

SPRING 2016 BIOLOGY COURSE DIRECTORY

For your advising appointment you will need:

- ✓ Course Directory
- ✓ Degree Advice Report
- ✓ Major/Specialization Guidelines
- ✓ Registration Class Planner
- ✓ Transcript

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.
- 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

Neurobiology & Physiology

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

Ecology, Behavior & Evolution

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

Upper Level Lab Courses Offered Spring 2016:

- 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 416 Herpetology
- CAS BI 422 Biochemistry II
- CAS BI 445 Cell & Molecular Neurophysiology

BIOCHEMISTRY & MOLECULAR BIOLOGY COURSES

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 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 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 Spilios, Gilmore Tue,Thu 1:00pm - 5:00pm

Notes: Permission required

Text(s): Xeroxed lab note packet

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

BIOCHEMISTRY & MOLECULAR BIOLOGY COURSES

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.

GRS MB 722: ADVANCED BIOCHEMISTRY

Prereq: BI 422, BI 622, 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 - 2:00pm

Discussion

Wed 4:30 - 6:30pm

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 | Monette, Eldred, Loechler | Mon,Wed,Fri | 10:00am - 11:00am |
| A2 | Monette, Eldred, Loechler | Mon,Wed,Fri | 12:00pm - 1:00pm |
| A3 | Monette, Eldred, Loechler | Mon,Wed,Fri | 2:00pm - 3:00pm |

Lab

Spilios

| | | | | | |
|----|-----|------------------|----|-----|------------------|
| B1 | Mon | 1:00pm - 4:00pm | D5 | Wed | 1:00pm - 4:00pm |
| B2 | Mon | 1:00pm - 4:00pm | D7 | Wed | 4:00pm - 7:00pm |
| B3 | Mon | 4:00pm - 7:00pm | D8 | Wed | 4:00pm - 7:00pm |
| C1 | Tue | 9:00am - 12:00pm | E1 | Thu | 9:00am - 12:00pm |
| C2 | Tue | 9:00am - 12:00pm | E2 | Thu | 9:00am - 12:00pm |
| C3 | Tue | 9:00am - 12:00pm | E3 | Thu | 9:00am - 12:00pm |
| C4 | Tue | 1:00pm - 4:00pm | E4 | Thu | 1:00pm - 4:00pm |
| C5 | Tue | 1:00pm - 4:00pm | E5 | Thu | 1:00pm - 4:00pm |
| C6 | Tue | 1:00pm - 4:00pm | E5 | Thu | 1:00pm - 4:00pm |
| C7 | Tue | 5:00pm - 8:00pm | E6 | Thu | 1:00pm - 4:00pm |
| C8 | Tue | 5:00pm - 8:00pm | E7 | Thu | 5:00pm - 8:00pm |
| C9 | Tue | 5:00pm - 8:00pm | E8 | Thu | 5:00pm - 8:00pm |
| D2 | Wed | 8:00am - 11:00am | E9 | Thu | 5:00pm - 8:00pm |
| D3 | Wed | 8:00am - 11:00am | F1 | Fri | 10:00am - 1:00pm |
| D4 | Wed | 12:00pm - 3:00pm | F2 | Fri | 10:00am - 1:00pm |

Text(s): 1) Sadava, et. al. *Life: The Science of Biology*, 10th ed., Sinauer Publ., 2014 2) Spilios. *Principles of Biology II Laboratory Manual*. 2016.

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 | 9:00am - 10:00am |
|----|----|-------------|------------------|

Lab

| | | | | | |
|----|---------|------------------|----|---------|-------------------|
| B1 | Mon,Wed | 3:00pm - 4:30pm | C3 | Tue,Thu | 3:30pm - 5:00pm |
| C1 | Tue,Thu | 9:30am - 11:00am | D1 | Mon,Wed | 11:00am - 12:30pm |
| C2 | Tue,Thu | 1:30pm - 3:00pm | D2 | Mon,Wed | 1:30pm - 3:00pm |

Notes: Not for biology concentration credit

Text(s): 1) Cowan and Bunn. *Microbiology Fundamentals, A Clinical Approach*. McGraw-Hill, 2nd edition 2) Custom Lab Manual for BI114 by Co

