

# SPRING 2018 BIOLOGY COURSE DIRECTORY

## For advising you will need:

- ✓ Course Directory
- ✓ Degree Advice Report
- ✓ Major Guidelines Worksheet
- ✓ Transcript Preview

## COURSE NOTES:

### Courses fulfilling breadth requirements:

#### Cell & Molecular (CM)

- CAS BI 206 Genetics
- CAS BI 216 Intensive Genetics

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

- CAS BI 260 Marine Biology
- CAS BI 303 Evolutionary Ecology
- CAS BI 306 Biology of Global Change

#### Neurobiology & Physiology (PN)

- CAS BI 315 Systems Physiology
- CAS BI 325 Principles of Neuroscience

### Upper Level Lab Courses Offered Spring 2018:

- CAS BI 302 Vertebrate Zoology
- CAS BI 303 Evolutionary Ecology
- CAS BI 306 Biology of Global Change
- CAS BI 315 Systems Physiology
- CAS BI 422 Biochemistry 2
- CAS BI 445 Cellular and Molecular Neurophysiology
- CAS BI 519 Theoretical Evolutionary Ecology
- CAS BB 522 Molecular Biology Lab
- CAS BI 528 Biochemistry Lab 2

## TABLE OF CONTENTS:

<b>BMB Courses</b>	Pg. 2-3
<b>Cell &amp; Molecular Courses</b>	Pg. 4-7
<b>Ecology, Behavior &amp; Evolution Courses</b>	Pg. 8-10
<b>Physiology &amp; Neurobiology Courses</b>	Pg. 11-12
<b>MET College Courses</b>	Pg. 13
<b>Research &amp; Readings Courses</b>	Pg. 14-15
<b>Index</b>	Pg. 16

## REGISTRATION NOTES:

- **For permission required courses:** Students may not register for these course on their own. Students should have the instructor sign an Add/Drop form and take that form to the Registrar.
- **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 may request this fee waiver through the CAS Advising Office.
- **PDP, ROTC, and CAS FY/SY courses do not count toward** the 128 credits needed to graduate.
- The following courses **do not count toward the Biology or BMB major or minor:**

- CAS BI 106 Human Anatomy
- CAS BI 114 Human Infectious Diseases
- CAS BI 119 Sociobiology

# BIOCHEMISTRY & MOLECULAR BIOLOGY

## UNDERGRADUATE RESEARCH IN BMB

*Undergraduate Research in Biochemistry and Molecular Biology courses (CAS BB 192 - CAS BB 492) 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.*

### CAS BB 192: UNDERGRADUATE RESEARCH IN BMB 1

*Prereq: freshman standing, GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (faculty research mentor/sponsor), and approval of application by the BMB Research and Honors Committee.*

**[2 cr] Not for BMB major credit.** Laboratory research under the supervision of a BMB faculty mentor. 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 292: UNDERGRADUATE RESEARCH IN BMB 2

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

**[2 cr] Not for BMB major credit.** Laboratory research under the supervision of a BMB faculty mentor. 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 392: UNDERGRADUATE RESEARCH IN BMB 3

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

**[2 or 4 cr] Two credit option is not for BMB major credit.** Laboratory research under the supervision of a BMB faculty mentor. Research outside the BMB program is acceptable if approved and overseen by a BMB faculty sponsor. Students can use one semester of 4-credit research to fulfill a BMB elective if not using Undergraduate Research or Honors Research for the advanced lab elective.

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

### CAS BB 492: UNDERGRADUATE RESEARCH IN BMB 4

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

Laboratory research under the supervision of a BMB faculty mentor. Research outside the BMB program is acceptable if approved and overseen by a BMB faculty sponsor. Students can use one semester of 4-credit research to fulfill a BMB elective if not using Undergraduate Research or Honors Research for the advanced lab elective.

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

# BIOCHEMISTRY & MOLECULAR BIOLOGY

## 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 seminars. 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 for 4-credit research in BMB, not including preparation and evaluation.

## CAS BB 402: HONORS RESEARCH IN BIOCHEMISTRY AND MOLECULAR BIOLOGY

*Prereq:* senior standing, GPA in biochemistry and molecular biology (BMB) courses of at least 3.5, consent of instructor (faculty research mentor/sponsor), and approval of application by the BMB Research and Honors Committee.

*Coreq:* CAS BB 497

Independent laboratory research under the supervision of a BMB faculty mentor. Research outside the BMB program is acceptable if approved and overseen by a BMB faculty sponsor. Successful completion of both CAS BB 401 and BB 402 may lead to a degree with honors in the major. Students must also present a research talk at the BMB symposium at the end of the spring semester of the academic year.

**Grading:** Course grade is determined by laboratory performance, oral presentation, written thesis, and defense of the thesis before a committee of three BMB faculty members.

## CAS BB 498: HONORS RESEARCH IN BIOCHEMISTRY AND MOLECULAR BIOLOGY SEMINAR 1

*Prereq:* For students currently enrolled in the Honors BMB Program.

*Coreq:* CAS BB 401

[1 cr ] A one-credit research seminar for students enrolled in Honors Research in BMB (CAS BB 401) or Graduate Research in BMB (CAS BB 591). Students present at the BMB Symposium. A minimum grade of B+ in BB 497/498 and BB 401/402 is required to graduate with Honors in BMB.

**Grading:** Attendance and participation.

## CAS BB 592: GRADUATE RESEARCH IN BIOCHEMISTRY AND MOLECULAR BIOLOGY

*Prereq:* Admission to the BA/MA Program.

*Coreq:* CAS BB 497 is encouraged.

