

CHEMISTRY UNDERGRADUATE MAJOR (BA, BS, HBA, HBS)

This major offers the following option(s):

- Advanced Biochemistry (<http://catalog.oregonstate.edu/college-departments/science/chemistry/chemistry-ba-bs-hba-hbs/advanced-biochemistry-option/>)
- Advanced Chemistry (<http://catalog.oregonstate.edu/college-departments/science/chemistry/chemistry-ba-bs-hba-hbs/advanced-chemistry-option/>)
- Biochemistry (<http://catalog.oregonstate.edu/college-departments/science/chemistry/chemistry-ba-bs-hba-hbs/biochemistry-option/>)
- Business (<http://catalog.oregonstate.edu/college-departments/science/chemistry/chemistry-ba-bs-hba-hbs/business-option/>)
- Chemical Engineering (<http://catalog.oregonstate.edu/college-departments/science/chemistry/chemistry-ba-bs-hba-hbs/chemical-engineering-option/>)
- Chemistry Education (<http://catalog.oregonstate.edu/college-departments/science/chemistry/chemistry-ba-bs-hba-hbs/chemistry-education-option/>)
- Environmental Chemistry (<http://catalog.oregonstate.edu/college-departments/science/chemistry/chemistry-ba-bs-hba-hbs/environmental-chemistry-option/>)
- Forensic Science (<http://catalog.oregonstate.edu/college-departments/science/chemistry/chemistry-ba-bs-hba-hbs/forensic-science-option/>)
- Materials Science (<http://catalog.oregonstate.edu/college-departments/science/chemistry/chemistry-ba-bs-hba-hbs/materials-science-option/>)
- Pre-Medicine (<http://catalog.oregonstate.edu/college-departments/science/chemistry/chemistry-ba-bs-hba-hbs/pre-medicine-option/>)

BS Degree in Chemistry

The BS degree in Chemistry features two tracks, each with a chemistry core and a selection of accompanying options. Students in either track or any option with good academic records and letters of recommendation will be well prepared and competitive for continued graduate education in chemistry or related areas.

- **Track One** is well suited for students intending to pursue a graduate degree in chemistry or a closely related area. It provides the most rigorous and complete chemistry background and the most extensive laboratory experience. The curriculum is approved by the American Chemical Society (ACS) and has two options: **advanced biochemistry** and **advanced chemistry**. Both options include 6–12 credits of career-supportive electives (CSE) in advanced chemistry or related disciplines. These CSE courses are approved by the advisor and are intended to strengthen the student's background in areas related to career goals. Students choosing the advanced chemistry option must take at least 3 credits in advanced laboratory courses or research. Track-One graduates are eligible for ACS certification by the department chair and can become full members of the ACS without the requirement of work experience.
- **Track Two** is suited for chemistry majors who want to gain extensive experience in a secondary area, target a particular career direction

or continue with graduate education in chemistry or related areas.

Track Two options include biochemistry, business, chemistry education, chemical engineering, environmental chemistry, forensic science, materials science, and pre-medicine. The multidisciplinary approach of Track Two enhances preparation and opportunities for employment in electronics, polymers, or biotechnology (the biochemistry, chemical engineering, or materials science options), for careers in environmental science (environmental chemistry option), work in crime labs (forensic science option), or teaching in high schools (chemistry education option). The Track Two curriculum is not approved by the American Chemical Society. It consists of a core of chemistry courses (79–81 credits) and a combination of 8 to 11 courses (30–37 credits) that defines each option.

BA Degree in Chemistry

The BA degree in Chemistry is appropriate for chemistry students interested in obtaining a broader academic background through a second-language requirement and additional liberal arts courses (9 credits). It also includes 6–12 credits of approved career-supportive electives to allow students to choose courses in advanced chemistry or related disciplines to support their career goals. At least 3 credits are to be in advanced laboratory courses or research. This degree may lead to international opportunities, especially if coupled with the International Degree Program at OSU.

