

# CHEMISTRY (BS)

## Contacts

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Program Website (<https://www.jefferson.edu/academics/colleges-schools-institutes/life-sciences/degrees-programs/undergraduate-programs/chemistry.html>)

## Program Description

You will be a sought-after candidate for scientific careers or graduate programs, thanks to professional research and presentation experience, and close faculty mentorship.

This active and collaborative program will prepare you for what's next. You start collecting chemical knowledge and skills through core courses and shadowing faculty and upper-level student researchers. As a sophomore, you will start helping with authentic, real-world research projects – experience many biochemistry students don't get until graduate programs. This is possible thanks to the individual attention you get in our small classes and our well-equipped research laboratories.

## Learning Goals/Outcomes

- Describe the laws and theories of chemistry pertaining to the properties of matter, chemical reactions and their stoichiometry, properties of gases, solution chemistry and acid/base chemistry.
- Describe the chemistry of organic molecules including functional group structure and properties, structure and stereochemistry of alkanes, nucleophilic substitution and elimination reactions of 2°/3° alkyl halides, the structure/synthesis/reactions of alkenes, alcohols, aromatic compounds, amines, carboxylic acids, carboxylic acid derivatives and aldehydes/ketones.
- Summarize chemical thermodynamics, chemical kinetics, and quantum mechanics and relate this information to modern day chemistry.
- Develop the language, terms and critical thinking/problem solving skills to use and understand analytical instrumentation used in chemistry and biochemistry today.
- Acquire the necessary laboratory skills, including knowledge of laboratory safety, proper laboratory behavior, and to be functional with laboratory equipment and techniques.
- Describe the chemistry of inorganic compounds, to include symmetry and group theory, molecular orbital theory, coordination chemistry, main group element chemistry and the chemistry of the solid state.
- Describe metabolism (including signaling mechanisms, basic biochemistry of DNA and RNA and mechanisms of control of gene expression), protein structure-function and laboratory techniques used in biochemical research.
- Garner information and critically analyze information (Information Literacy skills in general).
- Effectively communicate in written formats germane to the sciences.

- Successfully use their garnered research skills to probe new avenues of scientific inquiry.

## Curriculum: 4 years, 126-129 credits

Course	Title	Credits
<b>First Year</b>		
FYS 100	Pathways Seminar	1
WRIT 101	Writing Sem I: Written Comm.	3
AVIS 101	American Visions	3
CHEM 103 & 103L	Chemistry I and Chemistry I Lab	4
BIOL 103 & 103L	Biology I and Biology I Lab	4
MATH 111	Calculus I	4
MATH 112	Calculus II	4
CHEM 104 & 104L	Chemistry II and Chemistry II Lab	4
BIOL 104 & 104L	Biology II and Biology II Lab	4
<b>Credits</b>		<b>31</b>
<b>Second Year</b>		
ETHIC 2XX	Ethics	3
WRIT 201	Writing Seminar II: Multi Comm	3
GDIV 1XX	Global Diversity	3
MATH 331	Math Methods in Chem, Phys & Eng	3
PHYC 201	Physics I	3
PHYC 201L	Physics I Lab	1
CHEM 201 & 201L	Organic Chemistry I and Organic Chemistry I Lab	4
PHYC 203	Phys II: Waves, Elec, & Mag	3
PHYC 203L	Physics II Lab	1
CHEM 202 & 202L	Organic Chemistry II and Organic Chemistry II Lab	4
General Electives		6
<b>Credits</b>		<b>34</b>
<b>Third Year</b>		
ADIV 1XX	American Diversity	3
GCIT 2XX	Global Citizenship	3
CGIS 300	Contemporary Global Issues	3
ISEM 3XX	Integrative Seminar	3
BCHM 312	Biochemistry: Proteins	3
BCHM 312L	Biochemistry: Proteins Lab	1
BCHM 313	Biochemistry: Metabolism	3
BCHM 313L	Biochemistry: Metabolism Lab	1
CHEM 305	Phys Chem: Thermodynamics	3
CHEM 305L	Phys Chem: Thermodynamics Lab	1
CHEM 306	Phys Chem: Quantum Chemistry	3
CHEM 306L	Phys Chem: Quant Chemistry Lab	1
ADV Chemistry Elective		3-4
<b>Credits</b>		<b>31-32</b>
<b>Fourth Year</b>		
PHIL 499	Philosophies of the Good Life	3
CHEM 309	Inorganic Chemistry	3
CHEM 309L	Inorganic Chemistry Lab	1
CHEM 323	Instrumental Meth of Analysis	3
CHEM 323L	Instrmntl Meth of Analysis Lab	1
Advanced Chemistry Electives		9-12
General Electives		9
<b>Credits</b>		<b>29-32</b>
<b>Total Credits</b>		<b>125-129</b>