

BIOLOGY MAJOR

Degree Requirements

All students are required to complete overall degree requirements in addition to their major. Please see Degree Completion Requirements (<https://catalog.hiram.edu/undergraduate/student-academic-responsibilities-performance/degree-completion-requirements/>) for full details for students entering in the 2022-2023 catalog year.

Those students who started at Hiram prior to the 2022-2023 academic year will follow the Degree Requirements outlined in your catalog of record.

Major Requirements

Correlative Courses

Success in the discipline of biology requires some additional training beyond the biology classroom. Students must therefore complete two courses in chemistry and one course from the menu of quantitative reasoning courses offered below.

Elective Tracks

The core courses in the biology major expose students to a range of sub-disciplines and methods that span the breadth and depth of biology as a science. To complete their education, each student will select a track within biology and take three additional courses at the 20000-level or higher (except as noted) to gain additional experience and expertise within that chosen area. Elective tracks in biology:

- Organismal Biology
- Ecology and Evolution
- Genes, Genomes, and Cells
- Bio-Innovation
- Pre-Medical
- Pre-Veterinary
- Pre-Physical Therapy

Coursework recommended for each track is listed below. Note that students may opt to modify and redesign their own areas of expertise or take alternate courses to fulfill requirements within a track with the advice and consent of their biology program advisor.

Teaching Biology

Students interested in a career in teaching biology may need to obtain additional required classes for state licensure. They should meet with an advisor in the education program as early as possible in their career at Hiram to ensure timely completion of all licensure requirements.

Pre-Medical or Pre-Veterinary

Students interested in a career in human or veterinary medicine who major in biology may be required to take multiple additional correlative courses outside the biology major if they wish to be competitive in their application to med or vet school. These correlatives are set by the med or vet schools and are not required to complete the biology major at Hiram College. These correlatives may include PHYS 11300 PRINCIPLES PHYSICS I-W/LAB:SM/PHYS 11400 PRINCIPLES PHYSICS II-W/LAB:SM or PHYS 21300 FUNMNTLS OF PHYSICS-W/LAB I:SM/PHYS 21400 FUNMNTL OF PHYSICS-W/LAB II:SM as well as PSYC 10100 GENERAL PSYCHOLOGY and SOCI 15500 INTRODUCTION TO SOCIOLOGY:CA. Students should meet with their biology program advisor early in their

college career to ensure they are on track to graduate from Hiram with all the necessary prerequisites for the med or vet schools of their choice.

Biomedical Engineering (as Part of Engineering 3+2 Program with CWRU or WUSTL)

Students can substitute the Human Anatomy and Physiology sequence (BIOL 13100 ANATOMY/PHYSIOLOGY I:W/LAB & BIOL 13300 ANATOMY & PHYSIOLOGY II-W/LAB) for the Introductory Biology sequence (BIOL 15100 INTRO BIOL I W/LAB: SM & BIOL 15200 INTRO BIO II W/LAB:SM). One BIOL elective and the APEX capstone are waived. Students interested in the biomedical engineering option should talk with Mark Taylor, Professor of Physics, as early as possible to make sure that they can complete the Hiram College portion of the 3+2 program on time.

Pre-Physical Therapy

Students interested in a career in physical therapy who major in biology may be required to take multiple additional correlative courses outside the biology major if they wish to be competitive in their application to PT school. These correlatives are set by the PT schools and are not required to complete the biology major at Hiram College. Some of these correlatives include PHYS 11300 PRINCIPLES PHYSICS I-W/LAB:SM/PHYS 11400 PRINCIPLES PHYSICS II-W/LAB:SM or PHYS 21300 FUNMNTLS OF PHYSICS-W/LAB I:SM/PHYS 21400 FUNMNTL OF PHYSICS-W/LAB II:SM, as well as PSYC 10100 GENERAL PSYCHOLOGY and SOCI 15500 INTRODUCTION TO SOCIOLOGY:CA, and MATH 10800 STATISTICS:MM. Students should meet with their biology program advisor early in their college career to ensure they are on track to graduate from Hiram with all the necessary prerequisites for the PT schools of their choice.

