

Holy Cross Chemistry Department Undergraduate Research Opportunities: Course Options

Overview

The Chemistry Department believes that involvement in research provides a unique and extremely valuable educational opportunity that is not easily gained through traditional courses. We have carefully designed our curriculum to develop independent creative scientists with excellent critical thinking and analytical reasoning skills. Student coursework is focused on practical hands-on experience with modern methods of chemistry including state-of-the-art chemical instrumentation and computational methods. We view undergraduate research as a capstone experience for our majors and minors (and other qualified students interested in chemistry). While capstone experiences typically involve work in the final year of college, many of our students choose to begin research earlier in their careers. Advantages of beginning research before the final year include being able to tackle a more complex or larger scope problem that requires more than two semesters of research, learning more techniques, and developing critical thinking and analytical reasoning skills sooner and more fully. Many of our students also enjoy the departmental community formed by our research students and our faculty members.

Students interested in research should attend annual research poster or oral presentation sessions given in September, December and May of each year where they can talk with faculty and students involved. Attending our weekly Departmental seminars is another way to begin to learn about research. These seminars feature leading researchers from a wide range of chemical and biochemical fields who share their latest results, breakthroughs and excitement.

Generally, students can apply to participate in our academic-year research program after they have completed the 4-semester introductory sequence (A&M, IER, Orgo I & II). If a student has not completed the sequence, they must be *invited* to apply for research and must have completed at least two of the introductory courses. The Department recommends first year students focus on their studies, attend departmental seminars, poster sessions and begin to talk with faculty and students about research. First year students can apply to begin research the first summer following their first year at the College through the Holy Cross Undergraduate Research Fellowship Program. Formal application for academic-year research involves talking with at least three faculty members about their research, rank ordering your interest in the different projects available and detailing the time you will have to devote to the project. Copies of your transcript are also required. (Applications are available in the Chemistry Office).

The Chemistry Department has a range of research courses available to students which are distinguished below. Full descriptions of these courses are available in the College catalogue.

<u>Title</u>	<u>Course #</u>	<u>Description</u>	<u>Credit</u>	<u>Requirements</u>
Introduction to Research	CHEM 389	1 semester 3-4 hrs/wk min	0	CHEM 222 & CHEM 231 <i>or</i> 1-Year CHEM & faculty invitation <i>By Application</i>
Independent Research	CHEM 390	1 semester 12 hrs/wk min (+ seminar)	1	CHEM 222 & CHEM 231 <i>or</i> 1-Year CHEM & faculty invitation <i>By Application</i>
General Research 1	CHEM 405	1 st semest, 1 st yr research 8 hrs/wk min (+ seminar)	0	CHEM 222 & CHEM 231 <i>By Application</i>
General Research 2	CHEM 406	2 nd semest, 1 st yr research 12 hrs/wk min (+ seminar)	1.5	CHEM 405 (& permission)
General Research 3	CHEM 407	1 st semest, 2 nd yr research 8 hrs/wk min (+ seminar)	0	CHEM 406 <i>By Application</i>
General Research 4	CHEM 408	2 nd semest, 2 nd yr research 12 hrs/wk min (+ seminar)	1.5	CHEM 407 (& permission)

(Chemistry Majors: General Research 1+2 (or General Research 3+4) fulfills one of the required upper level electives.)