

The image shows a large, multi-story brick building with a curved roofline. A prominent feature is a large, arched window with a green frame and a sign that reads "CHEMISTRY". In the foreground, there are several bright yellow Black-eyed Susans flowers and tall green grasses. A black lamp post with a white globe stands to the right of the building. The sky is clear and blue.

2021-2022 UConn Chemistry  
Graduate Student Handbook

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## Introduction

The Chemistry Department graduate curriculum for students entering during the 2021-2022 academic year is presented in the following pages. A summary of the requirements for a graduate degree in Chemistry with a typical timeline is presented in the next section.

The general requirements for all students studying for the Ph.D. degree are:

- successful completion of a series of courses in the first two years,
- completion of a second year progress report,
- completion of the oral general exam by the end of the third year,
- writing and defending a dissertation representing a significant contribution to ongoing research in the candidate's field.

Each requirement is presented in detail in later sections of this handbook. The requirements for the M.S. degree are set forth on page 25.

In addition to reading the information presented here, all graduate students are encouraged to examine the regulations concerning graduate study at the University of Connecticut Graduate School website (<https://grad.uconn.edu/policy/>)

## Degree Requirements

A student's academic program is determined by the student's advisory committee (the major advisor and at least two other members). Customarily, the research interests of at least one of the members of the committee lie outside the student's major area of interest. Members of the committee may be drawn from other units within the university as well as from among specialists in the student's field of study. Early choice of a research advisor and dissertation topic allows the student and the committee to design a plan of study best suited to the student.

The Graduate Faculty of Chemistry requires each graduate student to take a minimum of 30 course credits of graduate work beyond the Bachelor's degree, in addition to 15 credits of GRAD 6950, as required by the Graduate School. The Department does encourage extensive work in the major area and at least nine credits in a non-major area (usually chemistry but also areas such as biochemistry, chemical engineering, pharmacy, physics, and mathematics). It is most common for 24 course credits to be required beyond the Master's degree, unless a student earns a Master's degree in this Department as a step toward the Ph.D. In the latter case, all graduate credits may count toward the minimum of 30 course credits for the Ph.D., if approved by the advisory committee and the Graduate Records Office.

After qualification, the student must pass the General Examination, consisting of a written and an oral portion as determined by his or her selected division (Analytical, Biological, Environmental, Inorganic, Organic, Physical, or Polymer). The General Examination, is generally completed during the second or third year of graduate work.

A dissertation prospectus must be filed with the Graduate School at least six months before submission of the dissertation, but preferably much earlier. If you do not meet the six-month requirement, you will not graduate until six-months after submitting your Prospectus.

The primary requirement for the Ph.D. degree is submission of a dissertation that makes a significant contribution to the candidate's field of specialization. Specific requirements for submission of the Ph.D. dissertation are provided on the Office of Registrar's website:

<https://registrar.uconn.edu/graduation/doctoral-degrees/>

#### Graduate School Requirements

The general degree requirements are given in the *University of Connecticut Graduate Handbook*. A summary of these requirements and additional requirements of the Chemistry Department are listed in the following sections of this handbook.

## Ph.D. Program Timeline

This handbook contains a comprehensive list of graduate program requirements. The Graduate Committee created this suggested timeline to help students complete a Ph.D. in five years. Each student's coursework, and examinations will be individually designed by the student and their advisory committee based on research area. The handbook attempts to address each task in sequential order.

✓	SUGGESTED TIMELINE (year)	TASK	COMPLETED ON
<input type="checkbox"/>	1	Pass proficiency exams OR required grad courses <input type="checkbox"/> Analytical – CHEM 5331, 5336, 5337, or 5338 <input type="checkbox"/> Inorganic – CHEM 5324 <input type="checkbox"/> Organic – CHEM 5341 or 5343 <input type="checkbox"/> Physical – CHEM 5350	
<input type="checkbox"/>	0.5	Choose a major advisor	
<input type="checkbox"/>	1	Choose Ph.D. committee	
<input type="checkbox"/>	1-2	Complete three semesters of CHEM 5310	
<input type="checkbox"/>	2-3	Complete 24-30 course credits <sup>1</sup>	
<input type="checkbox"/>	2-3	Complete divisional course requirements	
<input type="checkbox"/>	2	Submit plan of study to the Graduate School	
<input type="checkbox"/>	2	Complete second year progress report	
<input type="checkbox"/>	3	Complete the written general exam	
<input type="checkbox"/>	3	Complete the oral general exam <sup>2</sup>	
<input type="checkbox"/>	3-4	Prepare dissertation prospectus & submit to the Graduate School	
<input type="checkbox"/>	3-4+	Prepare dissertation	
<input type="checkbox"/>	3-4	Give a departmental research presentation	
<input type="checkbox"/>	4+	Announce final defense of dissertation <sup>3</sup>	
<input type="checkbox"/>	4+	Defend dissertation & obtain signatures of advisory committee	
<input type="checkbox"/>	4+	Submit dissertation to Graduate School	

<sup>1</sup> 24 credits if student matriculates as M.S., 30 credits if B.S./B.A.

<sup>2</sup> The oral general must be announced in the Chemistry Department weekly newsletter.

<sup>3</sup> The final defense must be announced on the Graduate School website and in the Chemistry Department weekly newsletter. See <https://registrar.uconn.edu/graduation/doctoral-degrees/> for a complete check list of required steps.

## Proficiency Exams and Qualification for Ph.D. Candidacy- revised Spring 2022

**OBJECTIVE:** To identify if a student is prepared for a Ph.D. level program by testing their proficiency in four areas of chemistry at the advanced undergraduate level

**TIMELINE:** during orientation or before starting your first semester of the graduate program

All students in the Ph.D. Program must qualify to pursue the Ph.D. degree. To qualify, students must demonstrate proficiency in 4 areas of chemistry (Analytical, Inorganic, Organic, and Physical) in addition to showing an aptitude for independent research. A student may qualify in a given area by either passing a proficiency examination or earning a B (not B-) or better in a course specified by the Graduate Affairs Committee.

