EEMB 1101. Foundations in Ecology and Evolutionary Biology. 4 Hours.
Introduces students to the foundational principles of ecology and evolutionary biology. Merges traditional lectures on foundational topics in ecology and evolutionary biology (adaptation, mechanisms of evolution, community and ecosystems ecology) with explorations of local field sites and an introduction to field ecology. Students spend several weeks of the semester designing and implementing independent field research projects, through which they are exposed to the foundation of scientific inquiry, including hypothesis testing, collecting, managing, and analyzing data, and presenting their findings.

EEMB 1102. Lab for EEMB 1101. 1 Hour.
Accompanies EEMB 1101. Covers topics from the course through various experiments.

EEMB 1105. Foundations in Ecological and Evolutionary Genomics. 4 Hours.
Introduces students to the foundational principles of molecular ecology with an emphasis on applications of high-throughput sequencing techniques to answer questions in ecology and evolutionary biology. Covers foundational topics in ecological and evolutionary genomics (central dogma, structure of nucleic acids, genetic variation, tools in molecular ecology, understanding genomes, and genomics). Practical skills development includes clean technique and proper bench skills; basic command line programming; understanding, quantifying, and analyzing sequence variation; and visualizing genomic data for formal scientific presentations.

EEMB 1106. Lab for EEMB 1105. 1 Hour.
Accompanies EEMB 1105. Covers topics from the course through various experiments. Focuses on providing firsthand experience using tools from molecular ecology to test ecological and/or evolutionary hypotheses.

EEMB 1145. Beginning Scuba. 1 Hour.
Focuses on basic skin diving and scuba diving skills, with emphasis on safety. Requires lab fee. Requires ability to pass a swim test and basic comfort in the water.

EEMB 1450. Introduction to Marine Biology. 4 Hours.
Surveys the tremendous diversity of marine organisms in the context of the major marine ecosystems in which they are found. Explores interactions among organisms and how the physical and chemical environment influence marine organisms. Links changes on land to declines in organism numbers and diversity and explores the benefits humans gain from our relationship with the marine environment. Offers opportunities to investigate recent advances and understanding of marine organisms and their environments.

EEMB 1990. Elective. 1-4 Hours.
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

EEMB 2290. Ecology and Evolution of Behavior. 4 Hours.
Studies fundamental biological principles at behavioral, ecological, and evolutionary levels. Covers ethology, ecology, genetics, and comparative psychology, all within the conceptual framework of evolutionary theory. Explores both scientific practice and progress through readings, discussion, and projects. Illustrates the process by which biologists study questions about the evolutionary origin of behavior through a series of in-class activities, computer modeling assignments, interpretation of graphical data, collection and statistical analyses of behavioral data, as well as the generation and presentation of research. Does not focus on the neurological basis of behavior. Offers students an opportunity to become critical thinkers, critical readers, and to attain tools to interpret the world in a unique way. Requires permission of advisor.

EEMB 2302. Ecology. 4 Hours.
Offers students an opportunity to learn about the environmental and biological processes that control the distribution and abundance of species and controlling factors that operate on individuals, populations, and communities. The lecture and laboratory introduce a set of generalizable concepts that are of fundamental importance to plant and animal life on the land and in the sea and provide hands-on experiential learning that reinforce concepts covered in lecture. Offers students an opportunity to become proficient in the following: (a) understanding research results the primary literature; (b) conducting a research experiment; (c) interpreting the results of in-class research; (d) communicating results as manuscript.

EEMB 2303. Lab for EEMB 2302. 1 Hour.
Accompanies EEMB 2302. Covers topics from the course through various experiments.

EEMB 2400. Introduction to Evolution. 4 Hours.
Introduces evolutionary thinking, including contemporary examples of evolution. To understand the evolution of Charles Darwin's "endless forms most beautiful," the course adopts an integrative approach that includes information from ecology, genetics, molecular biology, biogeography, and paleobiology. Considers mechanisms of evolutionary change—how does it happen? Examines adaptation, the process by which attributes of an organism change to enhance fitness and the evolutionary history of life on our planet—what was the first living thing, how does speciation occur, what have we learned about evolution of life in the distant past, and how did humans evolve. Includes student presentations and analysis of scientific literature.

