

REQUIREMENTS for the Ph.D. DEGREE IN CHEMISTRY

This document describes the required steps to obtain the Ph.D. degree in Chemistry. Formal coursework advances the student's general knowledge and develops necessary expertise for the desired area of research. Our core curriculum and electives provide modern instruction for graduate students with a wide range of research interests. The essence of the Ph.D. degree is the conduct of cutting-edge research in chemistry and its presentation and defense in both written and oral form.

Required Coursework

- 1) Completion with a grade of A, B, or C of a minimum of 21 credits of graduate coursework by the end of the fourth semester of graduate study. See details below.
- 2) Chemistry 611 (Professional Skills for New Graduate Students, 1 credit) and Chemistry 612 (Scientific Presentations, 1 credit) must be taken during the first year in the Chemistry graduate program. These two credits count toward the 21 credits of graduate coursework.
- 3) 2 credits of seminar coursework (CHEM 889 series; note that 1 of these credits can count toward the 21 credits of graduate coursework; see details below).
- 4) 12 credits of Ph.D. research (CHEM 898 pre-candidacy, CHEM 899 post-candidacy; note that these credits do not count toward the 21 credits of graduate coursework).

Requirements 1) – 3) must be completed prior to advancement to candidacy.

Details of coursework requirements:

- At least 12 of the 21 credits of coursework must be in Chemistry or Biochemistry courses numbered 600 or higher. This formal coursework establishes the intellectual foundation for the proposed area of specialization. Advanced Special Topics Courses may be used to fulfill this requirement. Courses from outside the department (600 level or higher) may be used to satisfy this requirement with written approval of the student's research advisor and the Director of the Chemistry Graduate Program.
- A maximum of 7 credits from 400-level courses in chemistry, biochemistry, or in fields related to the proposed area of research specialization. Students are encouraged to take those classes best suited for developing a firm foundation for their research efforts. The required courses for the undergraduate degree in chemistry (CHEM 401, 425, 481, 482, 483, 484) cannot be used to fulfill the course requirements for an advanced degree in chemistry.
- One credit of CHEM 889 can be counted toward the 21 credit requirement, but only if that 1 credit is earned during the semester that the student presents a formal seminar.
- Students supported on a TA or RA must get written approval from their research advisor and the Director of the Chemistry Graduate Program before registering for any course that is offered from outside the Department.
- Students must get written approval before changing the registration status (e.g.

dropping, adding, or auditing) of any course once the semester has started.

- Courses that are audited do not count toward the 21 credits of graduate coursework.

Seminars

Each Ph.D. student must present at least two substantial seminars during their course of the study. The first seminar (35 minute duration), formally part of the CHEM 889 series, will be based on the scientific literature and will be given prior to the candidacy exam. The second seminar is based on the original scientific research conducted by the student and will be presented prior to the Ph.D. defense. All student seminars must be announced to the Department at least one week in advance.

Oral Preliminary Examination

Each student is required to pass an oral preliminary examination as a prerequisite for advancement to candidacy. The oral preliminary examination is to be held immediately following the students 2nd year literature seminar. First, the student will answer questions from students and other attendees in an open session (5 minutes). Subsequently, the students and other attendees will be excused and the faculty (a minimum of 3 faculty are required) will conduct the oral preliminary examination (20 minutes) in a closed session. The oral question and answer period will be based on the material contained in the student's literature presentation. However, the faculty are allowed considerable leeway in asking questions that probe a student's understanding of the background undergraduate and first year graduate coursework that form the basis for the literature topic.

All of the faculty in attendance are eligible to vote on whether the student receives a grade of pass, fail, or retake. To pass, a student must receive "pass" grades from $\geq 75\%$ of the faculty in attendance. To achieve a grade of "retake" a student must receive "pass" or "retake" grades from $\geq 66\%$ of the faculty in attendance. Students who receive a grade of "retake" will be allowed a second and final chance at the question and answer period within 6 weeks of the original examination. Students not meeting these requirements receive a grade of "fail". Students who fail will be required to complete a masters degree.

Advancement to Ph.D. Candidacy

Chemistry graduate students should advance to candidacy by the end of the 4th semester of graduate studies. Students not meeting this criteria will be placed on probationary status. Students who do not advance to candidacy by the end of the 5th semester of graduate studies will be dismissed from the program. To become a candidate for the degree of Ph.D. in Chemistry, each student must successfully meet all of the following criteria:

- 1) Successful completion of the required coursework with $GPA \geq 3.0$.
- 3) Successful completion of the literature seminar.
- 2) Successful completion of the oral preliminary examination.
- 4) Making satisfactory progress toward the degree.
- 5) Successful oral defense of a written research proposal on the candidates dissertation topic as part of the candidacy exam. The written proposal must focus on the students proposed Ph.D. research topic.

