

Fall 2021 Registration

[Check SPIRE for your enrollment start date. It will be in one of the date ranges listed below.]

Seniors (87 credits & above)	Apr 5-6
Juniors (57-86 credits)	Apr 12-13
Sophomores (27-56 credits)	Apr 22-23
Freshmen (26 credits & below)	Apr 28

Note: Enrollment start times and eligibility to register for courses that are restricted by level are determined by a student's potential credit total, which includes the credits he or she is enrolled in currently (i.e. courses). The Biology Department does not assign a specific advisor to our majors. Biology Majors do not need advisor permission to enroll. Advising is NOT mandatory but we are happy to meet with you and help with your course selection.

UNDERGRADUATE ADVISING OFFICE:
PLEASE SCHEDULE ADVISING APPOINTMENTS EARLY

<https://umass.campus.eab.com/>

Morrill Science Center III, Room 216
413.545.2287

Biology Peer Advising Spring 2021:

Monday 9:30-2 & 3:30-5

Tuesday 9:30-11 & 11:30-1

Wednesday 12:30-2

Thursday 11:30-2 & 2:30-4

Friday 9:30-1 & 1:30-4:30

To schedule an appointment with a peer advisor:

Use this link —> <https://umass.campus.eab.com/> You will need to log in with your NET ID and password and then click on the blue make appointment button in the upper right corner of the screen. Select you would like to make an appointment with a biology peer advisor.

To drop in with a peer advisor:

You can access the Peer Advising meeting in Zoom using this link: <https://umassamherst.zoom.us/j/96882561838>. Peers will only be available through this link at the times listed above.

REGISTRATION TIPS

Please note an adjustment to the **length of the add/drop period**. Starting in Fall 2021, matriculated undergraduate and non-degree students in the fall and spring semesters will have **7 calendar days** at the start of the semester to add classes and drop classes with no record. September 8th is the last day.

COURSE OVERRIDE PERMISSION FORMS: If you would like to enroll in a class that is full, monitor the course on SPIRE to see if someone drops. Some instructors may accept “extra” students. If an instructor agrees to an override, have him or her sign a [course override form](#). Send the completed form, including a signature or other indication of approval from the faculty supervisor, to Sue Clevenger (suec@bio.umass.edu).

To help us efficiently process your override, please drop all conflicting courses and apply for credit overload if the course you would like to add will put you over 19 credits.

SPECIAL NOTE: SPIRE WILL STOP PROMOTING STUDENTS FROM WAITLISTS TO COURSE OPENINGS AFTER THE FIRST DAY OF CLASSES (Wednesday, September 1, 2021).

Deans of the College of Natural Sciences

Morrill II Room 220

413.545.1969

Elizabeth Connor, Senior Associate Dean
Brenda Barlow, Associate Dean
Leo Hwang, Associate Dean
Rebecca D. Schneider, Life Sciences Academic Advisor
Wilmore Webley, Pre-Med/Pre-Dent/Pre-Health
Cathy Eden, Pre-Med/Pre-Dent/Pre-Health
Faith Nussbaum, Pre-Health Advisor

You need a dean's approval for:

Credit Overload: Apply online <https://secure.cns.umass.edu/webforms/credit-overload-petition>

Withdrawal from a course after the deadline: Apply online <https://secure.cns.umass.edu/webforms/late-withdrawal-petition>

Here is the link to other commonly requested petitions and forms in the College of Natural Sciences:

<https://www.cns.umass.edu/advising/petitions-and-forms>

CHANGING YOUR MAJOR

Change of majors, adding or deleting secondary majors, and adding minors no longer requires a paper form. A representative in the undergraduate department of the NEW major will change/add your record.

TRANSFER STUDENTS

Transfer credit for BIOL 151/152/153

Students who have transfer credit from another school for these Introductory Biology courses may not be able to add courses for which the intro courses are prerequisites (for example: Biology 285, 287, 311). If you encounter this problem, please call or stop by the undergraduate office (413-545-2287, 216 Morrill). We will verify that you have satisfied the prerequisites and then manually add the course you desire to your class schedule, as long as the course is not full.

