

SPRING 2021 BIOLOGY COURSE DIRECTORY

For advising you will need:

- ✓ Degree Advice Report
- ✓ Transcript Preview
- ✓ Advising Worksheet
- ✓ Course Directory

COURSE NOTES:

Courses fulfilling breadth requirements:

Cell & Molecular (CM)

- CAS BI 203 Cell Biology
- CAS BI 206 Genetics
- CAS BI 216 Intensive Genetics

Ecology, Behavior & Evolution (EBE)

- CAS BI 225 Behavioral Biology
- 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

Upper Level Lab Courses Offered Spring 2021:

- CAS BI 302 Vertebrate Zoology
- CAS/MET BI 303 Evolutionary Ecology
- CAS BI 306 Biology of Global Change
- CAS/MET BI 315 Systems Physiology
- CAS/MET BI/CH 422 Biochemistry 2
- CAS BI/NE 449 Neuroscience Design Lab
- CAS BB 522 Molecular Biology Lab
- CAS BI 527 Biochemistry Lab 1
- CAS BI 528 Biochemistry Lab 2
- CAS BI 586 Ecological and Evolutionary Genomics
- CAS BI Undergrad. Research Courses (first 4-credit semester)

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REGISTRATION NOTES:

- **Permission required courses:** Students may not register for these courses on their own, but need the instructor to sign an [Add/Drop form](#) which the student would take to CAS Advising or 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 with a 3.3 GPA may submit the [CAS Course Overload Fee Waiver form](#).
- **PDP, ROTC, and CAS FY/SY courses do not count** toward the 128 credits needed to graduate with a BA.
- The following courses **do not count** toward the Biology or BMB major or minor:
 - CAS BI 114 Human Infectious Diseases
 - CAS/MET BI 210 Human Anatomy
 - CAS BI 528 (unless both sections of BI 527/528 are taken)
 - MET BI 566 Neurobio. of Consc. & Evol. of Lang.
 - CAS BI 582 (unless two sections of BI 581/582 are taken)
 - CAS BI Readings or Research Courses (2 credits)

BIOCHEMISTRY & MOLECULAR BIOLOGY

UNDERGRADUATE RESEARCH IN BMB

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

CAS BB 140: FIRST YEAR RESEARCH IN BMB 1

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

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

Grading: Course grade is determined by laboratory performance.

CAS BB 141: FIRST YEAR RESEARCH IN BMB 2

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

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

Grading: Course grade is determined by laboratory performance.

CAS BB 240: SOPHOMORE RESEARCH IN BMB 1

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

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

Grading: Course grade is determined by laboratory performance.

CAS BB 241: SOPHOMORE RESEARCH IN BMB 2

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

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

Grading: Course grade is determined by laboratory performance.

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

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

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

Grading: Course grade is determined by laboratory performance.

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

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

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

Grading: Course grade is determined by laboratory performance.

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

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

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

Grading: Course grade is determined by laboratory performance.

BIOCHEMISTRY & MOLECULAR BIOLOGY

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

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

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

Grading: Course grade is determined by laboratory performance.

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

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

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

Grading: Course grade is determined by laboratory performance.

CAS BB 450: SENIOR RESEARCH IN BMB 1

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

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

Grading: Course grade is determined by laboratory performance.

CAS BB 451: SENIOR RESEARCH IN BMB 2

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

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

Grading: Course grade is determined by laboratory performance.

CAS BB 452: SENIOR RESEARCH IN BMB 3

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

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

Grading: Course grade is determined by laboratory performance.

CAS BB 453: SENIOR RESEARCH IN BMB 4

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

Coreq: CAS BB 497 or BB 498

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

Grading: Course grade is determined by laboratory performance.

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 research seminars (CAS BB 497 and 498). Students also write and defend an honors thesis on their research. For more information on research requirements and to apply, visit www.bu.edu/bmb/research. Time commitment is a minimum of 12 hours a week, not including preparation and evaluation.

CAS BB 401: HONORS RESEARCH IN BMB 1

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

First semester of Honors-level undergraduate research in BMB. Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor. A minimum grade of B+ in this course and in BB 497/498 and BB 401/402 is required to graduate with Honors in BMB. Students must also present a research talk at the BMB symposium at the end of the spring semester of the academic year. Students will conduct mentored laboratory research with a faculty member of the BMB Program leading to graduation with Honors in BMB. Application through the BMB Program including use of research literature and active participation at group meetings. Oral presentations at group meetings required. This course fulfills a single unit in the following BU Hub areas: Research and Information Literacy, Writing-Intensive, and Creativity/Innovation.

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

CAS BB 402: HONORS RESEARCH IN BMB 2

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 498

Second semester of Honors-level undergraduate research leading to graduation with Honors in BMB (continuation of BB 401). Research outside the BMB Program is acceptable if approved and overseen by a BMB faculty sponsor. A minimum grade of B+ in this course and in BB 497/498 and BB 401/402 is required to graduate with Honors in BMB. Students must also present a research talk at the BMB symposium at the end of the spring semester of the academic year. Students expected to attend and participate at group meetings and take a lead and make creative contributions to projects ending in writing and defending an original thesis with guidance from their mentor. This course fulfills a single unit in the following BU Hub areas: Research and Information Literacy, Writing-Intensive, and Creativity/Innovation.