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 - 12:30pm |
|----|---------|---------|-------------------|

Discussion

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|----|-----|------------------|----|-----|------------------|
| B1 | Mon | 12:00pm - 1:00pm | D1 | Wed | 8:00am - 9:00am |
| B2 | Mon | 12:00pm - 1:00pm | D2 | Wed | 12:00pm - 1:00pm |
| B3 | Mon | 1:00pm - 2:00pm | D3 | Wed | 2:00pm - 3:00pm |
| B4 | Mon | 2:00pm - 3:00pm | D5 | Wed | 2:00pm - 3:00pm |
| C1 | Tue | 8:00am - 9:00am | | | |

Notes: Meets with CAS BI 282/216

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. 20% discussion.

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 | Tue,Thu | 11:00am - 12:30pm |
| A2 | Celenza | Tue,Thu | 11:00am - 12:30pm |

Discussion

Loechler

| | | | | | |
|----|-----|------------------|----|-----|-------------------|
| B1 | Mon | 12:00pm - 1:00pm | D2 | Mon | 11:00am - 12:00pm |
| B2 | Mon | 2:00pm - 3:00pm | E1 | Tue | 10:00am - 11:00am |
| D1 | Wed | 2:00pm - 3:00pm | E2 | Tue | 5:00pm - 6:00pm |

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 | 1:00pm - 2:00pm |
|----|---------|-------------|-----------------|

Discussion

| | | |
|----|-----|------------------|
| B1 | Tue | 8:30am - 9:30am |
| C1 | Wed | 12:00pm - 1:00pm |
| D1 | Thu | 8:30am - 9:30am |
| E1 | Fri | 2:00pm - 3:00pm |

Text(s): Peter Parham. *The Immune System*. 3rd Edition. Garland Science Publishing, NY, NY

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

CAS BI 410: DEVELOPMENTAL BIOLOGY

Prereq: CAS BI 203 /BI 213 or consent of instructor

Contemporary aspects of embryonic development, drawing from current literature. Emphasis on the use of experimental approaches to address topics such as polarity in the egg, body axis specification, embryonic patterning, and organogenesis. Three hours lecture, one hour discussion.

Lecture

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|----|---------|---------|-----------------|
| A1 | Bradham | Tue,Thu | 2:00pm - 3:30pm |
|----|---------|---------|-----------------|

Discussion

| | | |
|----|-----|-----------------|
| B1 | Wed | 2:00pm - 3:00pm |
| B2 | Wed | 3:00pm - 4:00pm |

Notes: Meets with GRS BI 610

Text(s): Recommended: Gilbert, *Developmental Biology*, Sinauer Assoc. 2000

Grading: Two midterms, final exam, class participation.

CAS BI 411: MICROBIOME: OUR INTIMATE RELATIONSHIP WITH MICROORGANISMS

Prereq: CAS BI 203, CAS BI 206 and CAS BI 311 or consent of instructor

The microbial community - referred to as "microbiome" - that colonizes our body is essential for our health and has been implicated in several diseases, including depression, obesity, diabetes and cancer. Topics include (1) the human microbiome; and (2) fundamental aspects of the interactions between animals and the microorganisms that reside on them. Three hours lecture; one hour discussion.

Lecture

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|----|---------|---------|-----------------|
| A1 | Frydman | Tue,Thu | 3:30pm - 5:00pm |
|----|---------|---------|-----------------|

Discussion

| | | |
|----|-----|-----------------|
| A2 | Thu | 5:00pm - 6:00pm |
|----|-----|-----------------|

Notes: Meets with GRS BI 611. Permission Required

Text(s): Scientific papers will be made available to the students throughout the course

Grading: Midterm 30%, Oral Presentation and Discussion 20%, Final Exam 40% Participation 10%

CELL & MOLECULAR

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 anaplerotic 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 9:00am - 10:00am

Lab & Discussion

Tolan, Kornberg

| | | | |
|----|-----|-------------------|------------|
| B1 | Mon | 10:00am - 2:00pm | Lab |
| B2 | Mon | 3:00pm - 7:00pm | Lab |
| B3 | Tue | 6:00pm - 10:00pm | Lab |
| B4 | Wed | 1:00pm - 5:00pm | Lab |
| B5 | Wed | 5:30pm - 9:30pm | Lab |
| B6 | Thu | 6:00pm - 10:00pm | Lab |
| C1 | Fri | 8:00am - 9:00am | Discussion |
| C2 | Fri | 10:00am - 11:00am | Discussion |
| C3 | Fri | 11:00am - 12:00pm | Discussion |

Notes: ALSO OFFERED AS CH 422. 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.