On entrance, all students will take proficiency examinations in analytical, inorganic, organic and physical chemistry at the advanced undergraduate level, the results of which are used to determine the appropriate course level for the student.

Graduate students are required to take the proficiency exams upon the start of their first year (whether that be Fall or Spring semester). For any of the exams a student fails the first time around, they must either:

- 1 – Pass an exam in the same sub-discipline by the end of their first academic year\*; or
- 2 – Earn a grade of 'B' or better (not B-) in a proficiency course in the same sub-discipline.

\* first academic year means within 12 months of matriculation.

Students who earn a B- or lower in a proficiency course or who fail to pass the proficiency exam on the second attempt will automatically be transferred into the M.S. program. After successfully defending an M.S. thesis, students who later wish to pursue the Ph.D. must reapply for admission into the Ph.D. program and satisfy the qualification requirements for the Ph.D. program as stated above (i.e. a re-matriculated student would follow same rules as a new student).

## Choosing your Major Advisor

**OBJECTIVE:** explore different areas of research offered by the UConn Chemistry Department

**TIMELINE:** all Fall 2021 Chemistry Graduate Students must officially choose a major advisor by December 3rd

### Faculty Interviews

The department requires all incoming graduate students to discuss their research interests with at least five faculty members before selecting their major research advisor. You are welcome to talk with even more! There is a lot of exciting, cutting edge research going on in the Department, and you are encouraged to keep an open mind about choosing a major advisor. You must collect signatures of at least five faculty members on the "Prospective Advisor Interview" form.

**REQUIRED FORMS:** Prospective Advisor Interview; Change of Major Advisor

The Chemistry Department's procedure for choosing your advisor is as follows:

1. Meet virtually or in person with at least 5 faculty members. After your meeting, please ask the faculty to email the Graduate Program Administrator confirming your meeting. You must have 5 emails/signatures on file before you will be emailed the change of advisor form. This process replaces the need to obtain real signatures on the "Prospective Advisor Interview form."
2. Once you have decided which faculty member you would like as a new advisor, email Graduate Program Administrator with your decision. They will pass it on to the Department Head, for their approval.
3. After the Department Head approves your decision, you will be emailed the official "Change of Major Advisor" form.
4. The form is signed by your selected major advisor and returned to the Registrar's Office [Registrar@uconn.edu](mailto:Registrar@uconn.edu) with a copy to the Graduate Program Administrator. You fill out the top half of the form, email it to your new advisor and they will electronically sign the form and send it to the Registrar's office.

### Research Seminar (CHEM 5398)

New Ph.D. students are provided an opportunity to gain a broad perspective about research going on in the Department by taking a required one-credit seminar course during their first semester. MS students are also strongly encouraged to enroll for the course.

All of the Chemistry professors are invited to give a 30-minute presentation on their research activities.

The purpose is to let the new students know about all of the research opportunities available. This will be helpful in choosing a major advisor and will also be beneficial in selecting associate advisors. Students will receive 1 credit for this course and it will be graded on a letter grade basis. For Fall 2021 new Ph.D. students will enroll in CHEM 5398 section 01. You will need to contact the Graduate Program Administrator to obtain a permission number in order to be able to enroll in this course.

### Resources for Choosing Your Major Advisor

Choosing your major advisor is one of the most important decisions you will make during your graduate career. The following articles provide an objective and in-depth viewpoint on choosing an advisor.

- **["Choosing a Graduate or Postdoc Advisor"](#) by John Andraos, *Science Careers* (2002)**  
This article encourages you to evaluate prospective advisors based on the compatibility between faculty member's career development stage and your personality and goals. It provides an in-depth comparison of young faculty advisors, mid-career faculty advisors, and senior faculty advisors along with resources to design a plan of action.
- **["Planning for Graduate Work in Chemistry"](#) by ACS Committee on Professional Training (2010)**  
This PDF is a comprehensive guide to graduate education in chemical sciences. The article "Choosing a Graduate School Mentor," which begins on page 20, emphasizes the importance of personal fit and developing a mentor/mentee relationship with your academic advisor.
- **["An Insider's Guide to Choosing a Graduate Adviser and Research Projects in Laboratory Sciences"](#) by Marshall Lev Dermer, *University of Wisconsin—Milwaukee* (1992)**  
This essay is concerned with two issues: (1) selecting an advisor who can best train you, and (2) selecting a research project that can be completed in a reasonable length of time. This is a useful resource for the information-gathering stage of your advisor selection process.
- **[How to Pick a Graduate Advisor](#) by Ben A. Barres, *Neuron* (2013)**  
This article takes a technical approach to choosing a graduate advisor by using an M-index to measure mentoring quality. Drawing on his experiences as a Ph.D. student at Harvard and as an advisor at Stanford, the author provides a thoughtful analysis of what a good mentor is and how to find one.

### Choosing your Advisory Committee

**TIMELINE:** by the end of your second semester

**REQUIRED FORMS:** Graduate Student Advisory Committee Form

For choosing an Advisory Committee refer to the [Graduate Catalog](#) (Advisory System section). Note that both M.S. and Ph.D. candidates must choose an Advisory Committee (including a major advisor and two or more associate advisors). An Advisory Committee is chosen in consultation with the Major Advisor when not more than twelve credits of course work to be applied toward the degree have been completed. The names of the associate advisors are submitted on the Chemistry Department's "Thesis Committee Form."



## Course Requirements

### Requirements by Division

Ph.D. students must take the courses listed below in their division to satisfy their specific division requirements. Please consult the Student Administration System for details on all courses offered by the Chemistry Department.