Major Code: 520

- Recall, integrate, and apply essential core information about the key components of Chemistry.
- Demonstrate competency in basic laboratory techniques, laboratory safety, chemical synthesis, and measurement of chemical properties and phenomena.
- Communicate ideas effectively orally and in writing.
- Demonstrate the ability to analyze data, access information and integrate information from various sources in order to solve problems.

All Undergraduate Chemistry Degrees

Completion of an option is required to earn a degree in Chemistry.

The baccalaureate core requirements are met by:

Code	Title	Credits
Fitness		
HHS 231	*LIFETIME FITNESS FOR HEALTH	2
HHS 241	*LIFETIME FITNESS (or any PAC course)	1-2
Speech		
Writing courses		
Perspectives courses		
One Biology course		
One Difference, Power, and Discrimination course (DPD)		
Synthesis courses		
Total Credits		37-38

The quarters in which these are taken are flexible, except that synthesis courses must be taken at the junior and senior level. Chemistry majors or minors may not use S/U grading in courses that meet Department of Chemistry or College of Science requirements.

The timing of courses for all degrees and options can be critical, especially because of prerequisites. More detailed information and suggestions about when to take courses are found on the Chemistry

Department website (<http://chemistry.oregonstate.edu/>). Students should meet with their advisor every term. For many options in Track Two, students will also be directed to an additional advisor in another department for courses in that option.

For any option involving biochemistry courses, it is strongly recommended that students select BB 314 and BI 221 (as the biology course to fulfill the baccalaureate core requirement).

For options in which CH 462 is the recommended WIC course, it is strongly recommended that CH 422 be taken as a corequisite.

Chemistry offers the following courses through the Honors College (HC). Chemistry students in the HC may substitute these courses for courses in the regular sequences:

Code	Title	Credits
CH 231H & CH 232H & CH 233H	GENERAL CHEMISTRY and GENERAL CHEMISTRY and GENERAL CHEMISTRY	12
CH 261H & CH 262H & CH 263H	*LABORATORY FOR CHEMISTRY 231 and *LABORATORY FOR CHEMISTRY 232 and *LABORATORY FOR CHEMISTRY 233	3
CH 361H & CH 362H & CH 461H	EXPERIMENTAL CHEMISTRY I and EXPERIMENTAL CHEMISTRY I and EXPERIMENTAL CHEMISTRY II	9
CH 462H & CH 463H & CH 464H	*EXPERIMENTAL CHEMISTRY II and ^ EXPERIMENTAL CHEMISTRY II and *EXPERIMENTAL CHEMISTRY II	9

Track-One BS Degree in Chemistry

(See the Advanced Biochemistry option and Advanced Chemistry option)

Code	Title	Credits
Chemistry Core		
CH 231 & CH 271	GENERAL CHEMISTRY and *LABORATORY FOR CH 231 FOR CHEMISTRY MAJORS	5
CH 232 & CH 272	GENERAL CHEMISTRY and *LABORATORY FOR CH 232 FOR CHEMISTRY MAJORS	5
CH 233 & CH 273	GENERAL CHEMISTRY and *LABORATORY FOR CH 233 FOR CHEMISTRY MAJORS	5
CH 334 & CH 335 & CH 336	ORGANIC CHEMISTRY and ORGANIC CHEMISTRY and ORGANIC CHEMISTRY	9
CH 361 & CH 362	EXPERIMENTAL CHEMISTRY I and EXPERIMENTAL CHEMISTRY I	6
CH 421 & CH 422	ANALYTICAL CHEMISTRY and ANALYTICAL CHEMISTRY	6
CH 440 & CH 441 & CH 442	PHYSICAL CHEMISTRY and PHYSICAL CHEMISTRY and PHYSICAL CHEMISTRY	9
MTH 251	*DIFFERENTIAL CALCULUS	4
MTH 252	INTEGRAL CALCULUS	4
MTH 253 or MTH 306	INFINITE SERIES AND SEQUENCES MATRIX AND POWER SERIES METHODS	4
MTH 254	VECTOR CALCULUS I	4
PH 211 & PH 212 & PH 213	*GENERAL PHYSICS WITH CALCULUS and *GENERAL PHYSICS WITH CALCULUS and *GENERAL PHYSICS WITH CALCULUS	12
PH 221 & PH 222 & PH 223	RECITATION FOR PHYSICS 211 and RECITATION FOR PHYSICS 212 and RECITATION FOR PHYSICS 213	3