EEMB 2420. Fisheries Biology, Policy, and Conservation. 4 Hours.
Focuses on the study and management of economically valuable fish species. Studies the basic biology and ecology of fisheries species, quantifying and modeling their population biology to their interactions with each other and the environment. Requires students to read and analyze the scientific literature, to complete worksheets and writing assignments, and to develop and present research projects. Covers traditional stock assessment methods as well as how fisheries science and management has evolved more recently to integrate community- and ecosystem-level information. Reviews fisheries and how fishers are managed, their involvement in the management process, and the future fisheries in the United States and elsewhere.
EEMB 2616. Invertebrate Zoology. 4 Hours.
Surveys the tremendous diversity of invertebrates, emphasizing their form and function in ecological and evolutionary contexts. Explores functional morphology, systematics, phylogenetic relationships, ecology, and economic importance of the major invertebrate phyla. Discusses comparisons among phyla to enhance understanding of evolutionary relationships.

EEMB 2617. Lab for EEMB 2616. 1 Hour.
Accompanies EEMB 2616. Covers topics from the course through various experiments.

EEMB 2618. Vertebrate Zoology. 4 Hours.
Explores functional morphology, systematics, ecology, and phylogenetic relationships of the major vertebrate phyla.

EEMB 2619. Lab for EEMB 2618. 1 Hour.
Accompanies EEMB 2618. Covers topics from the course through various experiments.

EEMB 2700. Marine Biology. 4 Hours.
Examines biological aspects of natural ocean ecosystems and the physical processes that regulate them. Covers distributions, abundances, and interactions of marine organisms; interactions between organisms and the transformation and flux of energy and matter in marine ecosystems; and aspects of physiology related to marine species distributions, abundances, and roles. Students generate, evaluate, discuss, and present data from primary research and apply their knowledge of the scientific method and biological concepts through the creation of a written grant proposal.

EEMB 2701. Lab for EEMB 2700. 1 Hour.
Accompanies EEMB 2700. Covers topics from the lecture course through discussions and experiments.

EEMB 2990. Elective. 1-4 Hours.
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

EEMB 3120. Physical Biology of Marine Organisms. 4 Hours.
Introduces principles from the physical sciences (fluid and solid mechanics, mass and heat transfer theory) applied to the analysis of form, function, ecology, and evolution of marine organisms. Topics covered include suspension and deposit feeding in invertebrates, allometry of metabolic processes, drag and lift in sessile organisms, locomotion of nekton (fishes, marine mammals) and plankton, diffusive limitations to metabolic transactions in marine invertebrates and algae, thermal transactions in intertidal organisms, the biology of the benthic boundary layer, and the properties of biomaterials and biological structures. Presents engineering methods and measurement techniques applicable to biomechanical investigations.

EEMB 3450. Physiological Adaptations to the Environment. 4 Hours.
Explores the evolutionary mechanisms by which organisms adapt physiologically to survive, and thrive, in diverse, often seemingly “hostile,” habitats. Examines paleo- and modern examples of adaptation with the goal of predicting species success or failure as our planetary environment changes rapidly. Topics include adaptation of cellular metabolism, adaptations to variable oxygen availability and to changes in pH, the roles of water and microsolute in regulation of the internal environment of cells, and the effects of temperature on cellular function and the biogeographic distribution of organisms. Includes student presentations and analysis of scientific literature. Requires junior or senior standing; sophomores admitted by permission of instructor; EEMB 2400 or ENVR 2400 recommended but not required.

EEMB 3455. Ecosystems Ecology. 4 Hours.
Focuses on the foundational principles of ecosystems ecology. Examines the flow of energy and materials through both the biosphere (plants, animals, and microbes) and the geosphere (soils, atmospheres, and oceans) and the role that humans are playing in altering these key fluxes. Studies elemental cycles that are critically important for human and environmental sustainability—including carbon, nitrogen, and phosphorus—and examines similarities and differences in these cycles and flows while drawing on examples from both terrestrial and marine systems. Seeks to understand how changes in ecosystem structure ultimately affect ecosystem function and how this translates into the important services ecosystems provide.