#### *Analytical Chemistry*

CHEM 5331 (3 credits) Advanced Instrumental Analysis  
CHEM 5336 (3 credits) Electroanalytical Chemistry  
CHEM 5337 (3 credits) Optical Methods of Analysis  
CHEM 5338 (3 credits) Separation Methods

#### *Biological Chemistry*

CHEM 5360 (3 credits) Biological Chemistry I  
CHEM 5361 (3 credits) Biological Chemistry II

#### *Environmental Chemistry*

CHEM 5370 (3 credits) Environmental Chemistry I  
CHEM 5371 (3 credits) Environmental Chemistry II

#### *Inorganic Chemistry*

CHEM 5324 (3 credits) Advanced Inorganic Chemistry I  
CHEM 5325 (3 credits) Advanced Inorganic Chemistry II  
CHEM 5326 (3 credits) Advanced Inorganic Chemistry III  
CHEM 5327 (3 credits) Advanced Inorganic Chemistry IV

#### *Organic Chemistry*

CHEM 5340 (1 credit) Electronic Interpretation of Organic Chemistry  
CHEM 5343 (4 credits) Organic Reactions  
CHEM 5344 (3 credits) Concepts in Organic Chemistry  
CHEM 5345 (3 credits) Determination of Organic Structures  
CHEM 5347 (3 credits) Organic Synthesis

#### *Physical Chemistry*

CHEM 5351 (3 credits) Quantum Chemistry I  
CHEM 5353 (3 credits) Chemical Kinetics

Optional Courses include:

CHEM 5352 (3 Credits) Quantum Chemistry II  
CHEM 5354 (3 Credits) Molecular Modeling  
CHEM 5356 (3 Credits) Statistical Mechanics

#### *Polymer Chemistry*

CHEM 5380 (3 credits) Polymer Synthesis  
CHEM 5381 (3 credits) Polymer Physical Chemistry  
CHEM 5382 (3 credits) Polymer Characterization I  
CHEM 5384 (3 credits) Polymer Characterization II

### CHEM 5310 Departmental Seminar

**TIMELINE:** The Graduate Program Committee expects chemistry graduate student to enroll in the course during their 2nd, 3rd and 4th semesters.

All Ph.D. students must earn 3 credits of CHEM 5310. Graduate students enrolling in CHEM 5310 earn 1 credit, graded S or U, and may repeat the course for a maximum of 3 credits total. Students registered for CHEM 5310 are expected to take notes at the regular weekly Chemistry Department Seminars on Wednesdays from 2:30 to 3:30 **AND** Thursdays from 3:30 to 4:45. A complete schedule is published at the beginning of each semester with the exact dates of all seminars.

### GRAD 6950

The Graduate School requires all Ph.D. students earn at least 15 credits of GRAD 6950.

### Second Year Meeting

The Graduate Affairs Committee will consider a student's progress toward qualification at the end of each semester until a final decision is reached on qualification. The student will be appraised in writing of his or her status at the end of the first year of study, based on coursework, progress in research, and comments (teaching evaluations) from faculty.

The Graduate Affairs Committee will decide:

- if the student is qualified to pursue the Ph.D.
- if the student is not qualified to pursue a Ph.D. but is qualified to pursue a M.S.
- if the student is unqualified and must leave the graduate program.

The student will be appraised in writing of their qualification status. A written report will be included in the student's file.

### Plan of Study

The Plan of Study should be completed and submitted to the Office of the Registrar for final approval when not more than twelve credits of course work to be offered for the degree have been completed. The successful completion of all work indicated on the Plan of Study is a fundamental prerequisite for the conferring of the degree. The Plan of Study must be signed by the student and by each member of the advisory committee (major advisor and a minimum of 2 associate advisors) before submission to the Office of the Registrar for final approval. When fully approved, copies of the Plan of Study are returned to the student and to the major advisor.

### Transfer Credits

Students may transfer up to 6 course credits for work that was not completed at UConn, provided this work was not used to earn a degree at another institution. A grade of B or better (not B-) must have been awarded for this work. Transfer credits will only be approved upon submitting a Plan of Study to the Graduate School. An official transcript from the other institution, along with the course description and/or syllabi, will be required.

## General Exam Requirements

**TIMELINE:** As noted in the Graduate Student Handbook of the Graduate School, the General Examination for the Ph.D. degree must be completed at least eight months before the date of conferral of the degree.

Since the General Examination is generally taken over a period of months, a student is advised to begin the process well before the Graduate School deadline. The division of the Department in which the student is working determines the actual format of the General Examination, but in all cases the Examination consists of a written portion and an oral portion. Departmental regulations stipulate that the related area requirement must be met before the final phase (generally the oral portion) of the General Examination is completed. Divisional guidelines for the General Examination are outlined in the next section.

## Graduate School Requirements

Before considering the Departmental guidelines for the general examination, the candidate should be aware of the Graduate School requirements that must be fulfilled before a General Examination can be successfully completed. The detailed guidelines are given in the [Graduate Catalog](#); a summary of the major points follows:

- The general examination must be completed within five years of the beginning of doctoral study or (and this is important!) within four years if the student entered the Ph.D. program with a master's degree in the same field.
- Before taking the examination, the student's Plan of Study must be approved by the Graduate School.
- Not fewer than five (5) faculty members, including all members of the advisory committee, constitute the examining committee and participate in the examination

## Departmental Guidelines for the Oral Portion of the General Examination

The oral portion of the examination, presented to an examining committee consisting of the candidate's advisory committee and an additional examiner approved by the Department Head, is taken after successful completion of the written portion. This oral examination is open to students, faculty and other interested parties. All those present may participate in the examination but the outcome of the examination will be determined by vote of the examining committee.

The oral portion of the examination will ordinarily consist of questions covering not only the major field of study but also other areas of chemistry (generally the province of the external examiner). There is no formal time limit on the oral portion of the general examination. At the discretion of the examining committee, the examination may be recessed to be reconvened at a later time. At the end of the oral portion of the examination and before discussion among the examining committee, an initial vote (pass or fail) will be taken by written ballot. The outcome of the examination --pass or fail-- will be determined by majority vote of the examining committee.

## General Exam Requirements by Division

### *Analytical Chemistry*

The written portion of the general examination is intended to test the candidate's ability to critically review the current literature. It is advisable for the student to prepare for the oral portion of the written exam by making a PowerPoint presentation, or other multimedia materials, in anticipation of possible questions from their committee and the Analytical Division faculty. Questions from the faculty will grow out of the written answers, but could develop into discussion of any area of chemistry that appears to be appropriate.

