For advising you will need:
Degree Advice Report, Classes link on the Student Link, Advising Worksheet, & Course Directory

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)

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)
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

**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: Six lecture quizzes (48%), Lecture participation and homework (17%), Lab assignments (35%)

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

CAS BI 107: BIOLOGY 1

Prereq: 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  Spilios, Strickland  Mon, Wed, Fri  10:10am - 11:00am
A2  Spilios, Strickland  Mon, Wed, Fri  12:20pm - 1:10pm

**Lab**
B1  Mon  2:30pm - 5:15pm
B2  Mon  2:30pm - 5:15pm
B3  Mon  2:30pm - 5:15pm
C0  Tue  8:00am - 10:45am
C1  Tue  8:00am - 10:45am
C2  Tue  8:00am - 10:45am
C3  Tue  12:30pm - 3:15pm
C4  Tue  12:30pm - 3:15pm
C5  Tue  12:30pm - 3:15pm
C6  Tue  3:30pm - 6:15pm
C7  Tue  3:30pm - 6:15pm
C9  Tue  6:30pm - 9:15pm
D1  Wed  8:00am - 10:45am
D2  Wed  6:30pm - 9:15pm
D4  Wed  2:30pm - 5:15pm
D5  Wed  2:30pm - 5:15pm
D6  Wed  2:30pm - 5:15pm
D7  Wed  6:30pm - 9:15pm
D8  Wed  6:30pm - 9:15pm
D9  Wed  6:00pm - 8:45pm
E1  Thu  8:00am - 10:45am
E2  Thu  8:00am - 10:45am
E3  Thu  12:30pm - 3:15pm
E4  Thu  12:30pm - 3:15pm
E5  Thu  12:30pm - 3:15pm
E6  Thu  12:30pm - 3:15pm
E7  Thu  6:30pm - 9:15pm
E8  Thu  6:30pm - 9:15pm
E9  Thu  6:30pm - 9:15pm
F1  Fri  8:00am - 10:45am
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 E2 Thu 11:15am - 12:05pm
B6 Mon 1:25pm - 2:15pm F1 Fri 11:15am - 12:05pm
B7 Mon 11:15am - 12:05pm F2 Fri 1:25pm - 2:15pm
B8 Mon 3:35pm - 4:25pm
C1 Tue 11:15am - 12:05pm
C2 Tue 6:00pm - 8:45pm
D1 Wed 11:15am - 12:05pm
D2 Wed 12:20pm - 1:10pm
D3 Wed 1:25pm - 2:15pm
E2 TH 11:15am - 12:05pm

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


Grading: Best three of four lecture examinations (45%), homework (30%), in-class questions (7.5%), discussion (2.5%), and one final examination (15%)

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

CAS BI 211: HUMAN PHYSIOLOGY

Prereq: (CAS BI105 OR CAS BI108) & (CAS BI106 OR CAS BI210)

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

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: Co, Anatomy and Physiology 1e; 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

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.


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


A1 Beffert Tue, Thu 3:30pm - 4:45pm
Mon 6:30pm - 8:00pm


A3 Naya Tue, Thu 9:30am - 10:45am

Meets with BI 213.

Discussion
B1 Register for a BI 203 or 213 discussion.

Lab
L1 Bushell Wed. 1:25-5:25pm

Prelab
P1 Bushell Mon 2:30pm - 4:15pm

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 Traniello/Muscedere Tue, Thu 2:00pm - 3:15pm

Discussion
B1 Traniello/Muscedere Thu 3:35pm - 4:25pm
B2 Traniello/Muscedere Fri 9:05am - 9:55am


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 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

Lab
B1 Primack Mon 2:30pm - 5:15pm

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

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


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 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: Co, Anatomy and Physiology 1e; Visible Body Virtual Dissection App

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 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

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


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

Hub Units: Ethical Reasoning
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


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
B2 Mon 6:30pm - 9:15pm
C1 Tue 8:00am - 10:45am
C2 Tue 12:30pm - 3:15pm
C3 Tue 6:30pm - 9:15pm
D1 Wed 8:00am - 10:45am
D2 Wed 2:30pm - 5:15pm


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


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

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

CAS BI 408: INSECT BIOLOGY

Prereq: (CAS BI 107 & CAS BI 108) 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  MWF  10:10am - 11:00am

**Lab**
A1  Mon  2:30pm - 5:15pm

**Textbooks & Technology:** TBA

**Grading:** TBA

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
E1  Thu  8:00am - 10:45am
F1  Fri  2:30pm - 5:15pm

**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 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  B5  Fri  11:15am - 12:05pm
B2  Wed  2:30pm - 3:20pm  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


**Grading:** Three exams plus discussion grade
CAS BB 421: BIOCHEMISTRY 1

Prereq: CAS CH 204 or CAS CH 212 or CAS CH 214 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. See BB 527 for lab content.