Transcript/Transfer Credit

If you have completed courses at another University but they do not appear on your UMass transcript, please have the school at which you took the courses send a transcript to the Records Office, 207 Whitmore Administration Building.

PARTICIPATE IN A RESEARCH LAB FOR INDEPENDENT STUDY CREDIT OR JUST FOR THE EXPERIENCE.

It's up to you to first make arrangements with a faculty member who will sponsor your project. Check out our Biology faculty and their research interests at <http://www.bio.umass.edu/biology/faculty/faculty-listing>. Once you've arranged to do an independent study for credit, you'll need to register for those credits. To do so, get a course permission form – available just outside Morrill 216 – fill it out, and have your faculty sponsor sign it. If you're a sophomore sign up for BIOL 296; if you're a junior, BIOL 396; seniors sign up for BIOL 496. You may sign up for the same Independent Study number during multiple semesters. Take your signed form to the Undergraduate Advising Office in Morrill 216 and the staff in that office will add the class and credits to your schedule. It is always a good idea to check your student enrollment list (classes you are enrolled in) prior to the end of the add/drop period to make sure it is correct. Also, if you need to get credit overload approval you should apply for it promptly (<http://www.cns.umass.edu>) and notify the staff in the Undergraduate Advising Office so they are aware of it and will place a note on your course permission form. They can't add you until your Academic Dean has approved your credit overload.

The Biology Undergraduate Research Apprenticeship (BURA) advertises research positions beginning on the first day of classes each semester. The BURA website allows Biology undergraduates to see and apply to research opportunities in faculty laboratories focusing on biological research. Undergraduates at any stage of their training and interest can apply. BURA has matched hundreds of undergraduates and research projects since fall 2010! Visit BURA at <https://www.bio.umass.edu/bura/>.

NOTE: If you're doing research for an Honor's thesis, you should contact the Honor's Program to register. It is also important that you then notify the staff in the Biology Undergraduate Advising office so they will know which faculty member should deliver your grade.

Integrative Experience - Required for Biology majors

1. Take Biology 494 LI, Life After Biology (1-cr seminar, offered every semester)
2. Make sure that your upper-level elective courses include at least one of the following courses:

- Biology 372 Introductory Neurobiology
- Biology 383H Gene and Genome Analysis
- Biology 422 Field Ecology: An Experimental Approach
- Biology 477H Bioimaging
- Biology 487H Tropical Field Biology
- Biology 514 Population Genetics
- Biology 523 Histology
- Biology 550 Animal Behavior
- Biology 551 Animal Communication
- Biology 572 Neurobiology
- Biology 582 DNA to Diversity