#### Written Exam:

##### **What are the pre-requirements?**

- Candidates may be asked by their advisory committee or the Analytical Division to give a research seminar before the general examination to ascertain readiness for the general examination. This seminar would fulfill the department's seminar requirement for graduate students.
- The candidate's proposal should be submitted to each member of the candidate's committee, and each member of the Analytical Division

##### **When during the year is it offered? How is it announced? How much advanced notice is given?**

- Offered twice a year around September/October and January/February

##### **What is the format? How long does the exam take?**

- Seven days will be allowed to provide written answers that must be submitted electronically; these answers may be defended by the candidate during the oral examination.
- Take-home written examination that consists of 4 or 5 questions chosen from seven or eight
- The written answers must be submitted around the 21st of October or February. These answers will be defended by the candidate during the oral examination. Comments on the written answers will be given to each candidate before the oral.
- The written exam will consist primarily of questions based on the current analytical chemistry literature. The following literature and other sources will be used in the formulation of questions: ANALYTICAL CHEMISTRY, especially the A-page reviews, the instrumentation sections, and the Biennial Reviews, and other chemistry journals as appropriate to illustrate important fields of endeavor in analytical chemistry. Other sources include regular departmental seminars given by outside speakers, special seminars on analytical chemistry given by outside speakers, and graduate student seminars. Primarily, questions will be based on the two full years of literature up to the December prior to the date of the general examination, plus the literature that has already been published in the calendar year of the examination.

#### Oral Exam:

##### **What are the pre-requirements?**

- Submission of candidate's written proposal
- Completion of written exam
- By use of meetings, phone, e-mail, and other methods of communication, the candidate should arrange for the date of the oral examination, which should be before the 21st of either November or March.

**When do I give my committee a copy of my proposal? How many days in advance of the exam?**

- Submit the proposal before the written exam
- The oral examination will also include the presentation and defense of an original research proposal written by the candidate, a copy of which should be submitted to each member of the candidate's committee, and each member of the Analytical Division, before the written examination is taken. A student cannot proceed to the written examination until the proposal has been submitted.
- In addition to the submitted original research proposal, each candidate will submit to the examining committee, on the day of the oral (a) preprints or reprints of all publications that have resulted from the student's research at the University of Connecticut, or (b) a 2-page abstract, with references, of unpublished research done or (c) both (a) and (b).

### Biological Chemistry

If a graduate student chooses to pursue the Ph.D. thesis research in the Division of Biological Chemistry, the advisory committee should consist of a major advisor and at least two additional members from two different traditional chemistry divisions.

#### Written Exam:

##### What are the pre-requirements?

- The student will be required to take both Biological Chemistry I and II. In order to enroll in these courses, the student must have either completed a one-semester course in Biochemistry (e.g. MCB 5001) or have consent of the instructor.
- The student will be required to take at least two starred courses from another division
- Ph.D. students are required to present a research seminar. It is expected that this requirement will be completed by the end of a student's 5th semester
  - The student must select members for the advisory committee prior to the research presentation and notify the committee of the date for the research presentation.

##### When in my PhD timeline should I take it?

- It is expected to be completed by the end of a student's 7<sup>th</sup> semester

##### When during the year is it offered? How is it announced? How much advanced notice is given?

- Given twice a year, once in Fall and once in Spring (usually during the 3rd week of September and February)
- All students should prepare for the exam accordingly and let the major advisor know when he/she is planning to take it

##### What is the format? How long does the exam take?

- The written portion will consist of a single examination (take-home format) assembled by the student's advisory committee and comprised of material obtained from divisional faculty and culled largely from the biological chemical literature with emphasis on important biological topics. The objective of this approach is to train students in one of the traditional subfields of chemistry as well as to educate students toward scientific literacy in other areas of biological chemistry.

#### Oral Exam:

The oral portion combines a defense of an independent, original research proposal with questions of a general chemical nature. The student should consult solely with an associate advisor in the choice of the topic for the proposal. The objective of this part of the general exam is to evaluate the student's capability for independent thinking and self-criticism and to test the student's breadth of general chemical knowledge. The original research proposal is expected to be on a topic that is outside the specific area encompassed by the candidate's thesis program.

##### What are the pre-requirements?

- Completion of the written examination

##### When in my PhD timeline should I take it?

- Is expected to be completed by the end of a student's 7<sup>th</sup> semester

##### How soon after I've completed the written exam should I take it?

- Upon successful completion of the written examination, the oral portion of the general exam should be scheduled as soon as possible.

**How long should the presentation be? What should I cover?**

- Combines a defense of an independent, original research proposal with questions of a general chemical nature

**Which (and how many) faculty members must attend the exam? What is the role of the General Chemistry examiner?**

- The advisory committee should consist of a major advisor, 2 associate advisors; in addition, you must also have 1 general chemistry examiner and at least one additional member from the traditional chemistry divisions, whose role is to assess chemical competency.

**What is the format for the proposal document (sections, number of pages, etc.)?**

The expected format for the original research proposal is as follows:

- a) Summary of the Research Proposal: In less than one-half page, summarize the proposed research with a brief introduction and significance.
- b) Specific Aims: List the broad, long-term objectives and what the specific research proposed in this application is intended to accomplish, e.g., to test a stated hypothesis, create a novel design, solve a specific problem, or develop new technology. Less than one page is recommended.
- c) Background and Significance: Briefly sketch the background leading to the present application, critically evaluate existing knowledge, and specifically identify the gaps that the project is intended to fill. State concisely the importance and health relevance of the research described in this application by relating the specific aims to the broad, long-term objectives. One to two pages are recommended.
- d) Research Design and Methods: Describe the research design and the procedures to be used to accomplish the specific aims of the project. Include how the data will be collected, analyzed, and interpreted as well as the data-sharing plan as appropriate. Describe any new methodology and its advantage over existing methodologies. Discuss the potential difficulties and limitations of the proposed procedures and alternative approaches to achieve the aims. As part of this section, provide a tentative sequence or timetable for the project. Point out any procedures, situations, or materials that may be hazardous to personnel and the precautions to be exercised. Although no specific number of pages is recommended for the Research Design and Methods section, the total for Items a-d may not exceed 10 pages, including all tables and figures. Applicants are encouraged to be as succinct as possible and reminded that there is no requirement that all 10 pages allotted for this section be used. Please also keep in mind that the proposal should be clear and legible, and you may type in single space but the font size should not be smaller than 11 points and at least one-half inch margin should be maintained in all directions.
- e) Literature Cited/List All References: Each reference must include the title, names of all authors, book or journal, volume number, page numbers, and year of publication. The reference should be limited to relevant and current literature. While there is not a page limitation, it is important to be concise and to select only those literature references pertinent to the proposed research.