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

CAS BB 498: HONORS RESEARCH IN BMB SEMINAR 2

Prereq: For students currently enrolled in the Honors BMB Program or BB 453 in the spring semester.

Coreq: CAS BB 402 or BB 453 in the spring semester.

[1 cr] A one-credit continuation of BB 497 for students enrolled in Honors Research in BMB (BB 402) or BB 453 in the spring. Students learn and present digitally produced descriptions of their research and prepare their theses for defense under the guidance of the Research and Honors Committee and present at the BMB Symposium at the end of the semester. A minimum grade of B+ in this course and in BB 497 and BB 401/402 is required to graduate with Honors in BMB. This course fulfills a single unit in the following BU Hub areas: Digital/Multimedia Expression.

Grading: Attendance and participation.

GRADUATE RESEARCH IN BMB

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

CAS BB 592: GRADUATE RESEARCH IN BIOCHEMISTRY AND MOLECULAR BIOLOGY

Prereq: Admission to the BA/MA Program.

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.

Electives for the BMB major can be found in these sections:

Cell & Molecular (pgs. 5-10)
Physiology & Neurobiology (pgs. 16-18)
Metropolitan College (MET) (pgs. 19-20)

A list of courses accepted toward the BMB major can be found in the Bulletin at www.bu.edu/bmb/bulletin.

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 premedical students. Required for biology majors. It is strongly recommended students complete CAS CH 101 (or equivalent) before this course. High school biology is assumed. Biochemistry, cell & molecular biology, Mendelian & molecular genetics, physiology, and neurobiology. Three hours lecture, three hours lab. Carries natural science divisional credit (with lab) in CAS. This course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry II, Quantitative Reasoning II, Teamwork/Collaboration, Critical Thinking

Lecture

A1	Loechler	Mon,Wed,Fri	10:10am - 11:00am
A2	Loechler	Mon,Wed,Fri	12:20pm - 1:10pm
A3	Spilios	Mon,Wed,Fri	1:25pm - 2:15pm

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	E8	Thu	6:30pm - 9:15pm
C8	Tue	6:30pm - 9:15pm	E9	Thu	6:30pm - 9:15pm
C9	Tue	6:30pm - 9:15pm	F1	Thu	6:30pm - 9:15pm
D2	Wed	8:00am - 10:45am	F2	Fri	8:00am - 10:45am
D3	Wed	8:00am - 10:45am			

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

Grading: Lecture exams and quizzes account for approximately 2/3 of the final grade and lab accounts for approximately 1/3 of the final grade.

Course Delivery: LfA

CAS BI 114: HUMAN INFECTIOUS DISEASES

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. This course fulfills a single unit in the following BU Hub area(s): Scientific Inquiry I, Quantitative Reasoning II, Critical Thinking.

Lecture

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

C2	Tue,Thu	1:30pm- 3:15pm	D1	Mon,Wed	10:10am - 11:55am
C3	Tue,Thu	3:30pm - 5:15pm	D2	Mon,Wed	12:20pm - 2:05pm

Notes: Not for Biology major or minor credit.

Textbooks & Technology: Foster et al., *Microbiology: The Human Experience*, 1st ed, 2017, TopHat Account.

Grading: 4 lecture exams; laboratory.

Course Delivery: LfA

CELL & MOLECULAR

CAS BI 203: CELL BIOLOGY

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

Coreq: CAS CH 203 or equivalent.

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

Lecture

A1 Staff Tue,Thu 9:30am - 10:45am

Discussion

B1 Wed 12:20pm - 1:10pm

B2 Wed 3:35pm - 4:25pm

B2 Fri 8:00am - 8:50am

B4 Fri 11:15am - 12:05pm

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

Textbook & Technology: *The Cell* 8e by Geoffrey Cooper, Oxford University Press, 2018, electronic access to Dashboard (supplied with certain editions of the textbook available through the BU Bookstore)

Grading: Three midterm exams, homework, in class questions, and a final examination.

Course Delivery: LfA

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. For CMG and BMB majors, BI 216 is highly recommended instead of BI 206. Three hours lecture, one hour discussion. Students may receive credit for CAS BI 206 or 216, but not both courses. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Historical Consciousness, Quantitative Reasoning II, Critical Thinking.

Lecture

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

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 & Technology: 1) Required: Hartwell et al. *Genetics: from Genes to Genomes*. McGraw-Hill: 7th 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: Average of four exam scores given during the semester (75%); discussion (25%)

Course Delivery: LfA

CELL & MOLECULAR

CAS BI 216: INTENSIVE GENETICS

Prereq: CAS BI 108/116 and BI 203/213, and CAS CH 203 or consent of instructor

Advanced alternative to CAS BI 206, emphasizing depth of coverage, class discussion, and reading research papers. BI216 (instead of BI206) is highly recommended for BMB majors and Biology majors in the CMG track. 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. Students may receive credit for CAS BI 216 or 206, but not both courses. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Historical Consciousness, Quantitative Reasoning II, Research and Information Literacy.

