

BACHELOR OF SCIENCE IN BIOCHEMISTRY

The Bachelor of Science in Biochemistry integrates the chemical and biological sciences to prepare students for careers and advanced study in the health professions, biotechnology, pharmaceuticals, data-driven life sciences, and basic research. The program emphasizes the core concepts of modern biochemistry: the relationship between macromolecular structure and function; energy transformation in biological systems; and information storage and flow; and quantitative discovery through experimentation.

Students gain rigorous training in biochemical theory and laboratory practice, supported by strong foundations in biology, chemistry, physics, mathematics, statistics, and computation. Advanced coursework in computational biochemistry, structural and

mechanistic biochemistry, and physical biochemistry or molecular biophysics ensures depth and coherence across the discipline while aligning with national accreditation standards.

The curriculum offers flexible technical electives and focused specialization tracks in pre-health, chemistry, computation, and biophysics, enabling students to tailor their studies to professional goals such as medical school, graduate research, or emerging fields including artificial intelligence. Graduates of the program are prepared to conduct reproducible experiments, analyze quantitative data, collaborate effectively, and communicate scientific knowledge clearly and responsibly.

Required Courses

Code	Title	Credit Hours
Biochemistry Requirements		(18)
BIOL 301	Introductory Biochemistry	3
BIOL 402	Metabolic Biochemistry	3
BIOL 404	Biochemistry Laboratory	3
BIOL 412	Structural and Mechanistic Biochemistry	3
CHEM 438 or PHYS 410	Physical Biochemistry Molecular Biophysics	3
CHEM 456	Computational Biochemistry and Drug Design	3
Biology Requirements		(15)
BIOL 107	General Biology Lectures	3
BIOL 109	General Biology Laboratory	1
BIOL 115	Human Biology	3
BIOL 117	Human Biology Laboratory	1
BIOL 214	Genetics	3
BIOL 445	Cell Biology	3
BIOL 495	Biology Colloquium	1
Chemistry Requirements		(17)
CHEM 122 & CHEM 123	Principles of Chemistry I and General Chemistry Laboratory	4
CHEM 126 & CHEM 140	Principles of Chemistry II Without Laboratory and Principles of Chemistry II Lab	4
CHEM 235 & CHEM 236	Organic Chemistry I and Organic Chemistry I-Lab	4
CHEM 239	Organic Chemistry II	3
CHEM 240	Organic Chemistry Laboratory	1
CHEM 485	Chemistry Colloquium	1
Biology or Chemistry classes		(4)
BIOL 100 or CHEM 100	Introduction to the Profession Introduction to the Profession	2
BIOL 451 or CHEM 451	Biological Literature Undergraduate Seminar	2
Upper Division Laboratory		(3)
Select at least 3 credits of approved 300+ level lab classes, including:		3
BIOL 431	Animal Physiology Laboratory	3
BIOL 446	Cell Biology Laboratory	3
CHEM 321	Instrumental Analysis	4

CHEM 416	Advanced Chemistry Laboratory	3
CHEM 434	Spectroscopic Methods in Identification and Analysis	4
CHEM 461	Bioanalytical Chemistry Laboratory	3
CHEM 463	Analytical Method Development Laboratory	3
CHEM 476	Forensic Chemistry Laboratory	3
PHYS 300	Instrumentation Laboratory	4
BIOL 491	Biology Research Project	1 TO 3
CHEM 491	Undergraduate Research	1 TO 3
FDSN 494	Special Projects	1 TO 3
Technical Electives		(13)
Up to 7 credits of the following lower division courses will count towards this requirement		13
BIOL 210	Microbiology	3
BIOL 225	Microbiology Laboratory	2
CHEM 247	Analytical Chemistry	0 OR 4
CS 116	Object-Oriented Programming II	0 OR 2
FDSN 201	Nutrition and Wellness	3
MATH 230	Introduction to Discrete Math	3
MATH 251	Multivariate and Vector Calculus	4
MATH 252	Introduction to Differential Equations	4
Any lower division course towards the certificate in AI fluency or AI management		
Select at least 6 credit hours from the following upper division courses		
Any 300+ level BIOL or CHEM or FDSN course		
BME 418	Reaction Kinetics for BME	3
CS 330	Discrete Structures	3
CS 331	Data Structures and Algorithms	3
CS 422	Data Mining	3
CS 484	Introduction to Machine Learning	3
PHYS 410	Molecular Biophysics	3
Any 300+ level course towards the certificate in AI fluency or AI management		
Physics Requirements		(8)
PHYS 123	General Physics I: Mechanics	4
PHYS 221	General Physics II: Electricity and Magnetism	4
or PHYS 223	General Physics III	
Mathematics Requirements		(10)
MATH 151	Calculus I	5
MATH 152	Calculus II	5
Statistics Requirement		(3-4)
Any statistics course, including:		3 or 4
STAT 225	Introductory Statistics	3
BUS 221	Business Statistics	3
PSYC 203	Undergraduate Statistics for the Behavioral Sciences	4
MATH 425	Statistical Methods	3
BME 433	Biomedical Engineering Applications of Statistics	3
CHEM 513	Statistics for Analytical Chemists	3
Computer Science Requirement		(2)
Any CS core class		2
Interprofessional Projects (IPRO)		(6)
See Illinois Tech Core Curriculum, section E		6
Humanities and Social Science Requirements		(21)
See Illinois Tech Core Curriculum, sections B and C		21
Total Credit Hours		120-121