Code	Title	Hours
Core Courses		
BIOL 15100	INTRO BIOL I W/LAB: SM	4
BIOL 15200	INTRO BIO II W/LAB:SM	4
BIOL 23000	MOLECULAR&CELLULAR BIOL-W/LAB	4
BIOL/EVST 27800	ECOLOGY-W/LAB:SM	4
BIOL 36500	GENETICS-W/LAB	4
BIOL 48110	APPRENTICESHIP EXPERIENCE (APEX)	2
Correlative Courses		
CHEM 12000	GEN I:STRUCTURE/BOND-W/LAB:SM	4
CHEM 12100	GEN II:INTR CHEM ANLS-W/LAB:SM	4
Select one of the following:		4
MATH 10800	STATISTICS:MM	
MATH 19800	CALCULUS I:MM	
PHYS 11300	PRINCIPLES PHYSICS I-W/LAB:SM	
PHYS 21300	FUNMNTLS OF PHYSICS-W/LAB I:SM	
BIOL/PSYC 21000	RESEARCH DESIGN & ANALYSIS:SM	
Elective Tracks		
Select one of the following tracks and take three additional courses at the 20000-level or higher of the following:		9-12
<i>Organismal Biology</i>		
Select three of the following, including at least one plant course & one zoology course:		
BIOL 22300	VERTEBRATE BIOLOGY-W/LAB	
BIOL 25000	INTRO WILDLIFE MGMT-W/LAB:SM	
BIOL 28000	SEM: (Plant Biology w/Lab)	
BIOL 32000	INVERTEBRATE ZOOLOGY-W/LAB	
BIOL 32600	ANIMAL PHYSIOLOGY-W/LAB	

BIOL 33200	PLANT PHYSIOLOGY-W/LAB
BIOL 33800	MICROBIOLOGY-W/LAB
BIOL 38000	SEM: (Ornithology)
BIOL 38000	SEM: (Herpetology)

Ecology and Evolution

BIOL 33500	EVOLUTION
Select two of the following:	
BIOL 22300	VERTEBRATE BIOLOGY-W/LAB
BIOL 25000	INTRO WILDLIFE MGMT-W/LAB:SM
BIOL 28000	SEM: (Plant Biology w/Lab)
BIOL 30000	FIELD BIOLOGY-W/LAB
BIOL 31000	FISHERIES BIOLOGY-W/LAB
BIOL 32000	INVERTEBRATE ZOOLOGY-W/LAB
BIOL 34200	MARINE ECOLOGY-W/LAB
BIOL 34300	CONSERVATION BIOLOGY-W/LAB

Teaching Biology

BIOL 32600	ANIMAL PHYSIOLOGY-W/LAB
Select two of the following, including at least one plant biology course:	
BIOL 22300	VERTEBRATE BIOLOGY-W/LAB
BIOL 28000	SEM: (Plant Biology w/Lab)
BIOL 32000	INVERTEBRATE ZOOLOGY-W/LAB
BIOL 33200	PLANT PHYSIOLOGY-W/LAB
BIOL 33500	EVOLUTION

Genes, Genomes and Cells

Select three of the following:	
NEUR 22700	INTRO TO NEUROSCIENCE
BIOL 20100	TOPICS IN MEDICAL RESEARCH
BIOL 33000	CELLULAR & MOLECULAR NEUROBIO
BIOL 33800	MICROBIOLOGY-W/LAB
BIOL 34000	DEVELOPMENTAL BIOL-W/LAB
BIOL 37800	IMMUNOLOGY
BIOL 41500	ADV MOLECULAR BIOL-W/LAB
INTD 38800	BIOINFORMATICS

Bio-Innovation

ENTR 10100	SCIENCE & THE ENTREPRENEUR
Select two biology electives at the 30000-level or higher ¹	

Pre-Medical or Pre-Veterinary

BCHM 36600	BASIC BIOCHEMISTRY-W/LAB ²
Select two of the following:	
BIOL 22300	VERTEBRATE BIOLOGY-W/LAB
NEUR 22700	INTRO TO NEUROSCIENCE
BIOL 32600	ANIMAL PHYSIOLOGY-W/LAB
BIOL 33800	MICROBIOLOGY-W/LAB
BIOL 37800	IMMUNOLOGY
BIOL 38000	SEM: (Cancer Biology)
BIOL 32100	PARASITOLOGY

Biomedical Engineering (as part of Engineering 3+2 program with CWRU or WUSTL)

MATH 19800	CALCULUS I:MM
MATH 19900	CALCULUS II:MM
MATH 20000	CALCULUS III:MM

MATH 24300	DIFFERENTIAL EQUATIONS:MM
CHEM 22000	INTRO TO ORGANIC CHEM-W/LAB
PHYS 21300	FUNMNTLS OF PHYSICS-W/LAB I:SM
PHYS 21400	FUNMNTL OF PHYSICS-W/LAB II:SM
CPSC 17000	JAVA SUPPLEMENT
or CPSC 17200	INTRO TO PROGRAMMING-W/LAB:MM
BIOL 32600	ANIMAL PHYSIOLOGY-W/LAB
Select one of the following:	
NEUR 22700	INTRO TO NEUROSCIENCE
BIOL 22300	VERTEBRATE BIOLOGY-W/LAB
<i>Pre-Physical Therapy</i>	
BIOL 13100	ANATOMY/PHYSIOLOGY I:W/LAB
BIOL 13300	ANATOMY & PHYSIOLOGY II-W/LAB
Select one of the following:	
BIOL 22300	VERTEBRATE BIOLOGY-W/LAB
NEUR 22700	INTRO TO NEUROSCIENCE
BIOL 32600	ANIMAL PHYSIOLOGY-W/LAB
BIOL 34000	DEVELOPMENTAL BIOL-W/LAB
BIOL 37800	IMMUNOLOGY

Total Hours **43-46**

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Chosen in consultation with a biology program advisor. Students in this track are highly encouraged to pursue an entrepreneurship minor.

