BIOCHEMISTRY B.A. (Sample Plan of Study)
(for students following requirements in the ***2023-24 General Bulletin or later***)
(*120 total credit hours required for graduation)*

First Year – Fall

Course Number	*Course Topic*	*Hours*
BIOC 101	Biochemistry introduction	1
BIOL 214	Biology I	3
BIOL 214L	Biology I lab	1
CHEM 105 (or CHEM 111)	Chemistry 1	3 (or 4)
MATH 125 (or MATH 121)	Calculus I	4
Academic Inquiry, Breadth, or Elective course[1]		3
	Total	*15 (or 16)*

First Year – Spring

BIOL 215	Biology II	3
BIOL 215L	Biology II lab	1
CHEM 106 (or ENGR 145)	Chemistry II	3
CHEM 113	Chemistry lab	2
MATH 126 (or MATH 122/124)	Calculus II	4
Academic Inquiry, Breadth, or Elective course[1]		3
	Total	*16*

Second Year – Fall

Course Number	*Course Topic*	*Hours*
CHEM 223 (or CHEM 323)	Organic chemistry I	3
CHEM 233	Organic chemistry I lab	2
PHYS 115 (or PHYS 121/123)	Physics I: mechanics	4
ENGR 131 (or CSDS 132)	Computer programming introduction	3
Breadth or Elective course[1]		3
	Total	*15*

Second Year – Spring

CHEM 224 (or CHEM 324)	Organic chemistry II	3
CHEM 234	Organic chemistry II lab	2
PHYS 116 (or PHYS 122/124)	Physics II: electricity and magnetism	4
STAT 201 (or STAT 312/312R/313)	Basic statistics	3
Breadth or Elective course[1]		3
	Total	*15*

Third Year – Fall

Course Number	*Course Topic*	*Hours*
BIOC 307	Biochemistry I: molecules and pathways	4
BIOC Approved Technical Elective or Core Course[2]		3
Breadth or Elective course[1]		3
Open Elective course[3] (e.g. to complete a minor)		3
	Total	*13*

Third Year – Spring

BIOC 308	Biochemistry II: molecular biology	4
BIOC 391[4]	Research Project	3
BIOC Approved Technical Elective or Core Course[2]		3
Breadth or Elective course[1]		3
Open Elective course[3] (e.g. to complete a minor)		3
	Total	*16*

Fourth Year – Fall

Course Number	*Course Topic*	*Hours*
BIOC 373	Biochemistry SAGES Seminar	3
BIOC Approved Technical Elective or Core Course[2]		3
Breadth or Elective course[1]		3
Open Elective courses[3] (e.g. to complete a minor)		6
	Total	*15*

Fourth Year – Spring

BIOC 393[5]	Senior Capstone Experience	3
BIOC Approved Technical Elective or Core Course[2]		3
Breadth or Elective course[1]		3
Open Elective courses[3] (e.g. to complete a minor)		6
	Total	*15*

[1]Please refer to the general education requirement as specified in the 2023-2024 General Bulletin.
[2]Students must take 2 of the 3 Biochemistry core courses: BIOC 312, BIOC 334, and BIOC 350.
[2]B.A. students are required to complete 2 approved technical elective courses; please see approved course list posted on Biochemistry website.
[3]Any course not specified for the Biochemistry major or CWRU General Education requirements may be taken as an Open Elective.
[4]Students must take BIOC 391 at least one semester; students in the Honors Research track must take BIOC 391 at least two semesters.
[5]Students in the Honors Research track are required to take BIOC 393H in place of BIOC 393.

BIOCHEMISTRY B.A. (Required Courses by Subject)
(for students following requirements in the ***2023-24 General Bulletin or later***)

Course Number	*Course Title*		*Hours*	
BIOC 101	Frontiers in Biochemistry		1	
BIOC 307	Introduction to Biochemistry		4	
BIOC 308	Molecular Biology		4	
Two of these three Biochemistry Core courses:			6	
BIOC 312	Proteins and Enzymes	(3)		
BIOC 334	Structural and Computational Biology	(3)		
BIOC 350	Molecular Basis of Cancer	(3)		
BIOC 391	Research Project		3	
BIOC 373	Biochemistry SAGES Seminar		3	
BIOC 393	Senior Capstone Experience		3	
Two Approved Technical Elective courses			6	*BIOC total: 30*
BIOL 214	Genes, Evolution and Ecology		3	
BIOL 214L	Genes, Evolution and Ecology Lab		1	
BIOL 215	Cells and Proteins		3	
BIOL 215L	Cells and Proteins Lab		1	*BIOL total: 8*
CHEM 105	Principles of Chemistry I		3	
(or CHEM 111	Principles of Chemistry for Engineers		4)	
CHEM 106	Principles of Chemistry II		3	
(or ENGR 145	Chemistry of Materials)			
CHEM 113	Principles of Chemistry Lab		2	
CHEM 223	Introductory Organic Chemistry I		3	
(or CHEM 323	Organic Chemistry 1)			
CHEM 233	Introductory Organic Chemistry Laboratory I		2	
CHEM 224	Introductory Organic Chemistry II		3	
(or CHEM 324	Organic Chemistry 1I)			
CHEM 234	Introductory Organic Chemistry Laboratory II		2	*CHEM total:18 (or 19)*
MATH 125	Math and Calculus Applications for Life…Sciences I		4	
(or MATH 121	Calculus for Science and Engineering 1)			
MATH 126	Math and Calculus Applications for Life…Sciences II		4	
(or MATH 122/124	Calculus for Science and Engineering II/Calculus II)			*MATH total: 8*
PHYS 115	Introductory Physics 1		4	
(or PHYS 121/123	General Physics 1 - Mechanics/Physics and Frontiers 1 - Mechanics)			
PHYS 116	Introductory Physics 1I		4	
(or PHYS 122/124	General Physics 1 - Electricity and Magnetism/Physics and Frontiers 1I - Electricity and Magnetism)			*PHYS total: 8*
ENGR 131	Elementary Computer Programming		3	
(or CSDS 132	Programming in Java)			
STAT 201	Basic Statistics for Social and Life Sciences		3	
(or STAT 312/312R	Basic Statistics for Engineering and Science/Using R			
or STAT 313	Statistics for Experimenters)			

BIOCHEMISTRY B.A. (Courses Required for Optional Tracks)
(for students following requirements in the ***2023-24 General Bulletin or later***)

Biochemistry students may choose to complete optional tracks/concentrations that are defined by the following requirements for specific Biochemistry Core and Technical Elective courses

Track/Concentration	*Required Required*	*Two Required Technical Elective courses*
Cancer Biology	BIOC 350	BIOC 353 Biochemical Pathways in Cancer Therapeutics BIOC 360 Advanced Technologies for Cancer Research
Infectious Disease	BIOC 334	BIOC 310 Microbial Physiology and Therapeutic Opportunities BIOC 311 Antimicrobial Therapies and Resistance
Metabolism	BIOC 312	Two of BIOC 315 Biological Membranes and Their Proteins BIOC 344 Molecular Endocrinology BIOC 345 Metabolic Dysregulation and Human Disease
Computational Health Science*	BIOC 334	PQHS 431 Statistical Methods I PQHS 457 Current Issues in Genetic Epidemiology

(*requires approval by the Biochemistry Undergraduate Program Director)

Freshmen may apply for the Research Honors Track/Concentration early in spring semester of their first year. This track requires completion of the following courses:

BIOC 285	Honors Readings in Biochemistry	(fall of sophomore year)
BIOC 391	Research Project	(2 semesters)
BIOC 393H	Biochemistry Honors Senior Capstone	(in place of BIOC 393)