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

Lab
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
B4  Thu  8:00am - 12:00pm BA  Mon  10:10am - 2:10pm
B5  Thu  1:25pm 5:25pm  BB  Mon  3:35pm - 7:35pm
B6  Thu  6:30pm - 10:30pm BC  Tue  3:35pm - 7:35pm

Discussion
C1  Tue  12:30pm - 1:45pm
C2  Tue  2:00pm - 3:15pm

Notes: This class meets with CAS BB 621, and MET BB 421.


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

Hub Units: Quantitative Reasoning 2, 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

Textbooks & Technology: TBA

Grading: TBA

Notes: Meets with BI 643

CAS BI 445: CELLULAR AND MOLECULAR NEUROPHYSIOLOGY

Prereq: CAS BI 203 or CAS BI 315 or BI 325 or CAS NE 203 or consent of instructor.

This course examines two fundamental building blocks of brain function, voltage-gated ion channels and synaptic transmission. We first discuss basic properties of ion channels, namely their molecular structures and kinetics. We next consider how ion channels shape firing patterns in neurons of mammalian CNS and how firing patterns can be modulated through subtle variations in ion channel compositions. Second, we consider basic molecular processes underlying synaptic transmission. Based on the understanding of neuronal firing patterns and synaptic transmission, we then explore how these basic properties shape neuronal communication at network level. We discuss examples where complex network functions such as brain waves, attention, consciousness and auditory processing can be traced to, and explained by, basic properties of ion channels or synaptic functions. In the laboratory, we perform extracellular and intracellular recordings from motor axons and muscle fibers of crayfish, which allow us to observe how action potentials pair up with synaptic potentials in real time. The whole class will perform a project over the course of a semester with the expectation that, collectively, the data should be of sufficient quantity and quality for a publication. Some class projects in the past had led to publications on effects of pesticides and on drugs treating epilepsy. In the coming semesters, we plan to examine the same nerve-muscle preparation of a parthenogenetic crayfish (marble crayfish). These animals are all females and are genetic clones of each other. We will start by examining electrophysiological and morphological properties of nerve-muscle preparation since no previous studies has been perform in this species, which is believed to appear through a mutation recently (1997). Furthermore, the genome of marble crayfish had been sequenced, which may be a valuable resource for molecular pharmacological studies of ion channels.

Lecture
A1  Lin  Tue, Thu  2:00pm - 3:15pm

Lab
D1  Mon  2:30pm - 6:15pm

Notes: Meets with NE 445 and BI 645

Textbooks & Technology: Purves et al., Neuroscience, 4th or 5th ed., Sinauer Associates

Grading: Midterm 1 (15%), midterm 2 (25%), final (25%), lab reports, presentations , and participation (35%: 15% oral, 20% written)
CAS BI 448: CONSERVATION BIOLOGY

Prereq: CAS BI 303 OR CAS BI 306 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

Discussion
A1 Primack Wed 2:30pm - 3:20pm

Textbooks & Technology: TBA

Grading: TBA

Notes: Meets with BI 643

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.


Grading: One midterm and one final exam.

CAS BI 481: MOLECULAR BIOLOGY OF THE NEURON

Prereq: BI 325 (preferred) or BI 203.

Topics include electrical properties of neurons, a survey of neurotransmitters, molecular structure and function of receptors, synaptic transmission, intracellular signaling, and the molecular biology of sensory transduction.

Independent
A1 Ho Mon, Wed 2:30pm - 4:15pm

Notes: Meets with CAS NE 481 and GRS BI 681.

Textbooks & Technology: none

Grading: 2 midterms, 1 final exam, and discussion.