EEMB 3460. Conservation Biology. 4 Hours.
Explores conservation biology, an interdisciplinary science that focuses on conservation of biological diversity at multiple levels. Emphasizes the causes and consequences of biodiversity loss and demonstrates how ecological and evolutionary principles are applied to conservation problems. Covers sustainability; climate change; introduced species; conservation of threatened and endangered species; and pollution, disease, and habitat restoration using examples from marine, aquatic, and terrestrial systems. Offers students an opportunity to read, discuss, evaluate, and present data from primary research through written assignments and oral debates and to apply this knowledge to conservation issues. Emphasizes critical thinking, problem solving, and recognizing multiple perspectives.

EEMB 3465. Ecological and Conservation Genomics. 4 Hours.
Offers an overview of ecological and conservation genetics, an interdisciplinary science that focuses on understanding the processes that determine genetic diversity at the individual to population level. Focuses on fundamental concepts in evolutionary ecology and population and quantitative genetics, then applies those concepts to solving real-world problems in conservation science. Covers harvested populations, inbreeding, climate change, introduced species, conservation of threatened and endangered species, adaptation, and habitat restoration. Exposes students to multiple sides of these issues and the science that underpins them. Offers students an opportunity to develop the R programming skills required to analyze the complex data sets that often emerge when addressing cutting-edge questions in genetics. Includes writing and coding exercises and mathematical derivations. Emphasizes critical thinking and problem solving.

EEMB 3466. Disease Ecology. 4 Hours.
Covers the fundamentals of disease ecology and evolution. Focuses on how disease can impact the physiology of organisms and how this can, in turn, alter communities and ecosystems. Topics include mathematical theory on host-pathogen interactions; empirical studies of human, wildlife, insect, and plant host populations; emerging infectious diseases; effects on host behavior; host-parasite coevolution; multithost and multipathogen systems; and anthropogenic effects on disease. Includes writing exercises, with a special emphasis on critical thinking and problem solving.

EEMB 3470. Coastal Ecology and Sustainability. 4 Hours.
Designed to provide an integrated exposure to issues surrounding the ecology and sustainability of coastal and estuarine systems, with a particular focus on urban harbors. Exposes students to both the diversity and complexity of coastal habitats that exist both locally (salt marshes and seagrass beds) and globally (mangroves) and the mechanisms of estuarine and coastal functioning (geomorphology, biogeochemistry, microbial ecology, food webs, fisheries). Considers the ecosystem services provided by coastal systems and how those services are altered through human pressures.
EEMB 3471. Lab for EEMB 3470. 1 Hour.
Accompanies EEMB 3470. Emphasizes hands-on experience in monitoring water quality in the greater metropolitan Boston area. Specifically focuses on "one outfall per student" where students select a different combined storm water drainage pipe that delivers water into Boston area rivers. Exposes students to a suite of different water quality measurements typically used in coastal monitoring, including measuring nutrients, studying indicators of fecal contamination, and quantifying bacterial loads. Operates in partnership with the Massachusetts Water Resources Authority, local municipalities, and watershed associations so that the data students generate can be used to enhance ongoing monitoring efforts.

EEMB 3475. Wildlife Ecology. 4 Hours.
Focuses on wildlife ecology and management, with an emphasis on terrestrial species. Introduces habitat use, behavior, wildlife conservation, parasites and pathogens, wildlife sampling, wildlife management, food and nutrition, population viability, and conservation genetics. Offers students an opportunity to engage in analyzing primary literature, collection, interpretation, and wildlife data and using basic mathematical models.

EEMB 3555. Networks and Natural Systems. 4 Hours.
Covers the properties of diverse biological networks and explores foundational computational methods for analyzing, visualizing, and performing statistical investigations of networked data. From social networks and cities to ecosystems and evolution, methods from network science provide powerful tools for understanding and investigating the natural and modern world. Moving beyond description, a key objective of the course is to synthesize the diversity of biological networks and investigate how scientists have uncovered remarkable regularities in networked systems by applying approaches from scaling theory to biological networks. Based on a series of case-studies, focuses on how to elucidate the structure and function of biological networks using empirical data. Requires scientific programming.