Fall 2021 BIOLOGY COURSES

Subject	Course No.	Section	Course Name	Instructor	Day	Time
BIOL	109	LEC 1	Evolution Explained	Porter	MW	2:30-3:45
BIOL	151	LEC 1	Intro Biology	Phillis	MWF	12:20
BIOL	151	LEC 2	Intro Biology	Zehnder	MWF	9:05
BIOL	151	LEC 3	Intro Biology	Huyler	MWF	8:00
BIOL	151	LEC 4	Intro Biology	Rounds	MW	2:30-3:45
BIOL	151	LEC 5	Intro Biology	Moscarella	TUTH	2:30-3:45
BIOL	151	LEC 6	Intro Biology	Phillis	MWF	11:15
BIOL	152	LEC 1	Intro Biology II	Okusu	MWF	12:20
BIOL	153	LAB	Intro Biology Lab	Rounds	various	
BIOL	161H	LEC 1	Quantitative Biology of the Cell	Francis, Rounds	TUTH	10:00-11:15
BIOL	280	LEC 1	Evolution	Byers	MWF	12:20
BIOL	280	LEC 2	Evolution	TBA	MW	2:30-3:45
BIOL	284	LAB 1	Genetics Lab	Loomis	TU	1:00-5:00
BIOL	284	LAB 2	Genetics Lab	Loomis	TH	1:00-5:00
BIOL	284	LAB 3	Genetics Lab	Laney	M	1:25-5:25
BIOL	284	LAB 4	Genetics Lab	Laney	W	1:25-5:25
BIOL	285	LEC 1	Cell & Molecular Biology	Francis	MWF	11:15
BIOL	287	LEC1	Intro Ecology	Healey	TUTH	1:00-2:15
BIOL	288	LEC 2	Intro Physiology	TBA	TUTH	4:00-5:15
BIOL	297Q	LAB 1	PHage Bioinformatics	Rocheleau, Chien	MW	2:30-3:45
BIOL	311	LEC 1	Genetics	Moscarella	TUTH	11:30-12:45
BIOL	311	LEC 2	Genetics	Loomis	MWF	12:20
BIOL	312	LEC 1	Writing in Biology	Brewer	F	1:25-3:45
BIOL	312	LEC 2	Writing in Biology	Zehnder	MW	2:30-3:45
BIOL	312	LEC 3	Writing in Biology	Okusu	TU	8:30-11:15
BIOL	312	LEC 4	Writing in Biology	Houlihan	W	8:00-11:00
BIOL	312	LEC 5	Writing in Biology	Spracklen	TUTH	11:30-12:45
BIOL	312	LEC 6	Writing in Biology	Spracklen	TUTH	1:00-2:15
BIOL	312	LEC 7	Writing in Biology	Spracklen	MW	2:30-3:45
BIOL	335	LEC 1	Topics in Plant Biology	Caicedo, Hazen, Facette,	MW	11:30-12:45
BIOL	372	LEC 1	Intro Neurobiology	Katz	MWF	12:20-
BIOL	372	LEC 2	Intro Neurobiology	Jensen	TUTH	8:30-9:45
BIOL	422	LEC 1	Field Ecology: An Experimental Approach	Adler	TUTH	1:00-2:15
BIOL	426	LEC 1	New England Flora	Seidler	MW	12:20
BIOL	477H	LAB 1	Bioimaging	Stephens	TUTH	1:00-4:00
BIOL	494LI	LEC 1	Life After Biology	Schwartz	W	4:00-4:50
BIOL	497D	LEC 1	Genomics and Data Science	Babbitt	TUTH	2:30-5:30
BIOL	550	LEC 1	Animal Behavior	Podos	TUTH	10:00-11:15
BIOL	550	LEC 2	Animal Behavior	Jakob	MW	2:30-3:45
BIOL	551	LEC 1	Animal Communication	Houlihan	TUTH	10:00-11:15
BIOL	559	LEC 2	Cell Biology II	Maresca	TUTH	11:30-12:45
BIOL	564	LEC 1	Human Physiology	Woerman	TUTH	2:30-3:45
BIOL	580	LEC 1	Developmental Biology	Bartlett	TUTH	2:30-3:45
BIOL	582	LEC 1	DNA to Diversity	Albertson	TUTH	2:30-3:45
BIOL	583	LEC 1	Advanced Genetics	Laney	TUTH	10:00-11:15
BIOL	597GE	LEC 1	Evolutionary Genetics and Bioinformatics	Blanchard	W	9:05-12:05
BIOL	597MB	LEC 1	Human Microbiome in Health and Disease	Riley	TUTH	1:00-2:15
BIOL	597NB	LEC 1	Developmental Neurobiology	Pallas	TUTH	1:00-2:15

NOTE: PLEASE CHECK SPIRE BEFORE GOING TO THE 1ST CLASS FOR UP-TO-DATE INFORMATION.

