

Chemistry Graduate Program

Introduction

The Department of Chemistry offers the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees, with emphasis on the Ph.D. degree. In order to receive Ph.D. and M.S. degrees, students must fulfill a combination of requirements that consist of taking courses, presenting and attending seminars, passing an oral comprehensive examination, submitting and defending a research proposal and submitting and defending a thesis based on original research. Students should consult the Graduate School Handbook to obtain detailed information concerning the rules that need to be followed to obtain the degree. The Director of the Graduate Program (chemgrad@miami.edu) is also available for assistance.

Course Requirements for the Ph. D. Degree

The Ph.D. degree requires a minimum of 60 credits. The department will cover tuition costs up to 60 credits for students on assistantships and fellowships. At least 18 credits must be formal lecture courses. The remaining 42 credits could be broken down as follows:

<u>Courses</u>	<u>Credits</u>
Chemistry Seminar (CHM 779)	4
Chemistry Seminar (CHM 780)	1
Introduction to Research (CHM 785)	2
Problems in Research Planning (CHM 788)	2
Pre-candidacy Doctoral Dissertation (CHM 830)	26
Post-candidacy Doctoral Dissertation (CHM 840)	6
Doctoral Dissertation (CHM 880)	1

Courses, Exams and Thesis Requirements for the Ph.D. Degree

Students must take 18 credits of formal lecture courses by the end of the spring semester of their first year. Listing of courses is provided on a following page.

The required number of credits in *Introduction to Research* (CHM 785) must be taken in the first year.

The required number of credits in *Chemistry Seminar* (CHM 779) must be taken in the first and second year.

An *Oral Comprehensive Examination* must be passed before the end of the spring semester of the second year.

The required number of credits in the *Chemistry Seminar* (CHM 780) must be taken in the fall semester of the third year.

An original research proposal in *Problems in Research Planning* (CHM 788) must be presented and defended before the end of the spring semester of the third year.

The required number of credits in *Pre-Candidacy Doctoral Dissertation* (CHM 830) must be taken in the first, second, third and fourth year.

The required number of credits in *Post-Candidacy Doctoral Dissertation* (CHM 840) must be taken in the fourth year.

The required number of credits in the *Doctoral Dissertation* (CHM 880) must be completed before the end of the fifth year.

Course Requirements for the M.S. Degree

The M.S. degree requires a minimum of 30 credits. The department will cover tuition costs up to 30 credits for students on assistantships and fellowships. At least 18 credits must be formal lecture courses. The remaining 12 credits must be broken down as follows:

<u>Course</u>	<u>Credits</u>
Chemistry Seminar (CHM 779)	2
Introduction to Research (CHM 785)	2
Master's Thesis (CHM 810)	8

Schedule of Courses and Exams for the M.S. Degree

Students must take 18 credits of formal lecture courses by the end of the spring semester of their first year. Listing of courses is provided on a following page.

The required number of credits in *Chemistry Seminar* (CHM 779) and *Introduction to Research* (CHM 785) must be taken in the first and second year.

The required number of credits in *Master's Thesis* (CHM 810) must be taken in the second year.

A dissertation based on research of a quality acceptable for publication in a recognized scientific journal must be completed before the end of the second year.

Placement Exam

Each student must take the placement exam before classes begin in the first year. This exam is designed to test the basic knowledge of entering students in analytical, inorganic, organic and quantum chemistry with the sole scope of guiding the selection of core courses.

Lecture Courses

Each student must complete six courses by the end of the first year. Four of them must be the core courses listed below. The remaining ones can be selected out of the elective courses offered in that particular year. Students with satisfactory scores in at least one of the four sections of the placement exam may replace the corresponding core course with an elective one. No more than one core course can be substituted.

Core Courses

- CHM 620 Physical Organic Chemistry (3 credits)
- CHM 641 Principles of Bonding and Reactivity in Inorganic Chemistry (3 credits)
- CHM 653 Modern Quantum Chemistry (3 credits)
- CHM 681 Advanced Analytical Chemistry (3 credits)

Elective Courses

- CHM 622 Synthetic Organic Chemistry (3 credits)
- CHM 624 Supramolecular Chemistry (3 credits)
- CHM 625 Structural Organic Chemistry (3 credits)
- CHM 630 Fluorescence Spectroscopy and Microscopy (3 credits)
- CHM 635 Molecular and Supramolecular Photochemistry (3 credits)
- CHM 655 Electrochemistry (3 credits)
- CHM 665 Principles of Spectroscopic Techniques (3 credits)
- CHM 675 Principles of Nuclear Magnetic Resonance and Multidimensional (3 credits)
- CHM 691 Topics in Chemistry (3 credits)
- CHM 693 Readings in Chemistry (3 credits)

Credit Transfer

Any entering graduate student wishing to transfer credits from another institution must present a written proposal to the Director of Graduate Program identifying the appropriate courses and number of credits. In addition, copies of the course syllabi indicating the textbooks used must be provided. The Director of Graduate Program will then decide, in consultation with the course instructors, whether the credits can be transferred. It is important to note, however, that "credits that pertain to, and have been counted toward another degree, cannot be transferred" according to Graduate School. Additionally, any transferred credit is subject to the regency of credit rules listed in Graduate Studies Bulletin.

