BACHELOR OF SCIENCE IN BIOINFORMATICS

At Illinois Tech the bioinformatics major blends courses in biology, chemistry, and physics with courses in programming, statistics, and other methods, producing graduates who are both strong in science and able to develop and use data processing tools to advance scientific knowledge.

Our program is scientifically rigorous, providing students with in-demand programming and analytical skills through a solid, balanced offering in STEM courses. Combined with undergraduate research opportunities, this rounded curriculum provides the knowledge, skills, and experiences to pursue careers in bioinformatics or computational biology.

Courses include programming in Perl, C++, and Java; data structure and algorithms; data mining; statistics; human biology; genetics; genomics and transcriptomics; and more.

Two tracks are available. Applied Bioinformatics has more required and elective courses in computer science. Computational Biology has more required and elective courses in biology.

Required Courses

Code	Title		Credit Hours
Biology Requirements			**(29)**
BIOL 100	Intro to Profession		2
BIOL 104	Linux and Perl Programming		3
BIOL 107	General Biol Lecture		3
BIOL 115	Human Biology		3
BIOL 210	Microbiology		3
BIOL 214	Genetics		3
BIOL 225	Microbiology Laboratory		2
BIOL 403	Biochemistry		4
BIOL 413	Genomics and Transcriptomics		3
BIOL 451	Biological Literature		2
BIOL 495	Biology Colloquium		1
Chemistry Requirements			**(12)**
CHEM 124	Princ of Chemistry I with Lab		4
CHEM 125	Prin of Chemistry II w/Lab		4
CHEM 237	Organic Chemistry I		4
Physics Requirements			**(11)**
PHYS 123	General Physics I: Mechanics		4
PHYS 221	Gen Physics II: Elect&Magntism		4
PHYS 224	Gen Physics III for Engnrs		3
Track Electives			**(9-10)**
Select a track in Applied Bioinformatics or Computational Biology			9-10
Option 1: Applied Bioinformatics		9	
MATH 332	Elementary Linear Algebra	3	
CS 422	Data Mining	3	
CS 425	Database Organization	3	
Option 2: Computational Biology		10	
MATH 252	Introduction to Diff Equations	4	
BIOL 445	Cell Biology	3	
BIOL 446	Cell Biology Laboratory	3	
Bioinformatics Technical Electives			**(9)**
Select a minimum of nine credit hours of technical electives, with at least two electives in the chosen Bioinformatics track (Applied Bioinformatics or Computational Biology)			9
Applied Bioinformatics Technical Electives			
CS 429	Information Retrieval	3	
CS 430	Introduction to Algorithms	3	

CS 445	Objct Orntd Dsgn Prgmng	3	
CS 450	Operating Systems	3	
CS 451	Parallel/Distributed Computing	3	
CS 491	Undergraduate Research [1]	1-6	
CS 595	Topics in Computer Science [1]	3-12	
Computational Biology Technical Electives			
BIOL 305	Human Anatomy	3	
BIOL 404	Biochemistry Laboratory	3	
BIOL 410	Medical Microbiology	3	
BIOL 426	Concepts of Cancer Biology	3	
BIOL 430	Human Physiology	3	
BIOL 491	Biology Research Project [1]	1-3	
Suggested Additional Electives			
CHEM 239	Organic Chemistry II	3	
CHEM 343	Physical Chemistry I	3	
MATH 350	Intro to Computational Mathe [1]	3	
PHYS 240	Computational Science	3	
PHYS 410	Molecular Biophysics	3	
Mathematics Requirements			**(20)**
MATH 151	Calculus I		5
MATH 152	Calculus II		5
MATH 251	Multivariate & Vector Calculus		4
MATH 475	Probability		3
MATH 476	Statistics		3
Computer Science Requirements			**(10)**
Select one of the following options:			4
Option 1:			
CS 115 & CS 116	Object-Oriented Programming I and Object-Oriented Programming II	4	
Option 2:			
CS 201	Accelerated Intro to Cmptr Sci	4	
CS 330	Discrete Structures		3
CS 331	Data Structures and Algorithms		3
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			**127-128**

[1] Adviser and/or instructor approval required.

Bachelor of Science in Bioinformatics Curriculum

			Year 1
Semester 1	**Credit Hours**	**Semester 2**	**Credit Hours**
BIOL 100	2	BIOL 104	3
BIOL 107	3	BIOL 115	3
CHEM 124	4	CHEM 125	4
CS 115	2	CS 116	2
MATH 151	5	MATH 152	5
	16		**17**

			Year 2
Semester 1	**Credit Hours**	**Semester 2**	**Credit Hours**
BIOL 214	3	BIOL 210	3
PHYS 123	4	BIOL 225	2
CS 330	3	PHYS 221	4
MATH 251	4	Track Elective[1]	3-4
Social Sciences Elective	3	Humanities 200-level Course	3
	17		**15-16**

			Year 3
Semester 1	**Credit Hours**	**Semester 2**	**Credit Hours**
CHEM 237	4	BIOL 403	4
MATH 475	3	BIOL 413	3
Bioinformatics Technical Elective	3	CS 331	3
Humanities or Social Sciences Elective	3	PHYS 224	3
Humanities Elective (300+)	3	Bioinformatics Technical Elective	3
	16		**16**

			Year 4
Semester 1	**Credit Hours**	**Semester 2**	**Credit Hours**
MATH 476	3	BIOL 451	2
Track Elective[2]	3	BIOL 495	1
Track Elective[2]	3	Bioinformatics Technical Elective	3
IPRO Elective I	3	Humanities Elective (300+)	3
Social Sciences Elective (300+)	3	Social Sciences Elective (300+)	3
		IPRO Elective II	3
	15		**15**

Total Credit Hours: 127-128

1 For the Applied Bioinformatics track, select MATH 332. For the Computational Biology track, select MATH 252.

2 For the Applied Bioinformatics track, select CS 422 and CS 425. For the Computational Biology track, select BIOL 445 and BIOL 445.