Total credits required for graduation is 180

Track-Two BS Degree in Chemistry

(See options for Biochemistry, Business, Chemistry Education, Chemical Engineering, Environmental Chemistry, Forensic Science, Materials Science, Pre-Medicine)

Code	Title	Credits
Chemistry Core ¹		
CH 231 & CH 271	GENERAL CHEMISTRY and *LABORATORY FOR CH 231 FOR CHEMISTRY MAJORS	5
CH 232 & CH 272	GENERAL CHEMISTRY and *LABORATORY FOR CH 232 FOR CHEMISTRY MAJORS	5
CH 233 & CH 273	GENERAL CHEMISTRY and *LABORATORY FOR CH 233 FOR CHEMISTRY MAJORS	5
CH 324	QUANTITATIVE ANALYSIS ²	4
CH 334 & CH 335 & CH 336	ORGANIC CHEMISTRY and ORGANIC CHEMISTRY and ORGANIC CHEMISTRY	9
CH 361 & CH 362	EXPERIMENTAL CHEMISTRY I and EXPERIMENTAL CHEMISTRY I	6
CH 411 & CH 412	INORGANIC CHEMISTRY and INORGANIC CHEMISTRY ²	6
CH 440 & CH 441 & CH 442	PHYSICAL CHEMISTRY and PHYSICAL CHEMISTRY and PHYSICAL CHEMISTRY	9
CH 462 or CH 463 or CH 464	*EXPERIMENTAL CHEMISTRY II *EXPERIMENTAL CHEMISTRY II *EXPERIMENTAL CHEMISTRY II	3
MTH 251 & MTH 252 & MTH 254	*DIFFERENTIAL CALCULUS and INTEGRAL CALCULUS and VECTOR CALCULUS I	12
Select one of the following series:		15
Series 1		
PH 211 & PH 221	*GENERAL PHYSICS WITH CALCULUS and RECITATION FOR PHYSICS 211	
PH 212 & PH 222	*GENERAL PHYSICS WITH CALCULUS and RECITATION FOR PHYSICS 212	
PH 213 & PH 223	*GENERAL PHYSICS WITH CALCULUS and RECITATION FOR PHYSICS 213	
Series 2		
PH 201 & PH 202 & PH 203	*GENERAL PHYSICS and *GENERAL PHYSICS and *GENERAL PHYSICS	

Total credits required for graduation is 180

*

Baccalaureate Core Course (BCC)

^

Writing Intensive Course (WIC)

1

For a stronger background in analytical chemistry, instead of CH 324 plus CH 411 and CH 412 substitute CH 421, CH 422, CH 461, CH 411 or CH 412, which adds 2 credits

2

The 9 credits must be approved by the advisor and the department by the end of the winter quarter of the junior year and include 3 credits of lab