Laboratory research conducted under the supervision of a BMB faculty sponsor. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor. 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 CAS BB 592.

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

## GRS MB 722: ADVANCED BIOCHEMISTRY

*Prereq:* (BI/CH 422) or (GRS BI/CH 621 & 622) or MB 721 or CH 273.

An advanced treatment of the underlying theories, principles, mechanisms, and chemistry of current biochemical investigation. Selected topics may include enzyme mechanics, protein structure and folding, bioinformatics, signal transduction, nucleic-acid protein interactions, techniques in proteomics, and genetic disease mechanisms.

*Lecture*

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

*Discussion*

Wed 4:30pm - 6:15pm

**Grading:** Exams, homework, discussion.

# CELL & MOLECULAR

## CAS BI 108: BIOLOGY 2

*Prereq: High school biology and one semester college chemistry strongly recommended.*

For students planning to major in the natural sciences and for pre-med students. It is strongly recommended students complete CAS CH 101 (or equivalent) before this course. High school biology is assumed. Cell and molecular biology, Mendelian & molecular genetics, physiology, and neurobiology. Carries natural science divisional credit (with lab) in CAS.

### Lecture

A1	Loechler, Tolan	Mon,Wed,Fri	10:10am - 11:00am
A2	Loechler, Tolan	Mon,Wed,Fri	12:20pm - 1:10pm
A3	Spilios	Mon,Wed,Fri	2:30pm - 3:20pm

### Lab

B1	Mon	2:30pm - 5:15pm	D4	Wed	2:30pm - 5:15pm
B2	Mon	2:30pm - 5:15pm	D5	Wed	2:30pm - 5:15pm
B3	Mon	2:30pm - 5:15pm	D6	Wed	2:30pm - 5:15pm
B4	Mon	6:30pm - 9:15pm	D7	Wed	6:30pm - 9:15pm
B5	Mon	6:30pm - 9:15pm	D8	Wed	6:30pm - 9:15pm
B6	Mon	6:30pm - 9:15pm	E1	Thu	8:00am - 10:45am
C1	Tue	8:00am - 10:45am	E2	Thu	8:00am - 10:45am
C2	Tue	8:00am - 10:45am	E3	Thu	8:00am - 10:45am
C3	Tue	8:00am - 10:45am	E4	Thu	12:30pm - 3:15pm
C4	Tue	12:30pm - 3:15pm	E5	Thu	3:30pm - 6:15pm
C5	Tue	3:30pm - 6:15pm	E6	Thu	3:30pm - 6:15pm
C6	Tue	3:30pm - 6:15pm	E7	Thu	3:30pm - 6:15pm
C7	Tue	3:30pm - 6:15pm	F1	Fri	8:00am - 10:45am
D2	Wed	8:00am - 10:45am	F2	Fri	8:00am - 10:45am
D3	Wed	8:00am - 10:45am			

**Notes:** Meets with BI 116.

**Textbooks and Technology:** Sadava et al. *Life: The Science of Biology*, 11th ed., Sinauer Publ., 2017.

**Grading:** Four hourly exams, lecture 68%, lab 32%.

## CAS BI 114: HUMAN INFECTIOUS DISEASES: AIDS TO ZIKA

*Prereq: None*

**Not for Biology major or minor credit.** A study of the world's major human diseases, their causes, effects on history, pathology, and cures. Principles of immunology. Emphasis on present maladies such as AIDS, herpes, cancer, mononucleosis, tuberculosis, influenza, and hepatitis. This course is appropriate for non- majors and students in the health and paramedical sciences (Sargent College). Carries natural science divisional credit (with lab) in CAS.

### Lecture

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

B1	Mon,Wed	2:30pm - 3:45pm	C3	Tue,Thu	3:30pm - 4:45pm
C1	Tue,Thu	9:30am - 10:45am	D1	Mon,Wed	10:10am - 11:25pm
C2	Tue,Thu	2:00pm - 3:15pm	D2	Mon,Wed	12:20pm - 1:35pm

**Notes:** Not for Biology major or minor credit.

**Textbooks and Technology:** TBA.

**Grading:** 4 lecture exams; laboratory.

## CAS BI 116: BIOLOGY 2 WITH ISE LAB

*Prereq: CH 101*

Integration of general chemistry with biology and neuroscience, with an emphasis on how each discipline interacts experimentally. Laboratory focuses on projects relating to enzymes and their function.

### Lecture

A1	Loechler, Tolan	Mon,Wed,Fri	10:10am - 11:00am
A2	Loechler, Tolan	Mon,Wed,Fri	12:20pm - 1:10pm
A3	Spilios	Mon,Wed,Fri	2:30pm - 3:20pm

### Lab

L1	Tue,Thu	6:30pm - 9:15pm	L2	Wed,Fri	2:30pm - 5:15pm
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**Notes:** Meets with BI 108 Lecture.

**Text(s):** Sadava et al. *Life: The Science of Biology*, 11th ed., Sinauer Publ., 2017.

**Grading:** TBA.

# CELL & MOLECULAR

## CAS BI 206: GENETICS

*Prereq: CAS BI 108 and CAS CH 203 or equivalent*

Principles of classical, molecular, and evolutionary genetics derived from analytical, molecular, and whole genome cytological evidence in animals, plants, and microorganisms.