## Environmental Chemistry

### Written Exam:

#### What are the pre-requirements?

- Environmental Chemistry I, Environmental Chemistry II, and at least two starred courses from another division (first approved by the student's committee) are required.

#### When in my PhD timeline should I take it?

- Should be taken by the end of the third year of study

#### When during the year is it offered? How is it announced? How much advanced notice is given?

- The exam will be offered one to two times per year and will be scheduled in coordination with faculty members in the Environmental Division.

#### How do I sign up?

- Students should contact their advisor stating intention to take the exam.

#### What is the format? How long does the exam take?

- Take-home examination that will be prepared by the members of the Division and the student's advisory committee

### Oral Exam:

#### What are the pre-requirements?

- Completion of the written exam
- Completion of proposal

#### When in my PhD timeline should I take it?

- Should be taken by the end of the third year of study

#### How soon after I've completed the written exam should I take it?

- Two weeks after successful completion of the written part of the examination

#### How long should the presentation be? What should I cover?

- Will include defense of an independent original research proposal in environmental chemistry as well as questions regarding general chemistry principles

#### Which (and how many) faculty members must attend the exam? What is the role of the General Chemistry examiner?

- At least five faculty members, including the student's advisory committee, must attend the exam. The role of the General Chemistry examiner is to ensure that a fair and comprehensive exam is administered.

#### When do I give my committee a copy of my proposal? How many days in advance of the exam?

- The proposal should be submitted to all members of the Division a week in advance of the scheduled oral examination

#### What is the format for the proposal document (sections, number of pages, etc.)?

- Five pages in length (including references) and should be on a topic outside the specific area of the student's research project



## Inorganic Chemistry

### Written Exam:

#### **What are the pre-requirements?**

- Completion of all inorganic core courses.

#### **When in my PhD timeline should I take it?**

- Students should take the General Exam within a semester after all inorganic division core courses (Chem 5324, 5325, 5326 and 5327) are completed.

#### **When during the year is it offered? How is it announced? How much advanced notice is given?**

- Fall and spring semesters, or summer with approval of the Division.

#### **What is the format? How long does the exam take?**

- The student will present an original proposal topic of their choice that may include their current research.
- Approval of the proposal format by all Inorganic Division Faculty members is required. The final version of the approved proposal should be disseminated by the student in printed form to the Inorganic Division members.

### Oral Exam:

#### **What are the pre-requirements?**

- Completion of all inorganic core courses.
- Approval of the written portion.
- Approval of the Plan of Study.

#### **When in my PhD timeline should I take it?**

- Preferably within a month of approval of the written portion.

#### **How long should the presentation be? What should I cover?**

- The oral presentation will be less than 30 min, followed by questioning by the audience/ faculty present.

#### **Which (and how many) faculty members must attend the exam? What is the role of the General Chemistry examiner?**

- At least five faculty members, including the student's advisory committee, must attend the exam. The role of the General Chemistry examiner is to ensure that a fair and comprehensive exam is administered.

#### **When do I give my committee a copy of my proposal? How many days in advance of the exam?**

- The proposals are handed in to the Inorganic Division members well ahead of the oral exam, are critiqued, and returned to the student at the latest a week before the exam

**What is the format for the proposal document (sections, number of pages, etc.)?**

*A. Summary of the research proposal*

In less than one-half page summarize the proposed research with a brief introduction and significance.

*B. Specific Aims*

List the broad, long-term objectives and what the specific research proposed in this application is intended to accomplish, e.g., to test a stated hypothesis, create a novel design, solve a specific problem, or develop new technology. Not more than one page is recommended.

*C. Background and Significance*

Briefly sketch the background leading to the present application, critically evaluate existing knowledge, and specifically identify the gaps that the project is intended to fill. State concisely the importance and health relevance of the research described in this application by relating the specific aims to the broad, long-term objectives. Two to three pages are recommended.

*D. Research Design and Methods*

Describe the research design and the procedures to be used to accomplish the specific aims of the project. Include how the data will be collected, analyzed, and interpreted. Describe any new methodology and its advantage over existing methodologies. Discuss the potential difficulties and limitations of the proposed procedures and alternative approaches to achieve the aims. As part of this section, provide a tentative sequence or timetable for the project. Point out any procedures, situations, or materials that may be hazardous to personnel and the precautions to be exercised. The total for Items a-d may not exceed 10 pages, including all tables and figures. Students are encouraged to be as succinct as possible and reminded that there is no requirement that all 10 pages allotted for the proposal be used. Please also keep in mind that the proposal should be clear and legible, and you may type in single space but the font size should not be smaller than 11 points and a 1.0 inch margin should be maintained in all directions. The use of chemical equations, schematic drawings, original illustrations etc. is strongly encouraged.

*E. Literature Cited*

List all references in a consistent format (we suggest JACS format + title). Each reference must include the title, names of all authors, book or journal, volume number, page numbers, and year of publication. The reference should be limited to relevant and current literature. While there is not a page limitation, it is important to be concise and to select only those literature references pertinent to the proposed research.

## Organic Chemistry

### Written Exam:

#### What are the pre-requirements?

- There are no formal pre-requirements.

#### When in my PhD timeline should I take it?

- In the organic division the written portion of the general exam is a series of cumulative exams offered eight times per year. You should begin taking the cumulative exams in your first semester.
- You must accumulate 5 points within the first 19 cumulative exams offered from the date you start the graduate program. Scoring is detailed below.