Bachelor of Science in Biochemistry Curriculum

		Year 1	
Semester 1	Credit Hours	Semester 2	Credit Hours
BIOL 100 or CHEM 100	2	BIOL 115	3
BIOL 107	3	BIOL 117	1
BIOL 109	1	CHEM 126 & CHEM 140	4
CHEM 122 & CHEM 123	4	MATH 152	5
MATH 151	5	Humanities Elective	3
	15		16
		Year 2	
Semester 1	Credit Hours	Semester 2	Credit Hours
BIOL 214	3	CHEM 239	3
CHEM 235 & CHEM 236	4	CHEM 240	1
PHYS 123	4	PHYS 221	4
Computer Science Core	2	Technical Electives	4
Social Sciences Elective	3	Humanities or Social Science Elective	3
	16		15
		Year 3	
Semester 1	Credit Hours	Semester 2	Credit Hours
BIOL 301	3	BIOL 402	3
STAT 225	3	BIOL 404	3
Technical Elective	3	CHEM 456	3
Social Sciences Elective	3	Technical Electives	3
IPRO	3	IPRO	3
	15		15
		Year 4	
Semester 1	Credit Hours	Semester 2	Credit Hours
BIOL 412	3	BIOL 451	2
CHEM 438	3	CHEM 485	1
BIOL 445	3	Upper Division Laboratory ¹	3
BIOL 495	1	Technical Elective	3
Humanities Elective	3	Social Sciences Elective (300+)	3
		Humanities Elective (300+)	3
	13		15

Total Credit Hours: 120

¹ CHEM 321 or CHEM 434 should be selected for the chemistry specialization. CS 331 may be selected for the computation specialization.

The BS in Biochemistry offers specialization options that allow students to tailor their studies to specific career goals while maintaining a shared foundation in modern biochemistry. Each specialization is designed to prepare students for

common post#graduation pathways, including professional programs, graduate study, and careers in industry, research, and interdisciplinary or data#driven fields.

Pre#Health Specialization

The pre#health specialization is designed for students planning to pursue professional programs towards becoming a doctor, dentist, pharmacist, nurse, physician assistant, or other health

professional. This specialization emphasizes the biochemical basis of human health and disease, with coursework aligned to concepts central to professional school training and admissions exams. Students develop strong conceptual understanding, quantitative reasoning, laboratory experience, and scientific communication skills that support success in health-related graduate programs and evidence-based clinical careers.

Chemistry Specialization

The chemistry specialization is intended for students seeking rigorous, quantitative training in chemical analysis and preparation for careers or graduate study in chemistry-intensive fields such as pharmaceuticals, biotechnology, analytical chemistry, and chemical biology. This specialization is structured to meet American Chemical Society (ACS) certification requirements. ACS certification strengthens preparation for graduate programs, enhances competitiveness for industry and research positions, and signals to employers a strong foundation in analytical, instrumental, and spectroscopic methods.

Computation Specialization

The computation specialization is designed for students interested in applying computational, statistical, and data-driven approaches to biochemical problems, preparing them for graduate study or careers in computational biochemistry, systems biology, and data-driven life sciences. By integrating biochemistry with programming, data structures, and machine learning concepts, this specialization equips students with skills increasingly essential in modern biotechnology, pharmaceutical research, and interdisciplinary scientific fields.

Biophysics Specialization

The biophysics specialization is intended for students who wish to pursue quantitatively focused careers or graduate study in biophysics, structural biology, molecular biophysics, or related interdisciplinary research areas. This specialization emphasizes the physical principles underlying macromolecular structure, dynamics, and function, preparing students for research environments in academia, industry, or national laboratories where biology, chemistry, and physics intersect.

Specializations

Code	Title	Credit Hours
Pre-Health		
Choose 3 courses from the below, with no more than one lower division course counting towards the specialization		9
BIOL 210	Microbiology	3
BIOL 240	Neurobiology	3
FDSN 201	Nutrition and Wellness	3
BIOL 327	Introduction to Immunology	3
BIOL 410	Medical Microbiology	3
BIOL 470	Systems and Behavioral Neuroscience	3
BIOL 475	Health and Disease in Modern Society	3
FDSN 300	Nutrition Through the Life Cycle	3
FDSN 401	Nutrition, Metabolism, and Health	3

PSYC 414	Neural and Biological Bases of Behavior	3
Chemistry		13 OR 14
CHEM 247	Analytical Chemistry	3
CHEM 321	Instrumental Analysis ¹	3
CHEM 415	Inorganic Chemistry	3
CHEM 434	Spectroscopic Methods in Identification and Analysis ¹	4
Computation		11 OR 12
CS 116	Object-Oriented Programming II	2
CS 331	Data Structures and Algorithms ¹	3
CS 422	Data Mining	3
or CS 484	Introduction to Machine Learning	
Select one of the following		3 or 4
CS 330	Discrete Structures	3
MATH 230	Introduction to Discrete Math	3
MATH 251	Multivariate and Vector Calculus	4
MATH 252	Introduction to Differential Equations	4
Biophysics		9 or 10
PHYS 224	General Physics III for Engineers	3
or PHYS 223	General Physics III	
PHYS 304	Thermodynamics and Statistical Physics	3
PHYS 410	Molecular Biophysics	3

¹ Fulfills Upper Division Laboratory requirement