Biology Course Descriptions

Fall 2021

109—Evolution Explained

(BS) Porter, Morrill1 N440

This course examines evolutionary biology with an emphasis on the scientific basis of evolution, and attention to the implications of evolutionary thought in contemporary society. Not intended for life-science majors. Not for Biology major credit.

Prerequisites: None

151—Introductory Biology (4 cr.)

(BS) Huyler, ISB 427T; Moscarella Morrill2 350; Phillis, Morrill3 404; or Rounds Morrill2 354; Zehnder, Morrill 2 348C

First semester of a full year course for majors in the life sciences. Introduction to the biochemical basis of living systems, cell biology, mitosis and meiosis, principles of genetics, developmental biology. Includes lecture and discussion sections. Required for biology majors. (Gen. Ed. BS)

152—Introductory Biology (3 cr.)

(BS) Okusu, Morrill2 140

Lecture. Second semester of a full semester course for science majors. Lecture: Topics in organismal and evolutionary biology: evolution, survey organisms representing the diversity of life; plant and animal structure and physiology, ecology.

153—Introductory Biology Lab (2 cr.)

Rocheleau, Morrill2 356B

This course is a 2-credit laboratory experience that allows students to apply the biological concepts covered in Biology 151 and 152 Introductory Biology in laboratory and field settings. Students will develop and practice scientific research skills while exploring the areas of genetics, cell and molecular biology, evolution, and ecology. To enroll, students must be co enrolled in Biology 152 (Introductory Biology II) or have completed the 2 semester Introductory Biology Sequence (Biol 151 and 152).

161H—Quantitative Biology of the Cell (4 cr.)

Francis, Morrill2 360, Rounds, Morrill2 350

An introduction to the workings of the cell, focusing on themes of cellular structure, dynamics and energetics. This course is intended for students interested in a broad interdisciplinary approach to the biological sciences: frequent connections to chemistry, physics and mathematics will be made as the cell, its inner workings and malfunctions, are explored.

Prerequisite: Open to students in BIOTAP only

280—Evolution: Diversity of Life Through Time (3 cr.)

Byers, Morrill3 216A, Porter, Morrill1 N440

We will investigate the process of biological evolution and the evolutionary history of life on Earth. Topics to be covered include natural selection, speciation (the formation of new species), and other causes of evolutionary change; the methods that evolutionary biologists use to investigate evolutionary processes and history; and an overview of life's history, focusing on major evolutionary innovations and transitions.

Prerequisites: Biology 190H/197FH or Biology 151, 152 & 153 with a grade of 'C' or better.

284- Genetics Lab

Loomis, ISB 241D, Laney, Morrill2 432

Various classical and molecular genetic techniques using prokaryotic and eukaryotic systems. Laboratory projects include genetic mapping via recombination and P element-mediated mutagenesis in *Drosophila*, plasmid-mediated transformation of bacteria, yeast 2-hybrid assays for protein/protein interactions, and detection of human DNA polymorphisms. Also, bioinformatics tools to perform DNA and protein sequence similarity searches and characterize the organization of specific genes. **Prerequisites:** Biology 161H/162H or Biology 151, 152 & 153 with a grade of 'C' or better; and BIOL 283 with a grade of 'C' or better

285—Cell & Molecular Biology (3 cr.)

Francis, Morrill2 348A

Course designed for sophomores in Biology, Biochemistry, or Microbiology. Building upon concepts learned in Biology 151/152, consideration is given to structure and function. The course is equally divided between aspects of molecular and cellular biology.

Prerequisites: Biology 161H/162H or Biology 151, 152 & 153 with a grade of 'C' or better

287—Introductory Ecology (3 cr.)

Healey, Morrill2 354

The scope of ecology; how organisms cope with environmental challenges; population dynamics; species interactions of competition, predation, and mutualism; community ecology; biodiversity; biogeochemical cycles; selected topics in evolutionary and behavioral ecology. Basic concepts related to practical applications in harvesting, biological control, conservation, pollution, and global change.

