

# FALL 2023 BIOLOGY COURSE DIRECTORY

## For advising you will need:

Degree Advice Report, Classes link on the Student Link, Advising Worksheet, & Course Directory

## COURSE NOTES:

### Courses fulfilling breadth requirements:

#### Cell & Molecular (CM)

CAS BI 203 Cell Biology  
CAS BI 213 Intensive Cell Biology  
CAS BI 218 Cell Biology with ISE 2 Lab

#### Ecology, Behavior & Evolution (EBE)

CAS BI 225 Behavioral Biology  
CAS BI 306 Biology of Global Change  
CAS BI 309 Evolution  
CAS BI 407 Animal Behavior

#### Physiology & Neurobiology (PN)

CAS BI 310 Human Structure & Function  
CAS BI 315 Systems Physiology  
CAS BI 325 Principles of Neuroscience

### Upper Level Lab Courses Offered Fall 2023:

CAS NE 203 Principles of Neuroscience  
CAS BI 218 Cell Biology with ISE 2 Lab  
CAS BI 305 Plant Biology  
CAS BI 306 Biology of Global Change  
CAS BI 310 Human Structure & Function  
CAS BI 311 General Microbiology  
CAS BI 315 Systems Physiology  
CAS/BI 407 Animal Behavior  
CAS BI/CH 421 Biochemistry 1  
CAS BI 513 Genetics Laboratory  
CAS BI 527 Biochemistry Lab 1  
CAS BI 561 Proteostasis in the Biology of Neurodegenerative Disease  
CAS BI Undergraduate Research Courses (first 4-credit semester)

## REGISTRATION NOTES:

- **Permission required courses:** Students may not register for these courses on their own, but may need the instructor to sign an [Add/Drop form](#) which the student would take to CAS Advising or the Registrar. If the course has a waitlist form, students should fill that out instead of contacting the professor about a spot. If the course is a research course, students should follow the instructions for submitting an application for research for credit on the corresponding department's website.
- **Full time status** is 12-18 credits per semester. Seniors are automatically awarded a fee waiver so that they may take up to 20 credits per semester without additional fees. Non-seniors with a 3.3 GPA may submit the [CAS Course Overload Fee Waiver form](#).
- **PDP, ROTC, and CAS FY/SY courses do not count** toward the 128 credits needed to graduate with a BA from CAS.
- The following courses **do not count** toward the Biology or BMB major or minor:
  - CAS BI 105 Introductory Biology for Health Sciences
  - CAS BI 211 Human Physiology
  - CAS BI 527 (unless both sections of BI 527 & 528 are taken)
  - CAS BI 581 (unless two sections of BI 581 & 582 are taken)
  - CAS BI Readings or Research Courses (2-credit option)

## CAS BI 105: INTRODUCTORY BIOLOGY FOR HEALTH SCIENCES

*Prereq: High school biology and chemistry are assumed.*

**Not for Biology or BMB major/minor credit.** Principles of biology; emphasis on cellular structure, genetics, microbiology, development, biochemistry, metabolism, and immunology. This course is appropriate for non-majors and students in the health and paramedical sciences (Sargent College). Students may not receive credit for BI 105 if BI 108 has already been passed. Carries natural science divisional credit (with lab) in CAS.

### Lecture

A1	Hartmann	Mon, Wed, Fri	9:05am - 9:55am
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### Lab

C1	Tue	1:30pm - 3:15pm
C2	Tue	3:30pm - 5:15pm
D1	Wed	10:10am - 11:55am
D2	Wed	12:20pm - 2:05pm
D3	Wed	2:30pm - 4:15pm
E1	Thu	1:30pm - 3:15pm

**Notes: Not for Biology or BMB major or minor credit** (BI 108 is recommended instead).

**Textbooks & Technology:** TBA

**Grading:** Four lecture exams (45%), lecture assignments and homework (20%), laboratory exercises and exams (35%).

**Hub Units:** Scientific Inquiry I, Quantitative Reasoning I, Research and Information Literacy.

## CAS BI 107: BIOLOGY 1

*Prereq: None; high school biology assumed.*

The evolution and diversity of life; principles of ecology; behavioral biology. For students who plan to major in the natural sciences or environmental science, and for premedical students. Required for biology majors.

### Lecture

A1	Mullen, Spilios, Wasserman	Tue, Thu	12:30pm - 1:45pm
A2	Mullen, Spilios, Wasserman	Mon, Wed, Fri	2:30pm - 3:20pm

### Lab

B1	Mon	2:30pm - 5:15pm	D5	Wed	2:30pm - 5:15pm
B2	Mon	2:30pm - 5:15pm	D6	Wed	2:30pm - 5:15pm
B3	Mon	2:30pm - 5:15pm	D7	Wed	6:30pm - 9:15pm
C0	Tue	8:00am - 10:45am	D8	Wed	6:30pm - 9:15pm
C1	Tue	8:00am - 10:45am	D9	Wed	6:00pm - 8:45pm
C2	Tue	8:00am - 10:45am	E1	Thu	8:00am - 10:45am
C3	Tue	12:30pm - 3:15pm	E2	Thu	8:00am - 10:45am
C4	Tue	12:30pm - 3:15pm	E4	Thu	12:30pm - 3:15pm
C5	Tue	12:30pm - 3:15pm	E5	Thu	12:30pm - 3:15pm
C6	Tue	3:30pm - 6:15pm	E6	Thu	12:30pm - 3:15pm
C7	Tue	3:30pm - 6:15pm	E7	Thu	6:30pm - 9:15pm
C9	Tue	6:30pm - 9:15pm	E8	Thu	6:30pm - 9:15pm
D1	Wed	8:00am - 10:45am	E9	Thu	6:30pm - 9:15pm
D2	Wed	6:30pm - 9:15pm	F1	Fri	8:00am - 10:45am
D4	Wed	2:30pm - 5:15pm	F2	Fri	8:00am - 10:45am

**Textbooks & Technology:** Hillis et al, Principles of Life, 3rd ed, Sinauer, 2019; ExamSoft Account; lab manual

**Grading:** Periodic lecture assessments, and lab assignments.

**Hub Units:** Scientific Inquiry I, Quantitative Reasoning I, Critical Thinking, Research and Information Literacy.

## CAS BI 203: CELL BIOLOGY

*Prereq: (CAS BI 108 or CAS NE 102) and CAS CH 102 or equivalent.*

*Coreq: CAS CH 203 or equivalent.*

Principles of cellular organization and function: biological molecules, flow of genetic information, membranes and subcellular organelles, and cell regulation. Three hours lecture, one hour discussion.

### Lecture

A1	Beffert	Tue, Thu	9:30am - 10:45am
		Mon	6:30pm - 8:00pm *
A2	Beffert	Tue, Thu	3:30pm - 4:45pm
		Mon	6:30pm - 8:00pm *

\* These time slots are reserved for exams.

### Discussion

B2	Mon	11:15am - 12:05pm	D4	Wed	8:00am - 8:50am
B3	Mon	12:20pm - 1:10pm	D5	Wed	2:30pm - 3:20pm
B4	Mon	1:25pm - 2:15pm	E1	Thu	11:15am - 12:05pm
B5	Mon	12:20pm - 1:10pm	F1	Fri	11:15am - 12:05pm
B6	Mon	1:25pm - 2:15pm	F2	Fri	1:25pm - 2:15pm
B7	Mon	11:15am - 12:05pm			
B8	Mon	3:35pm - 4:25pm			
C1	Tue	11:15am - 12:05pm			
C2	Tue	11:15am - 12:05pm			
D1	Wed	11:15am - 12:05pm			
D2	Wed	12:20pm - 1:10pm			
D3	Wed	1:25pm - 2:15pm			

**Notes:** Class meets with BI 218 and BI 281. Students may receive credit for CAS BI 203 or 213, but not both courses.

**Textbook & Technology:** *The Cell, A Molecular Approach*, 8th edition, by Geoff Cooper. Oxford University Press, 2018.

**Grading:** Three midterm examinations, homework, in-class questions, discussion, and one final examination.

**Hub Units:** Scientific Inquiry 1, Quantitative Reasoning 1, Critical Thinking

## CAS BI 211: HUMAN PHYSIOLOGY

*Prereq: (CASBI105 OR CASBI108) & (CASBI106 OR CASBI210); or equivalent. First Year Writing Seminar (e.g., WR 100 or WR 120)*

**Not for Biology or BMB major/minor credit.** Intro. to principles of systemic mammalian physiology with special reference to humans.