#### When during the year is it offered? How is it announced? How much advanced notice is given?

- Eight cumulative examinations are given each year, one each month from October through May, with specific dates and faculty giving the exam announced at the beginning of each academic year.

#### How do I sign up?

- You should inform the cumulative exam coordinator (currently Mark Peczuh) that you intend on joining the organic division and obtain an ID number to be used for identification on the exams.

#### What is the format? How long does the exam take?

- Each exam is written and graded by a member of the Organic Division and its format will be determined by the individual who writes it. The exams typically involve a series of questions drawn from material covered in courses, the current literature, and recent seminars presented in the Department. At the discretion of the individual who writes the exam, the topics to be covered may be announced in advance and take-home exams may also be given.
- Scoring is as follows:
  - 1 point for each exam you pass (=full pass).
  - 0.5 points for each half pass.
- The total of 5 points can come from 5 full pass grades or from 4 full passes plus 2 half passes.

### Oral Exam:

#### What are the pre-requirements?

- You must complete the written part of the general exam before proceeding to the oral part.
- The Division requires that you provide a one-page pre-proposal of your idea to your advisory committee for approval prior to writing the full proposal. The purpose of this exercise is to prevent you from proposing something that is likely to be indefensible or that is too close to your thesis project. The document should be a well-articulated, advanced draft of the Project Summary, described below. It should include two to four **key** references that provide the foundation of your idea.

#### How much guidance can I get from my research advisor regarding my general exam proposal?

- Your research advisor should have little or no input on the development of the idea for the proposal and in the proposal writing. You can ask the other committee members specific questions about your idea, however. The research advisor, along with the other members of your advisory committee, must approve the pre-proposal. The associate advisors must also approve the written document before the oral presentation and defense of the original idea (See below).

**What are the parts of the oral exam? What does the oral exam consist of?**

- You must submit a detailed written research proposal, not related to your thesis/group research, and defend it in an oral presentation with questions from your advisory committee and other examiners (See below).

**How soon after I've completed the written exam should I take it?**

- As soon as you like, but it must be completed within 3 months of completion of the written part. This is usually in the third year of your training.

**What is the format for the proposal document?**

- The format of the written proposal should follow a typical grant application, and consist of two main parts:

**1. Project Summary**

This part summarizes the following components of the proposal

- the 'what': This section identifies background facts ("the lay of the land") and identifies the key unaddressed question(s) that will be addressed.
- the 'how': These are the specific aims of the proposed work. A specific aim should be a statement of a measurable goal with a strategy for achieving it, and a method to evaluate its success.
- the 'why': This should be a short summary of the major implications of your proposal.
- Figures may be included, and the entire project summary should be no more than one page in length.

**2. Project Proposal**

This is the main proposal.

- It should include the following sections (in an order that is appropriate for the proposed work): Background & Significance, Innovation, Experimental Design & Methods, and References. References should include titles in the citations.
- The length of the Project Summary and Project Proposal together, excluding references, should be a minimum of six pages and not exceed 10 (1" margins, font no smaller than 11pt, single spaced).

**What happens once my full proposal is written and approved my associate advisors?**

- You must submit your full proposal (Project Summary + Project Proposal) to your associate advisors no later than 30 days after the approval of your pre-proposal. The associate advisors will evaluate the proposal on all grounds, but with emphasis on organization, grammar, and style.
- They can decide to either request revisions or approve the proposal. If revisions are requested, the proposal must be revised and resubmitted to the associate advisors for evaluation, a process that could take multiple iterations. When the proposal is deemed satisfactory, you are allowed to defend it for the oral component of the General Examination.

**Which (and how many) faculty members must attend the exam? What is the role of the general examiner?**

- At least five faculty members, including the student's advisory committee, must participate in the exam. The role of the general examiner is to ensure that a fair and comprehensive exam is administered.

**When do I give my committee a copy of my proposal? How many days in advance of the exam?**

- The full, approved proposal should be distributed to all five faculty members that will be at your general exam at least one week before the oral examination.

**What is the nature and length of the oral presentation?**

- The presentation is an oral defense of the research proposal that will be the focal point of the Oral Exam. The presentation should be long enough to explain the proposed research adequately, approximately 30 minutes. Questions during the exam will, however, be comprehensive in nature, and the candidate should be prepared to answer questions in all areas of basic chemistry.

**What should I do about refreshments?**

- Refreshments are not expected for the general exam. Save your money for a celebration with your labmates and friends afterwards.

*Physical Chemistry*

**Written Exam:**

**What is the format? How long does the exam take?**

- Taken at home and will consist of questions on topics including quantum chemistry, thermodynamics, kinetics, the student's courses, and recent seminars and literature
- Questions will be submitted by the student's advisory committee and interested PChem faculty and selected by the advisory committee(s) of the student(s) involved.

**Oral Exam:**

**How long should the presentation be? What should I cover?**

- Defense of an original research proposal (submitted in advance by the student) with questions of a general chemical nature. The objective of this approach is to examine the student's capability for independent thinking and self-criticism, and to test the student's breadth of general knowledge.
- The original research proposal is expected to be on a topic that is outside the area of the candidate's research program.
- Prior approval of the topic by the student's advisory committee is recommended.

## Polymer Chemistry

### Written Exam:

#### **What are the pre-requirements?**

- Graduate students in the polymer division are expected to take and pass (B average grade) the following graduate courses for credit prior to taking the written exam: Polymer Synthesis (CHEM 5380), Polymer Physical Chemistry (CHEM 5381), Polymer Characterization I (CHEM 5382) and Polymer Characterization II (CHEM 5384).

#### **When in my PhD timeline should I take it?**

- The polymer division requests graduate students to take these courses from the first semester along with proficiency courses. If a student has to complete 4 proficiency courses, then the division requests them to start taking the polymer courses from the second year. Polymer division courses are offered in Fall and Spring, however, the division requests the students to take the synthesis and physical chemistry courses first unless the student has taken polymer courses during undergraduate or master's degree. Based on these ideas, polymer division students can take the written exam as soon as they complete all the four polymer courses.

