

BIOCHEMISTRY (BS)

Contacts

Program Director: Niny Z. Rao, PhD

Email: Niny.Rao@jefferson.edu

215-951-0906

Campus: East Falls

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

Program Description

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 laws & theories of chemistry pertaining to the properties of matter, chemical reactions and their stoichiometry, properties of gases, solution chemistry and acid/base chemistry.
- Describe chemistry of organic molecules including functional group structure and properties, structure and stereochemistry of alkanes, nucleophilic substitution and elimination reactions of 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 & quantum mechanics and relate information to modern day chemistry.
- Develop language, terms & critical thinking/problem solving skills to use and understand analytical instrumentation used in chemistry and biochemistry today.
- Acquire 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.
- Utilize communication skills to disseminate research to both the general public and the scientific community.

Curriculum: 4 Year, 124-125 Credits

| Course | Title | Credits |
|----------------------|---|----------------|
| First Year | | |
| FYS 100 | Pathways Seminar | 1 |
| WRIT 101 | Writing Sem I: Written Comm. | 3 |
| DBTU 114 | Debating U.S. Issues | 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 |
| Credits | | 31 |
| Second Year | | |
| ETHC 1XX | Ethics | 3 |
| WRIT 201 | Writing Seminar II: Multi Comm | 3 |
| GDIV 1XX | Diversity | 3 |
| MATH 213 | Calculus III | 4 |
| STAT 301 | | 4 |
| PHYS 201 | | 4 |
| PHYS 203 | | 4 |
| CHEM 201 & 201L | Organic Chemistry I and Organic Chemistry I Lab | 4 |
| CHEM 202 & 202L | Organic Chemistry II and Organic Chemistry II Lab | 4 |
| Credits | | 33 |
| Third Year | | |
| ADIV 1XX | American Diversity | 3 |
| GCIT 2XX | Global Citizenship | 3 |
| DBTG 300 | | 3 |
| ISEM 3XX | Integrative Seminar | 3 |
| BCHEM 312 & B312L | and | 4 |
| BCHEM 313 & B313L | and | 4 |
| CHEM 305 | Physical Chemistry I | 4 |
| CHEM 323 | Instrumental Meth of Analysis | 4 |
| Credits | | 28 |
| Fourth Year | | |
| HALLMK 499 | | 3 |
| CHEM 309 | Inorganic Chemistry | 4 |
| General Electives | | 9-10 |
| General Electives | | 12 |
| Credits | | 28-29 |
| Total Credits | | 120-121 |