EEMB 3990. Elective. 1-4 Hours.
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

EEMB 4000. Applied Conservation Biology. 4 Hours.
Studies landscape-scale conservation in Transylvania and the Carpathian Mountains of Romania. Working intensively with Foundation Conservation Carpathia, explores efforts to build Europe's largest national park. Offers students an opportunity to learn from local conservation leaders, collect data, and develop plans to help launch the "Yellowstone of Europe." Focuses on large carnivore conservation (brown bears, lynx, and wolves); sustainable agriculture; resource management in a country formerly under communist rule; and balancing urban and rural conservation needs. Explores Romania's rich cultural heritage in Sighisoara, a UNESCO World Heritage Site, and Vacaresti Nature Park, a constructed urban wetland in the heart of Bucharest. Requires prior completion of one laboratory science course or permission of instructor.

EEMB 4001. Landscape and Restoration Ecology. 4 Hours.
Topics include ecosystem processes, spatial patterns, disturbance, species distributions, invasive species, and habitat loss. Offers students an opportunity to participate in activities in which they look at and interpret spatial data. Course format includes group work, analyzing the scientific literature, and in-class activities.

EEMB 4010. Biology of Mammals. 4 Hours.
Surveys the mammals of the world, including their evolution, morphology, physiology, behavior, and ecology. Students conduct a research project in which they investigate the morphology, evolution, ecology, and behavior of a species and present their findings to the class. Includes reading and analyzing the scientific literature and conducting in-class activities.

EEMB 4548. Sociobiology. 4 Hours.
Studies sociobiology, a field of biology that strives to understand the biological basis of social behavior in animals. Sociobiology is a multidisciplinary science, meshing together ethology (animal behavior), ecology, genetics, population biology, and comparative psychology, all within the conceptual framework of evolutionary theory. Why do animals live in societies? Why do animals cooperate and sometimes show extreme forms of altruism? What are the costs and benefits of group living? Reviews studies on nonhuman animals that demonstrate sociobiological principles by using a series of in-class activities, computer-modeling assignments, interpretation of graphical and tabulated data, collection and statistical analyses of behavioral data, as well as the generation and presentation of research.

EEMB 4990. Elective. 1-4 Hours.
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

EEMB 4992. Directed Study. 1-4 Hours.
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor. May be repeated without limit.

EEMB 5130. Ecological Dynamics. 4 Hours.
Offers a comprehensive overview of mathematical and computational concepts needed to construct (meta)population, (meta)community, and (meta)ecosystem models. Focuses on how to mathematically derive and model processes (growth, trophic and nontrophic species interactions, dispersal, and environmental variability) to understand patterns of population abundance and species diversity. Emphasizes the mathematical tools required to analyze the dynamical behavior of ecological models (stability, invasion, graphical, and numerical analyses) and validate model predictions using empirical data (via maximum likelihood and optimization methods). Sophomores admitted by permission of instructor.

EEMB 5131. Lab for EEMB 5130. 1 Hour.
Accompanies EEMB 5130. Offers supervised lab sessions designed to show how the topics covered in the lectures can be addressed in industry-standard programming environments.

EEMB 5303. Marine Biology Careers Seminar. 1 Hour.
Covers the information and tools needed to begin pursuing career opportunities in marine biology. Encourages students to explore a variety of career paths, construct résumés, contact potential employers for their internship and permanent positions. Presents invited speakers from state and federal agencies, and from private consulting firms, to talk about their work and career track.

EEMB 5504. Biology of Corals. 3 Hours.
Focuses on the biology of Scleractinian reef-building corals and associated anthozoans found in coral reef ecosystems. Topics include systematics, anatomy, physiology, and population biology of corals, with an emphasis on the latest techniques employed by coral molecular biologists and physiologists.

EEMB 5506. Biology and Ecology of Fishes. 3 Hours.
Presents an examination of the systematics, functional morphology, and behavioral, larval, and community ecology of reef fishes through lectures. Field and laboratory experiments focus on morphology, behavior, and community ecology of reef fishes.

EEMB 5508. Marine Birds and Mammals. 2 Hours.
Studies principles of classification, anatomy, physiology, behavior, and evolution of seabirds and marine mammals. Also addresses conservation and protection of animals and essential habitat. Includes field trips to observe local species.
EEMB 5509. Lab for EEMB 5508. 1 Hour.
Accompanies EEMB 5508. Covers topics from the course through various experiments.

EEMB 5512. Tropical Terrestrial Ecology. 1 Hour.
Studies the animals, plants, and ecosystems of the new world tropics, with the community structure and diversity of terrestrial Jamaican habitats as an example. Includes field trips to lowland forests, carbonate caves, and the Blue Mountain mist-montane forest. The issue of land use and development vs. conservation is a recurring theme.