#### **When during the year is it offered? How is it announced? How much advanced notice is given?**

- The written exam is generally offered twice a year (Dec-Jan and May-June). The student (and advisor) should contact the division chair and a date for the exam will be set about a month in advance.

#### **What is the format? How long does the exam take?**

- Constructed from questions selected by the General Chemistry examiner from those submitted by interested faculty and
- The written exam is split in morning and afternoon sessions, three hours each. The questions may be open and closed book based on the core courses as well as polymer seminars and important literature.

### Oral Exam:

#### **What are the pre-requirements?**

- The students should have passed the written exam.

#### **When in my PhD timeline should I take it?**

- The student can take the oral exam as soon as the written exam has been completed. Most students are required to complete the oral exam in the third year.

#### **How soon after I've completed the written exam should I take it?**

- The oral defense of the prospectus should be scheduled within 9 months of the written general exam

#### **How long should the presentation be? What should I cover?**

- The presentation should be 30-45 minutes and should cover research goal, state of the art in the research field, novelty of proposed work, detailed work plan and some initial results. This presentation may be based on their thesis work.

**Which (and how many) faculty members must attend the exam? What is the role of the General Chemistry examiner?**

- Five faculty members including one General Chemistry examiner must attend the exam. The General Chemistry examiner questions the student on basic chemistry topics.

**When do I give my committee a copy of my proposal? How many days in advance of the exam?**

- The written proposal must be submitted to the student's advisory committee at least seven days before the oral examination

**What is the format for the proposal document (sections, number of pages, etc.)?**

- The thesis prospectus should conform to the graduate school guidelines; include a literature survey, preliminary results and a statement of the thesis.
- The prospectus should be written with due consideration for the principle that a thesis is the student's original contribution to the literature and is a single author publication. In that spirit, the prospectus must defend points of originality and differentiate the proposed effort from current and prior work in the advisor's laboratory



## Research Seminar

The Department of Chemistry requires a formal research seminar to be presented by all students in the Ph.D. program.

Ph.D. candidates are required to give a seminar on their thesis research as part of their training. This requirement should be completed at least six months prior to the thesis defense. The format of the presentation should be decided by the candidate's thesis advisory committee where either i) a departmental seminar as part of the chemistry seminar program OR ii) an oral research presentation at a regional, national, or international conference.

Students who present at a conference must give a copy of the conference proceedings to the Graduate Program Administrator in order to receive credit for completing this requirement.

Graduate students are encouraged to attend all graduate student seminars and are required to attend graduate student seminars given by students in the division in which they are fulfilling requirements for the Ph.D. degree.

## Writing your Dissertation

Please prepare your dissertation according to the published Office of Registrar's specifications listed below. The specifications and FAQs should be read through thoroughly. Should you have any questions, contact Degree Audit in the Registrar's Office at (860-486-6214) or [degreeaudit@uconn.edu](mailto:degreeaudit@uconn.edu) for assistance. (<https://registrar.uconn.edu/graduation/doctoral-degrees/>)

## Dissertation Defense

The Report on the Final Examination for the doctoral degree is evidence of a student's successful oral defense of his/her dissertation, and the document must include the original signatures of approval of all committee members. If dissertation revisions are necessary, the committee will notify the specific student. Once revisions are made, the student obtains the original signatures on the dissertation approval page. The defense date, however, is not the degree completion date. The completion date is determined by the date the dissertation is submitted to the Registrar's Office.

## Timeline and Deadlines

Deadlines for the conferring of the degree are:

- Summer Degree – August 31st
- Fall Degree – December 31st
- Spring Degree - 13 days before commencement

## M.S. Degree

A master's degree<sup>4</sup> may be earned under either of two plans as determined by the advisory committee.

**PLAN A:** This plan requires at least 21 credits of course work (plus 9 credits of GRAD 5950) and a written thesis describing original research in chemistry.

- Coursework - Must include at least three credit hours of independent study carrying out laboratory work or theoretical research.
- Master's Thesis - The Advisory Committee must approve the topic and scope of the thesis required. Specifications for preparation of the thesis can be obtained from the Registrar's Office (<https://registrar.uconn.edu/graduation/masters-degrees/#thesis-information>).
- Final exam- the MS candidate must present and defend their thesis in front of their advisory committee. The exam must take place no later than one year after the completion of the thesis. The committee will decide on the format of the exam.

**PLAN B:** This plan requires 30 credits of course work but no thesis. The advisory committee may require more than the minimum number of credits. The advisory committee may require a comprehensive final exam, if they do, the committee will decide on the exact format of the exam. If a final exam is required, the exam must take place no later than one year after the completion of all course work.

Deadlines for the conferring of the degree are:

- Summer Degree – August 31st
- Fall Degree – December 31st
- Spring Degree - 13 days before commencement

Students who qualify to pursue an M.S. degree, and who later wish to pursue the Ph.D. degree, must reapply for the Ph.D. program, and satisfy the qualification requirements for the Ph.D. program as if they were new students.

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<sup>4</sup> the Department does not consider a Master's degree a prerequisite for the Doctoral degree

## University Policies

### Discrimination, Harassment, and Inappropriate Romantic Relationships

**WEBSITE:** <http://policy.uconn.edu/2015/12/29/policy-against-discrimination-harassment-and-related-interpersonal-violence/>

The University of Connecticut (the “University”) is committed to maintaining a safe and non-discriminatory learning, living and working environment for all members of the University community – students, employees, and visitors. Academic and professional excellence can exist only when each member of our community is assured an atmosphere of safety and mutual respect. All members of the University community are responsible for the maintenance of an environment in which people are free to learn and work without fear of discrimination, discriminatory harassment or interpersonal violence. Discrimination diminishes individual dignity and impedes equal employment and educational opportunities.