### Lecture

A1	Co	Mon, Wed, Fri	1:25pm - 2:15pm
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### Lab

B1	Mon	2:30pm - 5:15pm	D3	Wed	6:30pm - 9:15pm
B2	Mon	6:30pm - 9:15pm	E1	Thu	12:30pm - 3:15pm
C1	Tue	12:30pm - 3:15pm			
C2	Tue	6:00pm - 8:45pm			
D1	Wed	8:00am - 10:45am			
D2	Wed	2:30pm - 5:15pm			

**Notes: Not for Biology or BMB major/minor credit** (BI 315 is recommended for major credit instead).

**Textbooks & Technology:** Silverthorn, *Human Physiology*, 8th ed., 2019; Top Hat Pro Account and lab manual.

**Grading:** 65% lecture; 5% teamwork; 30% lab.

**Hub Units:** Scientific Inquiry 2, Writing-Intensive, Critical Thinking, Teamwork/Collaboration

## CAS BI 213: INTENSIVE CELL BIOLOGY

*Prereq: CAS BI 108 and CAS CH 102 or equivalent.*

*Coreq: CAS CH 203 or equivalent.*

Recommended for students in BMB and the specialization in Cell Biology, Molecular Biology & Genetics. Alternative to CAS BI 203 emphasizing experimental approaches and in-depth discussion. Molecular basis of cell biology, including genomics, subcellular organelles, cell signaling, stem cells, and cancer.

### Lecture

A1	Naya	Tue, Thu	9:30am - 10:45am
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### Discussion

B1	Mon	12:20pm - 1:10pm	B3	Mon	4:40pm - 5:30pm
B2	Mon	1:25pm - 2:15pm	B4	Wed	12:20pm - 1:10pm

**Notes:** This course meets with CAS BI 218. Students may receive credit for CAS BI 213 or 203, but not both courses.

**Textbook & Technology:** Cooper, *The Cell: A Molecular Approach*, 8th ed, Oxford University Press, 2019

**Grading:** Two midterms, final exam, and discussion.

**Hub Units:** Scientific Inquiry 1, Quantitative Reasoning 1, Research & Information Literacy

## CAS BI 218: CELL BIOLOGY WITH INTEGRATED SCIENCE EXPERIENCE 2 LAB

*Prereq:* CAS BI 116 and CAS CH 116 (or equivalent) or consent of instructor.  
*Coreq:* CAS CH 218.

[5 cr] Integration of cell biology with organic chemistry and neuroscience, with emphasis on how each discipline interacts experimentally. Laboratory focuses on synthesizing compounds and testing in biological systems.

### Lecture

A1	Beffert	Tue, Thu	9:30am - 10:45am
		Mon	6:30pm - 8:00pm

*Meets with BI 203 A1. Monday evening timeslot reserved for exams.*

A2	Beffert	Tue, Thu	3:30pm - 4:45pm
		Mon	6:30pm - 8:00pm

*Meets with BI 203 A2. Monday evening timeslot reserved for exams.*

A3	Naya	Tue, Thu	9:30am - 10:45am
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*Meets with BI 213.*

### Discussion

B1 Register for a BI 203 or 213 discussion.

### Lab

L1	Bushell	Wed.	1:25-5:25pm
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### Prelab

P1	Bushell	Mon	2:30pm - 4:15pm
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**Textbooks & Technology:** Cooper, *The Cell: A Molecular Approach*, 8th ed, Oxford University Press, 2019

**Grading:** Lecture (75%) and laboratory (25%). Also see the BI 203 or BI 213 grading section.

**Hub Units:** Scientific Inquiry 2, Quantitative Reasoning 2, Teamwork/Collaboration, Writing-Intensive

## CAS BI 225: BEHAVIORAL BIOLOGY

*Prereq:* CAS BI 107, CAS BI 108 and sophomore standing. Seats reserved for Behavioral Biology majors; other students must receive consent of instructor. BI 225 and BI 407 cannot be taken concurrently, and BI 225 cannot be taken following completion of BI 407.

Introduction to the evolution, ecology, physiology, neurobiology and genetics of behavior. Topics include behavioral adaptation, behavior and conservation, nerve cells, circuits, neuromodulators, and behavior, behavioral genetics and genomics, sociogenomics, the development of behavior, hormones and behavior, communication, sexual selection and reproductive behavior, cooperation and altruism, socioecology, social evolution and culture. Emphasis on the interdisciplinary analysis of behavior. Integrated lectures, discussions, and class exercises.

### Lecture

A1	Pain	Tue, Thu	2:00pm - 3:15pm
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### Discussion

B1	Pain	Thu	3:35pm - 4:25pm
B2	Pain	Fri	9:05am - 9:55am

**Textbooks & Technology:** Behavioral Biology; Alcock, Animal Behavior (edition TBA).

**Grading:** 3 quizzes, research paper and class presentation, research article analysis and discussion; engagement and participation.

**Hub Units:** Philosophical Inquiry and Life's Meanings, Writing-Intensive Course, Oral/Signed Communication

## CAS BI 281: FUNDAMENTALS OF BIOLOGY 1

**Limited to seven-year medical students.** Principles of cellular organization and function: biological molecules, flow of genetic information, membranes and subcellular organelles, and cell regulation. Three hours lecture, one hour discussion, three hours lab.

### Lecture

A1	Beffert	Tue, Thu Mon*	9:30am - 10:45am 6:30pm - 8:00pm
A2	Beffert	Tue, Thu Mon*	3:30pm - 4:45pm 6:30pm - 8:00pm

\*Time slot reserved for exams.

### Lab

C1	Fri	8:00am - 10:45am
D2	Fri	11:15am - 2:00pm

### Discussion

Please register for a BI 203 discussion.

**Textbook & Technology:** See the BI 203 Textbooks & Technology section.

**Grading:** See the BI 203 Grading section.

**Hub Units:** Scientific Inquiry 1, Quantitative Reasoning 1, Critical Thinking

## CAS BI 305: PLANT BIOLOGY

*Prereq: (CAS BI107 and CAS BI108)*

An introduction to the plant sciences, including plant structure and diversity; reproduction, growth, and development; and economic and medicinal uses. Emphasis on new developments in the plant sciences. Three hours lecture, three hours lab.

### Lecture

A1	Primack	Tue, Thu	9:30am - 10:45am
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### Lab

B1	Primack	Mon	2:30pm - 5:15pm
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**Textbooks & Technology:** TBA

**Grading:** TBA

## CAS BI 306: BIOLOGY OF GLOBAL CHANGE

*Prereq: CAS BI 107; Recommended: CAS CH 101 or CH 171.*

The ecological impacts of human activity on terrestrial and aquatic ecosystems. Climate change, forest decline, eutrophication, acidification, loss of species diversity, and restoration of ecosystems.

### Lecture

A1	Templer	Tue, Thu	11:00am - 12:15pm
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### Lab

B1	Tue	12:30pm - 3:15pm	C2	Wed	2:30pm - 5:15pm
C1	Wed	8:00am - 10:45am	D1	Thu	12:30pm - 3:15pm
			E1	Fri	11:15am - 2:00pm

**Textbooks & Technology:** Wright, *Environmental Science: Toward a Sustainable Future*, 12th ed., Pearson, 2013

**Grading:** Two midterms (total of 40%), final examination (20%), and laboratory (included paper and presentation) (40%).

**Hub Units:** Scientific Inquiry II, Ethical Reasoning, Research and Information Literacy.

## CAS BI 309: EVOLUTION

*Prereq: CAS BI 107 and CAS BI 108 or equivalent.*

Introduction to modern concepts, controversies, and analytical approaches in evolutionary biology. Topics include adaptation, natural and sexual selection, species and speciation, phylogenetics, comparative analysis, basic population and quantitative genetics, origin of novelty, adaptive radiation, development and evolution.

