CHEMISTRY ACS-CERTIFIED MAJOR

Department of Chemistry (https://catalog.washcoll.edu/catalog/departments-programs/chemistry/)
Division of Natural Sciences and Mathematics

The ACS-certified major is accredited by the American Chemical Society. This major provides students with a recognized rigorous course of study that prepares them well for graduate study, work in industrial and government laboratories, as well as in allied professional fields.

Students take foundational courses in the 5 major areas of chemistry, 4 in-depth courses of their choosing, junior seminar, and calculus and calculus-based physics. A minimum of 350 lab hours are required, including a laboratory-based SCE project conducted in collaboration with a faculty member.

Chemistry ACS Certified Major Requirements

Code	Title	Credits	Notes
CHE 120 & CHE 122	Chem Principles Org Molecules with Lab and Chemical Principals Orgnc Molecules Lab	4	_____
CHE 140 & CHE 142	Reactions of Organic Molecules with Lab and Reactions of Organic Molecules Lab	4	_____
CHE 220 & CHE 222	Quantitative Chemical Analysis with Lab and Quantitative Chemical Analysis Lab	4	_____
CHE 240 & CHE 242	Chemistry of the Elements with Lab and Chemisty of the Elements Lab	4	_____
CHE 303	Chem of Biological Compounds with Lab [2]	4	_____
or CHE 309	Biochemistry with Lab		_____
CHE 305	Chemical Thermodynamics/Kinetics w/Lab	4	_____
CHE 306	Quantum Chem & Spectro with Lab	4	_____
CHE 340	Synthesis of Organic Molecules with Lab	4	_____
CHE 392	Junior Seminar	2	_____
CHE 200, 300, 400 level		4	_____
CHE 200, 300, 400 level		4	_____
CHE 200, 300, 400 level		4	_____
MAT 111	Differential Calculus [1]	4	_____
MAT 112	Integral Calculus	4	_____
PHY 111	General Physics I with Lab	4	_____
PHY 112	General Physics II with Lab	4	_____
CHE SCE	Senior Capstone Experience	4	_____
Total Credits		**66**	_____

1 MAT 106 Stretch Differential Calculus I and MAT 107 Stretch Differential Calculus II may be taken in place of MAT 111 Differential Calculus, at the advisement of the Math.

2 Students on the pre-med track must take CHE 309 Biochemistry with Lab,which has a prerequisite of BIO 111 General Biology I with Lab.

Chemistry Junior Seminar

All junior chemistry majors participate in a two-credit Chemistry Seminar (CHE 392 Junior Seminar) course offered in the spring semester of the junior year. This course is designed to prepare our chemistry majors to become citizens of the 21st century by exposing them to research ethics, sustainable science literacy, societal and moral issues in chemistry, and the writing and presentation of an integrative research proposal. Professional preparation

(exposure to career options, resume building, job searching and mock interview) as well as improvement of communication (oral-debate, discussions, final presentation), written (ethics case study, abstract) and visual (poster, website) skills are the main outcomes of this seminar course.

Internship and Research Opportunities

A number of stipend-bearing internships and research opportunities exist for chemistry majors and minors. Summer on-campus research projects as well as summer and semester-long off-campus internships not only provide additional laboratory experience, but also allow students the opportunity to explore, in depth, areas of chemistry not covered in the core curriculum. Off-campus internships may or may not bear credit. On-campus summer internships are credit-bearing.

Distribution Courses

For distribution credit in Natural Sciences, the Chemistry department offers CHE 110 Chemistry of the Environment with Lab, CHE 120 Chem Principles Org Molecules with Lab, CHE 140 Reactions of Organic Molecules with Lab, CHE 220 Quantitative Chemical Analysis with Lab, and CHE 235 Art in the Anthropocene.

Advanced Placement Credit

Students who earn a 3 or 4 on the Advanced Placement exam in Chemistry will earn credit for CHE 194 Special Topics. Students who earn a 5 on the Advanced Placement exam in Chemistry will earn credit for CHE 194 Special Topics and CHE 220 Quantitative Chemical Analysis with Lab. Regardless of a student's score on the AP exam, they should begin their study of chemistry at Washington College with CHE 120 Chem Principles Org Molecules with Lab.

Transfer Credit

Students who transfer in credit as:

- General Chemistry I receive credit for CHE 194 Special Topics
- General Chemistry II receive credit for CHE 220 Quantitative Chemical Analysis with Lab
- Organic Chemistry I and II receive credit for CHE 120 Chem Principles Org Molecules with Lab and CHE 140 Reactions of Organic Molecules with Lab

It is not recommended to seek to take introductory chemistry courses away from Washington College. In exceptional circumstances, students may seek prior approval from the Chair of the Department for permission to take and transfer in such courses.

