

# SPRING 2017 BIOLOGY COURSE DIRECTORY

## For your advising appointment you will need:

- ✓ Course Directory
- ✓ Degree Advice Report
- ✓ Major Guidelines Worksheets

## COURSES:

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## REGISTRATION NOTES:

- **For permission required courses:** If contact information is not listed on the Student Link, email Stacy Straaberg Finfrock at [stacysf@bu.edu](mailto:stacysf@bu.edu).
- Full time students may take up to 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.
- PDP, ROTC, and CAS FY/SY courses **do not count** towards graduation credits.
- The following courses **do not count as Biology or BMB electives** and cannot be applied to Biology or BMB majors:
  - CAS BI 106 Human Anatomy
  - CAS BI 114 Human Infectious Diseases: AIDS to Tuberculosis
  - CAS BI 119 Sociobiology

## Courses fulfilling breadth requirements:

### *Cell & Molecular*

- CAS BI 206 Genetics
- CAS BI 216 Intensive Genetics

### *Ecology, Behavior & Evolution*

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

### *Neurobiology & Physiology*

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

## Upper Level Lab Courses Offered Spring 2017:

- CAS BB 522 Molecular Biology Lab
- 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 II

# BIOCHEMISTRY & MOLECULAR BIOLOGY COURSES

NOTE: Minimum of three hours per week per credit of lab or field work, not including preparation and evaluation.

## CAS BB 192: UNDERGRADUATE RESEARCH IN BIOCHEMISTRY AND MOLECULAR BIOLOGY I

*Prereq: freshman standing, GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (laboratory advisor), 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 faculty member.

## CAS BB 292: UNDERGRADUATE RESEARCH IN BIOCHEMISTRY AND MOLECULAR BIOLOGY II

*Prereq: sophomore standing, GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (laboratory advisor), 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 faculty member.

## CAS BB 392: UNDERGRADUATE RESEARCH IN BIOCHEMISTRY AND MOLECULAR BIOLOGY III

*Prereq: junior standing, GPA in biochemistry and molecular biology (BMB) courses of at least 3.0, consent of instructor (laboratory advisor), 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 faculty member. A maximum of 4 credits earned in undergraduate research courses may be counted toward the BMB major.

## CAS BB 492: UNDERGRADUATE RESEARCH IN BIOCHEMISTRY AND MOLECULAR BIOLOGY IV

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

Laboratory research under the supervision of a faculty member. A maximum of 4 credits earned in undergraduate research courses may be counted toward the BMB major.

## 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 (laboratory advisor), and approval of application by the BMB Research and Honors Committee.*

*Coreq: CAS BB 498*

Independent laboratory research under the supervision of a faculty member. Minimum of 12 hours per week in the lab, not including preparation and evaluation. Course grade is determined by laboratory performance, oral presentation, written thesis, and defense of the thesis before a committee of three BMB faculty members. 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. Students must also present a research talk at the BMB symposium at the end of the Spring semester of the academic year. No more than 12 credits of undergraduate research may be counted toward the 128 credits required for graduation from CAS.

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

*Prereq: CAS BB 497. For students currently enrolled in the Honors BMB Program.*

[1 cr] A one-credit research seminar for students enrolled in Honors Research in BMB (CAS BB 402) or in BA/MA in Biotechnology research (CAS BB 592). Students present at the BMB Symposium. A minimum grade of B+ in this seminar and in CAS BB 401 and CAS BB 402 is required to graduate with Honors in BMB.

**Grading:** Regular attendance required.

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

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

*Coreq: CAS BB 498 is encouraged.*

Continuation of the laboratory research project initiated in CAS BB 591, under supervision of a faculty member. Externships are acceptable if approved and overseen by a BMB faculty member or the BMB Director. Minimum of 15 hours per week in the lab, culminating in a presentation at the BMB symposium.