### Lecture

A1	Celenza	Tue,Thu	12:30pm - 1:45pm
		Thu	6:30pm - 8:15pm

### Discussion

B1	Mon	12:20pm - 1:10pm	D1	Wed	8:00am - 8:50am
B2	Mon	12:20pm - 1:10pm	D2	Wed	12:20pm - 1:10pm
B3	Mon	1:25pm - 2:15pm	D3	Wed	1:25pm - 2:15pm
B4	Mon	2:30pm - 3:20pm	D5	Wed	2:30pm - 3:20pm
C1	Tue	8:00am - 8:50am			

**Notes:** Meets with BI 282 and with BI 216 for the first half of the semester.

**Textbooks and Technology:** 1) Required: Hartwell et al. *Genetics: from Genes to Genomes*. McGraw-Hill: 6th edition, book or ebook. 2) Recommended, but not required: Connect subscription that includes Smartbook. Both will be available through the BU Bookstore and other sources.

**Grading:** 80% avg. of four exam scores given during the semester. 20% discussion.

## CAS BI 216: INTENSIVE GENETICS

*Prereq: CAS BI 108 & BI 203 or equivalents to both, and CAS CH 203 or consent of instructor*

Advanced alternative to CAS BI 206, emphasizing depth of coverage, class discussion, and reading research papers. Principles of classical, molecular, and evolutionary genetics derived from analytical, molecular, and whole genome cytological evidence in animals, plants, and microorganisms.

### Lecture

A1	Celenza, Loechler	Tue,Thu	12:30pm - 1:45pm
		Thu	6:30pm - 8:15pm*

\* This block of time is reserved for instructor-led discussion and the giving of exams.

### Discussion

B1	Mon	12:20pm - 1:10pm	D2	Mon	11:15am - 12:05pm
B2	Mon	2:30pm - 3:20pm	E1	Wed	10:10am - 11:00am
D1	Wed	2:30pm - 3:20pm	E2	Tue	3:35pm - 4:25pm

**Notes:** Meets with BI 206/282.

**Textbooks and Technology:** 1) Required: Hartwell et al. *Genetics: from Genes to Genomes*. McGraw-Hill: 6th edition, book or ebook. 2) Recommended, but not required: Connect subscription that includes Smartbook. Both will be available through the BU Bookstore and other sources.

**Grading:** 80% avg. of four exam scores given during the semester. 20% discussion.

## CAS BI 385: IMMUNOLOGY

*Prereq: CAS BI 203, CAS BI 206 and junior standing*

The constituents and regulation of the mammalian immune system are described at the levels of the gene, protein and cell. Topics include the innate immune system, T and B cell response, immune memory, tolerance, response to pathogens, inflammation, allergy & hypersensitivity, the role of the immune system in cancer.

### Lecture

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

B1	Tue	8:00am - 8:50am	F1	Tue	8:00am - 8:50am
C1	Wed	12:20pm - 1:10pm	G1	Wed	11:15am - 12:05pm
D1	Thu	8:00am - 8:50am	H1	Wed	12:20pm - 1:10pm
E1	Fri	2:30pm - 3:20pm	I1	Fri	3:35pm - 4:25pm

**Textbooks and Technology:** Peter Parham. *The Immune System*. 4th Edition. Garland Science Publishing, NY, NY

**Grading:** 3 exams (2 midterms and 1 final) 80%; discussion/participation 20%.

# CELL & MOLECULAR

## CAS BI 411: MICROBIOME: OUR INTIMATE RELATIONSHIP WITH MICROORGANISMS

*Prereq: CAS BI 203 (or equivalent) and CAS BI 206 (or equivalent) or consent of instructor*

There are more bacterial cells inhabiting our bodies than actual human cells. This abundant and diverse population of microbes – referred to as the “microbiome” – colonizes several tissues in our body and plays important roles in maintaining our health. Topics will include the evolutionary, ecological, cellular, molecular and medical aspects of the interactions between animals and the bacterial communities that have evolved with them.

### *Lecture and Discussion*

A1	Frydman	Tue,Thu	3:30pm - 4:45pm
		Thu	5:00pm - 5:50pm

**Notes:** Meets with GRS BI 611.

**Textbooks and Technology:** Scientific papers will be made available to the students throughout the course via Blackboard.

**Grading:** Midterm 30%; Oral Presentation and Discussion 20%; Final Exam 40%; Participation 10%.

## CAS BI 422: BIOCHEMISTRY 2

*Prereq: CAS BI 421 or CAS CH 421 or equivalent*

Cell metabolism, with special emphasis on the uptake of food materials, the integration and regulation of catabolic, anabolic, and anaerobic routes, and the generation and utilization of energy. Lectures include consideration of events in prokaryotic and eukaryotic organisms.

### *Lecture*

A1	Kornberg	Mon,Wed,Fri	9:05am - 9:55am
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### *Lab & Discussion*

B1	Mon	12:20pm - 4:20pm	Lab
B2	Mon	5:30pm - 9:30pm	Lab
B3	Wed	2:30pm - 6:30pm	Lab
B4	Thu	5:30pm - 9:30pm	Lab
B5	Fri	12:20pm - 4:20pm	Lab
B6	Fri	5:30pm - 9:30pm	Lab
C1	Fri	10:10am - 11:00am	Discussion
C2	Fri	11:15am - 12:05pm	Discussion
C3	Wed	12:20pm - 1:10pm	Discussion

**Notes:** Meets with CAS CH 422 A1, GRS BI/CH 622 A1 and MET CH 422.

**Textbooks and Technology:** 1) Lehninger: Principles of Biochemistry Seventh Edition. David L. Nelson & Michael M. Cox. W.H. Freeman & Company (2007). 2) The Absolute, Ultimate Guide to Principles of Biochemistry Study Guide and Solutions Manual Seventh Edition. David L. Nelson & Michael M. Cox. W.H. Freeman & Company (2017).