### The Office of Institutional Equity

**WEBSITE:** <http://equity.uconn.edu/>

The Office of Institutional Equity (OIE) ensures the University's commitment and responsibility to foster diverse and inclusive working and learning environments. Our work focuses on ensuring compliance with the University's non-discrimination and anti-harassment policies, as well as state and federal laws and regulations related to equal opportunity and affirmative action. OIE's major areas of focus include:

- Accessibility at UConn (<https://equity.uconn.edu/accessibility-at-uconn/>)
- [Discrimination/Harassment](#)
- Employment Equity (<https://equity.uconn.edu/search-process/>)
- [Education and Training](#)
- [Title IX Compliance](#)

### Ethics

**WEBSITE:** <http://policy.uconn.edu/2011/05/24/guide-to-the-state-code-of-ethics/>

The Department of Chemistry expects all scientific endeavors to be conducted with the highest degree of professionalism and ethical conduct. We expect our graduate students to read and thoroughly understand the information in the booklet entitled “On Being a Scientist” which is available from Graduate Program Administrator.

All UConn Graduate students are also expected to follow the Student Code of Conduct which is available at this website: <http://community.uconn.edu/the-student-code-preamble/>.

### Environmental Health and Safety (EH&S)

**WEBSITE:** <https://ehs.uconn.edu/chemical-health-and-safety/>

Chemical Health and Safety provides services designed to limit the risks of exposure during the handling, storage, and disposal of hazardous chemicals and regulated materials in research and teaching laboratories. Policies and procedures developed through Chemical Health and Safety are intended to support the safe usage of hazardous chemicals and comply with all applicable federal, state, and local safety regulations and standards.

## Financial Aid

The department offers a stipend to all full-time Ph.D. students who demonstrate satisfactory progress toward that degree and *satisfactory work in teaching or research duties associated with the financial support*. This stipend includes fringe benefits and waiver of tuition and is detailed in the acceptance letters sent out by the Department. Financial support from the Department is awarded on a yearly basis but it is not guaranteed. For 2021-2022 academic year, graduate assistant stipends are listed below. In addition, most graduate students will receive summer support.

	<u>9 month</u>
• For the graduate assistant with at least the <u>baccalaureate</u>	\$24,800.30
• For experienced graduate assistants with at least the <u>master's degree</u> or its equivalent in the field of graduate study. (Equivalency consists of thirty credits of appropriate course work beyond the baccalaureate, together with admission to a Ph.D. program)	\$26,095.68
• For students with experience as graduate assistants who have at least the master's degree or its equivalent and who have <u>passed the general examination for the Ph.D.</u>	\$29,013.08

Students may receive financial aid from one or more of the following sources:

1. **Teaching Assistantships.** Teaching assistantship appointments are made on a semesterly basis and run from August 23 through May 22. These appointments are made at the discretion of the Department Head. A student must maintain a cumulative GPA of 3.0 or better in order to remain eligible for financial support. Teaching assistant duties are assigned by the TA committee. **Certification of English proficiency** may be obtained by meeting one of the following requirements:
  - a. Speak English as a native language.
  - b. Submit a valid TOEFL IBT score with a speaking subscore of 27 or higher, an IELTS speaking band score of 8.0 or higher, or a Pearson Test of English Academic (PTE) score of 74 or higher.
  - c. Pass the Microteaching Test. You must take the Microteaching test if
    - your TOEFL IBT speaking subscore is between 22 and 26
    - your IELTS score is 7.0 or 7.5 on the speaking band
    - your PTE score is between 62 and 73
2. **Research Assistantships.** The research assistantship stipend is the same as that for teaching assistantships. Funds for research assistantships are generated by extramural grants and the responsibility for the administration of these funds rests with the faculty member to whom the grant was made.

- 3. Summer Doctoral Dissertation Fellowships.** Pending budgetary approval, The Graduate School awards a limited number of Summer Doctoral Dissertation Fellowship (DDF) awards for students in doctoral programs requiring a dissertation. Eligible applicants should fill out the application form on the Graduate School's website beginning in February 2022 for a Summer 2022 award. Students should discuss this Fellowship application with their advisor. <https://grad.uconn.edu/financing/fellowships/dissertation/>
- 4. Conference Participation Awards.** Graduate students who meet all eligibility requirements may apply to the Graduate School for a Conference Participation Award. Awards are worth \$750, are limited and not guaranteed. <https://grad.uconn.edu/financing/fellowships/travel-fellowship/>
- 5. Charles E. Waring Memorial Scholarship.** The Waring Scholarship will be awarded to outstanding graduate students in chemistry at the University of Connecticut. Winners will be selected annually from among those students who have completed two or three semesters of graduate study and who have qualified for Ph.D. candidacy. The Scholarship will be awarded by the Graduate Program Committee based on courses taken and grades earned at the graduate level as well as academic and research progress. The Scholarship will be \$400.
- 6. Teaching Assistantship Awards.** Each year, Masterton Awards are given to the five most outstanding graduate teaching assistants. These awards consist of \$400 each. Four of these awards are given to people teaching general chemistry, and one award is for upper division courses. Awards are made in the spring/summer and recipients can only receive the award once.
- 7. Connecticut Chemistry Research Award:** In the spring of each year, faculty members may nominate a student for this award. The major advisor should draft a nomination letter describing the research contributions of the student, and include a list of publications of the graduate student with full citations.
- 8. Outstanding Service and Research Award:** In the spring of each year, faculty and/or a staff member may nominate a graduate student for this award. The nomination letter must describe specific activities or services provided to the department by the student. A list of publications of the graduate student with full citations, and a nomination letter from the major advisor describing research contributions of the student must also be included in the nomination packet
- 9. Excellence in Service Award:** In the spring, a nomination letter from faculty or staff describing outstanding service by a graduate student, over and beyond normal expectation.
- 10. Bobbitt-Chou Graduate Summer Research Fellowship:** This is a fellowship to recognize early accomplishment in a student's graduate studies and the promise of continued success. One student entering their third summer of research will be awarded a \$3,500 fellowship. The fellowship will be awarded based on course grades and a letter from the primary research advisor. The letter should specifically address the technical abilities of the student and his/her conceptual ownership and creative contributions to the research project.