# BIOCHEMISTRY & MOLECULAR BIOLOGY COURSES

## **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 II

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

For students planning to concentrate in the natural sciences and for premedical 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. Three hours lecture, three hours lab. 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  | D6 | Wed | 2:30pm - 5:15pm  |
| B2 | Mon | 2:30pm - 5:15pm  | D7 | Wed | 6:30pm - 9:15pm  |
| B3 | Mon | 6:30pm - 9:15pm  | D8 | Wed | 6:30pm - 9:15pm  |
| C1 | Tue | 8:00am - 10:45am | E1 | Thu | 8:00am - 10:45am |
| C2 | Tue | 8:00am - 10:45am | E2 | Thu | 8:00am - 10:45am |
| C3 | Tue | 8:00am - 10:45am | E3 | Thu | 8:00am - 10:45am |
| C4 | Wed | 8:00am - 10:45am | E4 | Mon | 6:30pm - 9:15pm  |
| C5 | Mon | 2:30pm - 5:15pm  | E5 | Mon | 6:30pm - 9:15pm  |
| C6 | Tue | 12:00pm - 2:45pm | E6 | Thu | 12:00pm - 2:45pm |
| C7 | Tue | 3:30pm - 6:15pm  | E7 | Thu | 3:30pm - 6:15pm  |
| C8 | Tue | 3:30pm - 6:15pm  | E8 | Thu | 3:30pm - 6:15pm  |
| C9 | Tue | 3:30pm - 6:15pm  | E9 | Thu | 3:30pm - 6:15pm  |
| D2 | Wed | 8:00am - 10:45am | F1 | Fri | 8:00am - 10:45am |
| D3 | Wed | 8:00am - 10:45am | F2 | Fri | 8:00am - 10:45am |
| D4 | Wed | 2:30pm - 5:15pm  | F3 | Fri | 8:00am - 10:45am |
| D5 | Wed | 2:30pm - 5:15pm  |    |     |                  |

**Notes:** Meets with BI 116.

**Text(s):** 1) Sadava, et. al. *Life: The Science of Biology*, 10th ed., Sinauer Publ., 2014 2) Spilios. *Principles of Biology II Laboratory Manual*. 2017.

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

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

*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). Three hours lecture, three hours lab. Carries natural science divisional credit (with lab) in CAS.

### Lecture

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

### 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 - 2:05pm  |

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

**Text(s):** TBA

**Grading:** 4 lecture exams; laboratory

## 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. Three hours lecture, one hour discussion.

### Lecture

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

### 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 | 2:30pm - 3:20pm  |
| 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.

**Text(s):** 1) Hartwell et al. *Genetics: From Genes to Genome*. McGraw-Hill Edition: 5th edition. 2) Recommended, but not required: Solutions Manual for the text. (These will be available through the BU bookstore or as an ebook.)

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

# CELL & MOLECULAR

## 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. Three hours lecture, one hour discussion.

### Lecture

|    |                   |         |                   |
|----|-------------------|---------|-------------------|
| A1 | Celenza, Loechler | Tue,Thu | 11:00am - 12:15pm |
|    |                   | 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

**Text(s):** 1) Hartwell et al. *Genetics: From Genes to Genome*, McGraw-Hill. 5th edition. 2) Recommended, but not required: Solutions Manual for the text. (These will be available through the BU bookstore or as an ebook.)

**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. Three hours lecture, one hour discussion.

### Lecture

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

### 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   |

**Text(s):** Peter Parham. *The Immune System*. 4th Edition. Garland Science Publishing, NY, NY

**Grading:** 3 exams (2 midterms and 1 final) 80%, Discussion/participation: 20%

## 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.

**Text(s):** 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 II

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. Lab exercises are described under BI 528. Three hours lecture, four hours lab, one hour discussion.

### Lecture

|    |          |             |                 |
|----|----------|-------------|-----------------|
| A1 | Kornberg | Mon,Wed,Fri | 9:05am - 9:55am |
|----|----------|-------------|-----------------|

### 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 | Wed | 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.

**Text(s):** Voet, Voet & Pratt. 2013. *Fundamentals of Biochemistry*. John Wiley & Sons, Inc. 4th Edition

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

# CELL & MOLECULAR

## 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, and yeast molecular biology.

*Independent*

A1 Gilmore, Cheng Tue,Thu 1:00pm - 4:45pm

**Notes:** Permission required

**Text(s):** Xeroxed lab note packet

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

## CAS BI 528: BIOCHEMISTRY LABORATORY II

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. Four hours lab, one hour discussion.

*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

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

## CAS BI 553: MOLECULAR BIOLOGY II

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

Continuation of CAS BI 552 with emphasis on eukaryotes. General areas of focus include genome organization, mechanisms of gene regulation, and functional genomics. Topics including genomics, chromatic structure, high-throughput technologies and genome editing.

