

CHEMISTRY PROGRAMS

Overview

Chemistry Major/Minor Information:

The field of chemistry touches every aspect of our lives, and the work of chemists shows up in all types of settings. The chemist has a role in the development of new pharmaceuticals, medical devices, and medical tests, in monitoring and remediating pollution, in developing new energy sources and technologies, in analyzing evidence for criminal investigations, in the preservation of art and artifacts, and in the development of AI technologies. Chemists are critical to the food and beverage, packaging, paint, adhesive and textiles industries. Chemists work in academia, in industry, in governmental capacities, as consultants and as entrepreneurs. In all these settings, they play an important role in ensuring that decisions about equipment and materials are sound. We live in a material world, and the chemist has a significant role in the workings of this world.

A chemist approaches the world's problems and finds solutions by considering what is going on at the molecular level and how it informs an understanding of observed phenomena. Chemistry students learn to ask chemical questions and develop a deep understanding of their solutions, grounded in the conceptual and practical knowledge that is needed to do pure and applied research. Chemistry students learn collaboratively and independently. Across the curriculum, from 100 to 400 levels courses, they design, implement, and evaluate laboratory investigations. They gain hands-on experience with state of the art instrumentation such as nuclear magnetic resonance spectroscopy, infrared, ultraviolet, fluorescence and visible spectroscopy, gas and high performance liquid chromatography and mass spectrometry. They learn to communicate, in both written and spoken word, effectively using the language and concepts of chemistry, and presenting to audiences with a variety of scientific backgrounds.

Chemistry students gain knowledge and appreciation for the diversity of uses and needs for the world's raw materials. Their ability to approach a situation or setting from a chemist's perspective, a strong foundation in communication, analysis, and problem solving, means that they are informed citizens, effective advocates, responsible consumers, principled business owners, and strong community leaders.

Chemistry students have strong mentor relationships with faculty. Chemistry majors are interns across the Milwaukee area and beyond, applying their knowledge and abilities in a variety of settings. These internships lead to networking opportunities and employment in chemistry. The demand for Chemists in Wisconsin and beyond remains strong. The mean annual wage for a chemist with a bachelor's degree working in Southeastern Wisconsin is over \$70,000 and the employment rate for chemistry is high.

Learning Outcomes:

1. Effectively uses the language, concepts, and models of chemistry fluently in written and oral communication (*Communication*)

- Consistently uses scientific and chemical vocabulary fluently and precisely in developing coherent and substantiated communications of chemical concepts and applications
- Effectively uses graphs, tables, diagrams, chemical structures, and equations to represent chemical data and relationships

- Adeptly matches communication content, style, and structure to the purpose of the communication and to the audience
- Consistently and thoroughly meets standards of academic integrity in selection and citation of source material and in use of data to construct arguments and draw conclusions

2. Accurately applies the frameworks and methodology of chemistry to solve problems independently and collaboratively (*Analysis, Problem Solving, Social Interaction*)

- Selects and applies appropriate strategies and models of chemistry to analyze and synthesize chemical data
- Expresses valid interpretations based on a sound understanding of fundamental chemical concepts and analytical frameworks
- Demonstrates appropriate and effective social interaction skills and professional behaviors in group problem solving experiences in the classroom and laboratory
- Demonstrates creativity and sophistication in structuring, carrying out, and critiquing scientific investigations

3. Uses a wide variety of laboratory techniques with accuracy, precision, safety and an attention to local and global implications of chemical practices (*Developing a Global Perspective, Valuing in Decisions Making*)

- Explains the theoretical underpinnings and demonstrates the practical application of chemical techniques and instrumentation
- Applies valuing frameworks to make responsible decisions about the safe handling and conscientious disposal of chemicals, the safe and appropriate use of equipment and technology, and the ethical use of chemical information
- Cultivates a professional identity by integrating experiences from academic and professional settings and by demonstrating initiative in engaging with contemporary issues in chemistry

Faculty

Contact for Chemistry Programs

Blom, Alex, Professor of Physical Science, PhD, *Physical Chemistry, Inorganic Chemistry, Analytical Chemistry, Instrumental Analysis*, alex.blom@alverno.edu (<https://catalog.alverno.edu/laps/ns/chem/alex.blom@alverno.edu>)