Prerequisites: Biology 161H/162H or Biology 151, 152 & 153 with a grade of 'C' or better

288—Introductory Physiology (3 cr.)

TBA

The physiology of humans and other vertebrates on a system-by-system basis (e.g., circulatory, respiratory, digestive, etc.). Emphasis on understanding fundamental physiological concepts. Concentrates primarily on human physiology, but examples from other vertebrate animals used to illustrate some physiological phenomena.

Prerequisites: Biology 161H/162H or Biology 151, 152 & 153 with a grade of 'C' or better

297Q—Phage Bioinformatics (3 cr.)

Rocheleau, Morrill2 356B; Chien, LSL Rm N325

This research-focused course uses bacteriophage genomics to introduce biology as an experimental science. Students learn computational biological techniques through annotation and characterization of novel viral genomes. Students will be introduced to concepts in bioinformatics, microbiology, evolution, and molecular biology through hands-on experiments driven by results obtained during class.

311—General Genetics (3 cr.)

Loomis, ISB 241D, Moscarella Morrill2 350

This course discusses the principles of genetics with application to the study of biological function at the level of molecules, cells, and multicellular organisms, including humans. The topics include: structure and function of genes, chromosomes and genomes, biological variation resulting from recombination, mutation, and selection, use of genetic methods to analyze protein function, gene regulation and inherited disease.

Prerequisites: C or better in BIOL 151 or 161H AND a C or better in BIOL 152 or 162H

Biology 312—Writing in Biology (3 cr.)

Satisfies Junior Year Writing requirement for Biology majors

Section 1 Brewer, Morrill 3 3113

See SPIRE for description

Section 2 Zehnder, Morrill2 348C

See SPIRE for description

Section 3 Okusu, Morrill 2 140

See SPIRE for description

Section 4 Houlihan, Morrill2 352

Students write and revise short papers on subjects likely to be encountered by biologists. Class discussion of papers.

Section 5,6,7 Spracklen, Morrill 2 348B

See SPIRE for description

Prerequisites: 3 biological science courses, for declared Biology Majors ONLY

335—Topics in Plant Biology (3 cr.)

Caicedo, LSL N425; Facette, Morrill4S 375D; Hazen, LSL,N427

We have two goals in this course. The first, and most important, is to introduce Undergraduate Biology students to some of the many fascinating aspects of Plant Biology, especially as these differ from animal biology. For instance, did you know that plants are moving (on a large scale) all the time? It's the truth, but in a very different time scale than we animals use. How do plants do that without the benefit of muscles and a skeleton? Have you ever thought about how, in the absence of a pumping heart, plants' circulatory systems work? After all, the water at the top of a tree got there from roots in the ground, but no pump was involved. Plants don't have an immune system, and yet, they 'stand and fight' - literally rooted to the spot - taking on all types of pathogens, as well as insects and other predators. What strategies do plants use to overcome these attacks? Have you ever wondered about how biotechnology is used in agriculture? We have all heard news stories about GMO's (genetically modified organisms). What are these and what makes them useful or dangerous? These are the types of topics we will be covering in this course. The second goal for this course is to provide a convenient way for UMass Biology majors to accomplish their plant biology course requirement.

372—Intro Neurobiology (3 cr)

Jensen, Morrill3 414A; Katz, Morrill3 106C

This course functions as an introductory survey to neurobiology with a focus on cellular neuroscience. It provides a knowledge base for future advanced neuroscience courses and a stand-alone course for Biology majors. Topics within neuronal anatomy and

physiology will be covered, including membrane potentials and neural transmission, sensory and motor systems, neuromodulatory and homeostatic systems. **This course is not-for-credit for those who have previously taken Psych 330 or Biol 572.**

422—Field Ecology: An Experimental Approach (4 cr.)