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

A2 Tolan Fri 10:00am - 11:00am

Lab

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|----|-----|------------------|----|-----|------------------|
| B1 | Mon | 10:00am - 2:00pm | B4 | Wed | 1:00pm - 5:00pm |
| B2 | Mon | 3:00pm - 7:00pm | B5 | Wed | 5:30pm - 9:30pm |
| B3 | Tue | 6:00pm - 10:00pm | B6 | Thu | 6:00pm - 10:00pm |

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 cell signaling. Topics including genomics, mouse transgenics systems, signal transduction, chromatin structure, and cell cycle.

Lecture

A1 Naya Tue,Thu 9:30am - 11:00am

Discussion

B1 Mon 1:00pm - 2:00pm
B2 Mon 5:00pm - 6:00pm

Text(s): TBA

Grading: Two midterms, final, discussion participation

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, McCall Mon 3:00pm - 5:00pm
Wed 3:00pm - 4:00pm

Discussion

B1 Wed 4:00pm - 5:00pm
B2 Arranged
B3 Arranged

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

NEUROBIOLOGY & PHYSIOLOGY

CAS BI 106: HUMAN ANATOMY

Prereq: CAS BI 105 or equivalent

Not for biology concentration 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 11:00am - 12:00pm

Lab

Pasino

| | | | |
|----|-----|------------------|-----------------------|
| C2 | Tue | 12:30pm - 2:30pm | |
| C3 | Tue | 3:30pm - 5:30pm | |
| C4 | Tue | 6:00pm - 8:00pm | Meets with MET BI 106 |
| D1 | Wed | 8:30am - 10:30am | |
| D2 | Wed | 12:30pm - 2:30pm | |
| D3 | Wed | 3:30pm - 5:30pm | |
| D4 | Wed | 6:00pm - 8:00pm | |
| E1 | Thu | 9:30am - 11:30am | |
| E2 | Thu | 12:30pm - 2:30pm | |
| E3 | Thu | 3:30pm - 5:30pm | |
| F1 | Fri | 12:30pm - 2:30pm | |

Notes: Not for Biology or BMB major credit

Text(s): 1) Marieb. *Human Anatomy*. 7th Edition 2) Custom Lab Manual available at BU Bookstore

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

CAS BI 315: SYSTEMS PHYSIOLOGY

Prereq: CAS BI 108 or CAS BI 118 or ENG BE 209, and CAS CH 101 and CAS CH 102, or equivalent.

Examines the structure and function of the body's major organ systems (nervous, endocrine, circulatory, respiratory, digestive and urinary) at the cell, tissue and organ levels. Special emphasis on regulatory and integrative aspects of feedback systems underlying the maintenance of optimal internal state required for survival in a dynamic environment.

Lecture

A1 Widmaier Tue,Thu 12:30pm - 2:00pm

Lab

Seliga

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

Text(s): 1) Vander's. *Human Physiology: The Mechanisms of Body Function*. 14th edition 2) Lab manual by Rycroft, 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, Gavornik Tue,Thu 2:00pm - 3:30pm

Discussion

| | | |
|----|-----|-----------------|
| B1 | Mon | 3:00pm - 4:00pm |
| B2 | Wed | 3:00pm - 4:00pm |
| B3 | Thu | 1:00pm - 2:00pm |

Notes: Meets with NE 203 in the fall only.

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

Grading: Two midterms and a final exam.

NEUROBIOLOGY & PHYSIOLOGY

CAS BI 445: CELLULAR AND MOLECULAR NEUROPHYSIOLOGY

Prereq: CAS BI 203, CAS BI 315, 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. Three hours lecture, three hours lab.

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

Lab

B1 Fri 1:00pm - 4:00pm

Notes: Meets with CAS GRS BI 645, CAS NE 445, BI 645. Also offered as NE 445

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 9:00am - 10:00am

Pastorino Wed 10:00am - 11:00am

Notes: Meets with CAS NE 525 INDEPENDENT.