Lecture

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

*Thursday evening timeslot reserved for 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	8:00am - 8:50am

Notes: Meets with BI206/282 for the first half of the semester

Textbooks & Technology: 1) Required: Hartwell et al. *Genetics: from Genes to Genomes*. McGraw-Hill: 7th 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: Average of four exam scores given during the semester (75%); discussion (25%)

CAS BI 282: FUNDAMENTALS OF BIOLOGY 2

Prereq: (CASCH182) or equivalent, and consent of instructor.

Principles of classical, molecular, and evolutionary genetics derived from analytical, molecular, and whole genome cytological evidence in animals, plants, & microorganisms. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Historical Consciousness, Quantitative Reasoning II, Critical Thinking.

Lecture

A1	Celenza	Tues, Thu	12:30pm - 1:45pm
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Lab

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

Notes: Limited to seven-year medical students. Meets with BI 206.

Textbooks & Technology: See BI 206.

Grading: See BI 206.

Course Delivery: LfA

CAS BI 385: IMMUNOLOGY

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

The constituents and regulation of mammalian immune systems are described at the levels of the gene, protein, and cell. Topics include nonspecific, T cell and B cell recognition and responses, genetics of immune receptors, inflammation, tolerance, memory, and evolution and manipulation of defense systems. Three hours lecture, one hour discussion.

Lecture

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

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 & Technology: Peter Parham. *The Immune System*. 4th Edition. Garland Science Publishing, NY, NY; TopHat Account.

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

Course Delivery: LfA

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. Three hours lecture; one hour discussion.

Lecture and Discussion

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

Notes: Meets with GRS BI 611.

Textbooks & 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%.

Course Delivery: LfA

CELL & MOLECULAR

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 anaplerotic routes, and the generation and utilization of energy. Lectures include consideration of events in prokaryotic and eukaryotic organisms.

Lecture

A1	Tolan	Mon,Wed,Fri	9:05am - 9:55am
		Wed	7:00pm - 9:00pm

*Wednesday evening timeslot reserved for exams

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	
B7^	Tue,Thu	8:00am - 12:00pm	Lab	^Co-req. is BI/CH 527
C1	Fri	10:10am - 11:55am	Discussion	
C2	Thu	3:30pm - 5:15pm	Discussion	
C3	Wed	12:20pm - 2:05pm	Discussion	
C4		Arranged	Discussion	

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

Textbooks & Technology: 1) Tolan & Medrano, *Biochemistry Laboratory Manual*, 5th Ed., 2020.

Grading: Hour exams, lab, final.

Course Delivery: Fully in-person course

CAS BI 459: LECTURES IN 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 anaplerotic routes, and the generation and utilization of energy. Lectures include consideration of events in prokaryotic and eukaryotic organisms.

Independent

A1	Tolan	Mon, Wed, Fri	9:05am - 9:55am
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Textbooks & 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, final.

Course Delivery: Fully remote course

CAS BI 481: MOLECULAR BIOLOGY OF THE NEURON

Prereq: BI 325 (preferred) or BI 203.

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

Independent

A1	Ho	Mon, Wed	2:30pm - 4:15pm
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Notes: Meets with CAS NE 481 and GRS BI 681.

Textbooks & Technology: none

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

Course Delivery: LfA

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, yeast molecular biology, RNA isolation and quantification, RT-qPCR analysis and introduction to RNA-seq bioinformatic analysis.

Lab

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

Notes: Permission required.

Textbooks & Technology: Xeroxed lab note packet.

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

Course Delivery: Fully in-person course

CAS BI 527: BIOCHEMISTRY LAB 1

Prereq: BI/CH 437.

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

Lecture

A1 Medrano Arranged January 19 - March 5

Lab

B1 Tue,Thu 8:00am - 12:00pm

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

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

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

Course Delivery: Fully in-person course

CAS BI 528: BIOCHEMISTRY LABORATORY 2

Prereq: CH 437

[2 cr] Not for Biology major or minor credit unless both BI 527 and BI 528 are taken. 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.

Lecture

A1 Medrano Fri 10:10am - 11:55am

A2 Medrano Thu 3:30pm - 5:15pm

A3 Medrano Wed 12:20pm - 2:05pm

Lab

B1 Medrano Mon 12:20pm - 4:20pm

B2 Medrano Mon 5:30pm - 9:30pm

B3 Medrano Wed 2:30pm - 6:30pm

B4 Medrano Thu 5:30pm - 9:30pm

B5 Medrano Fri 12:20pm - 4:20pm

B6 Medrano Fri 5:30pm - 9:30pm

Notes: Meets with CAS CH 422, CAS BI 422, CAS CH 528, GRS CH 622 and GRS BI 622. **Not for Biology major or minor credit unless both BI 527 and BI 528 are taken.**

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

Grading: Lab preparation, lab reports, final exam.