Course Delivery: LfA

CAS BI 503: NEUROIMMUNOLOGY

Prereq: CAS BI 203/NE 102 or CAS BI 213 and BI 325/NE 203

Neuroimmunology is a burgeoning field in neuroscience. This course examines current topics including the role of glia in brain development, health, and disease, glia-neuron crosstalk, impact of stress and environment on the neuroimmune system, and cell trafficking into the brain.

A1 Tay Tue, Thu 9:00am - 10:45am

Notes: Meets with NE 503.

Textbooks & Technology: Primary literature will be provided on the Blackboard site. In-class use of laptops with Wi-Fi access.

Grading: Written assignments, experiments, presentations, debates, and final group project using digital multimedia.

Hub Units: 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

Notes: Meets with ENG BF 510.


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 Celenza Tue, Thu 4:15pm - 7:00pm

Notes: To register for BI 513, please use this for the 2024 sign up link: https://forms.gle/QvUThJ8ko9eTVhWq6

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 genetic drift, natural selection, coalescence and neutral theory, along with introduction to analysis of population genomic data.

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 both model and non-model organisms, focusing on fundamental principles of sensory transduction and processing. This class focuses mainly on the senses that are not covered heavily in introductory neuroscience classes, including taste, touch, olfaction, and specialized non-human senses such as echolocation. Vision is not a central focus. Students will learn to read and discuss primary literature. 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 BB W: 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: Tolan, Tue 12:30pm - 1:45pm
- A2: Tolan, Tue 2:00pm - 3:15pm

Lab
- 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
- BA: Mon 10:10am - 2:10pm
- BB: Mon 3:35pm - 7:35pm
- BC: Tue 3:35pm - 7:35pm

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


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 deprecate 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, biomolecular condensates 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 three exams during the semester (probably 9/26, 10/24 & 12/5)

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

Grading: 4 exams (75% total), homework (12.5%), and discussion participation (12.5%)
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 565: FUNCTIONAL GENOMICS

Prereq: CAS BI 552 or consent from instructor

Recent years have seen an explosion in the number of organisms for which sequenced genomes are available. However, we are only beginning to understand how the information encoded in the million/billion DNA bases of eukaryotic genomes is organized and how that information is translated into function. Throughout this course, we will start to answer central questions in the molecular biology and functional genomics fields, including: Given that only ~2% of the genome encodes for proteins, what is the function of the rest of the genome? How is it possible that yeast, worms and humans have a similar number of genes? What is the flow of information in the cell that controls gene function and activity? Which experimental approaches allow us to tackle these questions?

Independent

A1 Fuxman Bass Tue, Thu 9:00am - 10:45am

Textbooks & Technology: Review articles and research papers on Blackboard

Grading: Exam I: 25%, Exam II: 30%, Project: 15%, Assignments: 9%, Participation: 8%, Paper presentation: 8%, Quizzes: 5%.

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: Three problem sets, Group 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. Effective Fall 2023, this course fulfills a single unit in each of the following BU Hub areas: Oral and/or Signed Communication, Ethical Reasoning.

**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 582: 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. Effective Fall 2023, this course fulfills a single unit in each of the following BU Hub areas: Oral and/or Signed Communication, Ethical Reasoning.

**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 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
The BU Marine Semester is a fall semester study abroad program consisting of month-long, research-oriented marine courses, chosen from a set of diverse course offerings. Courses take place on campus in BU’s Marine Research Teaching Lab and off campus at field sites in New England and Belize (Central America). For more information, visit www.bu.edu/biology/ms. All CAS BI Marine Semester courses count as electives toward the Biology, Behavioral Biology, and Ecology & Conservation Biology majors. All CAS BI Marine Semester courses will also count towards the three upper-level labs required for all Biology and all Specialization majors. The Marine Semester program earns the following Hub units: Scientific Inquiry II, Teamwork/Collaboration, Oral/Signed Communication and Creativity/Innovation.

Please note: CAS MR courses offered in the Marine Semester are not accepted as Biology, ECB, or SBB electives. If students submit a Department Petition well in advance, the CAS MR courses will be reviewed and a decision will be made about whether the courses can count as major electives.

General Marine Semester Information:
The following courses for Fall 2024 have not yet been announced. These courses are meant to be an example of what may be offered for the Fall 2024 Marine Semester. Actual courses are subject to change.