*Independent*

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

**Notes:** This course is currently being updated on the Link. The dates and times here are correct.

**Text(s):** 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.

**Text(s):** Weinberg (2013).The Biology of Cancer. Garland Science.

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

# 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. The evolution of animal and human societies; genetics and the development of social behavior; the adaptive significance of social organization; altruism; cooperation; courtship, mate choice, and reproductive behavior; human sociobiology; evolutionary psychology; religion; impact of evolutionary theory on social thought. Three hours lecture plus discussion. Carries natural science divisional credit (without lab) in CAS.

### 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.

**Text(s):** 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. Three hours lecture, one hour discussion.

### Lecture

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

### Discussion

B1 Wed 10:10am - 11:00am

B2 Wed 4:40pm - 5:30pm

C1 Thu 3:35pm - 4:25pm

C2 Tue 11:15am - 12:05pm

C3 Tue 3:35pm - 4:25pm

E1 Thu 11:15am - 12:05pm

F1 Fri 9:05am - 9:55am

F2 Fri 10:10am - 11:00am

**Text(s):** 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. Two hours lecture, six hours lab.

### Lecture

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

### Lab

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

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

**Text(s):** 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

Investigation of ecological processes and patterns at the individual, population, and community level. An evolutionary approach is emphasized. Three hours lecture, three hours lab. One research paper and 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 Wed 2:30pm - 5:15pm

F1 Fri 2:30pm - 5:15pm

**Text(s):** 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. Three hours lecture, three hours lab.

### Lecture

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

### Lab

C1 Tue 12:30pm - 3:15pm

E1 Thu 12:30pm - 3:15pm

**Text(s):** 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 307: BIOGEOGRAPHY

*Prereq: GE 101 and BI 107*

Examines the spatial distribution of plants and animals from historical, ecological, and analytical perspectives. Environmental and human influences on species distribution, abundance, and diversity are considered, as are changes resulting from past and projected climate change.

### Independent

A1 Phillips Tue 3:30pm - 6:15pm

**Notes:** Meets with GE 307.

## CAS BI 414: ORNITHOLOGY

*Prereq: CAS BI 107*

Examines the behavior, ecology and morphology, physiology, classification, and evolution of birds. Flight, navigation, migration, territorial courtship, nesting, and parental behavior. Field trips. Three hours lecture, one hour discussion and demonstrations.

### Independent

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

**Notes:** Meets with GRS BI 614.

**Text(s):** 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.

**Text(s):** TBA.

**Grading:** TBA.

## CAS BI 504: ADVANCED EVOLUTIONARY ANALYSIS

*Prereq: BI 309 or consent of the instructor*

Modern concepts, controversies, and analytical approaches in evolutionary biology. Topics include adaptation, natural and sexual selection, species and species formation, phylogenetics, origin of evolutionary novelty, adaptive radiation, basic population and quantitative genetics, development and evolution. Three hours lecture, one hour discussion.

### Lecture

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

### Discussion

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

**Notes:** This course will have a delayed posting on the Link. If not currently listed, please check back.

**Text:** Readings will be available through Blackboard.

**Grading:** Midterm Exams (50%); Discussion (25%); Paper (25%)



# ECOLOGY, BEHAVIOR & EVOLUTION

## CAS BI 506: PHENOTYPIC PLASTICITY

*Prereq:* CAS BI 107 and (BI 303 or BI 309 or BI 315 or BI 410) or consent of instructor

Explores the flexible phenotype as a product of development and target of natural selection, and addresses the role of plasticity in ecological interactions and evolutionary diversity. Topics include evolution of plasticity, mechanisms underlying plasticity, and role of plasticity in ecology, diversification of life, and conservation in a changing environment. Three hours lecture, one hour discussion.

### Lecture

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

### Discussion

B1 Wed 10:10am - 11:00am

**Notes:** This is a graduate course. Highly motivated, prepared undergraduates are also welcome, but should note the additional work required. Contact instructor for more information.

**Text(s):** Gilbert & Epel (2015) *Ecological Developmental Biology*, 2nd Edition; West-Eberhard (2003) *Developmental Plasticity and Evolution*.