**Grading:** Hour exams, lab, final.

## CAS BB 522: MOLECULAR BIOLOGY LAB

*Prereq: CAS BI 552*

Introduction to techniques of cellular and molecular biology research, including analysis of DNA and protein molecules, by techniques such as plasmid isolation, restriction enzyme digestions, PCR, subcloning, DNA sequence analysis, reporter gene assays, mammalian cell culturing, immunofluorescence, yeast molecular biology, RNA isolation and quantification, RT-qPCR analysis and introduction to RNA-seq bioinformatic analysis.

### *Lab*

A1	Gilmore, Cheng	Tue,Thu	1:00pm - 4:45pm
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**Notes:** Permission required.

**Textbooks and Technology:** Xeroxed lab note packet.

**Grading:** Midterm (20%); final (20%); lab reports (35%); lab participation and preparation (25%).

# CELL & MOLECULAR

## CAS BI 528: BIOCHEMISTRY LABORATORY 2

*Prereq: BI 421 or BI 527*

Emphasizes protein, carbohydrate, nucleic acid, and lipid chemistry. Development and use of modern instrumentation and techniques. Same as CAS CH 528 and laboratory portion of CAS BI/CH 422. Required for BMB students enrolled concurrently in GMS BI 555.

### Lecture

A1	Tolan	Fri	10:10am - 11:00am
A2	Tolan	Fri	11:15am - 12:05pm
A3	Tolan	Wed	12:20pm - 1:10pm

### Lab

B1	Mon	12:20pm - 4:20pm	B4	Thu	5:30pm - 9:30pm
B2	Mon	5:30pm - 9:30pm	B5	Fri	12:20pm - 4:20pm
B3	Wed	2:30pm - 6:30pm	B6	Fri	5:30pm - 9:30pm

**Notes:** Meets with CAS CH 422, CAS BI 422, CAS CH 528, GRS CH 622 and GRS BI 622

**Textbooks and Technology:** TBA.

**Grading:** Lab preparation, lab reports, final exam.

## CAS BI 553: MOLECULAR BIOLOGY 2

*Prereq: CAS BI 552, recommended: BI/CH 421/422*

This course focuses on gene regulatory mechanisms with emphasis on eukaryotes, and current research in molecular biology. General areas of focus include genomics, gene regulation, and cell signaling. Course topics include genome organization and DNA rearrangement, RNA interference and noncoding RNAs, gene editing, mouse transgenic approaches, signal transduction pathways, chromatin structure, and cell cycle. Research articles and molecular biology approaches will be discussed.

### Independent

A1	Naya	Tue,Thu	9:00am - 10:45am
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**Textbooks and Technology:** TBA.

**Grading:** two exams, discussion participation, project.

## CAS BI 576: CARCINOGENESIS

*Prereq: BI 203, BI 206, BI 552*

The course covers multiple aspects of cancer biology with a focus on molecular mechanisms underlying cancer development and progression, and the implications for therapy. Topics include oncogenes, tumor suppressors, apoptosis, angiogenesis, metastasis, mouse models, cancer immunity, immunotherapy, and chemotherapy. Emphasis on current research.

### Lecture

A1	Gilmore, Tullai	Mon	2:30pm - 4:15pm
		Wed	2:30pm - 3:20pm

### Discussion

B1	Wed	3:35pm - 4:25pm
B2	Wed	4:40pm - 5:30pm
B3	Thu	3:35pm - 4:25pm

**Notes:** No credit if CAS BI 327 or GMS BT 520 were taken previously.

**Textbooks and Technology:** Weinberg (2013). The Biology of Cancer. Garland Science.

**Grading:** Three exams, presentation, participation.

## CAS BI 594: TOPICS IN BIOLOGY: 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

F1	Fuxman Bass	Mon, Wed	10:10am - 11:55am
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**Textbooks and 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%.

# ECOLOGY, BEHAVIOR & EVOLUTION

## CAS BI 119: SOCIOBIOLOGY

Prereq: None.

**Not for biology major or minor credit.** Designed for non-science majors to fulfill natural science divisional requirements (without lab) in CAS. The evolution and ecology of animal and human societies and social behavior, including genetics, development, and adaptive significance; altruism; cooperation; courtship and mate choice, parenting; evolutionary psychology; religion; evolutionary theory, philosophy, and social thought.

### Lecture

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

### Discussion

B1 Thu 2:00pm - 2:50pm

B2 Fri 2:30pm - 3:20pm

**Notes:** Not for biology major or minor credit.

**Textbooks and Technology:** Suggested: Alcock, *Animal Behavior*, 2005; selected readings.

**Grading:** Three exams; weekly participation in discussion section and lecture/section assignments and projects.

## CAS BI 260: MARINE BIOLOGY

Prereq: CAS BI 107 or consent of instructor.

Life in the seas: its ecology, evolution, and human impacts. Includes behavioral, physiological, structural, ecological, and evolutionary perspectives. A prerequisite for the Marine Semester.

### Lecture

A1 Rotjan Mon,Wed,Fri 12:20pm - 1:10pm

### Discussion

B1 Wed 10:10am - 11:00am C3 Tue 3:35pm - 4:25pm

B2 Wed 4:40pm - 5:30pm E1 Thu 11:15am - 12:05pm

C1 Thu 3:35pm - 4:25pm F1 Fri 9:05am - 9:55am

C2 Tue 11:15am - 12:05pm F2 Fri 10:10am - 11:00am

**Textbooks and Technology:** Castro & Huber. *Marine Biology*. 9th Edition

**Grading:** TBA.

## CAS BI 302: VERTEBRATE ZOOLOGY

Prereq: CAS BI 107

Methods and principles of comparative vertebrate zoology. Phylogeny, natural history, adaptation, and taxonomy. Laboratory emphasis on correlation among structural, physiological, and evolutionary features of selected vertebrates by both dissection and experimentation. Field trips.