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CHEM 22000 INTRO TO ORGANIC CHEM-W/LAB and CHEM 32000 INTERMED ORGANIC CHEM-W/LAB are prerequisites for BCHM 36600 BASIC BIOCHEMISTRY-W/LAB and also requirements for all students applying to med or vet school.

APEX

The apprenticeship experience, or APEX, is designed as the culmination of a student's program in biology BIOL 48110 APPRENTICESHIP EXPERIENCE. The APEX allows each student to apply their expertise in a variety of contexts. This concrete experience can be achieved through an independent or collaborative research project on campus, a research techniques course and project, an internship off campus, or student teaching of biology in middle or secondary school. All students prepare and submit a scientific paper to the faculty supervisor and present a public lecture based upon the apprenticeship experience. Majors are required to meet with their biology faculty advisor no later than the advising period in the fall semester of the junior year to discuss options for the apprenticeship experience. APEX is also considered the capstone course for Biology majors.

Requirements for Honors in Biology

To be a candidate for honors in the APEX program in biology, a student must satisfy the College requirements for honors and must initiate and complete a high quality apprenticeship (APEX). The student must conduct themselves in a professional manner from inception to culmination of the apprenticeship experience.

Phi Beta Kappa

To receive the honor of induction into the Hiram College chapter of Phi Beta Kappa, a biology major must complete the major (any track is acceptable), maintain a GPA of 3.7 or higher, take and pass a foreign

language through the 20200-level, and take and pass a mathematics course at or above 19800-level.

Pathway

Course	Title	Hours	Term
First Year			
Fall 12 Week			
BIOL 15100	INTRO BIOL I W/LAB: SM	4	_____
CHEM 12000	GEN I:STRUCTURE/BOND-W/ LAB:SM	4	_____
UCS 10101	FIRST-YEAR ENDURING QUESTIONS	4	_____
Hours		12	
Fall 3 Week			
Hiram Core Requirement		3	_____
Hours		3	
Spring 12 Week			
BIOL 15200	INTRO BIO II W/LAB:SM	4	_____
CHEM 12100	GEN II:INTR CHEM ANLS-W/ LAB:SM	4	_____
UCS 20201	ADDRESSING URGENT QUESTIONS	4	_____
Hours		12	
Spring 3 Week			
Hiram Core Requirement		3	_____
Hours		3	
Second Year			
Fall 12 Week			
BIOL 27800	ECOLOGY-W/LAB:SM	4	_____
PHYS 11300	PRINCIPLES PHYSICS I-W/ LAB:SM	4	_____
Hiram Core Requirement		4	_____
Hours		12	
Fall 3 Week			
Hiram Core Requirement		3-4	_____
Hours		3-4	
Spring 12 Week			
BIOL XXXXX	Biology Elective ¹	4	_____
Hiram Core Requirement		4	_____
Elective, Second Major, Minor Course		4	_____
Hours		12	
Spring 3 Week			
Hiram Core Requirement		3-4	_____
Hours		3-4	
Third Year			
Fall 12 Week			
UCS 30301	URGENT CHALLENGE SEMINAR:TT	4	_____
BIOL 23000	MOLECULAR&CELLULAR BIOL- W/LAB	4	_____
BIOL XXXXX	Biology Elective ¹	4	_____
Hours		12	

Fall 3 Week

Hiram Core Requirement, Elective, or Minor Course	3-4	_____
Hours	3-4	

Spring 12 Week

BIOL 36500	GENETICS-W/LAB	4	_____
BIOL XXXXX	Biology Elective ¹	4	_____
Hiram Core Requirement		4	_____
Hours		12	

Spring 3 Week

Elective, Second Major, Minor Course	3-4	_____
Hours	3-4	

Fourth Year

Fall 12 Week

BIOL 48110	APPRENTICESHIP EXPERIENCE (APEX)	2	_____
Elective, Second Major, Minor Course		4	_____
Urgent Challenge Seminar		4	_____
Hiram Core Requirement or Elective		3-4	_____
Hours		13-14	

Fall 3 Week

Elective, Second Major, Minor Course	3-4	_____
Hours	3-4	

Spring 12 Week

Major Course if needed or Hiram Core Requirement		3-4	_____
Elective, Second Major, Minor Course		3-4	_____
Elective, Second Major, Minor Course		3-4	_____
Elective, Second Major, Minor Course		3-4	_____
Hours		12-16	

Spring 3 Week

Elective, Second Major, Minor Course	3-4	_____
Hours	3-4	

Total Hours 121-132

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Biology electives are chosen in conjunction with the student's major advisor.