candidates are required to take the following courses:

- CHEM 5330 - Advanced Organic Chemistry I
- CHEM 5340 - Synthetic Methods in Organic Chemistry
- CHEM 5320 - Spectroscopic Methods of Structure Determination

There are three (3) graduate level courses required for all organic Ph.D. candidates: 5330 (Advanced Organic Chemistry I), 5320 (Synthetic Methods in Organic

Chemistry), and 5320 (Spectroscopic Methods of structure Determination). In addition, the student must also take one additional 5000-level graduate course from either the organic chemistry division or from any other department, with proper approval of advisor and graduate committee.

#### Physical Chemistry

The graduate level course required for all physical Ph.D. candidates is one (1) of the offered 5500 level physical chemistry courses. The student must also take an additional three (3) 5000-level graduate courses from either the physical chemistry division (including Special Topics in Physical Chemistry) or from any other department, with proper approval of advisor and graduate committee. All physical Ph.D. candidates must also enroll in the Physical Group Chemistry seminar (5501) each semester.

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Student First and Last Name: \_\_\_\_\_

Degree being sought:    \_\_\_MS \_\_\_Ph.D.

By signing below, I hereby declare that I have read, understand and hereby accept the terms described in this document

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

*Detach and return the signed form to Dr. Hill by **Friday September 30, 2022.***

**DEPARTMENT OF CHEMISTRY - CHEMISTRY GRADUATE PROGRAM**  
College of Arts and Sciences, University of Wyoming, Laramie

**GRADUATE PETITION TO SELECT A RESEARCH ADVISOR**

NAME \_\_\_\_\_ Area \_\_\_\_\_

**Research Advisors Considered**

Before officially joining a research group, incoming students are required to (1) attend Faculty Research Presentations and (2) actively explore research opportunities with at least three potential advisors. After in depth discussions with these potential advisors, have them sign below.

Type or Print Name of Faculty	Signature	Date
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____ *	_____	_____
5. _____ *	_____	_____

\*Optional

**Primary Research Advisor Selection**

The above named student has completed CHEM 4920, actively inquired about research opportunities with each of the indicated faculty members, and has selected a primary research advisor. By signing below, the advisor approves of this selection and invites the student to formally join his/her research group.

Type/Print Name of Student	Signature	Date
_____	_____	_____

Type/Print Name of Primary Advisor	Signature	Date
_____	_____	_____

Type/Print Name of Primary Co-Advisor*	Signature	Date
_____	_____	_____

Type/Print Name of Department Head	Signature	Date
_____	_____	_____

\*If applicable