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 563 or CAS BI 325 (or CAS NE 203) or consent from instructor

The purpose of this course is to link neurobiology to behavioral ecology and the properties of the sensory stimulus environment. Examples include vocal learning in songbirds, sensory-motor integration in bats, and marine odor plume navigation in lobsters and sharks. Students choose and develop a research topic in the second half of the course. Three hours lecture; one hour discussion.

Lecture

A1 Atema Tue,Thu 9:30am - 11:00am

Discussion

A2 Wed 2:00pm - 3:00pm Meets with NE 542

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 (25 % each) ; Presentations of Individual Research Topics (50 %)

CAS BI 582: NEUROBIOLOGY OF BRAIN DISORDERS

Prereq: Suggested BI 203 and BI 325

[2 cr] 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

A1 Ho Friday 10:00am - 12:00pm

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

Grading: Participation 50%, Oral presentation 50%

ECOLOGY, BEHAVIOR & EVOLUTION

CAS BI 119: SOCIOBIOLOGY

Prereq: None

Not for biology concentration credit. Designed for non-science concentrators 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 - 2:00pm

Discussion

B1 Thu 2:00pm - 3:00pm

B2 Fri 2:00pm - 3:00pm

Notes: Not for biology concentration 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 Buston Mon,Wed,Fri 3:00pm - 4:00pm

Discussion

B1 Wed 10:00am - 11:00am

B2 Wed 4:00pm - 5:00pm

C1 Thu 2:00pm - 3:00pm

C2 Tue 10:00am - 11:00am

C3 Tue 2:00pm - 3:00pm

E1 Thu 1:00pm - 2:00pm

F1 Fri 9:00am - 10:00am

F2 Fri 10:00am - 11:00am

Text(s): Castro & Huber. *Marine Biology*. 9th Edition

Grading: Three exams, participation in discussion.

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 12:30pm - 2:00pm

Lab

B1 Tue,Thu 2:00pm - 5:00pm

B2 Tue,Thu 9:00am - 12:00pm

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 Stewart Mon,Wed,Fri 9:00am - 10:00am

Lab

B1 Mon 2:00pm - 5:00pm

D1 Wed 2:00pm - 5:00pm

F1 Fri 2:00pm - 5:00pm

Text(s): Molles. *Ecology*. 6th Edition

Grading: Two hourly exams and final. Required weekly lab. Research paper and oral presentation.

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 terrestrial and aquatic ecosystems. Climate change, forest decline, eutrophication, acidification, loss of species diversity, and restoration of ecosystems. Three hours lecture, three hours lab.

Lecture

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

Lab

C1 Tue 10:00am - 1:00pm E1 Thu 10:00am - 1:00pm

Text(s): Richard Wright, *Environmental Science Toward a Sustainable Future*, 10th Ed. Pearson, Prentice Hall.

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 Wed 4:00pm - 7:00pm

Notes: Independent. Also offered as GE 307

CAS BI 416: HERPETOLOGY

Prereq: CAS BI107 or equivalent.

Examines the diversity, life history, physiology, behavior, ecology, and evolution of amphibians and reptiles. Three hours lecture, three hours lab. Field trips (including required Spring Recess trip to Florida).

Lecture

A1 Schneider Tue,Thu 9:30am - 11:00am

Lab

A2 Wed 3:00pm - 6:00pm

Notes: Meets with GRS BI 616

Text(s): *Herpetology*, 4th edition by Pough, Andrews, Cadle, Crump, Savitsky and Wells

Grading: Lecture Participation (10%), Midterm & Final Lecture Exams (30%), Midterm & Final Lab Exams (20%), Field Trip Participation & Notebook (20%), Term Paper (20%)

CAS BI 448: BIODIVERSITY AND CONSERVATION BIOLOGY

Prereq: CAS BI 303 or CAS BI 306 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.

Lecture

A1 Primack Mon,Wed,Fri 1:00pm - 2:00pm

Discussion

A2 Mon 2:00pm - 3:00pm

Notes: Meets with GRS BI 648

Text(s): Richard Primack. *Essentials of Conservation Biology*, 6th edition, 2014 Sinauer Associates

Grading: Exams, course paper, oral presentation, quizzes, course participation.