Course Delivery: Fully in-person course

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

Textbooks & Technology: none.

Grading: Three exams, discussion, participation.

Course Delivery: LfA

CELL & MOLECULAR

CAS BI 565: FUNCTIONAL GENOMICS

Prereq: CAS BI 552 or consent from instructor.

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

Independent

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

Textbooks & Technology: Review articles and research papers on Blackboard.

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

Course Delivery: Fully remote course

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

Grading: Three exams, presentation, participation.

Course Delivery: LfA

CAS BI 594: TOPICS IN BIOLOGY: QUANTITATIVE MICROBIOLOGY

Prereq: CAS BI 108 or equivalent, CAS MA 121 or equivalent, and CAS PY 105 or equivalent, or consent of instructor

Important bacterial behaviors and phenomena are described with mathematical models including growth, multispecies interactions, motility, and cell differentiation. Every subject is motivated directly by experimental data, with specific discussion of the techniques used to collect the data, their biases, and their limitations. The goal is to show how quantitative models can give a unified, conceptual understanding of complicated, living systems and generate new hypotheses for experiments. Homework assignments will be in python and the course will include an introduction to python. No prior programming experience needed. Even though the course deals specifically with prokaryotes, the techniques and approaches learned are applicable to any area of the life sciences.

Independent

L1 Larkin Mon, Wed, Fri 4:30pm - 6:15pm

Textbooks & Technology: None. Required reading will be provided by the instructor.

Grading: Homework (75%), Final presentation or project (25%)

Course Delivery: LfA

Additional electives for the CMG specialization can be found in these sections:

Ecology, Behavior & Evolution (pgs. 11-15)
Physiology & Neurobiology (pgs. 16-18)
Metropolitan College (MET) (pgs. 19-20)
Research & Readings (pgs. 21-24)

A list of courses accepted toward the CMG specialization can be found in the Bulletin at www.bu.edu/biology/cm-g-bulletin.

ECOLOGY, BEHAVIOR & EVOLUTION

CAS BI 225: BEHAVIORAL BIOLOGY

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

Introduction to the evolution, ecology, physiology, neurobiology and genetics of behavior, from classic studies to current trends. Topics include behavioral adaptation, hormones and behavior, nerve cells, circuits, neuromodulators and behavior, behavioral genetics and genomics, the development of behavior, communication, reproductive behavior, social evolution and culture, cooperation and altruism, sociality and brain evolution. Emphasis on the integrative analysis of behavior.

Independent

A1 Traniello Tue, Thu 1:30pm - 3:15pm

Textbooks & Technology: Primary literature and complementary readings; Traniello, *Behavioral Biology*, 1st ed., 2012; Alcock, *Animal Behavior*, edition TBA

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

Course Delivery: LfA

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. Effective Spring 2019, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry I, Critical Thinking, Research and Information Literacy.

Lecture

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

Discussion

B1 Mon 2:30pm - 3:20pm C3 Tue 3:35pm - 4:25pm

C2 Tue 11:15am - 12:05pm F1 Fri 9:05am - 9:55am

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

Grading: Three exams, discussion, and participation.

Course Delivery: LfA

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. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Historical Consciousness, Scientific Inquiry II, Critical Thinking.

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 & Technology: Pough, et al. *Vertebrate Life*. 10th edition

Grading: Multiple lecture quizzes, lab quizzes, and class participation.

Course Delivery: Fully in-person course (lecture is remote, but lab must be in person)

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. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry II, Quantitative Reasoning II, Digital/Multimedia Expression.

Lecture

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

Lab

B1 Mon 2:30pm - 5:15pm

C1 Tue 3:30pm - 6:15pm

E1 Thu 12:30pm - 3:15pm

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

Grading: Two exams, a final exam, lab, 3-minute video assignment, and participation.

Course Delivery: LfA

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. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry II, Ethical Reasoning, Research and Information Literacy.

Lecture

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

Lab

B1 Mon 2:30pm - 5:15pm D1 Wed 2:30pm - 5:15pm

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

Textbooks & 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%).

Course Delivery: LfA

CAS BI 414: ORNITHOLOGY

Prereq: 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.

Textbooks & Technology: none

Grading: Multiple quizzes and class participation.

Course Delivery: Fully remote course

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 ES 423 and GRS BI/ES 623.

Textbooks & Technology: All readings will come from the primary literature and will be posted on Blackboard Learn.

Grading: Exams, class presentations, and participation in weekly literature journals and discussions.

Course Delivery: LfA

CAS BI 500: SHARK BIOLOGY & CONSERVATION

Prereq: Some background in ecology and/or evolution recommended.

