

Chemistry

Chemistry is the study of the composition, structure, properties, and reactions of matter, so it is by nature the central science. All human activities deal with a material world, which consists of chemicals, both natural and manufactured. Chlorophyll, hemoglobin, and insulin are examples of natural chemicals that are essential to life. The colors used by painters, the electronic components in computers, and modern medicines are examples of manufactured chemicals produced by chemists. The contributions of chemistry to modern society occur in such diverse fields as pharmaceuticals, polymers and plastics, agricultural chemicals, petroleum products, and biotechnology. Chemistry also plays a role in cleaning up the environment, improving methods of producing, processing, and packaging food, and making automobiles safer and more fuel-efficient. Thus, a world of opportunities awaits the student who majors in chemistry.

Pursuing Chemistry at Ohio State

Students interested in chemistry as a major should have a good high school background in chemistry, math, and physics as well as good verbal and written communication skills. Scientific curiosity and the ability to think logically and creatively are common characteristics of successful chemistry majors.

Upon acceptance into the Colleges of the Arts and Sciences, students may declare chemistry as a major. To pursue a major in the College of Mathematical and Physical Sciences, students must first earn a minimum of 12 hours of university credit; have achieved level R mathematics placement (college algebra) or have completed Mathematics 075 or 076 or 104, or an equivalent course; and have completed or be eligible to take English 110 or 111. Students should then contact the Undergraduate Chemistry Office to make an appointment with a chemistry advisor to map out an appropriate program of courses and complete the required departmental forms.

The Department of Chemistry offers both the Bachelor of Science (BS) and the Bachelor of Arts (BA) degrees. The BS is the degree of choice for the professional chemist. The BA is a liberal arts degree, often chosen by students who want a background in chemistry to serve as a basis for future work in other areas of science or in professional programs such as medicine, secondary education, or law.

Chemistry Requirements

The BS degree in chemistry requires 58 credit hours beyond general chemistry in the major program. In addition, 20 hours in calculus and analytic geometry, 5 hours in differential

equations, and 15 hours in physics are required.

The BA degree in chemistry requires 45 credit hours beyond general chemistry in the major program. In addition, 15 hours in calculus and analytic geometry and 15 hours in physics are required.

For well-qualified and highly motivated students, Honors courses are available in general chemistry, organic chemistry, and quantitative analysis. In addition to specific course requirements and electives, both the BS and BA programs offer chemistry majors the opportunity to conduct undergraduate research projects with the chemistry faculty.

Co-Curricular Opportunities

Exciting opportunities for outreach to elementary schools are available with the Wonders of Our World (WOW) program. Novel approaches to incorporating research into undergraduate chemistry courses are provided in our Research Experiences to Enhance Learning (REEL) modules in several chemistry courses, and interested students can then serve in our REEL peer mentorship program.

The chemistry department encourages all of its students to become involved in research with one of its faculty members in one of many active research programs. This is an excellent opportunity to learn about and become involved in the cutting edge of chemistry discoveries. In addition, there is an undergraduate chemistry club that has many activities including hosting guest chemists to come and speak about their research.

Honors Program

The department supports an active honors program, starting with the honors sequence General Chemistry H201, H202, and H203, which must be started in the autumn quarter and is recommended for well qualified entering freshmen. In addition, there is an honors organic chemistry sequence and an honors analytical course in the second year with access to extensive lab work. These courses offer more intensive investigations into these topics and provide an excellent foundation for pursuing advanced levels in chemistry.

Career Prospects in Chemistry

Chemists are employed in industrial, government, and academic positions. Chemistry graduates find industrial and government positions in research and development, analytical services, quality control, and chemical sales or marketing. Chemistry graduates with education credentials are in demand to teach in high schools and middle schools.