Adler, Fernald 102D

This course provides an introduction to methods in field ecology, with an emphasis on rigorous experimental design, hypothesis testing, data collection, introductory data analysis, and presenting results. The ability to pose clear questions, state hypotheses, and design appropriate experiments to test these hypotheses is of fundamental importance in all research disciplines; this course takes advantages of challenges in field ecology to address these essential topics. We will use formal lectures, interactive discussions, and hands-on learning in the field and computer lab, including field data collected during the laboratory time, as examples to learn the fundamental concepts that are essential for designing effective experiments. This course will provide students with the skills to design and conduct experiments to address basic and applied ecological questions.

426—New England Flora (3 cr.)

Seidler, Morrill1N 239B

Learn the vascular plants of the region in their natural habitats through field trips and in the laboratory with the use of botanical keys and manuals. Field experience will include some collecting and pressing of specimens. The class also visits the herbarium and greenhouses. Recognition of certain plant families and familiarity with terminology will be gained. **Prerequisite:** Introductory biology or consent of instructor

477H—BioImaging (4 cr.)

Wadsworth, Morrill4S 458

Bioimaging is a project based laboratory course that focuses on the use of microscopy in the life sciences, ranging from the principles of optics to the use of specialized microscopic techniques to investigate the structure and behavior of various types of cells. Using research-quality fluorescence microscopes purchased on the HHMI grant, students learn to use both phase and fluorescence microscopy, and to take digital stills and movies with both. They observe the movements of living cells in response to various substrates or drugs, and they learn to fix and stain cells to see greater internal detail, using quantification techniques to measure the size or concentration of various cellular components. Then they apply these techniques to the independent investigation of a particular problem regarding cell division, locomotion, or growth.

Prerequisites: Department Consent Required

494LI—Life After Biology (1 cr.)

Schwartz Morrill3 417

This 1-credit course fulfills one component of the General Education Integrative Experience requirement for Biology majors. The course is designed to help students appreciate what their academic training has been, and where it is leading them professionally. Students will learn about career options for life scientists and develop strategies and skills to position themselves to be successful. In order to satisfy the Integrative Experience requirement, BA-Biol and BS-Biol majors must also take one of the approved 3- or 4-credit Biology courses listed on their Academic Requirements Report.

497D—Genomics and Data Science (3 cr.)

This course provides an introduction to genomics, bioinformatics and data sciences skills. Computer-based lab sessions will provide hands-on training in data science skills (Unix command line, Python, R, reproducible research, and cluster computing) and we will use them to learn bioinformatic methods related to gene expression, detecting variation, genome visualization, and critical statistical methods to understand large-scale datasets.

497E—Physiology of Extreme Environments (2 cr.)

Gerson, Morrill3 318A

In this course we will explore the physiological adaptations that allow animals to live in extreme environments, such as long duration migration, high or low temperature, low oxygen, or extreme pressures of the deep oceans. Topics will be student directed, and material will be presented in traditional lectures, through group discussions of primary literature, and through student developed presentations.

550—Animal Behavior (4 cr.)

Jakob, Morrill3 401; Podos, Morrill 2 332A

Our first goal in this course will be to examine the mechanisms that underlie the expression of behavior. For example, how do predators locate prey, how do animals avoid becoming prey, and how do animals navigate through their world? To help answer these questions we will apply neurobiological, hormonal, genetic, and developmental perspectives. Our next goal in the course will be to examine the evolutionary bases of behavior, asking for example why animals move, forage, hide, communicate, and socialize as they do. To address these questions, we make use of optimality theory and other behavioral ecological perspectives. Other topics in the course will include sexual selection, human behavior, and the role of behavior in establishing biodiversity. When taken with Biology 494LI, this course

satisfies the Integrative Experience requirement for BA-Biol and BS-Biol students. **Prerequisite:** an introductory biology or psychology course

551—Animal Communication (3 cr.)