This course explores the natural history and behavior of sharks and their relationship to other animals in the ecosystem. Conservation of sharks and other elasmobranchs is crucial to ecosystem function and requires accurate scientific knowledge of species in order to implement the best conservation practices. The course will delve in detail into the life, natural history, behavior and psychology of one of the best-known wide-ranging species, the Pacific grey reef shark (*Carcharhinus amblyrhynchos*). We will examine shark ecotourism case studies from Palau, Tahiti, Fiji and Belize. In class, you will be able to handle a variety of shark specimens, tracking technology, anti-shark shield and other devices used to study big wild animals in the open sea. We will include discussion on how to communicate fish natural history using videos and photos, which will be used extensively in lectures.

Independent

L1 Lobel Tue,Thu 9:00am - 10:45am

Textbooks & Technology: Scientific papers will be made available to the students throughout the course

Grading: Midterm 40%; Project and Discussion 40%; Dissection lab 10%; Participation 10%.

Course Delivery: LfA

ECOLOGY, BEHAVIOR & EVOLUTION

CAS BI 504: ADVANCED EVOLUTIONARY ANALYSIS

Prereq: CAS BI 309 or consent of 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 and Discussion

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

Textbooks & Technology: Readings will be available through Blackboard.

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

Course Delivery: LfA

CAS BI 506: PHENOTYPIC PLASTICITY

Prereq: CAS BI 107 and one of the following: BI 303, BI 309, BI 315, or BI 410; or consent of instructor.

Explores the flexible phenotype as a product of development and a target of natural selection, and addresses the role of phenotypic plasticity in ecological interactions and evolutionary diversity. Topics: evolution and mechanisms of plasticity; role of plasticity in ecology, diversification of life, and conservation in a changing environment.

Lecture

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

B1		Wed	10:10am - 11:00am
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Textbooks & Technology: Gibert & Epel, *Ecological Developmental Biology* (2nd edition 2015), West-Eberhard *Developmental Plasticity and Evolution*, 2003, Papers from the scientific literature and chapters from other books posted on the course website.

Grading: Midterm and final exam, multi-stage project, participation.

Course Delivery: Fully remote course

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 & Technology: DA Perry, R Oren and SC Hart, *Forest Ecosystems*. 2008, Johns Hopkins University Press.

Grading: Two exams (40%), Class assignments (55%), Class participation (5%)

Course Delivery: LfA

CAS BI 542: NEUROETHOLOGY

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

An in-depth study of the neural mechanisms underlying natural behaviors in animals, integrating perspectives from behavioral ecology and neurobiology. Behaviors that are central to fitness will be studied in detail, including the sensory and motor bases of prey detection, predator avoidance, communication, courtship, navigation, and migration. A wide variety of non-model organisms such as honey bees, owls, bats, and crickets will be discussed. Lectures are integrated with student-led discussions of relevant research papers.

Independent

A1	Muscedere	Tue, Thu	9:00am - 10:45am
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Notes: Meets with CAS NE 542.

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

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

Course Delivery: Fully remote course

ECOLOGY, BEHAVIOR & EVOLUTION

CAS BI 550: MARINE GENOMICS

Prereq: Acceptance into the Marine Semester.

Covers the evolution of genomes, the architecture of gene networks, and the connection between genotype and phenotype in marine organisms, as well as the technical development of modern genomics. Student research projects utilize modern genomics experimental approaches. Effective Fall 2019, this course fulfills a single unit in the following BU Hub area: Teamwork/ Collaboration.

Independent

A1 Finnerty Tue, Thu 12:30pm - 3:15pm

Course Delivery: LfA

CAS BI 582: SEMINAR IN BIOLOGY: INTRODUCTION TO STATISTICAL MODELLING

Prereq: CAS MA 115 or equivalent, or permission of the instructor

[2 cr] Not for Biology major or minor credit unless two sections of BI 581/582 are taken. Statistical modelling is a vital part of all quantitative research. While biological, environmental and social data are famously complicated, modern statistical methods are able to accommodate many of these complications. Other problems can be avoided through careful study design and data collection. This course aims to guide students through modern statistical principles and methods. The main software platform for the course is 'R', a powerful, flexible and free resource. The lectures start with introductions to statistics basics, for those with little previous knowledge of statistics, and those wanting a refresher, and will lead all the way to generalized and mixed model analysis and other useful tools commonly used in modern ecological/ evolutionary/behavioral and marine biology research. The lectures will be accompanied by practicals, which allow practicing material covered in the lectures using R.

Independent

R1 Rueger Mon, Wed 11:15am - 12:05pm

Notes: [2 cr] Not for Biology major or minor credit unless two sections of BI 581/582 are taken.

Textbooks & Technology: Readings and other course materials will be made available on Blackboard.

Grading: Grades will be based on participation in lectures, practicals and practical assignments.