### Lecture

A1	Mullen	Mon, Wed, Fri	10:10am - 11:00am
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### Discussion

B1	Wed	12:20pm - 1:10pm	B3	Thu	11:15am - 12:05pm
B2	Wed	1:25pm - 2:15pm	B4	Thu	3:35pm - 4:25pm

**Textbooks & Technology:** Herron and Freeman, *Evolutionary Analysis*, 5th ed., Pearson, 2013

**Grading:** 2 midterms (50%), final (25%), and discussion (25%)

**Hub Units:** Ethical Reasoning



## CAS BI 310: HUMAN STRUCTURE & FUNCTION

Prereq: CAS BI 108 and CAS BI 203

Examines the cells and tissues that make up our organs (histology), the structure and interactions of the organ systems (anatomy), and how disease reshapes our bodies (pathology). As a secondary focus, this course also studies and critiques educational media related to human anatomy, and builds introductory competency in health communication.

### Lecture

A1 Co Mon, Wed, Fri 11:15am - 12:05pm

### Lab

B1 Tue 12:30pm - 3:15pm

B2 Tue 3:30pm - 6:15pm

**Textbooks & Technology:** Saladin, *Human Anatomy*, 6th ed. McGraw-Hill, 2020; Visible Body Virtual Dissection App; Co, Anatomy Course Manual

**Grading:** Four lecture exams (45%), multi-part media project (15%), lecture assignments and homework (10%), laboratory exercises and exams (30%).

**Hub Units:** Scientific Inquiry I, Digital/Multimedia Expression, Creativity/Innovation

## CAS BI 311: GENERAL MICROBIOLOGY

Prereq: CAS BI 203 and CAS BI 206 or equivalent or consent of the instructor and WR 120 or equivalent.

Organisms discussed include bacteria, archaea, viruses, fungi, protists, and algae. Course will cover microbial diversity, the environmental and human micro biomes, and technologies used to study microbes today. Global issues of emerging infectious disease, agriculture and microbial responses to global change are discussed.

### Lecture

A1 Bhatnagar Mon, Wed, Fri 10:10am - 11:00am

### Lab

B1 Mon, Wed 12:20pm - 2:05pm

B2 Mon, Wed 2:30pm - 4:15pm

B3 Tue, Thu 9:00am - 10:45am

B4 Tue, Thu 1:30pm - 3:15pm

B5 Tue, Thu 3:30pm - 5:15pm

B6 Mon, Wed 10:10am - 11:55am

B7 Mon, Wed 4:30pm - 6:15pm

**Textbooks & Technology:** Slonczewski and Foster, *Microbiology: An Evolving Science*, 4th ed., W.W. Norton & Company, Inc., 2017

**Grading:** Exams (21%), wiki assignment (13%), lab assignments (45%), participation (5%), and final exam (13%).

**Hub Units:** Scientific Inquiry 2, Writing-Intensive, Teamwork/Collaboration

## CAS BI 315: SYSTEMS PHYSIOLOGY

Prereq: (CAS BI 108 or ENG BE 209), WR 120 or equivalent, and CAS CH 101 and CAS CH 102, or equivalent.

An introduction to physiological principles applied across all levels of organization (cell, tissue, organ system). Preparation for more advanced courses in physiology. Topics include homeostasis and neural, muscle, respiratory, cardiovascular, renal, endocrine, gastrointestinal, and metabolic physiology.

### Lecture

A1 Muscedere Mon, Wed, Fri 11:15am - 12:05pm

### Lab

B1 Mon 2:30pm - 5:15pm D3 Wed 6:30pm - 9:15pm

B2 Mon 6:30pm - 9:15pm E1 Thu 8:00am - 10:45am

C1 Tue 8:00am - 10:45am E2 Thu 12:30pm - 3:15pm

C2 Tue 12:30pm - 3:15pm E3 Thu 6:30pm - 9:15pm

C3 Tue 6:30pm - 9:15pm F1 Fri 8:00am - 10:45am

D1 Wed 8:00am - 10:45am F2 Fri 8:00am - 10:45am

D2 Wed 2:30pm - 5:15pm

**Textbooks & Technology:** Widmaier et al., *Vander's Human Physiology: The Mechanisms of Body Function*, 15th ed., McGraw-Hill Education, 2013; Top Hat Pro account and lab manual.

**Grading:** Lecture (60%: 4 exams, small assignments); Lab (40%, 4 writing assignments, teamwork assignments).

**Hub Units:** Scientific Inquiry 2, Writing-Intensive, Critical Thinking, Teamwork/Collaboration

## CAS BI 325: PRINCIPLES OF NEUROSCIENCE

*Prereq: CAS BI 203 or consent of instructor.*

This course will introduce fundamentals of the nervous system at descriptive scales ranging from individual cells to the entire brain. Topics will include biophysics of excitable membranes, synaptic transmission, sensory and motor systems, learning and memory, plasticity, neuromodulation, and the biological basis of complex behaviors.

### Lecture

A1 Gavornik Tue, Thu 12:30pm - 1:45pm

### Discussion

B1	Wed	12:20pm - 1:10pm	B5	Fri	11:15am - 12:05pm
B2	Wed	1:25pm - 2:15pm	B6	Fri	12:20pm - 1:10pm
B3	Fri	9:05am - 9:55am	B7	Wed	9:05am - 9:55am
B4	Fri	10:10am - 11:00am	B8	Wed	3:35pm - 4:25pm

**Notes:** Meets with NE 203.

**Textbooks & Technology:** Bear, Connor, and Paradiso, *Neuroscience: Exploring the Brain*, 4th ed., Lippincott Williams & Wilkins, 2015. ExamSoft account.

**Grading:** Texts, quizzes, and participation.

**Hub Units:** Scientific Inquiry 2, Critical Thinking

## CAS BI 407: ANIMAL BEHAVIOR

*Prereq: CAS BI 107.*

The science of ethology on a hormonal, neural, and evolutionary level. Special emphasis will be on significance and adaptiveness of an expressed behavior. Individual lab projects as well as some prepared labs may require more than the scheduled time. BI 407 and BI 225 cannot be taken concurrently.

### Lecture

A1 Wasserman Tue, Thu 3:30pm - 4:45pm

### Lab

B1 Mon 2:30pm - 5:15pm F1 Fri 2:30pm - 5:15pm  
E1 Thu 12:30pm - 3:15pm

**Notes:** Meets with BI 607.

**Textbooks & Technology:** None.

**Grading:** 3 Lecture exams (66%) and lab (34%).

**Hub Units:** Philosophical Inquiry & Life's Meanings, Ethical Reasoning, Research & Information Literacy

## CAS BI 408: INSECT BIOLOGY

*Prereq: (CASBI107 & CASBI108) CAS BI 303 is recommended.*

Course explores the biology of insects, focusing on insect diversity and complexity. Lectures will focus on various aspects of insect biology, including development, physiology, behavior, ecology and evolution. Lab will focus on insect diversity.

### Lecture

A1 Casasa Velez Mon, Wed 10:10am - 11:00am

### Lab

A1 Mon 2:30pm - 5:15pm

**Textbooks & Technology:** TBA

**Grading:** TBA

## CAS BI 410: DEVELOPMENTAL BIOLOGY

*Prereq: CAS BI 203 or BI 213 or BI 218 or consent of the instructor.*

Contemporary aspects of embryonic development are covered, drawing from current literature. There is an emphasis on the use of experimental approaches to address topics such as polarity in the egg, body axis specification, embryonic patterning, and organogenesis.

### Lecture

A1 Bradham Tue, Thu 2:00pm - 3:15pm

### Discussion

B1 Wed 1:25pm - 2:15pm  
B2 Wed 2:30pm - 3:20pm  
B3 Wed 12:20pm - 1:10pm

**Notes:** Meets with GRS BI 610.

**Textbooks & Technology:** Gilbert, *Developmental Biology*, 10th ed., Sinauer, 2013

**Grading:** Three exams plus discussion grade.

## CAS BI 421: BIOCHEMISTRY 1

*Prereq: CAS CH 204 or CAS CH 212 or CAS CH 214 or equivalent and WR 120 or equivalent.*

Introductory biochemistry. The following topics are covered: protein structure and folding enzyme mechanisms, kinetics, and allostery; nucleic acid structure; lipids and membrane structure; bioenergetics; vitamins and coenzymes; introduction to intermediary metabolism. See BI 527 for lab content.