CAS BI 541: CORAL REEF RESTORATION & RESILIENCE
Prereq: Acceptance into the Marine Semester.
Caribbean coral reefs have fallen into ruin. Students develop methods to restore reef health by applying natural history and home aquarium skills, genomics, community and landscape ecology, and climatology. This is the clinical (conservation applications) sister course to CAS BI/ES 539 (Coral Reef Dynamics), and includes field work in Belize.

CAS BI 523: MARINE URBAN ECOLOGY
Prereq: Acceptance into the Marine Semester.
Marine Urban Ecology is an emerging, interdisciplinary field that aims to understand how human and ecological processes can coexist in human-dominated systems. Topics, ecosystems, and organisms associated with urbanization in the Greater Boston area.

CAS BI 531: ICHTHYOLOGY
Prereq: CAS BI 260 and consent of instructor; acceptance into the Marine Semester.
A comprehensive introduction to fish biology and systematics. Emphasis on phylogenetic relationships, ecology, and behavior. Labs include morphological studies of specimens and behavioral studies of live fish.

CAS BI 539: CORAL REEF DYNAMICS
Prereq: Acceptance into the Marine Semester.
Tropical reefs-- diverse, complex, and ancient-- exhibit lawful cycles of growth, degradation, and regeneration. Explore these through observations on the Belize Barrier Reef in fossil reef environments and through laboratory experiments. Insights are applied to reef conservation in today’s changing world. Also offered as CAS ES 539. This course involves field work in Belize.

CAS BI 546: MARINE MEGAFAUNAL ECOLOGY: STELLWAGEN BANK NATIONAL MARINE SANCTUARY AND SURROUNDING WATERS
Prereq: CAS BI 260 and CAS MA 213 or consent of the instructor; acceptance into the Marine Semester.
Marine macrofauna: whales, seals, seabirds, fishes, turtles, jellies, and people in Stellwagen Bank National Marine Sanctuary. Evolution, food webs, and distributional ecology; physical and human influences on foraging and movement behavior. Student research builds ecosystem-based science for Sanctuary management.
**CAS BI 548: MARINE MICROBIAL ECOLOGY**
Prereq: Acceptance into the Marine Semester

Microorganisms are the most abundant form of life in the ocean. Fluorescence in situ hybridization (FISH) is a critical tool that uses sequencing to develop a deeper sense of specific microbe roles in an ecosystem. This project-based course weaves together scientific background, analytical tools, and data processing and analysis. Students gain insight into the complexity and importance of marine microbial communities. With lab-based FISH projects, students design and conduct an adaptive set of experiments. Through computational data analysis, students turn raw data into usable results.

**CAS BI 591: BIO-OPTIC OCEANOGRAPHY**
Prereq: Prereq: ES/EE 144 and CH 101 and CH 102 (or CH 171 and CH 172); MA 121 or MA 123; MA 122 or MA 124 recommended; or consent of instructor, acceptance into the Marine Semester.

This field- and lab-based course explores how the optically active constituents in seawater affect the in-water light field, and in turn, how field optics and remote sensing can facilitate the study of marine biogeochemistry, biological oceanography and water quality.

**CAS BI 593: MARINE PHYSIOLOGY AND CLIMATE CHANGE**
Prereq: CAS BI 108 or consent of instructor; acceptance into the Marine Semester.

Explores the range of physiological responses marine organisms exhibit in response to climate change. Investigates phenotypic plasticity exhibited across different organisms and how this plasticity can influence an organism’s resilience to its changing environment.

**CAS BI 569: TROPICAL MARINE INVERTEBRATES**
Prereq: CAS BI 107 and CAS BI 260; acceptance into the Marine Semester.

Explores the diversity of marine invertebrates, including body plans, feeding biology, reproductive strategies, and developmental programs. Field biodiversity surveys and behavioral studies in shallow water tropical marine environments, especially seagrass beds and mangrove. This course involves field work in Belize.

**CAS BI 578: MARINE GEOGRAPHIC INFORMATION SCIENCE**
Prereq: CAS BI 260 and CAS ES 144; CAS MA 213 is strongly recommended; acceptance into the Marine Semester.

Introduction to marine geographic information systems and spatial analysis for conservation, management, and marine landscape ecology. Comparative examples from Gulf of Maine and tropics. Solve problems in coastal zoning and marine park design, whale and coral reef conservation.
## 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.
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.
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. 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. 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 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.

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. 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.

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
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. 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.
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. 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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