Houlihan, Morrill2 352

This course will explore animal communication from several biological perspectives. We will explore how animals use different modalities of communication (sound, smell, electricity, etc.) and how these modes of sending and receiving information are limited by environmental constraints and their functions. We will look at the physiological and anatomical aspects of signal production and perception. The class will discuss the different types of messages encoded in signals and how they evolved. We will explore the evolution of sexually selected forms of communication (antlers, bird song, etc.) and the theories that attempt to explain their function and evolution. The lectures/discussions will draw on examples from a diverse selection of animals (insects, fish, birds, and mammals). Students will also work on projects where they will learn how to analyze and interpret different forms of vocal and visual communication.

559—Cell Biology II (3 cr.)

Maresca, Morrill4S 436B

Discussion of cell structure and function; emphasis will be placed on the properties of individual molecules that contribute to cell function. Topics will include the mechanism and regulation of cell division; interactions of cells with each other and with the extracellular environment; cell motility; and the organization of membrane systems. Techniques used to study cells will also be discussed. Format will include both lectures and class presentations; quizzes, mid-term exams and written assignments will be included.

Prerequisite: Biology 285 (C or better)

564—Human Physiology (3 cr.)

Woerman, LSL N263

Mechanisms underlying organ system function in vertebrates; nervous, endocrine, cardiovascular, respiratory, muscular, digestive, excretory, reproductive systems.

Prerequisites: BIOL 285 OR BIOCHEM 275/285 (C or better)

580—Developmental Biology (3 cr.)

Bartlett, Morrill4S 374B

Biology of nerve cells and cellular interactions in nervous systems. Lectures integrate structural, functional, developmental, and molecular approaches. Topics include neuronal anatomy and physiology, membrane potentials, synapses, development of neuronal connections, visual system, control of movement, and neural plasticity. Text and reserve readings, 2 hour-exams, final, short critique paper. **Prerequisites:** Biology 285 or 523; or both Psychology 330 and Biology 151

582—DNA to Diversity (3 cr.)

Albertson, Morrill2 336

How do complex morphologies develop from a single-cell embryo? What makes the human hand different from the horse's hoof, the bat's wing, or the flipper of a whale? These and related questions will be addressed as we explore the genetic and developmental basis of evolutionary change.

Prerequisite: BIOL 280 (C or better)

583—Advanced Genetics (3 cr.)

Laney, Morrill 2 432

This course covers current topics and advanced concepts and techniques in genetics and their use in answering fundamental questions in biology. Theoretical background and experimental approaches will be emphasized. Topics will include, but are not limited to, gene and genome structure and function, tools and approaches of genetic analysis, recombination and mapping, and developmental and quantitative genetics.

Prerequisites: BIOL 283 (C or better)

597GE—Evolutionary Genetics (3 cr.)

Blanchard, Morrill3 409A

The course deals with evolutionary processes on a molecular and genetic level and provides training in analytical methods related to detecting genetic variation, phylogenetics, recombination, horizontal gene transfer, comparative genomics, and the analysis of microbiomes. The course contains three intellectual parts: genetic variation (mutation process, evolutionary rates, the molecular clock, and selection and neutral evolution at the molecular level), genome evolution (genome size, the evolution of chromosomes, the evolution of introns, gene/genome duplication, genome reduction, transposons, retroelements, gene conversion, and horizontal gene transfer) and evolution of genetic systems (the evolution of sex and sexual reproduction, recombination rates, sex ratios, genomic conflict, viral RNA genomes and bacterial transduction, transformation and conjugation).

Prerequisites: BIOL 280 (C or better)

597MB—Human Microbiome in Health and Disease (3 cr.)