### Lecture

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

### Lab

B1 Tue,Thu 8:00am - 10:45am

B2 Tue,Thu 12:30pm - 3:15pm

**Textbooks and Technology:** Pough, et al. *Vertebrate Life*. 9th edition

**Grading:** Three exams, lab quizzes and participation.

## CAS BI 303: ECOLOGY

Prereq: CAS BI 107 recommended: CAS BI 206, MA 121/123

Investigation of ecological processes and patterns at the individual, population, and community level. An evolutionary approach is emphasized. One day-long field trip required.

### Lecture

A1 Rotjan Mon,Wed,Fri 9:05am - 9:55am

### Lab

B1 Mon 2:30pm - 5:15pm

C1 Tue 3:30pm - 6:15pm

D1 Thu 12:30pm - 3:15pm

F1 Fri 2:30pm - 5:15pm

**Textbooks and Technology:** Molles. *Ecology*. 6th Edition

**Grading:** TBA.

# ECOLOGY, BEHAVIOR & EVOLUTION

## 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 the Earth's climate and terrestrial and aquatic ecosystems. Climate change, productivity and land-atmosphere feedbacks.

### Lecture

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

### Lab

C1 Tue 12:30pm - 3:15pm E1 Thu 3:30pm - 6:15pm

**Textbooks and Technology:** There is no required textbook for this course. Readings will be assigned from the scientific literature and will be available through Blackboard.

**Grading:** Two exams (20%), final exam (30%), lab and participation (30%).

## CAS BI 413: MICROBIAL ECOLOGY

*Prereq: BI 107 & BI 108 and CH 101 & CH 102*

Microbes (bacteria, archaea, and fungi) are the most diverse and abundant living organisms on the planet and microbial communities are key contributors to ecosystems and their functioning. Microbial Ecology is the study of how microbes interact with each other and with the environment around them. Topics will include microbial cell structure and physiology, microbe-microbe interactions including biofilm formation and quorum sensing, and microbe-environment interactions including microbiomes and geochemical cycling.

### Lecture and Discussion

A1 Angell Tue,Thu 3:30pm - 4:45pm  
Fri 3:35pm - 4:25pm

**Textbooks and Technology:** TBA.

**Grading:** TBA.

## CAS BI 423: MARINE BIOGEOCHEMISTRY

*Prereq: CAS ES 144 and (CH 102 or Marine Semester).*

Oceanic nutrient and biogeochemical cycling in the context of the marine response to global change. Links between local and global scales are emphasized. Topics include oceanic productivity, iron limitation, oceanic glacial carbon dioxide budget, biogenic particle fluxes, oceanic glacial-interglacial biogeochemistry.

### Independent

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

**Notes:** Meets with GRS BI 623 and ES 423/623.

**Textbooks and Technology:** TBA.

**Grading:** TBA.

## CAS BI 519: THEORETICAL EVOLUTIONARY ECOLOGY

*Prereq: CAS BI 107 and CAS MA 123 (also recommended: CAS BI 225 or CAS BI 303 or CAS BI 309) or consent of the instructor.*

Familiarizes students with the theory of evolutionary ecology. Students gain enough background to read theoretical evolutionary ecology literature, do simple modeling, and move on to more complex theory.

### Lecture and Lab

A1 Buston Mon, Wed, Fri 11:15am - 12:05pm  
Tue 3:30pm - 6:15pm

**Textbooks and Technology:** TBA.

**Grading:** TBA.

## CAS BI 530: FOREST ECOLOGY

*Prereq: CAS BI 107 and (CAS BI 303 or CAS BI 306), or consent of instructor*

The major biotic and abiotic factors influencing forest ecosystem composition, structure, and function. Role of solar radiation, hydrology, soils, succession, and management of forest ecosystems. Includes New England case study.

### Lecture and Discussion

A1 Templer Tue,Thu 11:00am - 12:15pm  
Fri 10:10am - 11:00am

**Notes:** Meets with GE 530.

**Textbooks and Technology:** TBA.

**Grading:** TBA.

# ECOLOGY, BEHAVIOR & EVOLUTION

## CAS BI 542: NEUROETHOLOGY

*Prereq: CAS BI 325, CAS NE 203, or CAS BI 563 or consent from instructor.*

The purpose of this course is to link neurobiology to behavioral ecology and the sensory stimulus properties of the natural environment. We use a textbook in the first half of the course; in the second half we use student-generated research topics and develop these into multi-disciplinary team essays. Past topics have included courtship in bowerbirds and music frogs, and hunting in rattlesnakes and sharks. Lecture and discussion periods are devoted to student presentations and class discussions.

### *Lecture and Discussion*

A1 Atema Tue,Thu 9:30am - 10:45am  
Wed 2:30pm - 3:20pm

**Notes:** Meets with CAS NE 542.

**Textbooks and Technology:** Guenther Zupanc, *Behavioral Neurobiology: An Integrative Approach*, 2nd Edition 2010, Oxford University Press, Oxford, New York.