Course Delivery: LfA

ECOLOGY, BEHAVIOR & EVOLUTION

CAS BI 586: ECOLOGICAL AND EVOLUTIONARY GENOMICS

Prereq: (BI 206 or BI 216) and (MA 115 or MA 213); also recommended are BI 303 and BI 309; or consent of instructor

The onset of next generation sequencing technologies has changed the way we address questions in ecology. Ecological genomics is a relatively new and powerful field that capitalizes on these advancements and aims to address ecological and evolutionary questions through a genomic lens. This course will teach a panel of genomic methods that have been developed specifically for addressing these sorts of long-standing questions in non-model organisms. This course will navigate students through topics related to community ecology, population biology and organismal physiology and lectures and readings will be integrated with genomic analyses and statistics. The majority of the genomic problems tackled in the class will be using marine invertebrates, however these tools are universal across microbes, fungi, plant and animals, and many will be applicable to your own species of interest. This course is intended for those interested in embarking on genomics within an ecological or evolutionary setting and teaches the fundamentals of the discipline, while concentrating on the skills required to address these questions. The course will focus on three topics, each involving by introductory lectures, readings in primary literature, and assignments, and the final portion of the class will involve small group independent genomic projects and student presentations.

Lecture and Lab

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

Textbooks & Technology: TBA

Grading: Bioinformatic Labs: 45%; Literature discussion: 25%; Final research project: 30%

Course Delivery: Fully remote course

Additional electives for the ECB specialization can be found in these sections:

Cell & Molecular (pgs. 5-10)
Metropolitan College (MET) (pgs. 19-20)
Research & Readings (pgs. 21-24)

A list of courses accepted toward the ECB specialization can be found in the Bulletin at www.bu.edu/biology/ecb-bulletin.

Additional electives for the SBB specialization can be found in these sections:

Physiology & Neurobiology (pgs. 16-18)
Research & Readings (pgs. 21-24)

A list of courses accepted toward the SBB specialization can be found in the Bulletin at www.bu.edu/biology/sbb-bulletin.

PHYSIOLOGY & NEUROBIOLOGY

CAS BI 210: HUMAN ANATOMY

Prereq: CAS BI 105 or equivalent

Not for Biology major or minor credit. Intensive pre-professional 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. Effective Spring 2020, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry I, Digital/Multimedia Expression, Creativity/Innovation.

Lecture

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

Lab

B1	Mon	9:00am - 10:45am	D2	Wed	12:20pm - 2:05pm
B2	Mon	12:20pm - 2:05pm	D3	Wed	2:30pm - 4:15pm
C1	Tue	1:30pm - 3:15pm	E1	Thu	1:30pm - 3:15pm
C2	Tue	3:30pm - 5:15pm	E2	Thu	3:30pm - 5:15pm
D1	Wed	9:00am - 10:45am	F1	Fri	9:00am - 10:45am

Notes: Not for Biology major or minor credit.

Textbooks & Technology: Saladin. *Human Anatomy*, 6th ed., 2019., TopHat Account, ExamSoft Account.

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

Course Delivery: LfA

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. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry I, Oral and/or Signed Communication, Teamwork/Collaboration.

Lecture and Discussion

A1 DiBenedictis Mon, Wed, Fri 2:30pm - 3:20pm
Fri 3:35pm - 4:25pm

Notes: Meets with NE 230.

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

Grading: Two midterms (20% each), a final exam (30%), discussion presentation and participation (20%), quizzes (10%).

Course Delivery: Fully remote course

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. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry II, Writing-Intensive Course, Critical Thinking, Teamwork/Collaboration.

Lecture

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

Lab

B1	Mon	2:30pm - 5:15pm	D2	Wed	2:30pm - 5:15pm
B2	Mon	2:30pm - 5:15pm	D3	Wed	2:30pm - 5:15pm
B3	Mon	6:30pm - 9:15pm	D4	Wed	6:30pm - 9:15pm
B4	Mon	6:30pm - 9:15pm	E1	Thu	8:00am - 10:45am
C1	Tue	8:00am - 10:45am	E2	Thu	12:30pm - 3:15pm
C2	Tue	12:30pm - 3:15pm	E3	Thu	6:30pm - 9:15pm
C3	Tue	6:30pm - 9:15pm	E4	Thu	6:30pm - 9:15pm
C4	Tue	6:30pm - 9:15pm	F1	Fri	8:00am - 10:45am
D1	Wed	8:00am - 10:45am			

Textbooks & Technology: Widmaier et al., *Vander's Human Physiology: The Mechanisms of Body Function*, 15th ed., McGraw-Hill Education, 2013; TopHat Account

Grading: Three team papers and one individual paper.

Course Delivery: LfA

PHYSIOLOGY & NEUROBIOLOGY

CAS BI 325: PRINCIPLES OF NEUROSCIENCE

Prereq: CAS BI 203 or consent of instructor.

This course will introduce fundamentals of the nervous system at descriptive scales ranging from individual cells to the entire brain. Topics will include biophysics of excitable membranes, synaptic transmission, sensory and motor systems, learning and memory, plasticity, neuromodulation, and the biological basis of complex behaviors. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Scientific Inquiry II, Critical Thinking.

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

Grading: Three midterms.

Course Delivery: LfA

CAS BI 349: NEUROTOXINS IN BIOLOGY, MEDICINE, AGRICULTURE AND WAR

Prereq: BI 108 or NE 102 or equivalent.