### Lecture

A1	Tolan	Mon	8:00am - 8:50am
		Mon, Wed, Fri	9:05am - 9:55am
A2	Liu	Tue, Thu	2:00pm - 3:15pm
		Mon*	6:30pm - 8:30pm

\*Time slot reserved for exams

### Lab

BA	Mon	10:10am - 2:10pm	B4	Thu	8:00am - 12:00pm
BB	Mon	3:35pm - 7:35pm	B5	Thu	1:25pm - 5:25pm
BC	Tue	3:35pm - 7:35pm	B6	Thu	6:30pm - 10:30pm
B1	Wed	8:00am - 12:00pm	B7	Fri	8:00am - 12:00pm
B2	Wed	1:25pm - 5:25pm	B8	Fri	1:25pm - 5:25pm
B3	Wed	6:30pm - 10:30pm	B9	Fri	6:30pm - 10:30pm

### Discussion

C1	Mon	12:20pm - 2:05pm
C2	Tue	3:35pm - 4:50pm

**Notes:** This class meets with CAS BI/CH 527, GRS BI/CH 621, and MET CH 421. Students may also register for the CH 421 laboratory and discussion sections; however, preference in registration for these sections will be given to chemistry majors.

**Textbooks & Technology:** Lehninger, *Principles of Biochemistry*, 7th ed., Nelson and Cox.

**Grading:** Exams (65%), and lab (35%).

**Hub Units:** Quantitative Reasoning 2, Writing-Intensive, Critical Thinking, Teamwork/Collaboration

## CAS BI 443: TERRESTRIAL BIOGEOCHEMISTRY

*Prereq: CAS BI 107 or CAS ES 105 and CH 101/102, or consent of instructor*

The patterns and processes controlling carbon and nutrient cycling in terrestrial ecosystems. Links between local and global scales are emphasized. Topics include net primary production, nutrient use efficiency, and biogeochemical transformation.

### Independent

A1	TBD	Mon, Wed, Fri	11:15am - 12:05pm
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**Textbooks & Technology:** TBA

**Grading:** TBA

**Notes:** Meets with BI 643.

## CAS BI 448: CONSERVATION BIOLOGY

*Prereq: (CASBI303 OR CASBI306) or consent of instructor.*

The study of biological diversity and modern methods to protect endangered plant and animal species. The environment, population, and genetic and human factors that affect the survival of species are examined for temperate and tropical communities, as well as terrestrial and aquatic habitats. Three hours lecture, one hour discussion. Effective Fall 2020, this course fulfills a single unit in each of the following BU Hub areas: Oral and/or Signed Communication, Ethical Reasoning.

### Lecture

A1	Primack	Mon, Wed, Fri	1:25pm - 2:15pm
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### Discussion

A1	Primack	Wed	2:30pm - 3:20pm
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**Textbooks & Technology:** TBA

**Grading:** TBA



## CAS BI 455: DEVELOPMENTAL NEUROBIOLOGY

*Prereq: CAS BI 203 or CAS BI 325 or CAS NE 203 or consent of instructor.*

This course will introduce current theories regarding the formation of the nervous system. Emphasis will be placed on the cellular and molecular mechanisms underlying events including neuronal determination, neurogenesis, patterning, axonal growth and guidance, polarity, synaptogenesis, synaptic modification, and cell death.

### *Lecture and Discussion*

A1	Man	Wed	10:10am - 11:55am
		Fri*	10:10am - 11:55am

\*Also includes paper presentation

**Notes:** Meets with CAS NE 455 and GRS BI 655.

**Textbooks & Technology:** (Recommended) Sanes, Reh, and Harris, *Development of the Nervous System*, 3rd ed., Academic Press, 2011; (Optional) Rao and Jacobson, *Developmental Neurobiology*, 4th ed., Springer, 2005.

**Grading:** One midterm and one final exam.

## CAS BI 507: DIVERSITY OF SEX

*Prereq: Senior or graduate standing, WR 120 or equivalent, and at least one of the following courses or equivalent: CAS BI 225, BI 309, BI 315, BI 407, or BI 410; or consent of instructor.*

Examines the integrative and comparative biology of sex and sexes based on readings drawn from recent primary literature, review papers, and book chapters. Effective Fall 2023, this course fulfills a single unit in each of the following BU Hub areas: Writing-Intensive Course, Oral and/or Signed Communication.

### *Independent*

A1	Mon, Wed	Warkentin	10:10am - 11:55am
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**Notes:** Meets with CAS WS 507

**Textbooks & Technology:** TBA

**Grading:** TBA

## CAS BI 510: INSTITUTIONAL RACISM IN HEALTH AND SCIENCE

*Prereq: CAS BI 126 or CAS 206/216 or ENG BE 209 and senior standing, or consent of instructor.*

Historically, pseudoscientific theories have provided the justification for establishing and maintaining racial hierarchies, which resulted in centuries of dehumanizing and unethical practices meted out to Blacks, Indigenous, and People of Color (BIPOC). Unfortunately, many of these pernicious ideas persist, such that they hinder BIPOC's opportunities in Science and exacerbate their health outcomes. This course traces the historical roots (e.g. mischaracterization of race as a biological construct) and physiological manifestations of racism in science, and examines harmful consequences on victims' health outcomes.

### *Independent*

A1	Osborne	Mon, Wed, Fri	2:30pm - 3:20pm
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**Notes:** Meets with ENG BF 510.

**Textbooks & Technology:** *Superior: The Return of Race Science* by Angela Saini ISBN-13 978-0-8070-2842-1; Assigned papers

**Grading:** Writing assignments/homework, discussion, capstone project

## CAS BI 513: GENETICS LAB

*Prereq: CAS BI 203 and CAS BI 206, senior standing, and consent of instructor.*

Genetic techniques such as mutant selection and screening, complementation, mapping, recombinant DNA, and targeted mutagenesis are taught using the genetic model systems *Escherichia coli*, *Saccharomyces cerevisiae*, and *Arabidopsis thaliana*. Short-term and long-term projects in which students formulate and test hypotheses.

### *Lab*

A1	Celenza	Tue, Thu	12:30pm - 3:15pm
A2	Hartmann	Tue, Thu	4:15pm - 7:00pm

**Notes:** To register for BI 513, please fill out this waitlist form: <https://forms.gle/vspHGPGT5iD2JuWv7>

**Textbooks & Technology:** Class notes and assigned papers.

**Grading:** Lab reports, homework, notebook and attendance.

## CAS BI 515: POPULATION GENETICS

*Prereq: (CASBI206 OR CASBI309) and (CAS MA 121/123 or CAS MA 115/213) or consent of instructor.*

Examines evolutionary processes that give rise to genetic variation in populations, such as mutation, drift, and selection. Covers theoretical basis of population genetics including Hardy-Weinberg equilibrium, coalescence, neutral theory, and quantitative genetics, and application of techniques to real datasets.

### Lecture

A1 Sorenson Mon, Wed, Fri 3:35pm - 4:25pm

### Discussion

B1 Sorenson Wed 2:30pm - 3:20pm

**Textbooks & Technology:** TBA

**Grading:** TBA

## CAS BI 520: SENSORY NEUROBIOLOGY

*Prereq: (CASBI325 OR CASNE203) or consent of instructor.*

A broad survey of sensory system function in model organisms and humans, focusing on fundamental principles of neural processing. Topics include basic cellular transduction, neural coding, and links between neural activity and sensory perception. Also offered as CAS NE 520.

### Lecture

A1 Younger Tue, Thu 11:00am - 12:15pm

### Discussion

B1 Wed 4:40pm - 5:30pm

**Textbooks & Technology:** TBA

**Grading:** TBA

## CAS BI 527: BIOCHEMISTRY LAB 1

*Prereq: (CAS CH 204 and CAS CH 212 and CAS CH 214) or CAS CH 282.*

**[2 cr] Not for Biology major or minor credit unless both BI 527 and BI 528 are taken.** Emphasizes the purification and characterization of proteins and DNA. Development and use of modern instrumentation and techniques.