**Grading:** 20% participation, 30% project, 50% midterm and final exams

## 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. Three hours lecture plus discussion.

### Lecture and Discussion

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

**Notes:** Meets with GE 530.

**Text:** *Forest Ecosystems*. 2008. DA Perry, R Oren and SC Hart. Johns Hopkins University Press.; *Forests in Time The Environmental Consequences of 1,000 Years of Change in New England*. 2004. Eds DR Foster and JD Aber. Yale University Press.

**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. The three hour lecture and one hour 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.

**Text(s):** Guenther Zupanc, *Behavioral Neurobiology: An Integrative Approach*, 2nd Edition 2010, Oxford University Press, Oxford, New York

**Grading:** Two midterm exams (20% each) and written and oral final essay (60%).

## CAS BI 543: GLOBAL ECOLOGY

*Prereq:* Senior standing and previous undergraduate ecology or environmental science courses or permission of instructor.

Explores the many threads that link and exchange throughout the biosphere. Themes include life systems as a geological force; bacterial as a global superorganism; the major impacts of algae and symbiosis; climate change updates; and examples of humans in various countries/cultures working toward a sustainable human-biosphere relationship. Three hours lecture.

### Lecture and Discussion

A1 Zook Tue 3:30pm - 6:15pm

**Notes:** Occasionally, sessions are held outside the classroom.

**Text:** Original research articles and reviews.

**Grading:** Based on periodic written reflections to assigned readings; active participation especially in discussions; project presentation; final exam.

# ECOLOGY, BEHAVIOR & EVOLUTION

## CAS BI 582: ADVANCED TOPICS IN EVOLUTION

*Prereq: Consent of instructor. Open to seniors in biology.*

[2 cr] We will meet for two hours each week to discuss topics at the forefront of evolutionary biology. Topics vary from year to year and readings are drawn from recent primary literature augmented by classical literature that puts the current work in the broader context of major questions in evolution.

*Independent*

S1 Schneider Arranged

**Text(s):** Readings from the primary literature available through Blackbaord.

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

# NEUROBIOLOGY & PHYSIOLOGY

## 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. Three hours lecture, two hours lab (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  
C2 Tue 1:30pm - 3:15pm  
C3 Tue 3:30pm - 5:15pm  
C4 Tue 6:30pm - 8:15pm  
D1 Wed 8:00am - 9:45am  
D2 Wed 12:20pm - 2:05pm  
D3 Wed 2:30pm - 4:15pm  
D4 Wed 4:30pm - 6:15pm  
E1 Thu 9:00am - 10:45am  
E2 Thu 1:30pm - 3:15pm  
E3 Thu 3:30pm - 5:15pm  
F1 Fri 12:20pm - 2:05pm  
F2 Fri 2:30pm - 4:15pm

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

**Text(s):** 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. Three hours lecture, one hour discussion.

### Lecture and Discussion

A1 DiBenedictis Mon, Wed, Fri 12:20pm - 1:10pm  
Fri 1:25pm - 2:15pm

**Notes:** Meets with NE 230. This course will have a delayed posting on the Link. If not currently listed, please check back.

**Text(s):** 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. Three hours lecture, three hours lab.

### Lecture

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

### Lab

B1 Mon 2:30pm - 5:15pm D2 Wed 8:00am - 10:45am  
B2 Mon 6:30pm - 9:15pm D3 Wed 2:30pm - 5:15pm  
C1 Tue 8:00am - 10:45am D4 Wed 6:30pm - 9:15pm  
C2 Tue 12:30pm - 3:15pm E1 Thu 8:00am - 10:45am  
C3 Tue 12:30pm - 3:15pm E2 Thu 12:30pm - 3:15pm  
C4 Tue 6:30pm - 9:15pm E3 Thu 6:30pm - 9:15pm  
C5 Tue 6:30pm - 9:15pm F1 Fri 8:00am - 10:45am  
D1 Wed 8:00am - 10:45am

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

**Grading:** Two hourly exams, 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. Three hours lecture, one hour discussion.