We will start by examining how neurotoxins in different animals are used for distinct behavioral needs, such as defense versus predation. Examining evolutionary lineage of different types Neurotoxins will also be discussed and give us insights on how neurotoxins evolved and their roles in evolutionary "arm race". We will also cover mechanisms of neurotoxin actions at cellular and molecular levels. At system level, envenomation by poisonous animal is of clinical importance in many parts of the world, consequences of venoms on mammalian physiological systems will be discussed. In addition to naturally occurring neurotoxins, many synthetic chemicals used as pesticides and chemical weapons are also neurotoxins. We will discuss the history, mechanisms and physiological effects of these manmade agents. Effective Fall 2019, this course fulfills a single unit in each of the following BU Hub areas: Quantitative Reasoning I, Critical Thinking.

Independent

A1 Lin Tue,Thu 3:30pm - 5:15pm

Notes: Meets with CAS NE 349.

Textbooks & Technology: *Neuroscience: Exploring the Brain*. Bear, Connors and Paradiso. 4th ed.

Grading: Midterm 1 (25%); Midterm 2 (25%); Final (25%)
Discussion/presentation (25%)

Course Delivery: LfA

CAS BI 449: NEUROSCIENCE DESIGN LAB

Prereq: (BI 315 OR BI 325 OR NE 203) or consent of instructor.

Design and build devices for neuroscience experiments. Interface sensors with computers using Arduino microprocessors. Guided exercises followed by independent design projects to quantify human sensory and motor performance, or emulate animal sensory-motor circuits. All levels of programming experience accepted.

Lab

A1 Gavornik Tue,Thu 12:30pm- 3:15pm

Notes: Meets with CAS NE 449 and GRS BI/NE 649.

Textbooks & Technology: Purchase of an Arduino kit.

Grading: Lab notebook, project and participation.

Course Delivery: LfA

CAS BI 481: MOLECULAR BIOLOGY OF THE NEURON

Prereq: BI 325 (preferred) or BI 203.

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

Independent

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

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

Textbooks & Technology: none

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

Course Delivery: LfA

PHYSIOLOGY & NEUROBIOLOGY

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's Disease and Cruetzfeldt-Jakob disease are becoming more and more common since people are more exposed to pathogenic agents (as in Cruetzfeldt-Jakob 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.

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

Grading: Exams (66%), assignments (12%), paper presentation (12%), and participation in class (10%).

Course Delivery: LfA

CAS BI 594 B1: TOPICS IN BIOLOGY: DRUG DISCOVERY IN THE NEUROSCIENCES

Prereq: BI 108 and CH 102 (and PS/NE 333 strongly recommended) or permission of instructor.

Drug discovery and development is long, complex, and expensive process which involves many stages where potential problems must be addressed. This process is uniquely compounded when a drug is intended to treat a neurological disease due to the complexity of the nervous system. This course will introduce the Drug Discovery Process, Pharmacology of known central nervous system drugs, and—through scientific literature—focus on several areas of recent drug discovery for neurological and neuropsychiatric diseases.

Independent

B1	Bushell	Tue, Thu	9:00am - 10:45am
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Notes: Meets with NE 594 B1.

Textbooks & Technology: TBA.

Grading: TBA.

Course Delivery: LfA

CAS BI 599: PHYSIOLOGY OF THE SYNAPSE

Prereq: Junior standing and CAS BI 325 or BI 481 or BI 445 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 Discussion

A1	Man	Wed, Fri	10:10am - 11:55am
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Notes: Wednesday meetings are for paper presentations and Friday meetings are for lecture

Textbooks & Technology: *Synapses* (2003) by W. Maxwell Cowan and Thomas C. Südhof

Grading: Midterm and final exams (85%); paper presentation and attendance (15%)

Course Delivery: LfA

Additional electives for the Neurobiology specialization can be found in these sections:

Cell & Molecular (pgs. 5-10)
Ecology, Behavior & Evolution (pgs. 11-15)
Metropolitan College (MET) (pgs. 19-20)
Research & Readings (pgs. 21-24)

A list of courses accepted toward the Neurobiology specialization can be found in the Bulletin at www.bu.edu/biology/nb-bulletin.

METROPOLITAN COLLEGE (MET)

Metropolitan College (MET) offers evening versions of several biology courses, often taught by Biology Department faculty. The MET courses listed here count toward a student's major the same way the corresponding CAS courses do. If a student wishes to take more than one MET course a semester or is a freshman or sophomore, it is first necessary to get approval by filling out the Petition to Take Course at Metropolitan College form at www.bu.edu/biology/met-petition.

MET BI 108: BIOLOGY 2

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

Coreq: 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

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

Lab

A2 Kieswetter Wed 6:00pm - 8:45pm

MET BI 206: GENETICS

Prereq: BI 108 or equivalent; CH 203 recommended.