**Grading:** Oral and written discussions (20% each) and oral and written final essay (60%).

## CAS BI 582: SEMINAR IN BIOLOGY: SEX, SEXES, AND SEXUAL PHENOTYPES

*Prereq: Consent of instructor and graduate or senior standing. Some background in evolution, development and/or behavior recommended.*

[2 cr] We will meet for two hours each week to discuss topics in the integrative and comparative biology of sex and sexes, based on readings drawn from recent primary literature, review papers, and book chapters. Specific content will depend on student interests. Potential topics include the evolution of sex; evolution of two or more sexes; maintenance of sexual vs. asexual reproduction; evolution of diverse mechanisms of sex determination; sex change; evolution and development of sexually differentiated phenotypes; sex role divergence, convergence and reversal; sexuality, same-sex and non-reproductive sexual behavior in animals; neurobiology of sex difference and similarity.

### *Independent*

W1 Warkentin Arranged

**Textbooks and Technology:** All readings will be available through Blackboard.

**Grading:** Preparation and participation in discussion.

# PHYSIOLOGY & NEUROBIOLOGY

## CAS BI 106: HUMAN ANATOMY

Prereq: CAS BI 105 or equivalent

**Not for Biology major or minor credit.** Intensive preprofessional course for students whose programs require anatomy. Gross structure of the human body; skeletal, muscular, nervous, respiratory, circulatory, digestive, urinary, and reproductive systems. Lab requires dissection. Carries natural science divisional credit (with lab) in CAS.

### Lecture

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

### Lab

C1	Tue	9:00am - 10:45am	D4	Wed	4:30pm - 6:15pm
C2	Tue	1:30pm - 3:15pm	E1	Thu	9:00am - 10:45am
C3	Tue	3:30pm - 5:15pm	E2	Thu	1:30pm - 3:15pm
C4	Tue	6:30pm - 8:15pm	E3	Thu	3:30pm - 5:15pm
D1	Wed	8:00am - 9:45am	F1	Fri	12:20pm - 2:05pm
D2	Wed	12:20pm - 2:05pm	F2	Fri	2:30pm - 4:15pm
D3	Wed	2:30pm - 4:15pm			

**Notes:** Not for Biology major or minor credit.

**Textbooks and Technology:** TBA.

**Grading:** 3 midterm lecture exams; 1 cumulative lecture final; 2 laboratory practical exams.

## CAS BI 230: BEHAVIORAL ENDOCRINOLOGY

Prereq: (BI 108 or NE 102) and sophomore standing.

Hormonal control of reproductive and parental behaviors, social affiliation, aggression, fluid homeostasis, biological rhythms including seasonal reproduction, stress, learning and memory, affective disorders and steroid abuse.

### Lecture and Discussion

A1	DiBenedictis	Mon, Wed, Fri	10:10am - 11:00am
		Fri	11:15am - 12:05pm

**Notes:** Meets with NE 230.

**Textbooks and Technology:** R.J. Nelson. Introduction to Behavioral Endocrinology, 5th ed. Sinauer, 2017.

**Grading:** Two midterms and a final exam (20% each), discussion/presentation participation (20%), quizzes (20%).

## CAS BI 315: SYSTEMS PHYSIOLOGY

Prereq: (CAS BI 108 or ENG BE 209) 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 Tue,Thu 11:00am - 12:15pm

### Lab

B1	Mon	2:30pm - 5:15pm	D3	Wed	2:30pm - 5:15pm
B2	Mon	6:30pm - 9:15pm	D4	Wed	6:30pm - 9:15pm
C1	Tue	8:00am - 10:45am	E1	Thu	8:00am - 10:45am
C2	Tue	12:30pm - 3:15pm	E2	Thu	12:30pm - 3:15pm
C3	Tue	12:30pm - 3:15pm	E3	Thu	6:30pm - 9:15pm
C4	Tue	6:30pm - 9:15pm	E4	Thu	6:30pm - 9:15pm
C5	Tue	6:30pm - 9:15pm	F1	Fri	8:00am - 10:45pm
D1	Wed	8:00am - 10:45am			

**Textbooks and Technology:** 1) Vander's. *Human Physiology: The Mechanisms of Body Function*. 14th edition 2) Lab manual by Sanxaridis Mantis et al

**Grading:** Three lecture exams, lecture assignments and homework, final exam, lab quizzes and write ups, cumulative lab final.

## CAS BI 325: PRINCIPLES OF NEUROSCIENCE

Prereq: CAS BI 203 or consent of instructor.

Fundamentals of the nervous system, emphasizing synaptic transmission; hierarchical organization; autonomic nervous system; mechanisms of sensory perception; reflexes and motor function; biorhythms; and neural mechanisms of feeding, mating, learning, and memory.

### Lecture

A1 Cruz-Martin Tue,Thu 2:00pm - 3:15pm

### Discussion

B1	Mon	2:30pm - 3:20pm
B2	Wed	3:35pm - 4:25pm
B3	Thu	3:35pm - 4:25pm

**Textbooks and Technology:** Bear, et al. *Neuroscience: Exploring the Brain*. 4th Ed. Wolters Kluwer.

**Grading:** Two midterms and a final exam.

# PHYSIOLOGY & NEUROBIOLOGY

## 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*

Cellular and molecular basis of neural excitability and synaptic transmission. The molecular understanding of ion channels is extrapolated to higher brain functions such as learning, memory, and sleep. In the lab, we learn to obtain intracellular and extracellular recordings from muscle fibers and the third motor nerve of crayfish ventral nerve cord. The extracellular recordings allow us to monitor the network activity that controls the animal's posture while the intracellular recordings allow us to investigate synaptic transmission. Quantitative analyses of experimental data will be performed. The entire class will contribute to a research project with the expectation that the data pooled from all students should be of sufficient quantity and quality for a publication.

### Lecture

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

### Lab

B1 Fri 2:30pm - 5:15pm

**Textbooks and 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 481: MOLECULAR BIOLOGY OF NEURONS

*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.