CAS BI 486: BIOLOGICAL DESIGN FOR SUSTAINABLE DEVELOPMENT

Prereq: CAS BI 107 and one EBE (ecology, behavior, and evolution) course numbered CAS BI 260 or higher

Study of biological constraints on the problem of human society's relationship with the ecosystems, terrestrial and marine, that sustain it. Case studies combining natural history, ecological theory, dynamical modeling, and experimental design in the search for workable solutions.

Lecture

A1 Stewart Mon,Wed,Fri 11:00am - 12:00pm

Discussion

A2 Wed 12:00pm - 1:00pm

Notes: Meets with GRS BI 686

Text(s): Select chapters from Morse (2010) *Sustainability: A Biological Perspective* (pdf) and contemporary literature (pdf) will be made available on Blackboard. Textbook purchase is not required.

Grading: Seminar discussion, write and submit an original Op-Ed, co-present a final project within the framework of the course.

ECOLOGY, BEHAVIOR & EVOLUTION

CAS BI 542: NEUROETHOLOGY

Prereq: CAS BI 563 or CAS BI 325 (or CAS NE 203) or consent from instructor

The purpose of this course is to link neurobiology to behavioral ecology and the properties of the sensory stimulus environment. Examples include vocal learning in songbirds, sensory-motor integration in bats, and marine odor plume navigation in lobsters and sharks. Students choose and develop a research topic in the second half of the course. Three hours lecture; one hour discussion.

Lecture

A1 Atema Tue,Thu 9:30am - 11:00am

Discussion

A2 Wed 2:00pm - 3:00pm Meets with NE 542

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 (25 % each) ; Presentations of Individual Research Topics (50 %)

CAS BI 582: SPECIES AND SPECIATION

Prereq: Consent of instructor. Open to seniors and graduate students concentrating in biology.

[2 cr] Defining and understanding how new species arise remains a major goal of evolutionary biology. Indeed, there are few topics as controversial among biologists, in general, as the subject of how to define species. This course will introduce students to modern study of speciation and provide an historical overview of the field, spanning the ~150 years between Darwin's first publication of the Origin and the present.

Objectives:

- 1) Students will gain familiarity with the strengths and weakness of the most commonly utilized species concepts.
- 2) We will examine how pre- and postzygotic barriers to gene exchange arise and discuss the consequences of these different isolating mechanisms on the maintenance of species boundaries.
- 3) The class we explore the geographic context in which speciation occurs (allopatry, sympatry, parapatry, etc) as well as the evolutionary forces that drive divergence (natural selection, sexual selection, genetic drift, etc.).
- 4) The students should, ultimately, be able to identify unanswered questions about speciation and will conduct independent research projects to review current theory and data in the area of their choice.

Independent

M1 Mullen

Notes: 2 credits; 12:00pm - 2:00pm Thursday or by arrangement after the first meeting

Text(s): Coyne, J.A. and H. Allen Orr. 2004. Speciation. Sinauer Associates, Inc. Sunderland, MA.

Grading: Attendance 25%, Presentation 50%, Review Paper 25%

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 concentration 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

A1 Pasino Mon 6:00pm - 9:00pm

Lab

B4 Tue 6:00pm 8:00pm 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 Spilios Mon 6:00pm - 9:00pm

Lab

C1 Wed 6:00pm- 9:00pm

MET BI 206: GENETICS (CM)

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

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

Discussion

Tues 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.

MET BI 303: ECOLOGY (EBE)

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

B1 Wasserman Tue 6:00pm - 9:00pm

Lab

C1 Wed 6:00pm 9:00pm

MET BI 315: SYSTEMS PHYSIOLOGY (PN)

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 - 9:00pm

Lab

Seliga

C1 Wed 6:00pm- 9:00pm

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 concentration 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 concentration 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 concentration 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 concentration 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 concentration 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 concentration 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

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

[2 cr] **Not for biology concentration 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 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).

Grading: Regular attendance at seminars (50%) and the review paper (50%). The student's research advisor assigns the course grade. A minimum grade of B+ is required to graduate with Honors in Biology.

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