BACHELOR OF SCIENCE IN COMPUTATIONAL CHEMISTRY AND BIOCHEMISTRY

Computational chemistry and biochemistry is the application of computational methods to understand chemical and biochemical properties and processes. Majors in this program will learn chemical and molecular modeling and simulation, computational chemical biology, computational drug design, big data in chemistry and biochemistry, and computational methods for data analytics. Students will be prepared to advance in the rapidly growing fields of computational and data science, gaining a strong background in traditional chemistry areas combined with relevant and advanced skills in experimental and computational science.

Required Courses

Code	Title		Credit Hours
Computational Chemistry and Biochemistry Requirements			**(45)**
CHEM 100	Introduction to the Profession		2
CHEM 124	Principles of Chemistry I with Laboratory		4
CHEM 125	Principles of Chemistry II with Laboratory		4
CHEM 237	Organic Chemistry I		4
CHEM 239	Organic Chemistry II		3
CHEM 247	Analytical Chemistry		3
CHEM 343	Physical Chemistry I		3
CHEM 344	Physical Chemistry II		4
CHEM 415	Inorganic Chemistry		3
CHEM 434	Spectroscopic Methods in Identification and Analysis		4
CHEM 452	Cheminformatics		3
CHEM 454	Computational Quantum Chemistry		3
CHEM 456	Computational Biochemistry and Drug Design		3
CHEM 485	Chemistry Colloquium		1
CHEM 495	Seminar in Special Topics		1
Computational Chemistry and Biochemistry Elective			**(3)**
Select one course from the following:			3
CHEM 240	Organic Chemistry Laboratory	2	
CHEM 321	Instrumental Analysis	4	
CHEM 416	Advanced Chemistry Laboratory	3	
CHEM 455	Advanced Organic Chemistry	3	
CHEM 467	Medicinal Chemistry	3	
CHEM 513	Statistics for Analytical Chemists	3	
CHEM 538	Physical Biochemistry	3	
CHEM 550	Theoretical and Computational Quantum Chemistry	3	
Biology Requirements			**(9)**
BIOL 107	General Biology Lectures		3
or BIOL 115	Human Biology		
BIOL 401	Introductory Biochemistry		3
BIOL 402	Metabolic Biochemistry		3
Mathematics Requirements			**(18)**
MATH 151	Calculus I		5
MATH 152	Calculus II		5
MATH 251	Multivariate and Vector Calculus		4
MATH 252	Introduction to Differential Equations		4
Physics Requirements			**(8)**
PHYS 123	General Physics I: Mechanics		4
PHYS 221	General Physics II: Electricity and Magnetism		4
Computer Science Requirement			**(9)**

CS 105	Introduction to Computer Programming	2
or CS 110	Computing Principles	
CS 201	Accelerated Introduction to Computer Science	4
CS 331	Data Structures and Algorithms	3
Humanities and Social Sciences Requirements		**(21)**
See Illinois Tech Core Curriculum, sections B and C		21
Interprofessional Projects (IPRO)		**(6)**
See Illinois Tech Core Curriculum, section E		6
Free Electives		**(9)**
Select nine credit hours [1]		9
Total Credit Hours		**128**

[1] Suggested electives include: BIOL 550, CS 411, CS 422, CS 425, ITMD 521, ITMD 525, ITMD 527, ITMD 529, MATH 474, and PHYS 240.

Bachelor of Science in Computational Chemistry and Biochemistry Curriculum

			Year 1
Semester 1	**Credit Hours**	**Semester 2**	**Credit Hours**
CHEM 124	4	CHEM 100	2
CS 105 or 110	2	CHEM 125	4
MATH 151	5	MATH 152	5
Humanities 200-level Course	3	PHYS 123	4
		Social Sciences Elective	3
	14		**18**

			Year 2
Semester 1	**Credit Hours**	**Semester 2**	**Credit Hours**
CHEM 237	4	CHEM 239	3
BIOL 107 or 115	3	CHEM 247	3
MATH 251	4	CS 201	4
PHYS 221	4	MATH 252	4
Humanities or Social Sciences Elective	3	Humanities Elective (300+)	3
	18		**17**

			Year 3
Semester 1	**Credit Hours**	**Semester 2**	**Credit Hours**
CHEM 343	3	BIOL 401	3
CS 331	3	CHEM 344	4
IPRO Elective I	3	CHEM 434	4
Humanities Elective (300+)	3	CHEM 485	1
Social Sciences Elective (300+)	3	Free Elective[1]	3
	15		**15**

			Year 4
Semester 1	**Credit Hours**	**Semester 2**	**Credit Hours**
BIOL 402	3	CHEM 452	3
CHEM 415	3	CHEM 454	3
CHEM 456	3	CHEM 495	1
IPRO Elective II	3	Computational Chemistry and Biochemistry Elective[2]	3
Social Sciences Elective (300+)	3	Free Elective[1]	3
		Free Elective[1]	3
	15		**16**

Total Credit Hours: 128

1 Suggested electives include: BIOL 550, CS 411, CS 422, CS 425, ITMD 521, ITMD 525, ITMD 527, ITMD 529, MATH 474, and PHYS 240.

2 Choose from the following courses: CHEM 240, CHEM 321, CHEM 416, CHEM 455, CHEM 467, CHEM 513, CHEM 538, or CHEM 550.