



Rensselaer

BIOCHEMISTRY & BIOPHYSICS B.S.

Biochemistry and biophysics, closely-related fields, use tools from different sciences to study life. Specifically, biochemistry studies the chemical processes and transformations in living organisms, while biophysics applies the theories and methods of physics to questions of biology. Rensselaer's BCBP undergraduate curriculum 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			Spring		
Number	Course	CR	Number	Course	CR
MATH 1010	Calculus I	4	MATH 1020	Calculus II	4
CHEM 1110	Chemistry I with Advanced Lab ¹	4	CHEM 1200	Chemistry II	4
BIOL 1010	Introduction to Biology	3	BIOL 2120	Intro. Cell & Molecular Biology	3
BIOL 1015	Introduction to Biology Laboratory	1	BIOL 2125	Intro. Cell & Molecular Biology Lab	1
	HASS Core Elective ²	4		HASS Core Elective ²	4

SECOND YEAR

Fall			Spring		
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 ²	4

THIRD YEAR (WITH 3RD YEAR FALL SEMESTER AWAY)

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

FOURTH YEAR (WITH 3RD YEAR FALL SEMESTER AWAY)

Fall			Spring		
Number	Course	CR	Number	Course	CR
	Molecular Biophysics Module ⁶	4		Molecular Biophysics Module ⁶	4
BCBP 4990	Senior Research Thesis ⁴	4		HASS Core Elective ²	4
	Restricted Elective ⁵	4		Elective	4
	Elective	4		Elective	4

THIRD YEAR (WITH 3RD YEAR SPRING SEMESTER AWAY)

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

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FOURTH YEAR (WITH 3RD YEAR SPRING SEMESTER AWAY)

Fall			Spring		
Number	Course	CR	Number	Course	CR
	Molecular Biophysics Module ⁶	4		Molecular Biophysics Module ⁶	4
BCBP 4990	Senior Research Thesis ⁴	4	BCBP 4770	Molecular Biochemistry II ⁶	4
	Restricted Elective ⁵	4		HASS Core Elective ²	4
	HASS Core Elective ²	4		Elective	4

This curriculum requires a minimum of 128 credit hours.

FOOTNOTES

1. Students may substitute CHEM 1100 for CHEM 1110.
2. 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.
3. Students may substitute Macroscopic or Microscopic Physical Chemistry (CHEM 4410 & CHEM 4420).
4. Senior Research Thesis (BCBP 4990) is recommended; however, students may substitute with any of the BIOL, BCBP, or CHEM courses listed below.
5. 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, mentoring, or independent study courses may count toward this requirement.
6. Molecular Biochemistry I & II, molecular biophysics modules, and laboratory options cannot be satisfied with transfer credits.
7. 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>
8. The Advanced Lab Option fulfills the Communication Intensive (CI) in major requirement and the Culminating Experience requirement.

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 4630	Molecular Biology II
BIOL 4150	Cellular Neuroscience	BIOL/BCBP 4660	The Biology of Systems
BIOL 4220	Mach. Learning for Env. Biology	BIOL 4860	Evolution
BIOL 4250	Developmental Biology	BIOL 4870	Lake George BLUE
BIOL 4260	Advanced Cell Biology	BIOL 4961	Human Population
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 4540	Sequence Analysis	BCBP 4870	Protein Structure Determination
BIOL 4550	Molecular Modeling	CHEM 4310	Bioorganic Mechanisms

ADVANCED LABORATORY OPTION (CHOOSE 1)

BIOL 4710	Biochemistry Laboratory	BIOL 4720	Molecular Biology Laboratory
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