For more information, check these web sites:

Chemistry: www.chemistry.ohio-state.edu

College of Mathematical & Physical Sciences:
www.mps.ohio-state.edu

Ohio State: osu.edu

Admissions: undergrad.osu.edu

Multicultural Center: multiculturalcenter.osu.edu

Curriculum Sample

This is a sample list of classes a student will take to pursue a BS in Chemistry. Since university students need more than specific education in a narrow field, they also will take classes to complete the General Education Curriculum (GEC). The GEC will allow students to develop the fundamental skills essential to collegiate success across major programs. Course work options satisfying the GEC often come from a variety of academic areas of study allowing students to tailor their GEC toward their interests. Note: This sample represents one of several possible paths to a degree in Chemistry. Consult the departmental web site, www.chemistry.ohio-state.edu, for details on each specific track.

Freshman Year:

MPS Survey	1
General Chemistry	15
Calculus/Analytic Geometry	15
GEC courses	15
Total hours	46

Sophomore Year:

Quantitative Analysis	5
Organic Chemistry	18
Physics	15
Calculus/Differential Equations	10
GEC courses	5
Total Hours	53

Junior Year:

Physical Chemistry	12
Advanced Inorganic Chemistry	6
Instrumental Analysis	6
GEC (foreign language)	15
GEC courses	5
Free electives	
Total hours	44

Senior Year:

Advanced chemistry lab	3
GEC (foreign language)	5
GEC courses	20
Advanced science/chemistry electives	8
Free electives	2
Total hours	38

This sample curriculum is a general guideline intended for a pre-college audience and includes a minimum of 181 credit hours for graduation. The courses selected are for students pursuing a BS in Chemistry. Courses required for the BA in Chemistry vary from this sample. All students intending to major in chemistry at Ohio State should meet with a college advisor before scheduling classes.

Chemistry majors earning a Bachelor of Science degree often go on to graduate school to earn a master's or PhD degree. Graduate students in chemistry usually receive a tuition waiver and a modest salary for their work as a teaching or research assistant while pursuing advanced studies and research in analytical, organic, physical, biological, inorganic, and/or theoretical chemistry. A chemist with an advanced degree qualifies for a variety of opportunities in both industry and education. Chemistry professors at colleges and universities are Ph.D. chemists who teach chemistry to undergraduate and graduate students and conduct research in chemistry. Chemistry majors earning a Bachelor of Arts degree have excellent credentials for admission to professional schools such as medicine, pharmacy, dentistry, optometry, and veterinary medicine or admission to graduate programs in areas such as business, law, education, and journalism.

The 2007 median annual starting salary for B.S./B.A. chemists with 2-4 years experience was \$44,800. The 2007 median annual salary for all B.S./B.A. chemists was \$68,700.

More About Chemistry

Chemistry is one of the strongest academic programs at Ohio State and in the state of Ohio. The Department of Chemistry has been ranked consistently among the top 20 chemistry departments in the nation by The National Research Council, the Gourman reports, and U.S. News and World Report.

Consistent with this strong standing, the department's faculty includes two members of The National Academy of Science, one fellow of the American Academy of the Arts and Sciences, eight recipients of Guggenheim Fellowships, fourteen Sloan Fellows, seven fellows of the American Association for the Advancement of Science, five fellows of the American Physical Society, two Ohio Eminent Scholars, six Dreyfus Teacher-Scholar awardees, and two Humboldt U. S. Senior Scientists awardees. In addition, several members of the faculty have received major national awards of The American Chemical Society, seventeen have received Distinguished Scholar Awards from The Ohio State University, and twelve have received NSF Career Awards since 1997.

The State of Ohio and the university have awarded the department funds as a Center of Excellence and for two Ohio Eminent Scholars. In addition, funds from national agencies and industries average about \$10 million annually. Ohio State ranks eighth in the nation, first in the Big Ten, and first in the entire Midwest in federal funding of chemistry projects.

In addition to excellence in research, the department has a long tradition among its faculty of teaching excellence. The courses at Ohio State are exciting because our faculty are actively involved in the current research of this rapidly moving science. The quality of the teaching is reflected by the thirteen Ohio State Alumni Distinguished Teaching Awards, nine Teaching Awards of the Colleges of the Arts and Sciences received by faculty in the department, and the OSU Departmental Teaching Excellence Award.

Revised May 2008. For the most up-to-date information on the chemistry program, please visit www.chemistry.ohio-state.edu.

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