### Lecture

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

### Discussion

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

**Text(s):** Bear, et al. *Neuroscience: Exploring the Brain*. 4th Ed. Wolters Kluwer.

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

# NEUROBIOLOGY & PHYSIOLOGY

## CAS BI 525: BIOLOGY OF NEURODEGENERATIVE DISEASES

*Prereq: CAS NE 102 or CAS BI 203, and CAS NE 203 or CAS BI 325*

This course focuses on understanding the molecular mechanisms that are at the basis of neurodegenerative diseases and on their impact and relevance in clinical diagnosis and treatment. Neurodegenerative diseases like Alzheimer's disease, Parkinson's disease, Amyotrophic Lateral Sclerosis, Huntington Disease and Cruetzfeldt-Jacob disease are becoming more and more common since people are more exposed to pathogenic agents (as in Cruetzfeldt-Jacob disease and Mad Cow disease) or just encounter these diseases as a result of aging (like Alzheimer's or Parkinson's disease). Although very different from one another, these diseases share common mechanisms and features leading to neuronal death, including protein misfolding and aggregation, oxidative stress, impaired protein degradation, and apoptosis. This course will study how these molecular pathways define each disease, contributing to neurodegenerative phenomena. Relevance will be given to Alzheimer's disease.

*Independent*

|    |           |               |                   |
|----|-----------|---------------|-------------------|
| A1 | Pastorino | Mon, Wed, Fri | 9:05am - 9:55am   |
|    |           | Wed           | 10:10am - 11:00am |

**Notes:** Meets with CAS NE 525.

**Text(s):** Detailed handouts, powerpoint presentation, PDF files on course website

**Grading:** 2 midterm exams 46%; final exams 24%; assignments 15%; paper presentation 15%

## 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. The three hour lecture and one hour 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.

**Text(s):** Guenther Zupanc, *Behavioral Neurobiology: An Integrative Approach*, 2nd Edition 2010, Oxford University Press, Oxford, New York

**Grading:** Two midterm exams (20% each) and written and oral final essay (60%).

## CAS BI 582: NEUROBIOLOGY OF BRAIN DISORDERS

*Prereq: Suggested BI 203 and BI 325*

**[2 cr] Not for Biology major or minor credit unless two semesters of different topics are taken.** This course reviews recent topics and readings in the field of neurodegeneration that span disorders affecting neurodevelopment, learning and memory and aging. Specifically, the course will probe cellular and molecular mechanisms underlying cell death. In addition, the class will probe commonalities of the diseases, genetic risk factors and the usefulness and limitations of animal models. Also, we will discuss different interdisciplinary approaches that include molecular genetics tools in mice, biochemistry, cell biology and electrophysiology in addressing biomedical-related problems in neuroscience

*Lecture*

|    |    |     |                   |
|----|----|-----|-------------------|
| H1 | Ho | Fri | 10:10am - 11:55am |
|----|----|-----|-------------------|

**Text(s):** Scientific papers will be posted to the blackboard website.

**Grading:** Participation 50%, Oral presentation 50%

## CAS BI 599: PHYSIOLOGY OF THE SYNAPSE

*Prereq: Junior standing; CAS BI 325 or CAS BI 445 or CAS BI 481 are recommended.*

Neuron development and maturation, synapse formation, structure and molecular components of synapses, synaptic transmission, synaptic plasticity, neurotransmitter receptors, cellular basis for learning and memory, synaptic pathology in neurological diseases. Two hours lecture, two hours paper presentation and discussion.

*Lecture and Paper Presentation/Discussion*

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

**Notes:** This course will have a delayed posting on the Link. If not currently listed, please check back.

**Text(s):** Synapses (2003) by W. Maxwell Cowan and Thomas C. Südhof

**Grading:** Midterm exam; final exam; class participation/participation

# METROPOLITAN COLLEGE (MET)

**MET courses cover the same material as CAS courses but offer *alternative* schedules.**

## MET BI 106: HUMAN ANATOMY

*Prereq: MET BI 105*

**Not for biology major or minor credit.** Gross structure of the human body: skeletal, muscular, nervous, respiratory, circulatory, digestive, urinary, and reproductive systems. Laboratory course. Three hours lecture, two hours lab.

### Lecture

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

### Lab

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

D1 Thu 6:00pm - 8:00pm

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

## MET BI 108: BIOLOGY II

Assumes year of high school biology and chemistry. For premedical students and students who plan to concentrate in the natural sciences. Required of biology concentrators. It is recommended that MET CH 101 and CH 102 be taken prior to or concurrently with this sequence. Each course has three hours lecture and three hours lab. Course examines cells, genetics, development, physiology, and neurobiology.