### Lecture

A1 TBD Mon 12:20pm - 2:05pm

A2 TBD Tue 3:35pm - 4:50pm

### Lab

BA Mon 10:10am - 2:10pm

BB Mon 3:35pm - 7:35pm

BC Tue 3:35pm - 7:35pm

B1 Wed 8:00am - 12:00pm

B2 Wed 1:25pm - 5:25pm

B3 Wed 6:30pm - 10:30pm

B4 Thu 8:00am - 12:00pm

B5 Thu 1:25pm - 5:25pm

B6 Thu 6:30pm - 10:30pm

B7 Fri 8:00am - 12:00pm

B8 Fri 1:25pm - 5:25pm

B9 Fri 6:30pm - 10:30pm

**Notes:** Meets with CAS CH 527, CAS BI 421, GRS BI/CH 621 and MET CH 421. **Not for Biology major or minor credit unless both BI 527 and BI 528 are taken.**

**Textbooks & Technology:** Tolan & Medrano, *Biochemistry Laboratory Manual*, 5th Ed., 2020.

**Grading:** Attendance, pre-lab quizzes, lab notebooks and reports, safety, and participation.

**Hub Units:** Teamwork/Collaboration

## CAS BI 535: TRANSLATIONAL RESEARCH IN ALZHEIMER'S DISEASE

*Prereq: (CAS BI 203 or CAS NE 102) and (CAS BI 325 or CAS NE 203).*

An introduction to translational research focused on Alzheimer's disease, with particular emphasis on the search for new therapeutic targets, from observations of pathogenic phenotypes in patients to the development of appropriate animal and cellular models of the disease.

### *Independent*

A1	Pastorino	Mon, Wed, Fri	1:25pm - 2:15pm
		Wed	2:30pm - 3:20pm

**Notes:** Meets with NE 535.

**Textbooks & Technology:** Powerpoint presentations on research articles will be provided to students the day before class.

**Grading:** Exams (66%), assignments (13%), paper presentation (13%), and participation in class (8%).

**Hub Units:** Ethical Reasoning, Oral/Signed Communication, Research & Information Literacy

## CAS BI 551: BIOLOGY OF STEM CELLS

*Prereq: CAS BI 203 or CAS BI 206 or consent of instructor.*

Views on stem cell research range from assumptions of a potential cure for most diseases to fears that it will depreciate the value of human life. This course equips students with the science that underlies this discussion, including the biological properties of stem cells and the experimental hurdles to its utilization in regenerative medicine.

### *Lecture and Discussion*

A1	Frydman	Tue, Thu	9:30am - 10:45am
		Thu	11:15am - 12:05pm

**Textbooks & Technology:** Primary literature will be provided on the blackboard site.

**Grading:** Midterm, final, presentation, and participation.

## CAS BI 552: MOLECULAR BIOLOGY 1

*Prereq: (CAS BI 203 or CAS BI 213) and CAS BI 206 or CAS BI 216.*

How cells synthesize biologically important macromolecules (DNA, RNA and proteins), as well as their structure, function and regulation. Both prokaryotic and eukaryotic molecular biology are discussed. Topics include: DNA replication, DNA repair, recombination, prokaryotic transcription, translation, eukaryotic transcription/RNA processing, DNaseI hypersensitive sites, 5-methylcytosine, eukaryotic RNA polymerase structure/CTD modification, eukaryotic promoter structure, general transcription factors, enhancer-promoter loops, histone modification/chromatin remodeling, and non-coding RNA. Discussion of important molecular biological techniques such as genetic & recombinant DNA techniques, including CRISPR/Cas9.

### *Lecture*

A1	Loechler	Tue, Thu	11:00am - 12:15pm
		Thu*	6:30pm - 10:30pm
A2	Loechler	Tue, Thu	3:30pm - 4:45pm
		Thu*	6:30pm - 10:30pm

\*Time reserved for two exams during the semester (probably 10/13 & 11/17)

### *Discussion*

B1	Tue	5:00pm - 5:50pm
B2	Wed	10:10am - 11:00am
B3	Wed	1:25pm - 2:15pm
B4	Wed	2:30pm - 3:20pm
B5	Wed	3:35pm - 4:25pm
B6	Thu	5:00pm - 5:50pm

**Textbooks & Technology:** TBD and TopHat.

**Grading:** 3 exams (25% each), homework (12.5%), and discussion participation (12.5%).

## CAS BI 556: DRUG DISCOVERY IN NEUROSCIENCE

*Prereq: CAS NE 102 (or BI 108), CH 102, and strongly recommended NE/PS 333, or consent of instructor.*

The process of drug discovery is complex especially when a drug is intended to treat a neurological disease. This discussion-heavy course examines the specific challenges of modern neuroscience drug discovery, including: target selection, pharmacodynamics, animal models, and clinical trials. Effective Fall 2021, this course fulfills a single unit in each of the following BU Hub areas: Digital/Multimedia Expression, Scientific Inquiry II, Creativity/Innovation.

### *Independent*

A1	Staff	Mon, Wed	10:10am - 11:55am
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**Textbooks & Technology:** TBD

**Grading:** TBD

## CAS BI 560: SYSTEMS BIOLOGY

*Prereq:* CAS BI 552 or consent of the instructor.

Examines critical components of systems biology, including design principles of biological systems (e.g., feedback, synergy, cooperativity), and the generation and analysis of large-scale datasets (e.g., protein-protein interaction, mRNA expression).

*Independent*

A1 Siggers Mon, Wed 2:30pm - 4:15pm

**Textbooks & Technology:** Course readings provided via Blackboard.

**Grading:** Midterm 1, midterm 2 (midterm total 30%), final exam (40%), and class participation (30%).

## CAS BI 561: PROTEOSTASIS IN THE BIOLOGY OF NEURODEGENERATIVE DISEASES

*Prereq:* (CASNE102 OR CASBI108) . CAS BI 203 or CAS BI 213 are recommended.

A hands-on class focusing on the mechanisms that control protein homeostasis, and on the approaches that we can use to study how it may change in conditions associated with neurodegenerative diseases. The class mimics, as much as possible, a real research environment, as students carry out experiments throughout the semester, learn how to develop and test new hypotheses, and also share knowledge through weekly readings and presentation of research articles inherent to the topics of the class. Effective Fall 2021, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry II, Creativity/Innovation, Research and Information Literacy.

*Independent*

A1 Pastorino Mon, Fri 2:30pm - 6:30pm

**Textbooks & Technology:** TBA

**Grading:** TBA

**Hub Units:** Scientific Inquiry 2, Research and Information Literacy, Creativity/Innovation

## CAS BI 566: DNA DYNAMICS IN DISEASE

*Prereq:* CAS BI 206 or 216, or approval from instructor

What goes wrong to cause disease? In this course we will examine diseases caused by problems in basic cellular processes including mitosis, meiosis, and DNA repair. We will focus on past and current research that has led to the understanding of the mechanisms contributing to disease. Content will be delivered through active, engaging lectures where you will analyze data from past and current research papers, and think critically to answer questions. Paper discussion days will include in-depth analysis of one primary literature article that is central to the field and addresses the content of that module. You will display the knowledge and skills learned through participation, problem sets, and exams.

*Independent*

A1 Hartmann Mon, Wed 10:10am - 11:55am

**Textbooks & Technology:** Primary literature and other materials will be provided.

**Grading:** Problem sets, exams, presentation, participation.

## CAS BI 572: ADVANCED GENETICS

*Prereq:* (CASBI206 & CASBI203) CAS BI 552 is recommended.

An in-depth study of eukaryotic genetics, ranging from the history and basic principles to current topics and modern experimental approaches. Genetics of *Drosophila*, *C. elegans*, mice, and humans are explored in detail, including readings from primary literature. Three hours lecture, one hour discussion.

*Lecture*

A1 McCall Tue, Thu 11:00am - 12:15pm

*Discussion*

A1 McCall Wed 12:20pm - 1:10pm

**Textbooks & Technology:** Meneely, *Genetic Analysis: Genes, Genomes, and Networks in Eukaryotes*, 3rd Ed., Oxford University Press, 2020

**Grading:** 2 Midterms (20%), final exam (25%), problem sets (15%), discussion/participation (10%), and final presentation (10%).

## CAS BI 581 G1: SEMINAR IN BIOLOGY

*Prereq:* Consent of instructor

Informal discussion and student reports on subjects of current interest based on an intensive study of the literature. Topics and prerequisites vary. Not for Biology major or minor credit unless two sections of BI 581/582 are taken.

*Independent*

G1 Gilmore Thu 9:00am - 10:45am

**Textbooks & Technology:** TBA

**Grading:** TBA

## CAS BI 588: PROJECT DESIGN AND STATISTICS IN BIOLOGICAL ANTHROPOLOGY

*Prereq: CAS AN 102 or CAS BI 107/108 (for undergraduates) or graduate student standing, and/or consent of instructor.*

This seminar teaches students project design and statistics using R and Rstudio. Students will become competent in coding, version control, data reports and commenting code, and implement both basic and advanced statistics to be used in student research projects.