Chemistry Faculty

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Thompson, Tracy, Professor of Physical Science, PhD, *Organic Chemistry*, tracy.thompson@alverno.edu (<https://catalog.alverno.edu/laps/ns/chem/tracy.thompson@alverno.edu>)

Major Req

Chemistry Major (CH.D.BS) 25-26 Catalog

Code	Title	Credits
CH-213 & 213L	Chemistry of Bioorganic Molecules and Chemistry of Bioorganic Molecules Lab (General Education)	4
CH-221 & 221L	Organic Chemistry 1 and Organic Chemistry 1 - Lab	4
CH-234 & 234L	Analytical Chemistry/Quantitative Analysis and Analytical Chem-Quant Analysis Lab	4
CH-260 & 260L	Chemistry of Inorganic Materials and Chemistry/Inorganic Materials - Lab	4
CH-322 & 322L	Organic Chemistry 2 and Organic Chemistry 2 Lab	4
CH-328	Biochemistry With Laboratory	4
CH-337 or CH-395	Instrumental Methods of Analysis Lab Biochemistry of Micronutrients	3
CH-441	Physical Chemistry 1	3
CH-442	Physical Chemistry 2	3
CH-450L	Physical Chemistry Lab	2
INTERN-383	Internship Seminar	2
MT-152 or MT-268	Calculus 1 Intro to Python Programming	4
MT-253 or MT-368	Calculus 2 Think Like A Data Scientist	4
PH-231 & 231L or PH-241 & 241L	Algebra-Based Physics I and Physics Lab Calculus-Based Physics 1 and Physics Lab	4
PH-232 or PH-242	Algebra-Based Physics 2 Calculus-Based Physics 2	3
Total Credits		52

Major Map

Chemistry (CH.D.BS) Map 25-26 Catalog

Freshman			
Fall	Credits	Spring	Credits
AC 151		CH-213 & 213L	4
CM-120		4 SC-120 & 120L	4
FSS-125		2 CM-125	3
ILA-100 & ILA-200		0 MT-256	4
QL-122 or BU 151		4	
SC-119 & 119L		4	
		14	15
Sophomore			
Fall	Credits	Spring	Credits
CH-221 & 221L		4 CH-234 & 234L	4
MT-152 or 268		4 MT-253 or 368	4

HUM-150	4	CH-260 & 260L	4
CM-225	3	FA-110	4
MT-123 ¹	3		
ADV-299	0		
		18	16
Junior			
Fall	Credits	Spring	Credits
PH-241 & 241L ²		4 PH-242 & 242L ³	4
CH-337 or 395		3 CH-322 & 322L	4
CH-374		0 INTERN-383	2
BSC-215		2 General Elective	3-5
PPS-229		1	
GLS-200, POL 225, PSY 110, or SW 200		3-4	
		13-14	13-15
Senior			
Fall	Credits	Spring	Credits
CH-328		4 CH-442	3
CH-441		3 CH-450L	2
HFA-210 or 250		2 HFA-310 or 250	2
General Elective		8 Choose One Globally Effective Citizen Course: AHS 409, GEC 302, GEC 307, GEC 312, GEC 314, GEC 315, GEC 316, GEC 317, GEC 320, GEC 323, GEC 324, GEC 328, GEC 332, GEC 333, GEC 336, GEC 393, GEC 398, SW 336	3
		General Elective	4-6
		17	14-16
Total Credits 120-125			

¹ Take only if MP-0 or MP-1
² Choose PH 231 & 231L OR PH 241 & PH 241L
³ Choose PH 232 & PH 232L OR PH 242 & PH 242L

Minor Req

Chemistry Minor (CH.D.SUP.2022) Requirements 25-26 Catalog

Code	Title	Credits
CH-213 & 213L	Chemistry of Bioorganic Molecules and Chemistry of Bioorganic Molecules Lab	4
MT-123 & MT-124 or MT-148 or MT-152 or MT-268	College Algebra and Trigonometry Functions & Modeling Calculus 1 Intro to Python Programming	5-4
Chemistry Electives		16

Choose From: CH-221, CH-221L, CH-234, CH-234L, CH-260,
CH-260L, CH-322, CH-322L, CH-328, CH-337, CH-395, CH-441,
CH-442, CH-450L

Total Credits

25-24