### Lecture

A1 Ho Mon, Wed, Fri 1:25pm - 2:15pm

### Discussion

B1 Mon 3:35pm - 4:25pm

**Textbooks and Technology:** TBA.

**Grading:** TBA.

## CAS BI 542: NEUROETHOLOGY

*Prereq: CAS BI 325, CAS NE 203, or CAS BI 563 or consent from instructor.*

The purpose of this course is to link neurobiology to behavioral ecology and the sensory stimulus properties of the natural environment. We use a textbook in the first half of the course; in the second half we use student-generated research topics and develop these into multi-disciplinary team essays. Past topics have included courtship in bowerbirds and music frogs, and hunting in rattlesnakes and sharks. Lecture and discussion periods are devoted to student presentations and class discussions.

### Lecture and Discussion

A1 Atema Tue,Thu 9:30am - 10:45am  
Wed 2:30pm - 3:20pm

**Notes:** Also offered as CAS NE 542.

**Textbooks and Technology:** Guenther Zupanc, *Behavioral Neurobiology: An Integrative Approach*, 2nd Edition 2010, Oxford University Press, Oxford, New York

**Grading:** Oral and written discussions (20% each) and oral and written final essay (60%).

## CAS BI 594: TOPICS IN BIOLOGY: NEUROBIOLOGY OF SOCIAL BEHAVIOR

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

An in-depth exploration of the neuroanatomical, neurochemical, neuroendocrine, and neurogenetic underpinnings of social behavior in animals. Detailed investigations of the mechanisms of social behavior will be studied within a broader framework of the evolution of sociality, in an attempt to understand how adaptation to group living has affected brain structure and function in both social vertebrates and invertebrates. Model and non-model organisms will be discussed, from ants to humans. Lectures are integrated with student-led discussions of relevant research papers.

### Independent

M1 Muscedere Tue,Thu 1:30pm - 3:15pm

**Textbooks and Technology:** None.

**Grading:** Exams, class presentations, and participation in daily literature discussions.

# METROPOLITAN COLLEGE (MET)

**MET BI evening courses count toward a student's major the same way CAS BI courses do.**

**Juniors and seniors can take one MET course per semester.** All other students should fill out the Petition to Take Courses at Metropolitan College form on CAS Advising's website.

## MET BI 106: HUMAN ANATOMY

*Prereq: MET BI 105*

**Not for Biology or BMB major/minor credit.** Gross structure of the human body: skeletal, muscular, nervous, respiratory, circulatory, digestive, urinary, and reproductive systems. Laboratory course.

*Lecture*

C1 Kieswetter Wed 6:00pm - 8:45pm

*Lab*

B4 Pasino Tue 6:30pm - 8:15pm Meets with CAS BI 106

D1 Pasino Thu 6:00pm - 8:00pm

**Notes:** Not for Biology or BMB major credit.

## MET BI 108: BIOLOGY 2

*Prereq: One year of high school biology and chemistry strongly recommended.*

*Coreq: MET CH 101 and CH 102 recommended as prereqs or coreqs.*

For pre-med students and students who plan to major in the natural sciences. Required for Biology majors. Course examines cells, genetics, development, physiology, and neurobiology.

*Lecture*

B1 Tullai Tue 6:00pm - 8:45pm

*Lab*

C1 Spilios Wed 6:00pm - 8:45pm

## MET BI 206: GENETICS

*Prereq: MET BI 108 or equivalent; MET CH 203 recommended.*

Principles of heredity as derived from genetic, biochemical, and cytological evidence in animals, plants, and microorganisms.

*Lecture and Discussion*

B1 Celenza TBA

## MET BI 303: ECOLOGY

*Prereq: MET BI 107*

Basic principles of ecology, population dynamics and behavior, interrelationships of plants and animals and their physical and chemical environment. Structure and function of ecosystems and community dynamics. Laboratory course.

*Lecture*

B1 Wasserman Tue 6:00pm - 8:45pm

*Lab*

C1 Wed 6:00pm - 8:45pm

## MET BI 315: SYSTEMS PHYSIOLOGY

*Prereq: MET BI 108 & MET BI 203*

An introduction to the basic physiological principles applied across all levels of organization (cell, tissue, organ system) and intended to prepare the student for more advanced courses in physiology. Topics include homeostasis, neural, muscle, cardiopulmonary, renal, endocrine, and reproductive physiology.

*Lecture*

D1 Vyshedskiy Thu 6:00pm - 8:45pm

*Lab*

C1 Seliga Wed 6:00pm - 8:45pm

**Notes:** Permission required for non-MET students.

# RESEARCH & READINGS

## UNDERGRADUATE RESEARCH IN BIOLOGY

*Undergraduate Research in Biology courses (CAS BI 192 - CAS BI 492) require an online application. For more information on research requirements and to apply, visit [www.bu.edu/biology/undergrad/research](http://www.bu.edu/biology/undergrad/research). Time commitment is a minimum of 6 hours a week for 2-credit research and 12 hours a week for 4-credit research.*

### CAS BI 192: UNDERGRADUATE RESEARCH IN BIOLOGY 1

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

[2 cr] **Not for biology major or minor credit.** Laboratory research or field work under the supervision of a Biology faculty mentor. Research outside of 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 292: UNDERGRADUATE RESEARCH IN BIOLOGY 2

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

[2 cr] **Not for biology major or minor credit.** Laboratory research or field work under the supervision of a Biology faculty mentor. Research outside of 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 392: UNDERGRADUATE RESEARCH IN BIOLOGY 3

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

[2 or 4 cr] **Two credit option not for Biology major or minor credit.** Laboratory research or field work under the supervision of a Biology faculty mentor. Research outside of the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor. Up to two 4-credit research courses may be counted as electives and one of those can apply towards the three-lab requirement.