*Independent*

A1 Schmitt Thu 3:30pm - 6:15pm

**Notes:** Meets with AN 588.

**Textbooks & Technology:** Kabacoff R. 2015. *R in Action*, 2nd Edition. New York: Manning Publications. Tillman D. 2016. *The Book of R: A First Course in Programming and Statistics*. San Francisco: No Starch Press.

**Grading:** TBA

## CAS BI 589: NEURAL IMPACTS ON TUMORIGENESIS

*Prereq: NE 203 or BI 325*

It has been known for some time that cancer cells leverage the tissue around them in order to allow for the formation and growth of a tumor, and ultimately to aid in its invasion of adjacent tissue and metastasize. Recent studies have shown a novel symbiotic interaction between the peripheral nervous system and tumors using reciprocal cross-talk. Topics of discussion will include neuronal invasion and mechanisms of neurogenesis into solid tumors, cross-talk in tumor microenvironments, nervous system influence on cancer modulators such as stem cells, inflammation and immune surveillance and extracellular signaling events that enhance tumorigenesis with attention paid to potential therapeutic interventions. Finally, we will explore if this nervous system/cancer interface might be a mediator for the effects of stress-induced cancer.

*Independent*

A1 Tullai Tue,Thu 12:30pm - 2:15pm

**Notes:** Meets with NE 589.

**Textbooks & Technology:** Primary literature will be provided on the Blackboard site.

**Grading:** Weekly quizzes, individual class presentations and participation in daily literature discussions.

**Hub Units:** Scientific Inquiry 2, Oral/Signed Communication, Research and Information Literacy

## CAS BI 598: NEURAL CIRCUITS

*Prereq: (CAS BI 325 or CAS NE 203) and PY 106.*

This course reviews modern techniques and toolsets that are capable of dissecting neural circuits, which are critical for understanding how coordinated patterns of neural activity lead to complex behavior. Recent literature on information processing, guided behavior and cognition is discussed.

*Independent*

A1 Cruz-Martín Tue,Thu 9:00am - 10:45am

**Notes:** Meets with NE 598.

**Textbooks & Technology:** None.

**Grading:** Presentations and discussion.



# RESEARCH & READINGS

## UNDERGRADUATE RESEARCH IN BIOLOGY

*Undergraduate Research in Biology courses (CAS BI 140 - CAS BI 453) require an online application. For more information on research requirements and to apply, visit [www.bu.edu/biology/ug-research](http://www.bu.edu/biology/ug-research). Time commitment is a minimum of 6 hours a week for 2-credit research and 12 hours a week for 4-credit research. 4-credit research courses can fulfill up to two Electives, one of which can count toward the three-lab requirement for Biology and specialization majors.*

## CAS BI 140: FIRST YEAR RESEARCH IN BIOLOGY 1

*Prereq: first year standing, consent of instructor (faculty research mentor/sponsor), and approved application.*

**[2 cr] Not for Biology major or minor credit.** First semester first year laboratory research under the supervision of a Biology faculty mentor. Application through the Biology Department. Research outside the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor.

**Grading:** Course grade is determined by laboratory/field work performance.

## CAS BI 141: FIRST YEAR RESEARCH IN BIOLOGY 2

*Prereq: first year standing, (BI 140 or UROP semester or equivalent), consent of instructor (faculty research mentor/sponsor), and approved application.*

**[2 cr] Not for Biology major or minor credit.** Second semester first year laboratory research under the supervision of a Biology faculty mentor. Application through the Biology Department. Research outside the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor.

**Grading:** Course grade is determined by laboratory/field work performance.

## CAS BI 240: SOPHOMORE RESEARCH IN BIOLOGY 1

*Prereq: sophomore standing, consent of instructor (faculty research mentor/sponsor), and approved application.*

**[2 cr] Not for biology major or minor credit.** First semester sophomore laboratory research under the supervision of a Biology faculty mentor. Application through the Biology Department. Research outside the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor.

**Grading:** Course grade is determined by laboratory/field work performance.

## CAS BI 241: SOPHOMORE RESEARCH IN BIOLOGY 2

*Prereq: sophomore standing, (BI 140 or BI 240 or UROP semester or equivalent), consent of instructor (faculty research mentor/sponsor), and approved application.*

**[2 cr] Not for biology major or minor credit.** Second semester sophomore laboratory research under the supervision of a Biology faculty mentor. Application through the Biology Department. Research outside the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor.

**Grading:** Course grade is determined by laboratory/field work performance.

## CAS BI 340: JUNIOR RESEARCH IN BIOLOGY 1 (2 CREDITS)

*Prereq: junior standing, consent of instructor (faculty research mentor/sponsor), and approved application.*

**[2 cr] Not for Biology major or minor credit.** First semester junior research including the use of research literature. Application through the Biology Department. Research outside the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance at group meetings required. This course fulfills a single unit in the following BU Hub area: Research and Information Literacy.

**Grading:** Course grade is determined by laboratory/field work performance.

## CAS BI 341: JUNIOR RESEARCH IN BIOLOGY 2 (2 CREDITS)

*Prereq: junior standing, consent of instructor (faculty research mentor/sponsor), BI 340 or BI 350 or 2 semesters of first year (BI 140/141) or sophomore research (BI 240/241) or UROP semester or equivalent, and approved application.*

**[2 cr] Not for Biology major or minor credit.** Second semester junior research including the use of research literature and active participation at group meetings. Application through the Biology Department. Research outside the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance with oral presentations at group meetings required. This course fulfills a single unit in the following BU Hub area: Oral/Signed Communication.

**Grading:** Course grade is determined by laboratory/field work performance.

# RESEARCH & READINGS

## CAS BI 350: JUNIOR RESEARCH IN BIOLOGY 1 (4 CREDITS)

*Prereq: junior standing, consent of instructor (faculty research mentor/sponsor), and approved application.*

First semester junior research including the use of research literature and active participation at group meetings. Application through the Biology Department. Research outside the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance with oral presentations at group meetings required. This course fulfills a single unit in the following BU Hub areas: Research and Information Literacy and Oral/Signed Communication.

**Grading:** Course grade is determined by laboratory/field work performance.

## CAS BI 351: JUNIOR RESEARCH IN BIOLOGY 2 (4 CREDITS)

*Prereq: junior standing, [BI 340 or BI 350 or 2 semesters of first year (BI 140/141) or sophomore research (BI 240/241) or UROP semester or equivalent], consent of instructor (faculty research mentor/sponsor), and approved application.*

Second semester junior research including the use of research literature. Application through the Biology Department. Research outside the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor. Students conduct research under supervision of a faculty mentor. Students expected to attend group meetings and take a lead and make creative contributions to projects. This course fulfills a single unit in the following BU Hub areas: Research and Information Literacy and Creativity/Innovation.

**Grading:** Course grade is determined by laboratory/field work performance.

## CAS BI 352: JUNIOR RESEARCH IN BIOLOGY 3 (4 CREDITS)

*Prereq: junior standing, (BI 341 or BI 351), consent of instructor (faculty research mentor/sponsor), and approved application.*

Third semester junior research including the use of the research literature. Application through the Biology Department. Research outside the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance at group meetings and final report required. Students expected to take a lead and make creative contributions to projects. This course fulfills a single unit in the following BU Hub areas: Writing-Intensive and Creativity/Innovation.

**Grading:** Course grade is determined by laboratory/field work performance.

## CAS BI 450: SENIOR RESEARCH IN BIOLOGY 1

*Prereq: senior standing, consent of instructor (faculty research mentor/sponsor), and approved application.*

First semester senior research including the use of research literature and active participation at group meetings. Application through the Biology Department. Research outside the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance at group meetings required. This course fulfills a single unit in the following BU Hub areas: Research and Information Literacy and Oral/Signed Communication.

**Grading:** Course grade is determined by laboratory/fieldwork performance.

## CAS BI 451: SENIOR RESEARCH IN BIOLOGY 2

*Prereq: senior standing, [BI 340 or BI 350 or BI 450 or 2 semesters of first year (BI 140/141) or sophomore research (BI 240/241) or UROP semester or equivalent], consent of instructor (faculty research mentor/sponsor), and approved application.*

Second semester senior research including the use of the research literature. Application through the Biology Department. Research outside the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor. Students conduct research under supervision of a faculty mentor. Students expected to attend group meetings and take a lead and make creative contributions to projects. This course fulfills a single unit in the following BU Hub areas: Research and Information Literacy and Creativity/Innovation.