Principles of heredity as derived from genetic, biochemical, and cytological evidence in animals, plants, and microorganisms. For BMB majors and Biology majors in the CMG track, BI 216 is highly recommended instead of BI 206.

Lecture and Discussion

A1 Celenza Tue, Thu 6:00pm - 7:30pm
Tue 7:30pm - 8:30pm

MET BI 210: HUMAN ANATOMY

Prereq: 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

A1 Kieswetter Wed 6:00pm - 8:45pm

Lab

A2 Taylor Thu 6:00pm - 7:45pm

Notes: Not for Biology or BMB major credit.

MET BI 303: ECOLOGY

Prereq: 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

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

Lab

A2 Wasserman Wed 6:00pm - 8:45pm

MET BI 315: SYSTEMS PHYSIOLOGY

Prereq: BI 108 & 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

A1 Vyshedskiy Thu 6:00pm - 8:45pm

Lab

A2 Seliga Wed 6:00pm - 8:45pm

METROPOLITAN COLLEGE (MET)

MET CH 422: BIOCHEMISTRY 2

Prereq: BI/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.

Lecture

A1	Tolan	Mon, Wed, Fri	9:05am - 9:55am
		Wed	7:00pm - 9:00pm

**Wednesday evening timeslot reserved for exams*

Lab

B2	Mon	5:30pm - 9:30pm
B4	Thu	5:30pm - 9:30pm
B6	Fri	5:30pm - 9:30pm

Discussion

C1	Fri	10:10am - 11:55am
C2	Thu	3:30pm - 5:15pm
C3	Wed	12:20pm - 2:05pm

Notes: Meets with CAS BI 422.

MET BI 566: NEUROBIOLOGY OF CONSCIOUSNESS AND EVOLUTION OF LANGUAGE

Prereq: BI 108 or equivalent.

Not accepted for Biology major or minor credit. Your brain is a bizarre device, set in place through natural selection of your ancestors and your own experience. One thing that clearly separates your brain from the brain of any other nonhuman animal is the propensity of your brain for imagination and creativity. In this class we will dive into the neuroscience of imagination: from neurons to memory to neurological control of novel conscious experiences. We will study what makes your brain unique and the selectional forces that shaped the brains of our ancestors. We will discuss what makes human language special and how it evolved. This interdisciplinary class is intended for paleoanthropologists who want to learn neuroscience, psychologists who are interested in the question of the origin of language, biologists who are interested in the uniqueness of the human mind, neuroscientists who want an exposure to paleoanthropology and linguistics, philosophers fascinated by neurological basis of behavior and other students interested in an understanding of the mind of a man and the evolution of the brain.

Independent

A1	Vyshedskiy	Wed	6:00pm - 8:45pm
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Notes: Not for Biology or BMB major/minor credit.

RESEARCH & READINGS

UNDERGRADUATE RESEARCH IN BIOLOGY

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

CAS BI 140: FIRST YEAR RESEARCH IN BIOLOGY 1

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

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

Grading: Course grade is determined by laboratory/field work

CAS BI 141: FIRST YEAR RESEARCH IN BIOLOGY 2

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

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

Grading: Course grade is determined by laboratory/field work

CAS BI 240: SOPHOMORE RESEARCH IN BIOLOGY 1

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

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

Grading: Course grade is determined by laboratory/field work

CAS BI 241: SOPHOMORE RESEARCH IN BIOLOGY 2

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

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

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

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

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

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

Grading: Course grade is determined by laboratory/field work

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

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

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

Grading: Course grade is determined by laboratory/field work

RESEARCH & READINGS

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

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

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

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

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

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

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

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

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

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

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

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

CAS BI 450: SENIOR RESEARCH IN BIOLOGY 1

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

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

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

CAS BI 451: SENIOR RESEARCH IN BIOLOGY 2

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

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

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

CAS BI 452: SENIOR RESEARCH IN BIOLOGY 3

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

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

Grading: Course grade is determined by laboratory performance.

RESEARCH & READINGS

CAS BI 453: SENIOR RESEARCH IN BIOLOGY 4

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

Coreq: CAS BI 497 or BI 498

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

Grading: Course grade is determined by laboratory performance.

HONORS RESEARCH IN BIOLOGY

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

CAS BI 401: HONORS RESEARCH IN BIOLOGY 1

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

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

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

CAS BI 402: HONORS RESEARCH IN BIOLOGY 2

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

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

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

CAS BI 497: HONORS RESEARCH IN BIOLOGY SEMINAR 1

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

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

Grading: Attendance and participation

CAS BI 498: HONORS RESEARCH IN BIOLOGY SEMINAR 2

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

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

Grading: Attendance and participation.

RESEARCH & READINGS

GRADUATE RESEARCH IN BIOLOGY

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

CAS BI 595: MASTER'S RESEARCH IN BIOLOGY

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

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

Grading: Course grade is determined by laboratory performance.

READINGS IN BIOLOGY

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

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.

GRADUATE READINGS IN BIOLOGY

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

GRS BI 701: GRADUATE READINGS IN BIOLOGY

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

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

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

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