Major Code: 520

Track One BS in Chemistry

First Year		Credits
CH 231 & CH 271	GENERAL CHEMISTRY and *LABORATORY FOR CH 231 FOR CHEMISTRY MAJORS	5
CH 232 & CH 272	GENERAL CHEMISTRY and *LABORATORY FOR CH 232 FOR CHEMISTRY MAJORS	5
CH 233 & CH 273	GENERAL CHEMISTRY and *LABORATORY FOR CH 233 FOR CHEMISTRY MAJORS	5
HHS 231	*LIFETIME FITNESS FOR HEALTH	2
HHS 241	*LIFETIME FITNESS (or any PAC courses)	1-2
MTH 251	*DIFFERENTIAL CALCULUS	4
MTH 252	INTEGRAL CALCULUS	4
MTH 254	VECTOR CALCULUS I	4
PH 211 & PH 221	*GENERAL PHYSICS WITH CALCULUS and RECITATION FOR PHYSICS 211	5
Perspectives courses		6
Speech		3
Writing I		3
Credits		47-48
Second Year		Credits
CH 334 & CH 335 & CH 336	ORGANIC CHEMISTRY and ORGANIC CHEMISTRY and ORGANIC CHEMISTRY	9
CH 361 & CH 362	EXPERIMENTAL CHEMISTRY I and EXPERIMENTAL CHEMISTRY I	6
MTH 253 or MTH 306	INFINITE SERIES AND SEQUENCES or MATRIX AND POWER SERIES METHODS	4
Option courses		6-7
PH 212 & PH 222	*GENERAL PHYSICS WITH CALCULUS and RECITATION FOR PHYSICS 212	5
PH 213 & PH 223	*GENERAL PHYSICS WITH CALCULUS and RECITATION FOR PHYSICS 213	5
Perspectives courses		6
Writing II		3
Credits		44-45
Third Year		Credits
BI 221 or BI 102	*PRINCIPLES OF BIOLOGY: CELLS or *ANIMAL BIOLOGY: GENES, BEHAVIOR AND EVOLUTION OF LIFE	4
CH 421 & CH 422	ANALYTICAL CHEMISTRY and ANALYTICAL CHEMISTRY	6
CH 440 & CH 441 & CH 442	PHYSICAL CHEMISTRY and PHYSICAL CHEMISTRY and PHYSICAL CHEMISTRY	9
Perspectives and Synthesis courses		6
Elective and Option courses		18
Credits		43
Fourth Year		Credits
Elective and Option courses		42-43
Synthesis course		3
Credits		45-46
Total Credits		179-182

Track Two BS in Chemistry

First Year		Credits
BI 221 or BI 102	*PRINCIPLES OF BIOLOGY: CELLS or *ANIMAL BIOLOGY: GENES, BEHAVIOR AND EVOLUTION OF LIFE	4
CH 231 & CH 271	GENERAL CHEMISTRY and *LABORATORY FOR CH 231 FOR CHEMISTRY MAJORS	5

CH 232 & CH 272	GENERAL CHEMISTRY and *LABORATORY FOR CH 232 FOR CHEMISTRY MAJORS	5
CH 233 & CH 273	GENERAL CHEMISTRY and *LABORATORY FOR CH 233 FOR CHEMISTRY MAJORS	5
HHS 231	*LIFETIME FITNESS FOR HEALTH	2
HHS 241	*LIFETIME FITNESS (or any PAC course)	1-2
MTH 251	*DIFFERENTIAL CALCULUS	4
MTH 252	INTEGRAL CALCULUS	4
Speech		3
Writing I		3
Perspective courses		6
Electives and Option courses		6
Credits		48-49
Second Year		Credits
CH 334 & CH 335 & CH 336	ORGANIC CHEMISTRY and ORGANIC CHEMISTRY and ORGANIC CHEMISTRY	9
CH 361 & CH 362	EXPERIMENTAL CHEMISTRY I and EXPERIMENTAL CHEMISTRY I	6
MTH 254	VECTOR CALCULUS I	4
Select one of the following groups:		15
Group A		
PH 211 & PH 221	*GENERAL PHYSICS WITH CALCULUS and RECITATION FOR PHYSICS 211	
PH 212 & PH 222	*GENERAL PHYSICS WITH CALCULUS and RECITATION FOR PHYSICS 212	
PH 213 & PH 223	*GENERAL PHYSICS WITH CALCULUS and RECITATION FOR PHYSICS 213	
Group B		
PH 201	*GENERAL PHYSICS	
PH 202	*GENERAL PHYSICS	
PH 203	*GENERAL PHYSICS	
Option courses		6
Perspective course		6
Writing II		3
Credits		49
Third Year		Credits
CH 324	QUANTITATIVE ANALYSIS ¹	4
CH 440 & CH 441 & CH 442	PHYSICAL CHEMISTRY and PHYSICAL CHEMISTRY and PHYSICAL CHEMISTRY	9
Select one of the following:		3
CH 462	*EXPERIMENTAL CHEMISTRY II	
CH 463	*EXPERIMENTAL CHEMISTRY II	
CH 464	*EXPERIMENTAL CHEMISTRY II	
Perspectives and Synthesis courses		6
Electives and Option courses		20
Credits		42
Fourth Year		Credits
CH 411 & CH 412	INORGANIC CHEMISTRY and INORGANIC CHEMISTRY	6
Synthesis or Perspective courses		6
Electives and option courses		6
Credits		18
Total Credits		157-158

1

For a stronger background in analytical chemistry, substitute CH 421, CH 422, and CH 461.