**Grading:** Course grade is determined by laboratory/fieldwork performance.

## CAS BI 452: SENIOR RESEARCH IN BIOLOGY 3

*Prereq: senior standing, (BI 341 or BI 351 or BI 451), consent of instructor (faculty research mentor/sponsor), and approved application.*

Third semester senior research including the use of research literature. Application through the Biology Department. Research outside the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance at group meetings and final report required. Students expected to take a lead and make creative contributions to projects. This course fulfills a single unit in the following BU Hub areas: Writing-Intensive and Creativity/Innovation.

**Grading:** Course grade is determined by laboratory performance.

# RESEARCH & READINGS

## CAS BI 453: SENIOR RESEARCH IN BIOLOGY 4

*Prereq: senior standing, (BI 352 or BI 452), consent of instructor (faculty research mentor/sponsor), and approved application.*

*Coreq: CAS BI 497 or BI 498*

Fourth semester senior research including the use of research literature. Application through the Biology Department. Research outside the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance at group meetings and final report required.

**Grading:** Course grade is determined by laboratory performance.

## HONORS RESEARCH IN BIOLOGY

*Honors Research in Biology offers students the ability to participate in two semesters of mentored 4-credit research (CAS BI 401 and 402) and a 2-credit research seminar (CAS BI 497 or 498). Students also write and defend an honors thesis on their research. For more information on research requirements and to apply, visit [www.bu.edu/biology/research-credit](http://www.bu.edu/biology/research-credit). Time commitment is minimum 12 hours/week in lab or fieldwork, meetings, data analysis, and writing.*

## CAS BI 401: HONORS RESEARCH IN BIOLOGY 1

*Prereq: senior standing, cumulative GPA of at least 3.5, and approval of the Biology Research and Honors Committee.*

First semester of Honors-level mentored laboratory or field research with a faculty member of the Biology Department leading to graduation with Honors in Biology. A minimum grade of B+ in this course and in BI 497 or 498 and BI 401/402 is required to graduate with Honors in Biology. Application through the Biology Department including use of research literature and active participation at group meetings. This course fulfills a single unit in the following BU Hub area: Research and Information Literacy and Oral/Signed Communication.

**Grading:** Course grade for both BI 401 and 402 is determined by laboratory performance, oral presentation, written thesis, and defense of the thesis before a committee of three faculty members. Grades for both BI 401 and 402 are determined upon completion of BI 402.

## CAS BI 402: HONORS RESEARCH IN BIOLOGY 2

*Prereq: senior standing, cumulative GPA of at least 3.5, and approval of the Biology Research and Honors Committee.*

Honors-level mentored laboratory or field research with a faculty member of the Biology Department leading to graduation with Honors in Biology. A minimum grade of B+ in this course and in BI 497 or 498 and BI 402 is required to graduate with Honors in Biology. Application through the Biology Department including use of research literature. Students expected to attend and participate at group meetings and take a lead and make creative contributions to projects. This course fulfills a single unit in the following BU Hub areas: Oral/Signed Communication, Writing-Intensive, and Creativity/Innovation.

**Grading:** Course grade for BI 402 is determined by laboratory performance, oral presentation, written thesis, and defense of the thesis before a committee of three faculty members. Grades for both BI 401 and 402 are determined upon completion of BI 402.

## CAS BI 497: HONORS RESEARCH IN BIOLOGY SEMINAR 1

*Prereq: For students currently enrolled in BI 401, BI 402, or BI 453 in the fall semester.*

[2 cr] A 2-credit weekly research seminar for students in BI 401, BI 402, or BI 453 in the spring semester. Students learn and present digitally produced descriptions of their research and prepare their theses for defense under the guidance of the Research and Honors Committee. A minimum grade of B+ in this course and BI 402 is required to graduate with honors. Students participate in only one course, either BI 497 or BI 498. This course fulfills a single unit in the following BU Hub areas: Digital/Multimedia Expression.

**Grading:** Attendance and participation

## GRADUATE RESEARCH IN BIOLOGY

*Graduate Research in Biology is offered as part of the BA/MS program. This dual degree program is only open to Biology and specialization majors. Students will receive both Bachelor's of Arts and Master's of Science degrees upon graduation. For more information on the BA/MS program, visit <https://www.bu.edu/biology/undergrad/bams/>.*

## CAS BI 595: MASTER'S RESEARCH IN BIOLOGY

*Prereq: Admission into the MS or BA/MS combined program*

Biology laboratory research conducted under supervision of a faculty member. Externships are acceptable with prior approval. Minimum of 7.5 to 15 hours per week in the lab, culminating in submission of a written progress report.

**Grading:** Course grade is determined by laboratory performance.

# RESEARCH & READINGS

## UNDERGRADUATE RESEARCH IN BMB

*Undergraduate Research in Biochemistry and Molecular Biology courses (CAS BB 140 - CAS BB 453) require an application. For more information on research requirements and to apply, visit [www.bu.edu/bmb/research](http://www.bu.edu/bmb/research). Time commitment is a minimum of 6 hours a week for 2-credit research and 12 hours a week for 4-credit research, not including preparation and evaluation. 4-credit research courses can fulfill an elective for BMB majors. Two semesters of senior-level research can fulfill the Advanced Lab Elective for BMB majors but cannot also count towards the 2 BMB electives.*

### CAS BB 140: FIRST YEAR RESEARCH IN BMB 1

*Prereq: first year standing, GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (faculty research mentor/sponsor), and approved application.*

**[2 cr] Not for BMB major credit.** First semester first year laboratory research under the supervision of a BMB faculty mentor. Application through the BMB Program. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor.

**Grading:** Course grade is determined by laboratory performance.

### CAS BB 141: FIRST YEAR RESEARCH IN BMB 2

*Prereq: first year standing, (BB 140 or UROP semester or equivalent), GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (faculty research mentor/sponsor), and approved application.*

**[2 cr] Not for BMB major credit.** Second semester first year laboratory research under the supervision of a BMB faculty mentor. Application through the BMB Program. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor.

**Grading:** Course grade is determined by laboratory performance.

### CAS BB 240: SOPHOMORE RESEARCH IN BMB 1

*Prereq: sophomore standing, GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (faculty research mentor/sponsor), and approved application.*

**[2 cr] Not for BMB major credit.** First semester sophomore laboratory research under the supervision of a BMB faculty mentor. Application through the BMB Program. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor.

**Grading:** Course grade is determined by laboratory performance.

### CAS BB 241: SOPHOMORE RESEARCH IN BMB 2

*Prereq: sophomore standing, GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, (BB 140 or BB 141 or BB 240 or UROP semester or equivalent), consent of instructor (faculty research mentor/sponsor), and approved application.*

**[2 cr] Not for BMB major credit.** Second semester sophomore laboratory research under the supervision of a BMB faculty mentor. Application through the BMB Program. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor.

**Grading:** Course grade is determined by laboratory performance.

### CAS BB 340: JUNIOR RESEARCH IN BMB 1 (2 CREDITS)

*Prereq: junior standing, GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (faculty research mentor/sponsor), and approved application.*

**[2 cr] Not for BMB major credit.** First semester junior research including the use of research literature. Application through the BMB Program. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance at group meetings required. This course fulfills a single unit in the following BU Hub area: Research and Information Literacy.

**Grading:** Course grade is determined by laboratory performance.

### CAS BB 341: JUNIOR RESEARCH IN BMB 2 (2 CREDITS)

*Prereq: junior standing, [BB 340 or BB 350 or 2 semesters of first year (BB 140/141) or sophomore research (BB 240/241) or UROP semester or equivalent], GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (faculty research mentor/sponsor), and approved application.*

**[2 cr] Not for BMB major credit.** Second semester junior research including the use of research literature. Application through the BMB Program. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance at group meetings required. This course fulfills a single unit in the following BU Hub area: Research and Information Literacy.

**Grading:** Course grade is determined by laboratory performance.

### CAS BB 350: JUNIOR RESEARCH IN BMB 1 (4 CREDITS)

*Prereq: junior standing, GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (faculty research mentor/sponsor), and approved application.*

First semester junior research including the use of research literature and active participation at group meetings. Application through the BMB Program. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance with oral presentations at group meetings required. This course fulfills a single unit in the following BU Hub areas: Research and Information Literacy and Oral/Signed Communication.