Academic Standing

All students must maintain a grade point average (GPA) of 3.0 throughout the program. Students with a grade point average lower than 3.0 at the end of the fall semester of their first year are placed on academic probation and can lose financial support, if the grades are not improved in the spring semester. Students with a GPA lower than 3.0 at the end of the spring semester of their first year are terminated from the Graduate Program.

Choosing a Research Advisor

Students must attend the *Introduction to Research* (CHM 785) seminars in the fall semester of their first year. In these talks, faculty members, able to accept additional students in their research groups, present their research directions and discuss possible projects for the students. At the end of this seminar series, students must submit their Preceptor Interview Form to the Director of the Graduate Program before December 15, indicating their research advisor of first and second choice. Each student will be then notified of his/her advisor assignment no later than January 15 of the following semester.

Once the decision is made, students are strongly discouraged to change advisors and any such change is considered to be an exceptional situation. Students wishing to change research advisors, any time during the course of study, must submit a written request stating the reasons to the Director of Graduate Program. The Graduate Committee reviews the requests and authorizes the change only if the student and/or the advisor can offer convincing reasons to justify it.

Choosing an Advising Committee

The progress of each student is monitored by an advising committee of at least three chemistry faculty members, including the research advisor. A fourth committee member, from within or outside the chemistry department, may be selected should the student or research advisor choose to do so. Students must select the members of the committee in consultation with the research advisor before the end of the fall semester of the second year. The committee is expected to attend the student's oral exam, chemistry seminar, research proposal and dissertation to evaluate the student's performance. For the dissertation defense, the advising committee must be comprised of no less than four members; this includes the research advisor, at least two chemistry faculty members, and a faculty member from outside the Department of Chemistry.

Chemistry Seminars (CHM 779 and 780)

Students enrolled in CHM 779 must attend all departmental seminars. It is their responsibility to sign the attendance sheet. Students enrolled in the third-year CHM 780 must present a seminar on a literature topic not related to his/her research area. The choice of topic must be approved by the faculty member in charge of the seminar program. Students must prepare a one-page abstract of the talk, including literature references. The abstract must be distributed to faculty members and graduate students at least one week before the seminar date. Talks must be between 45 and 55 minutes and are followed by discussion and questions. Students enrolled in CHM 780 must attend all the student seminars that semester.

Oral Comprehensive Exam

All Ph.D. candidates must pass an oral comprehensive exam on their research project before the end of the spring semester of the second year. Students must submit a summary of their research project to each member of the advisory committee by March 1 of the corresponding semester and at least one week before the date of the exam. The document must have the following format:

1. Title Page
 - Title
 - Candidate name
 - Research advisor
 - Committee members
 - Place, date and time of the exam (if known)
 - Date submitted
 - Courses completed with dates and grades
 - Authors, titles and citations of candidate publications
2. Text (12 point Times New Roman font, double-spaced, 1.0 inch margins, 15 page limit) including:
 - Title
 - Introduction
 - Results and Discussion
 - Conclusions and Future Work
 - Experimental Section
3. References (not included in the 15 page limit)

At the time of the examination, the student will give a brief (not to exceed 15 minutes) verbal presentation of his/her work to date and a description of his/her proposed research work. The committee may then question the student on his/her presentation and written summary. A majority vote of the committee is required to pass the student. Alternatively, the student may be dismissed from the Ph.D. program and switched to the M.S. program.

Problems in Research Planning (CHM 788)

Students must write an original proposal for research in chemistry before the end of the spring semester of the third year. The topic cannot be related to his/her research project but can be connected to that of his/her chemistry seminar. The document must be submitted to the members of the advisory committee by March 1 of the corresponding semester and at least one week before the date of the exam. The document must have the following format:

1. Title Page
 - Title
 - Candidate name
 - Research advisor
 - Committee members
 - Place, date and time of the exam (if known)
 - Date submitted
 - Courses completed with dates and grades
 - Title of third year seminar
 - Authors, titles and citations of candidate publications

2. Text (12 point Times New Roman font, double-spaced, 1.0 inch margins, 15 page limit) including:
 - Title
 - Goal and Significance
 - Background
 - Plan

3. References (not included in the 15 page limit)

At the time of the examination, the student will give a brief (not to exceed 15 minutes) verbal presentation of his/her proposed research work. The committee may then question the student on his/her presentation and written proposal. A majority vote of the committee is required to pass the student. Alternatively, the student may be dismissed from the Ph.D. program and switched to the M.S. program.