### Lecture

A1 Tullai Mon 6:00pm - 8:45pm

### Lab

C1 TBA 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. Three hours lecture, one hour discussion.

### Lecture and Discussion

B1 Celenza Tue,Thu 6:00pm - 7:30pm

Tue 7:30pm - 8:30pm

**Juniors and seniors can take one MET course per semester.**

All other students must request permission from Steve Jarvi, Associate Dean for Student Life, at [sjarvi@bu.edu](mailto:sjarvi@bu.edu).

## 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. Three hours lecture, three hours lab.

### Lecture

A1 Wasserman Mon 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. Three hours lecture, three hours lab.

### 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

**NOTE:** Minimum of three hours per week per credit of lab or field work, not including preparation and evaluation. No more than 12 credits of undergraduate research may be counted toward the 128 credits required for graduation from CAS.

## CAS BI 192: UNDERGRADUATE RESEARCH IN BIOLOGY I

*Prereq: freshman standing, consent of instructor, and completed application.*

[2 cr] **Not for biology major or minor credit.** Research in biological science for students at the freshman level. Students design and implement a research project with a faculty member.

## CAS BI 292: UNDERGRADUATE RESEARCH IN BIOLOGY II

*Prereq: sophomore standing, consent of instructor, and completed application.*

[2 cr] **Not for biology major or minor credit.** Research in biological science for students at the sophomore level. Students design and implement a research project with a faculty member.

## CAS BI 392: UNDERGRADUATE RESEARCH IN BIOLOGY III

*Prereq: junior standing, consent of instructor, and completed application.*

[2 or 4 cr] **Two credit option not for biology major or minor credit.** Research in biological science for students at the junior level. Students design and implement a research project with a faculty member. 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.

## CAS BI 492: UNDERGRADUATE RESEARCH IN BIOLOGY IV

*Prereq: junior or senior standing, consent of instructor, and completed application.*

Research in biological science for students at the senior level. Students design and implement a research project with a faculty member. Research topic must be defined at the time of registration. Course grade is to be determined by laboratory performance and written report. 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.

## CAS BI 402: HONORS RESEARCH IN BIOLOGY

*Prereq: senior standing, cumulative GPA in biology 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.

## CAS BI 172: READINGS IN BIOLOGY I

*Prereq: freshman standing, consent of instructor, and completed application.*

[2 cr] **Not for biology major or minor credit.** Library research on a well-defined topic in biological sciences, chosen in conjunction with a faculty member. Individual conferences and discussion with the faculty member are required as well as a paper presentation.

## CAS BI 272: READINGS IN BIOLOGY II

*Prereq: sophomore standing, consent of instructor, and completed application.*

[2 cr] **Not for biology major or minor credit.** Library research on a well-defined topic in biological sciences, chosen in conjunction with a faculty member. Individual conferences and discussion with the faculty member are required as well as a paper presentation.

## CAS BI 372: READINGS IN BIOLOGY III

*Prereq: junior standing, consent of instructor, and completed application.*

[2 cr] **Not for biology major or minor credit.** Library research on a well-defined topic in biological sciences, chosen in conjunction with a faculty member. Individual conferences and discussion with the faculty member are required as well as a paper presentation.

## CAS BI 472: READINGS IN BIOLOGY IV

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

[2 cr] **Not for biology major or minor credit.** Intensive library research on a well-defined subject, followed by individual conferences and discussion with a faculty member. May be taken as preparation for CAS BI 401, 402, 491, and 492.

## CAS BI 498: HONORS RESEARCH IN BIOLOGY SEMINAR

*Prereq: CAS BI 107 & CAS BI 108 and at least two additional biology courses. For students currently enrolled in or intending to apply to the Honors Biology Program*

[2 cr] A 2-credit weekly research seminar for students in the Honors in Biology Program. A minimum grade of B+ and a written assignment based on a research topic in one of the seminars is required to graduate with honors. Juniors enrolled in BI 497 or 498 must have a current faculty research mentor (See the Biology website or contact the Undergraduate Program Coordinator in the Department of Biology).

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

**Grading:** TBA.

A1 Wasserman Arranged

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