Students may specialize within a subdiscipline of chemistry or a chemistry-related cross-disciplinary or multidisciplinary area to complete an area of emphasis within the ACS certified or non-ACS certified chemistry majors. Each area of emphasis requires students to complete three 4-credit courses and their SCE in the selected area. Students pursuing the ACS certified option are only be able to count the CHE courses listed for each area of emphasis towards their major. Students who do do not choose an area of emphasis, may complete the SCE with any professor of their choice on any topic.

Chemistry Emphases are listed the transcript. A student may only complete one area of emphasis.

Organic and Medicinal Chemistry Emphasis

This emphasis is for students pursuing graduate study or careers in organic chemistry, medicinal chemistry, or pharmacology. Students gain a strong foundation in organic synthesis and mechanisms, while broadening their knowledge in areas such as drug discovery and pharmacology.

Code	Title	Credits	Notes
SCE specialization in Organic or Medicinal Chemistry			_____
Select 3 of the following:		**12**	_____
CHE 303	Chem of Biological Compounds with Lab		_____
or CHE 309	Biochemistry with Lab		_____
CHE 320	Introduction to Medicinal Chemistry		_____
CHE 403	Advanced Organic Chemistry with Lab		_____
PSY 205	Drugs & Behavior		_____
or PSY 305	Psychopharmacology with Lab		_____
Approved Special Topics Course or Research Experience [1]			_____

[1] CHE 394 Special Topics/CHE 494 Special Topics or CHE 395 On-Campus Guided Research/CHE 495 On-Campus Guided Research/CHE 396 Off-Campus Research/CHE 496 Off-Campus Research

Greener Materials Science Emphasis

This emphasis provides a thorough grounding in the basic sciences and engineering of all materials while being exposed to ways to prevent pollution before it is created (Green Chemistry). Students are prepared for graduate study, bench research, consultantships dealing with the production, structure, characterization, properties, and applications of metals, ceramics, polymers, composites, nano- and bio-compatible and electronic materials. Additionally, future chemists and engineers are provided the tools required to minimize the environmental impact of materials production.

Code	Title	Credits	Notes
SCE specialization in Greener Materials Science			_____
Select 3 of the following:		12	_____
CHE 235	Art in the Anthropocene		_____
CHE 310	Greener & Sustainable Chemistry		_____
CHE 410	Fundamentals of Materials Science		_____
Approved Special Topics Course or Research Experience [1]			_____

[1] CHE 394 Special Topics/CHE 494 Special Topics or CHE 395 On-Campus Guided Research/CHE 495 On-Campus Guided Research/CHE 396 Off-Campus Research/CHE 496 Off-Campus Research

Physical Chemistry Emphasis

This emphasis is for students interested in the physical aspects of chemistry. Students are prepared for graduate school or careers that require a stronger foundation in theoretical or physical areas of chemistry.

Code	Title	Credits	Notes
SCE specialization in Physical Chemistry			_____
Select 3 of the following:		12	_____
CHE 305 & CHE 306	Chemical Thermodynamics/Kinetics w/Lab and Quantum Chem & Spectro with Lab		_____
Approved PHY elective at the 200-level or above			_____
MAT 210	Multivariable Calculus		_____
Approved Special Topics Course or Research Experience [1]			_____

[1] CHE 394 Special Topics/CHE 494 Special Topics or CHE 395 On-Campus Guided Research/CHE 495 On-Campus Guided Research/CHE 396 Off-Campus Research/CHE 496 Off-Campus Research

Biological Chemistry

This emphasis is for students interested in pursuing graduate study or a career in biological chemistry, chemical biology, pharmacology, or related fields. Students gain a strong background in biomolecular structure and dynamics, techniques utilized in biochemical characterization of biomolecules, and principles of effective drug design.

Code	Title	Credits	Notes
SCE specialization in Biological Chemistry			_____
Select 3 of the following:		12	_____
CHE 303	Chem of Biological Compounds with Lab		_____
CHE 309	Biochemistry with Lab		_____
CHE 320	Introduction to Medicinal Chemistry		_____
CHE 305 & CHE 306	Chemical Thermodynamics/Kinetics w/Lab and Quantum Chem & Spectro with Lab		_____

BIO category II elective at 200-level or above	_____
Approved Special Topics Course or Research Experience [1]	_____

[1] CHE 394 Special Topics/CHE 494 Special Topics or CHE 395 On-Campus Guided Research/CHE 495 On-Campus Guided Research/CHE 396 Off-Campus Research/CHE 496 Off-Campus Research

Major

- Biochemistry and Molecular Biology Major (https://catalog.washcoll.edu/catalog/interdisciplinary/biochemistry-molecular-biology-major/)
- Chemistry ACS-certified Major (p. 1)
- Chemistry Non-ACS certified Major (https://catalog.washcoll.edu/catalog/departments-programs/chemistry/chemistry-non-acs-certified-major/)

Minor

- Chemistry Minor (https://catalog.washcoll.edu/catalog/departments-programs/chemistry/chemistry-minor/)

Certificate

- Secondary Education Certification Program (https://catalog.washcoll.edu/catalog/departments-programs/education/secondary-education-certification-program/)