Thesis and Defense

Each candidate for a M.S. or Ph.D. degree must produce a thesis describing his/her original research in chemistry and defend it before the advisory committee. The thesis must be prepared in accordance with the rules and regulations of the Graduate School and must be submitted to the members of the advisory committee at least one month before the exam date. Then, the student is expected to present the results of his/her research work in the form of a seminar. The committee members may question the student on his/her presentation and written document and vote, after considering the quality of the thesis and performance in the oral examination. The committee may decide by majority vote to pass, fail or re-examine the student. Failure with no possibility of re-examination must be by unanimous vote. In addition, the student may be asked to revise certain portions of the thesis. It is the responsibility of the research advisor to verify that the requested changes have been implemented. One or more copies of the final, approved thesis must be submitted to the Graduate School in accord with current Graduate School regulations.

Candidates for a Ph.D. degree can submit a thesis to the advisory committee only after the acceptance for publication of at least of one article in a refereed chemical journal. They must schedule their defense in concomitance with their CHM 880 seminar.

M.S. (Non-thesis Option)

A student may obtain the Master of Science degree by examination, rather than by submitting a thesis. In such a case, thirty credits of coursework, which meet the minimum requirements, set forth for the MS with thesis must be presented. After completing all requirements, the student must pass a comprehensive examination administered by at least three faculty members in the Department of Chemistry. The committee will normally be appointed by the Director of Graduate Program. The examination will generally be oral, but may be written or combined written and oral portions at the discretion of the committee. A majority vote of the committee is required to pass, fail or reexamine the student. Rules for "Admission for Candidacy" are the same as those stated under M.S. (Thesis Option).

Authorship Guidelines

The co-authors of a manuscript that is submitted for publication should include all those who have made significant scientific contributions to the reported study and who share both the responsibility and accountability for the results presented. The significant contributions include, design of the work, data acquisition, analysis and interpretation. In addition, the co-authors participate in the writing of the work and/or revising it. Each co-author should agree with the final version is publication worthy and be accountable for the parts of work the co-author has performed. The authors should have confidence with the co-authors contributions and the integrity of their findings. Accordingly, contributions of technical staff and professionals should be recognized. Other types of contributions should be listed in the "Acknowledgement" section or in a footnote. Credit should be given where credit is due for performing the research work, and co-authorship when someone helped to write the paper but did not otherwise contribute to

the research, should be avoided. The corresponding author accepts the responsibility of having including the names of all co-authors appropriately. Prior to submission the corresponding author should have sent each co-author listed a draft copy of the manuscript to be submitted and have obtained the co-author's permission to their inclusion and contributions.

Financial Support

Students accepted into the graduate program can be awarded teaching or research assistantships. Both carry stipends sufficient for covering normal living expenses. University policy states that all teaching assistants must be able to communicate fluently in English. In order to receive the full financial value of the standard stipend as teaching assistants, students from non-English speaking countries must pass the SPEAK exam. Students failing the SPEAK exam upon entering the university have one academic year to pass the exam. If the exam is not passed by the end of the first year, the student's teaching assistantship would be terminated. Students no longer eligible to receive teaching assistantships may still receive stipends from research assistantships or fellowships, or they may continue in the program at their own expense.

Foreign Students

Foreign students must have valid I-20 forms and F-1 visas upon arrival to the United States. Then, they will be given I-94 cards. These three items and the offer letter from the Department of Chemistry must be submitted to International Student Scholar Services in Building 21 on the Coral Gables Campus in order to obtain a work permit. A work permit (Certification of On-Campus Employment Eligibility) will be issued within three business days. All four of these items, and in addition, the passport and an official copy of the birth certificate must be taken to Ms. Gylla Lucky in the Office of the Dean of Arts and Sciences to partially complete an I-9 form. These documents should also be submitted to the Social Security Office at 11401 W. Flagler Street, Miami, FL 33174 (Monday–Friday, 8:30 to 3:30 PM, phone: 1 800 772 1213) to obtain a Social Security Card. A card will be issued in three or four weeks, at which time the I-9 form can be completed by inserting the newly issued Social Security Number. It is important to note that no student may begin work or be paid until the I-9 form is completed (except for the Social Security Number).

Deferred Admission

An applicant's admission maybe deferred for no more than one year, if the applicant has accepted admission and is unable to begin graduate school on schedule, but intends to do so in a later semester. Each individual deferment request will be reviewed and subject to approval of the Director of the Graduate Program and department chair.

Updated July 2020