

# Doctor of Philosophy

## Chemistry (PhD)

The Ph.D. program in Chemistry prepares students in the application of chemical principles to address many of society's technical, environmental, and biomedical problems. Students will be able to provide leadership in industrial, governmental and educational institutions in directing research and/or development to solve these problems. The Ph.D. degree is granted to students who have:

1. mastered advanced knowledge of definite sub-fields of chemistry
2. become familiar with research in these specific fields and developed perceptions of opportunities for further scientific advances
3. demonstrated the capacity to perform original, independent, and scholarly scientific investigation in their specific field and interpret their results.

All students admitted to the program must read and understand the regulations and policies described here and elsewhere throughout this catalog relevant to Old Dominion University's requirements for Ph.D. degrees. The essential credit requirements for the Ph.D. are:

A minimum of 78 credit hours beyond the Bachelor's degree, and 48 credit hours beyond the Master's degree.

### Admission

Students with either a bachelor's or a master's degree may apply directly to the Ph.D. program. An application (<http://www.odu.edu/admission> (<http://www.odu.edu/admission/>)), undergraduate and graduate transcripts, two letters of recommendation from former college instructors, a resume, a writing sample, and an essay about career goals are required for consideration of admission to the program. The submission of Graduate Record Examination (GRE) scores is optional for domestic students, but strongly recommended for international applicants. All international applicants must satisfy ODU's English proficiency requirements for admission. Admission to regular status requires a grade point average of 3.00 in the major and 3.00 overall (based on a 4.00 scale). General university admission requirements apply. In addition, a Bachelor of Science degree (or equivalent) with a major in chemistry (or another science) is expected, although applications from majors in all science disciplines are welcome. Undergraduate courses in inorganic chemistry, organic chemistry, analytical chemistry (quantitative and instrumental analysis), physical chemistry, and calculus are required for regular admission. Deficiencies in any of these areas will be identified and must be rectified by taking undergraduate coursework in these areas.

To be considered for a teaching assistantship, students must demonstrate both written and oral fluency in the English language. All domestic and international students who are not native English speakers are required to take the SPEAK test. Students who have a score of 26 or better on the Speaking portion of the iBT TOEFL or a score of 8 on the IELTS are eligible to request a waiver for the SPEAK test requirement.

### Curriculum Requirements

The broad requirements for granting the Ph.D. are as follows:

- satisfactory performance in core and elective courses,
- successful completion of both written and oral portions of the Candidacy Examination,
- completion of the dissertation prospectus,
- presentation of two graded seminars,
- and completion of a satisfactory dissertation and defense of the dissertation.

A minimum of 78 semester hours is required for students entering the Ph.D. program with a bachelor's degree in the following manner:

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- Doctoral Research or Dissertation (1- 9 credits every semester)
- Graduate Orientation course (3 credits)
- Two semesters of Ph.D. seminar (2 x 2 credits each)
- Three core courses (3 x 3 credits each)
- Three elective courses (3 x 3 credits each) and
- Seminar course (1 credit per semester) until students achieve ABD status

A maximum of 12 semester hours may be transferred from non-degree status at Old Dominion University or from another University and applied towards the Ph.D. course requirements at the discretion of the graduate program director.

A minimum of 48 semester hours is required for students entering the Ph.D. program with a master's degree. All the requirements listed above for those entering the Ph.D. Program with a bachelor's degree are also applicable to those entering with a master's degree. However, courses taken as part of master's degree from ODU can be used to satisfy some of the above Ph.D. requirements.

Students who earn a grade of less than a B- in any two graduate courses will not be allowed to continue in the Ph.D. program.

### Core Courses

Students must choose one course from three different core areas. The core areas are:

- analytical chemistry
- biochemistry
- environmental chemistry
- inorganic chemistry
- organic chemistry
- physical chemistry

Classes from each area are listed on the following pages.

### Elective Courses

Students are required to take nine credit hours of elective courses. The courses are to be chosen upon consultation with their advisor and/or their guidance committee.

### Additional Requirements

#### Writing Proficiency Policy

The departmental graduate committee will request a writing sample from each new student. If the graduate committee feels that remedial assistance in writing is needed, the student will be referred to the Writing Center.

#### Teaching

Students are required to spend at least one semester as a teaching assistant.

#### Seminar

All students are required to register for seminar CHEM 890 (one credit, graded pass/fail) and attend departmental seminars throughout their graduate career. Twice during their career, students will register for CHEM 891 (two credits) and present a seminar, which will receive a letter grade. In the second year, students will give a background literature talk on their research. The second semester of CHEM 891 may not be taken in the same semester as graduation.

#### Advisor Selection

During their first semester (and not later than the end of their first semester), students are required to interview the chemistry graduate faculty (a signed sheet of at least three faculty members is required), choose a graduate faculty research advisor, and select a guidance committee in consultation with their advisor and the Graduate Program Director.

## **Candidacy Examination**

A student enrolled in the Ph.D. program in chemistry becomes a candidate for the doctoral degree by passing the Ph.D. candidacy examination. This examination consists of a written portion and oral portion. The student is required to submit a written description of a novel research idea in the form of a grant proposal, and then present and defend the idea to his or her guidance committee.

## **Dissertation**

The dissertation is the final and most important part of the work required for the Ph.D. degree. The dissertation must be based on original research and make a contribution to existing knowledge of sufficient interest to warrant publication in a refereed journal. The candidate normally works closely with the research advisor, who is chair of the dissertation committee.

## **Dissertation Defense**

The final examination of the candidate consists of the oral defense of the dissertation. This public examination is conducted by the dissertation committee with the research advisor serving as chair.