*

Baccalaureate Core Course (BCC)

^

Writing Intensive Course (WIC)

BA Degree in Chemistry

First Year		Credits
CH 231 & CH 271	GENERAL CHEMISTRY and *LABORATORY FOR CH 231 FOR CHEMISTRY MAJORS	5
CH 232 & CH 272	GENERAL CHEMISTRY and *LABORATORY FOR CH 232 FOR CHEMISTRY MAJORS	5
CH 233 & CH 273	GENERAL CHEMISTRY and *LABORATORY FOR CH 233 FOR CHEMISTRY MAJORS	5
HHS 231	*LIFETIME FITNESS FOR HEALTH	2
HHS 241	*LIFETIME FITNESS (or any PAC courses)	1-2
MTH 251	*DIFFERENTIAL CALCULUS	4
MTH 252	INTEGRAL CALCULUS	4
Perspectives courses		6
Speech		3
Writing I		3
Electives		10
Credits		48-49

Second Year		Credits
CH 334 & CH 335 & CH 336	ORGANIC CHEMISTRY and ORGANIC CHEMISTRY and ORGANIC CHEMISTRY	9
CH 361 & CH 362	EXPERIMENTAL CHEMISTRY I and EXPERIMENTAL CHEMISTRY I	6
MTH 254	VECTOR CALCULUS I	4
Select one of the following groups:		15
Group A		
PH 211 & PH 221	*GENERAL PHYSICS WITH CALCULUS and RECITATION FOR PHYSICS 211	
PH 212 & PH 222	*GENERAL PHYSICS WITH CALCULUS and RECITATION FOR PHYSICS 212	
PH 213 & PH 223	*GENERAL PHYSICS WITH CALCULUS and RECITATION FOR PHYSICS 213	
Group B		
PH 201	*GENERAL PHYSICS	
PH 202	*GENERAL PHYSICS	
PH 203	*GENERAL PHYSICS	
Perspectives courses		6
Writing II		3
Electives		3
Credits		46

Third Year		Credits
BI 221 or BI 101	*PRINCIPLES OF BIOLOGY: CELLS or *ENVIRONMENTAL BIOLOGY: ECOLOGY, CONSERVATION, GLOBAL CHANGE	4
CH 324	QUANTITATIVE ANALYSIS ¹	4
CH 440 & CH 441 & CH 442	PHYSICAL CHEMISTRY and PHYSICAL CHEMISTRY and PHYSICAL CHEMISTRY	9
Select one of the following:		3
CH 462	*EXPERIMENTAL CHEMISTRY II	
CH 463	*EXPERIMENTAL CHEMISTRY II	
CH 464	*EXPERIMENTAL CHEMISTRY II	
Language (first year)		12
Perspectives and Synthesis courses		6
Electives		3
Credits		41

Fourth Year

CH 411 & CH 412	INORGANIC CHEMISTRY and INORGANIC CHEMISTRY	6
Approved career-supportive electives ²		9
Synthesis course		3
Language (second year)		9-12
Electives		15-18
Credits		42-48
Total Credits		177-184

1

For a stronger background in analytical chemistry, instead of CH 324, plus CH 411 and CH 412, substitute CH 421, CH 422, CH 461, CH 411 or CH 412, which adds 2 credits.

2

The 9 credits must be approved by the advisor and the department by the end of the winter quarter of the junior year and include 3 credits of lab.

*

Baccalaureate Core Course (BCC)

^

Writing Intensive Course (WIC)