Rensselaer

BIOCHEMISTRY & BIOPHYSICS B.S. – FALL 2024

Biochemistry and biophysics, closely-related fields, use tools from different sciences to study life. This program includes thorough grounding in mathematics, chemistry, and physics, along with modern biochemistry, biophysics, and molecular-level biology. Students are trained in cutting-edge research approaches to biological problems.

FIRST YEAR

Fall '24			Spring '25		
Number	Course	CR	Number	Course	CR
BIOL 1010	Introduction to Biology[1]	3	BIOL 2120	Introduction to Cell & Molecular Biology[1]	3
BIOL 1015 **or** BIOL 1016	Introduction to Biology Lab **or** Intro to Computational Biology Lab[2]	1	BIOL 2125	Intro to Cell & Molecular Biology Lab	1
CHEM 1110	Chemistry I with Advanced Lab	4	CHEM 1200	Chemistry II	4
MATH 1010	Calculus I	4	MATH 1020	Calculus II	4
	HASS Core Elective[3]	4		HASS Core Elective[3]	4

SECOND YEAR

Fall '25			Spring '26		
Number	Course	CR	Number	Course	CR
CHEM 2250	Organic Chemistry I	3	CHEM 2260	Organic Chemistry II	3
CHEM 2230	Organic Chemistry Lab I	1	CHEM 2240	Organic Chemistry Lab II	1
PHYS 1100	Physics I	4	PHYS 1200	Physics II	4
	Quantitative Option	4	BIOL 4620	Molecular Biology	4
BIOL 2500	Genetics and Evolution	4		HASS Core Elective[3]	4

THIRD YEAR (WITH 3RD YEAR FALL SEMESTER AWAY)

The Arch Summer Semester[4] '26			Spring '27		
Number	Course	CR	Number	Course	CR
BCBP 4760	Molecular Biochemistry I[5]	4	BCBP 4770	Molecular Biochemistry II[5]	4
CHEM 4440	Physical Chemistry for Life Sciences[6]	4	BCBP 4710	Biochemistry Laboratory[5, 7] (Advanced Lab Option)	6
BIOL 4200	Biostatistics	4		Restricted Elective[8]	2
	HASS Core Elective[3]	4		HASS Core Elective[3]	4

FOURTH YEAR (WITH 3RD YEAR FALL SEMESTER AWAY)

Fall '27			Spring '28		
Number	Course	CR	Number	Course	CR
	Molecular Biophysics Module[5]	4		Molecular Biophysics Module[5]	4
BCBP 4990	Senior Research Thesis[9]	4		HASS Core Elective[3]	4
	Restricted Elective[8]	4		Free Elective	4
	Free Elective	4		Free Elective	4

THIRD YEAR (WITH 3RD YEAR SPRING SEMESTER AWAY)

The Arch Summer Semester[4] '26			Fall '26		
Number	Course	CR	Number	Course	CR
CHEM 4440	Physical Chemistry for Life Sciences[6]	4	BIOL 4720	Molecular Biology Laboratory[5,7] (Advanced Lab Option)	6
BIOL 4200	Biostatistics	4	BCBP 4760	Molecular Biochemistry I[5]	4
	Free Elective	4		Restricted Elective[8]	2
	HASS Core Elective[3]	4		Free Elective	4

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FOURTH YEAR (WITH 3RD YEAR SPRING SEMESTER AWAY)

Fall '27			Spring '28		
Number	Course	CR	Number	Course	CR
	Molecular Biophysics Module[5]	4		Molecular Biophysics Module[5]	4
BCBP 4990	Senior Research Thesis[9]	4	BCBP 4770	Molecular Biochemistry II[5]	4
	Restricted Elective[8]	4		HASS Core Elective[3]	4
	HASS Core Elective[3]	4		Free Elective	4

This curriculum requires a minimum of 128 credit hours.

FOOTNOTES

1. Students who apply Advanced Placement credits in place of BIOL 1010/1015 may take BIOL 2120 & BIOL 2125 in its place.
2. Students must take 1 of the following Laboratory courses alongside BIOL 1010 Introduction to Biology: BIOL 1015 Introduction to Biology Laboratory **OR** BIOL 1016 Introduction to Biology Computational Laboratory. Biology, Biochemistry and Biophysics, Biological Neuroscience majors, and/or students seeking a hands-on wet-lab experience are recommended to register for BIOL 1015. Computational Biology majors, Non-biology students, and/or students who seek to enhance their skills in data analysis are recommended to register for BIOL 1016. Students cannot get credit for both BIOL 1015 and 1016.
3. **Humanities and Social Sciences (HASS) Core Electives**: A total of 24 credits of HASS Core Electives should be taken. Students should take an Inquiry course during their first year. For a listing of HASS Inquiry courses go to: https://info.rpi.edu/hass-inquiry. In addition, students should take a HASS Communications Intensive course during their first three semesters.
4. For students who have applied for and been granted an exception, The Arch Summer courses would be taken during the fall semester. For listing of the exception process go to: http://info.rpi.edu/arch/students/#ExceptionProcess
5. Molecular Biochemistry I & II, molecular biophysics modules, and laboratory options cannot be satisfied with transfer credits.
6. Students may substitute Macroscopic or Microscopic Physical Chemistry (CHEM 4410 & CHEM 4420).
7. The Advanced Lab Option fulfills the Communication Intensive (CI) major requirement and the Culminating Experience requirement.
8. Restricted Electives: at least 6 credits in Science or Engineering. Restricted electives must be 4000 level courses. Molecular Biophysics Modules, Laboratory Option, and the Quantitative Option may be taken in different semesters than those shown if electives are shifted. Only 2 credits from research may count toward this requirement.
9. Senior Research Thesis (BCBP 4990) is recommended; however, students may substitute with any of the BIOL, BCBP, or CHEM courses listed below.

MOLECULAR BIOPHYSICS MODULES (CHOOSE 2)

BCBP 4310	Genetic Engineering	BCBP 4660	The Biology of Systems
BCBP 4550	Molecular Modeling	BCBP 4800	Methods in Biophysics
BCBP 4600	Data Analytics	BCBP 4870	Protein Struct. Determination

QUANTITATIVE OPTION (CHOOSE 1)

CSCI 1100	Computer Science I	MATH 2400	Intro to Diff. Equations
MATH 2010	Multivar. Calc. & Matrix Alg.	MATH 4720	Math. In Medicine & Biology

COURSES THAT CAN BE TAKEN IN LIEU OF SENIOR RESEARCH THESIS (BCBP 4990)

BIOL 4100	From Neuron to Behavior	BIOL 4540	Sequence Analysis
BIOL 4150	Cellular Neuroscience	BIOL 4550	Molecular Modeling
BIOL 4220	Mach. Learning for Env. Biology	BIOL 4630	Molecular Biology II
BIOL 4250	Developmental Biology	BIOL/BCBP 4660	The Biology of Systems
BIOL 4260	Advanced Cell Biology	BIOL 4860	Evolution
BIOL 4270	Human Physiology	BIOL 4990	Senior Research Thesis
BIOL 4310	Microbiology	BCBP 4310	Genetic Engineering
BIOL 4350	Virology	BCBP 4800	Methods in Biophysics
BIOL 4520	Human Population	BCBP 4870	Protein Structure Determination

ADVANCED LABORATORY OPTION (CHOOSE 1)

BIOL 4710	Biochemistry Laboratory	BIOL 4720	Molecular Biology Laboratory