**Grading:** Course grade is determined by laboratory performance.



# RESEARCH & READINGS

## CAS BB 351: JUNIOR RESEARCH IN BMB 2 (4 CREDITS)

*Prereq: junior standing, [BB 340 or BB 350 or 2 semesters of first year (BB 140/141) or sophomore research (BB 240/241) or UROP semester or equivalent], GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (faculty research mentor/sponsor), and approved application.*

Second semester junior research including the use of research literature. Application through the BMB Program. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor. Students conduct research under supervision of a faculty mentor. Students expected to attend group meetings and take a lead and make creative contributions to projects. This course fulfills a single unit in the following BU Hub areas: Research and Information Literacy and Creativity/Innovation.

**Grading:** Course grade is determined by laboratory performance.

## CAS BB 352: JUNIOR RESEARCH IN BMB 3 (4 CREDITS)

*Prereq: junior standing, (BB 341 or BB 351), GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (faculty research mentor/sponsor), and approved application.*

Third semester junior research including the use of the research literature. Application through the BMB Program. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance at group meetings and final report required. Students expected to take a lead and make creative contributions to projects. This course fulfills a single unit in the following BU Hub areas: Writing-Intensive and Creativity/Innovation

**Grading:** Course grade is determined by laboratory performance.

## CAS BB 450: SENIOR RESEARCH IN BMB 1

*Prereq: senior standing, GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (faculty research mentor/sponsor), and approved application.*

First semester senior research including the use of research literature and active participation at group meetings. Application through the BMB Program. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance with oral presentations at group meetings required. This course fulfills a single unit in the following BU Hub areas: Research and Information Literacy and Oral/Signed Communication.

**Grading:** Course grade is determined by laboratory performance.

## CAS BB 451: SENIOR RESEARCH IN BMB 2

*Prereq: senior standing, [BB 340 or BB 350 or BB 450 or 2 semesters of first year (BB 140/141) or sophomore research (BB 240/241) or UROP semester or equivalent], GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (faculty research mentor/sponsor), and approved application.*

Second semester senior research including the use of the research literature. Application through the BMB Program. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor. Students conduct research under supervision of a faculty mentor. Students expected to attend group meetings and take a lead and make creative contributions to projects. This course fulfills a single unit in the following BU Hub areas: Research and Information Literacy and Creativity/Innovation.

**Grading:** Course grade is determined by laboratory performance.

## CAS BB 452: SENIOR RESEARCH IN BMB 3

*Prereq: senior standing, (BB 341 or BB 351 or BB 451), GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (faculty research mentor/sponsor), and approved application.*

Third semester senior research including the use of research literature. Application through the BMB Program. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance at group meetings and final report required. Students expected to take a lead and make creative contributions to projects. This course fulfills a single unit in the following BU Hub areas: Writing-Intensive and Creativity/Innovation.

**Grading:** Course grade is determined by laboratory performance.

## CAS BB 453: SENIOR RESEARCH IN BMB 4

*Prereq: senior standing, (BB 352 or BB 452), GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (faculty research mentor/sponsor), and approved application.*

*Coreq: CAS BB 497 or BB 498*

Fourth semester senior research including the use of research literature. Application through the BMB Program. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor. Students conduct research under supervision of a faculty mentor. Attendance at group meetings and final report required.

**Grading:** Course grade is determined by laboratory performance.



# RESEARCH & READINGS

## HONORS RESEARCH IN BMB

Honors Research in BMB offers students the ability to participate in two semesters of mentored 4-credit research (CAS BB 401 and 402) and 1-credit research seminars (CAS BB 497 and 498). Students also write and defend an honors thesis on their research. For more information on research requirements and to apply, visit [www.bu.edu/bmb/research](http://www.bu.edu/bmb/research). Time commitment is a minimum of 12 hours a week, not including preparation and evaluation.

## CAS BB 401: HONORS RESEARCH IN BMB

*Prereq: senior standing, overall and BMB GPA of at least 3.5, and approval of application by the BMB Research and Honors Committee.*

*Coreq: BB 497.*

Independent laboratory research under the supervision of a faculty member. Minimum of 12 hours per week in the lab, not including preparation and evaluation. Successful completion of both CAS BB 401 and BB 402 may lead to a degree with honors in the major, although only 4 of the credits may count toward the BMB major. Grading: Course grade for both BB 401 and 402 is determined by laboratory performance, oral presentation, written thesis, and defense of the thesis before a committee of three BMB faculty members.

**Hub Units:** Oral and/or Signed Communication, Research and Information Literacy.

## CAS BB 497: HONORS RESEARCH IN BMB SEMINAR

*Coreq: BB 401.*

A one-credit research seminar for students enrolled in Honors Research in BMB (BB 401). A minimum grade of B+ in this course and in CAS BB 401 and CAS BB 402 is required to graduate with Honors in BMB.

## GRADUATE RESEARCH IN BMB

Graduate Research in BMB is offered as part of the BA/MA program. This dual degree program is only open to BMB majors and earns students a Bachelor's degree in BMB and a Master's degree in Biotechnology. For more information on the BA/MA program, visit [www.bu.edu/bmb/bama-bulletin](http://www.bu.edu/bmb/bama-bulletin).

## CAS BB 591: GRADUATE RESEARCH IN BMB

*Prereq: admission to the combined BA/MA in Biotechnology Program.*

BMB laboratory research conducted under supervision of a faculty member. Externships are acceptable if approved and overseen by a BMB faculty member or the BMB Director. Minimum of 15 hours per week in the lab, culminating in submission to the BMB Director of a written progress report and research outline for BB 592.

# RESEARCH & READINGS

## READINGS IN BIOLOGY

*Readings in Biology offers students the opportunity to do library research on a chosen topic in the biological sciences. Students must ask a Biology faculty member familiar with the topic to be their sponsor and submit the application found at [www.bu.edu/biology/forms](http://www.bu.edu/biology/forms). These courses are often used as preparation for Undergraduate Research in Biology or Honors Research in Biology. Open to Biology and BMB majors.*

## CAS BI 171: READINGS IN BIOLOGY 1

*Prereq: first year standing, consent of instructor (Biology faculty mentor), and approved application.*

[2 cr] **Not for biology major or minor credit.** Library research on a well-defined topic in the biological sciences, chosen in conjunction with a Biology faculty member.

**Grading:** Individual discussions and/or a paper presentation may be required.

## CAS BI 271: READINGS IN BIOLOGY 2

*Prereq: sophomore standing, consent of instructor (Biology faculty mentor), and approved application.*

[2 cr] **Not for biology major or minor credit.** Library research on a well-defined topic in the biological sciences, chosen in conjunction with a Biology faculty member.

**Grading:** Individual discussions and/or a paper presentation may be required.

## CAS BI 371: READINGS IN BIOLOGY 3

*Prereq: junior standing, consent of instructor (Biology faculty mentor), and approved application.*

[2 cr] **Not for biology major or minor credit.** Library research on a well-defined topic in the biological sciences, chosen in conjunction with a Biology faculty member.

**Grading:** Individual discussions and/or a paper presentation may be required.

## CAS BI 471: READINGS IN BIOLOGY 4

*Prereq: senior standing and consent of instructor (Biology faculty mentor), and approved application.*

[2 cr] **Not for biology major or minor credit.** Intensive library research on a well-defined topic in the biological sciences, chosen in conjunction with a Biology faculty member. May be taken as preparation for Undergraduate Research or Honors Research in Biology.

**Grading:** Individual discussions and/or a paper presentation may be required.

## GRADUATE READINGS IN BIOLOGY

*Graduate Readings in Biology is offered as part of the BA/MS program. This dual degree program is only open to Biology and specialization majors. Students will receive both Bachelor's of Arts and Master's of Science degrees upon graduation. For more information on the BA/MS program, visit <https://www.bu.edu/biology/undergrad/bams/>.*

## GRS BI 701: GRADUATE READINGS IN BIOLOGY

*Prereq: consent of instructor, limited to BA/MS students and graduate students in the scholarly paper MS program.*

Library research on well-defined subjects determined in consultation with faculty member.

**Grading:** Individual discussions and/or a paper presentation may be required.

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