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

### CAS BI 492: UNDERGRADUATE RESEARCH IN BIOLOGY 4

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

Laboratory research or field work under the supervision of a Biology faculty sponsor. Research outside of the Biology Department is acceptable if approved and overseen by a Biology faculty sponsor. Up to two 4-credit research courses may be counted as electives and one of those can apply towards the three-lab requirement.

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

## HONORS RESEARCH IN BIOLOGY

*Honors Research in Biology offers students the ability to participate in two-semester of mentored 4-credit research (CAS BI 401 and 402), a 2-credit research seminar (CAS BI 497 or 498), and to write and defend an honors thesis on their research. For more information on research requirements and to apply, visit [www.bu.edu/biology/undergrad/research](http://www.bu.edu/biology/undergrad/research).*

### CAS BI 402: HONORS RESEARCH IN BIOLOGY

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

Mentored laboratory or field research with a faculty member of the Biology Department leading to graduation with Honors in Biology. One 4 credit research course can count toward the 3-lab requirement and fulfill an upper level elective. A second 4 credit research course can fulfill an upper level elective.

**Grading:** Course grade is determined by laboratory/fieldwork performance, written thesis, and defense of the thesis before a committee of three Biology faculty members.

### CAS BI 498: HONORS RESEARCH IN BIOLOGY SEMINAR

*Prereq: For students currently enrolled in or intending to apply to the Honors in Biology Program.*

[2 cr] A 2-credit weekly research seminar for students in the Honors in Biology Program. A minimum grade of B+ and written assignments based on research topics in the seminar are required to graduate with departmental honors.

**Notes:** A minimum grade of B+ is required to graduate with Honors in Biology.

**Grading:** Attendance and written assignments.

# 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. These courses are often used as preparation for Undergraduate Research in Biology or Honors Research in Biology.*

### CAS BI 172: READINGS IN BIOLOGY 1

*Prereq: freshman 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 272: 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 372: 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 472: READINGS IN BIOLOGY 4

*Prereq: junior or senior standing, cumulative GPA in biology of at least 3.0, and consent of instructor (Biology faculty mentor).*

[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 BI 401/402 or BI 491/492.

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

# INDEX

## CAS

BB	192	Undergraduate Research in BMB 1	pg. 2
BB	292	Undergraduate Research in BMB 2	pg. 2
BB	392	Undergraduate Research in BMB 3	pg. 2
BB	402	Honors Research in BMB	pg. 3
BB	492	Undergraduate Research in BMB 4	pg. 2
BB	498	Honors Research in BMB Seminar 2	pg. 3
BB	522	Molecular Biology Lab	pg. 6
BB	592	Graduate Research in BMB	pg. 3
BI	106	Human Anatomy	pg. 11
BI	108	Biology 2	pg. 4
BI	114	Human Disease Infectious Diseases: AIDS to Zika	pg. 4
BI	116	Biology 2 with ISE Lab	pg. 4
BI	119	Sociobiology	pg. 8
BI	172	Readings in Biology 1	pg. 15
BI	192	Undergraduate Research in Biology 1	pg. 14
BI	206	Genetics	pg. 5
BI	216	Intensive Genetics	pg. 5
BI	230	Behavioral Endocrinology	pg. 11
BI	260	Marine Biology	pg. 8
BI	272	Readings in Biology 2	pg. 15
BI	292	Undergraduate Research in Biology 2	pg. 14
BI	302	Vertebrate Zoology	pg. 8
BI	303	Ecology	pg. 8
BI	306	Biology of Global Change	pg. 9
BI	315	Systems Physiology	pg. 11
BI	325	Principles of Neuroscience	pg. 11
BI	372	Readings in Biology 3	pg. 15
BI	385	Immunology	pg. 5
BI	392	Undergraduate Research in Biology 3	pg. 14
BI	402	Honors Research in Biology	pg. 14
BI	411	Microbiome: Our Intimate Relationship with Microorganisms	pg. 6
BI	413	Microbial Ecology	pg. 9
BI	422	Biochemistry 2	pg. 6
BI	423	Marine Biogeochemistry	pg. 9
BI	445	Cell and Molecular Neurophysiology	pg. 12
BI	472	Readings in Biology 4	pg. 15
BI	481	Molecular Biology of Neurons	pg. 12
BI	492	Undergraduate Research in Biology 4	pg. 14
BI	498	Honors Research in Biology Seminar	pg. 14

## CAS (cont.)

BI	519	Theoretical Evolutionary Ecology	pg. 9
BI	528	Biochemistry Lab 2	pg. 7
BI	530	Forest Ecology	pg. 9
BI	542	Neuroethology	pg. 10, 12
BI	553	Molecular Biology 2	pg. 7
BI	576	Carcinogenesis	pg. 7
BI	582	Seminar in Biology: Sex, Sexes, and Sexual Phenotypes	pg. 10
BI	594	Topics in Biology: Functional Genomics	pg. 7
BI	594	Topics in Biology: Neurobiology of Social Behavior	pg. 12

## GRS

MB	722	Advanced Biochemistry	pg. 3
----	-----	-----------------------	-------

## MET

BI	106	Human Anatomy	pg. 13
BI	108	Biology 2	pg. 13
BI	206	Genetics	pg. 13
BI	303	Ecology	pg. 13
BI	315	Systems Physiology	pg. 13