The candidacy exam will be administered by the candidacy committee consisting of four members of the faculty of the Department of Chemistry and Biochemistry. Inclusion of faculty from other Departments requires the approval of the Director of the Chemistry Graduate Program. Possible outcomes of the candidacy exam are “pass”, “conditional pass”, and “fail”. If the candidacy exam is failed, the candidate may be dismissed from the program or given the opportunity to complete a M.S. degree with or without thesis within the end of the fifth semester of study.

Good Standing

In order to maintain good academic standing, every graduate student must maintain a cumulative grade point average (GPA) of ≥ 3.0 for all courses taken at the University. Grades from research courses (799, 898, 899) are not included during the calculation of GPAs.

Request for waiver of graduate course requirements

Students who have completed graduate-level studies at other institutions may submit a written request for a waiver of graduate course requirements to the Director of the Chemistry Graduate Program upon completion of at least one semester in the program. These requests will be evaluated on a case-by-case basis and will generally be approved only for students whose GPA is ≥ 3.5 .

Time Limitations

The chemistry graduate program expects its students to advance to candidacy by the end of their 4th semester of graduate studies and to finish all requirements and graduate within 6 years. Students who miss these deadlines will be put on probationary status and/or dismissed from the program.

Satisfactory Progress

Graduate student progress will be monitored at the end of each semester of graduate study by the Director of the Chemistry Graduate Program in consultation with representatives of the faculty. Students not making satisfactory progress will be dismissed from the program or put on probationary status.

Ph.D. Dissertation and Defense

Each candidate for the Ph.D. degree must prepare and submit a dissertation describing his/her original research. The dissertation must be prepared in accordance with the rules and regulations of the Graduate School. Each candidate will defend his/her dissertation before their Ph.D. committee. At least two weeks before the scheduled Ph.D. defense the student will provide each member of the committee with a copy of the dissertation. The time and place of the oral exam must be announced to the department. An email to the department email reflector is sufficient. Prior to the examination, the student will make an oral seminar presentation of their Ph.D. work. The Department has approved the following guidelines for the use of manuscripts and published papers in graduate dissertations and theses:

- 1) Regardless of dissertation/thesis format, it is understood that the primary responsibility for acquiring data, developing concepts, interpreting the results and writing a dissertation/thesis belongs to the student, even though the advisor will have an important role in all of these areas.

- 2) Organization of the dissertation/thesis in the form of a series of scientific papers is acceptable provided there is an introduction to the format, in accord with Graduate School regulations.
- 3) In case papers are jointly authored with other graduate students or postdoctoral fellows the candidate must present his or her own report of the work, clearly indicating the role of collaborators.
- 4) Normally, presentation of substantially the same work in more than one dissertation/thesis is unacceptable. An exception would be a situation in which data from the candidate's own M.S. dissertation/thesis or from another candidate's dissertation/thesis is reinterpreted. In such a case, the earlier dissertation/thesis must be clearly cited as the source of the data.
- 5) Responsibility for ensuring adherence to these guidelines lies with the advisor and with the examining committee.

Criteria for Satisfactory Progress Toward the Ph.D. Degree

To be considered to be making satisfactory progress as a graduate student, a student must:

- 1) Complete a minimum of 15 chemistry/biochemistry credit hours within the first two semesters of graduate study. Normally, students should complete 21 credits in their first year.
- 2) Maintain a grade point average (GPA) ≥ 3.0 average for all courses taken; in computing this average, all research course grades are excluded from the average.
- 3) International students must pass the MEI exam by the end of the second semester of enrollment in the program. Financial support for the second semester of enrollment may not be available for students who have not received at least a conditional pass by the start of this semester.
- 4) Choose a research advising professor and begin research prior to the end of the 1st semester of graduate study.
- 5) Successfully present the literature seminar during the 3rd or 4th semester in the graduate program.
- 6) Pass the oral preliminary examination during the 3rd or 4th semester in the graduate program.
- 7) Students who wish to change research advisors must make this change as early as possible in their graduate careers because such a change negatively impacts satisfactory progress toward the Ph.D. degree. Requests to change advisors after a student has advanced to candidacy should be an extremely rare event. Such changes will only be approved by the Director of the Chemistry Graduate Program in highly compelling cases.
- 8) Secure advancement to Ph.D. candidacy by the end of the 4th semester of graduate study.
- 9) The progress of post-candidacy students toward scientific publications that form the basis of the Ph.D. dissertation will be monitored by the Director of the Chemistry Graduate Program in consultation with faculty representatives, the advising professor, and other members of the student's Ph.D. committee.
- 10) Abide by the rules and procedures given in the "Requirements for the Ph.D. Degree in Chemistry" document.

Students who fail to meet any of the criteria specified above will either be dismissed from the program or placed on probationary status. The decision to offer probationary status will be made by the Director of the Chemistry Graduate Program in consultation with the students research advisor. Probationary status will be granted on a semester-by-semester basis.