

PhD Program in Chemistry

Objectives:

The primary educational objectives of the Ph.D. program are:

- To develop proficiency in the critical analysis of scientific research problems
- To assess which problems are important enough to pursue vigorously
- To pursue and solve a research problem of interest to both the student and mentor

Prospective students are encouraged to contact directly any faculty member whose research program is of interest.

Program Overview

Chemistry students accepted into the graduate program are admitted primarily to pursue a Ph.D. The Ph.D. program at UA prepares high-achieving students for senior research positions in industry or government laboratories, or a career in college-level or university-level teaching and research. A number of [interdisciplinary](#) ^[1] research and training programs are also available under the Chemistry Ph.D. program including, Biological Chemistry Program, Biological Physics Program, Chemical Physics Program and others.

Primary research and coursework concentrations are available in: [Analytical Chemistry](#) ^[2], [Inorganic Chemistry](#) ^[3], [Organic Chemistry](#) ^[4], [Physical Chemistry](#) ^[5], and [Chemical Education](#) ^[6]. Research and coursework may also include an emphasis in chemical physics, materials science, optical sciences, polymer sciences, surface sciences, astrochemistry, biological chemistry and several other [interdisciplinary](#) ^[1] fields.

Students interested in biochemistry are encouraged to explore the [Ph.D. program in Biochemistry](#) ^[7].

The Doctor of Philosophy with a major in chemistry is primarily a research degree. The number and selection of courses is tailored to the individual student's needs and interests according to the guidelines available from the Department of Chemistry and Biochemistry. A dissertation based upon original laboratory research is required. All students must pass a series of written examinations, a comprehensive examination and a final oral defense examination.

Qualifying Exams

Upon entering the program, each student takes qualifying examinations in four traditional subdisciplines of Chemistry: analytical, inorganic, organic, and physical chemistry. Students will take a fifth exam chosen from Biological Chemistry or Chemical Physics. Based on the examination results and a subsequent meeting with the Graduate Program Committee, an individualized initial program of study is planned.

Course Work

Students must complete a minimum of 18 graded credits (typically six classes) in order to fulfill the coursework component of the Ph.D. These courses are chosen from a major coursework concentration in one of the subdisciplines of Chemistry, plus a minor in one of the other subdisciplines or in another department.

Written Exams

Advancement to Ph.D. candidacy involves satisfactory completion of a written examination component. At UA, the written examination in Chemistry is administered as a series of cumulative examinations offered eight times per year. Students must pass six of these exams within the first two academic years to advance to the Comprehensive Examination.

The Comprehensive Examination

The final step towards advancement to Ph.D. candidacy involves the development and oral defense of an original research proposal formulated by the student, before his/her Dissertation Committee. Students who complete both components of the exam successfully are advanced to candidacy.

Dissertation

The major requirement of the Ph.D. degree is the research dissertation, which presents a new and unique contribution of knowledge to the chemical sciences suitable for publication in a major scholarly journal. Students generally select a research director by the end of their first semester and begin dissertation-level research within the next year. Three to four years of mentored research follow, culminating in the Final Oral Examination. During this time the student takes progressively increasing responsibility for the direction of his/her research. The transition from student to colleague is completed with the successful defense of the dissertation in front of the student's committee.

[Graduate](#)^[8]

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