Riley, Morrill3 304A

This course will introduce the human microbiome and show how an understanding of the dynamics and function of the indigenous microbiota has altered our view of microbes in maintaining homeostasis and causing disease. It will discuss how disruption of the beneficial functions of the microbiota can lead to disease. Methods for studying the microbiota will be introduced as part of a conceptual framework for using these methods to delineate novel roles for microbes in health. Key associations between specific changes in the microbiome and disease will be discussed. This will lead to an explanation of how the intentional manipulation of the microbiota, either by restoring missing functions or eliminating harmful functions, may lead to novel methods to prevent or treat a variety of diseases. With the explosion of studies relating the microbiome to health and disease, this course aims to provide a foundation for students to follow this developing area of biomedical research.

Riley, Morrill3 304A

597NB—Developmental Neurobiology (3 cr.)

Pallas, Morrill2 418B

This course is designed for upper-level undergraduate, honors, and graduate students interested in development of the nervous system. It will provide the fundamentals of the discipline as well as investigate the guiding principles and research methods of Developmental Neurobiologists through lectures and discussions. It covers the field of developmental neurobiology from neural induction to the modification of neuronal connections in the adult nervous system. Research using a variety of invertebrate and vertebrate model organisms will be used to demonstrate the rules by which nervous systems develop. The course takes an experimental, inquiry-based approach to the field, using primarily a molecular, cellular, and systems approach. This course is complementary to Developmental Biology, but overlaps little due to the exclusive concentration of this course on the nervous system.

Biology Faculty and Their Research Interests

<http://www.bio.umass.edu/biology>

Click on Faculty

Lynn Adler, Professor
Ecology and Evolution of Insect-Plant Interactions
lsadler@bio.umass.edu Fernald 102D

R. Craig Albertson, Associate Professor
Evolutionary Developmental Biology
albertson@bio.umass.edu Mor2 336

Peter Alpert, Professor
Plant Ecology and Conservation Science
palpert@bio.umass.edu Clark 100A

Courtney Babbitt, Assistant Professor
Evolutionary Genomics
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Madelaine Bartlett, Assistant Professor
Plant Evo-Devo
mbartlett@bio.umass.edu Mor4S 374B

Tobias I. Baskin, Professor
Regulation of Plant Morphogenesis During
Growth & Development
baskin@bio.umass.edu Mor4S 375F

Jeffrey Blanchard, Associate Professor
Anaerobic Microbiology, Microbial Ecology
and Evolution, Genomics, Bioinformatics
jeffb@bio.umass.edu LSL N571

Steve D. Brewer, Assistant Professor
Science Education/Instructional Technology
sbrewer@bio.umass.edu Mor3 311A

Bruce E. Byers, Associate Professor
Songbird Vocalizations
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Ana Caicedo, Associate Professor
Plant Molecular Evolution and Evolutionary Genomics
caicedo@bio.umass.edu LSL N425

Gerald Downes, Associate Professor
Motor Behavior and Epilepsy
gbdownes@bio.umass.edu Mor1 N210

Michelle Facette, Assistant Professor
Plant Biology
mfacette@umass.edu Mor 4S 375D

Karine Fenelon, Assistant Professor
Synaptic Transmission and Neural Circuits
Underlying Sensory Information Filtering
kfenelon@umass.edu LSL N233

Laura Francis, Senior Lecturer
Molecular Mechanisms
lif@bio.umass.edu Mor2 348A

Lillian Fritz-Laylin, Assistant Professor
Quantitative Evolutionary Cell Biology
lfritzlaylin@umass.edu Mor2 330

Alexander Gerson, Assistant Professor
Integrative Eco-physiology – Environmental Physiology of Birds
argerson@bio.umass.edu Mor3 318A

Priyanjali Ghosh, Visiting Assistant Professor
Developmental Neurobiology
ghosh@umass.edu French Hall 200

Samuel P. Hazen, Associate Professor
Regulatory Networks & Natural Variation in Plant Cell Wall
hazen@bio.umass.edu LSL N427

Christiane Healey, Lecturer
Ecology, evolution and animal behavior
cihealey@bio.umass.edu Mor2 356A

Peter Houlihan, Senior Lecturer II
Animal Behavior, Vertebrate Ecology and Conservation Biology
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