EEMB 5516. Oceanography. 4 Hours.
Offers an integrated overview of physical, chemical, biological, and geological processes operating in the world ocean. Seemingly unrelated topics like plate tectonics, oscillating currents and waves in the atmosphere, the activities of microbes and phytoplankton, and land-use practices in the middle of the continent have global reach and interact with each other in surprising yet understandable ways. Examines how new technologies have allowed stunning insights into global weather and climate, the deep sea, biodiversity, and how the biogeochemistry of the oceans can be measured and understood. Presents data use and analysis and formal reasoning used in marine science. Views the ocean as a “system of systems” where integration of experience from disparate disciplines is key.

EEMB 5517. Lab for EEMB 5516. 1 Hour.
Accompanies EEMB 5516. Offers experiential field and laboratory exercises in oceanography. The New England rocky intertidal, subtidal, wetlands, barrier islands, and dunes provide opportunities for field exercises in marine geology, physical oceanography, and marine ecology. Investigates processes affecting changes in the global ocean, such as ocean acidification; temperature stress in organisms; hydrodynamic drag and lift; suspension feeding; and the ecophysiology of reef corals, boreal invertebrates, and macroalgae.

EEMB 5518. Ocean and Coastal Processes. 2 Hours.
Examines the coupling between physical and biological processes on coral reefs and adjacent habitats. Focuses on biophysical, oceanographic, and benthic-pelagic processes acting in coral reef and associated nearshore ecosystems. Specific topics include oceanographic forcing mechanisms, organismal biomechanics, hydrodynamics, and nutrient dynamics.

EEMB 5520. Coral Reef Ecology. 2 Hours.
Examines the ecology and paleoecology of coral reefs. This course highlights the ecological importance of coral reefs and associated nearshore communities, ecosystem function, changes in reef biotas through geologic time, and the causes and consequences of reef degradation worldwide.

EEMB 5522. Experimental Design Marine Ecology. 4 Hours.
Includes introduction to and application of observational methods in three local marine habitats, experimental design, statistical analysis, R statistical computing and graphics software, and principles of marine ecology. Combines lecture, hand-on research experience, and computer laboratory and includes reading and analyzing the scientific literature and developing research projects. At the end of the semester, students are expected to demonstrate an integrative mastery of course topics by writing a scientific manuscript about a class experiment. Seeks to prepare students for practicing ecology in new environments and to provide students with the foundational knowledge necessary for pursuing more complex concepts in experimental design, statistical analysis, and marine ecology.

EEMB 5523. Lab for EEMB 5522. 1 Hour.
Accompanies EEMB 5522. Covers topics from the course through various experiments.

EEMB 5528. Marine Conservation Biology. 3 Hours.
Examines several critical issues facing marine ecosystems, including invasive species, marine pollution and eutrophication, fisheries impacts, physical alteration of habitats, and global climate change. Offers students an opportunity to spend field time surveying intertidal and subtidal habitats within the San Juan Islands and Friday Harbor Marine Reserve and to conduct independent research projects.

EEMB 5532. Physiological and Molecular Marine Ecology. 3 Hours.
Explores the physiological responses of marine organisms to variations in environmental factors. Uses complementary techniques, including molecular and physiological approaches, to determine genetic relationships at the species and population level and elucidate the mechanistic basis of organismic responses to environmental conditions at the level of genes and gene products.

EEMB 5534. Marine Invertebrate Zoology and Botany. 4 Hours.
Surveys the major groups of marine invertebrates, algae, and plants, in addition to their ecological roles and relationships. Offers students an opportunity to learn to identify these groups and understand the mechanisms they use to survive and adapt to changing oceans. Topics include ecological and evolutionary importance, ecosystem engineering, adaptive physiology, and climate change effects. Emphasizes interrelationships among major taxa. Hands-on learning includes field identification; visits to intertidal and subtidal marine environments; and specimen dissection, preparation, and cataloging. Offers students an opportunity to improve skills in reading and discussing scientific literature, experimental design, and scientific communication. Restricted to Three Seas students only; not open to students who have taken EEMB 5500 or EEMB 5502.

EEMB 5535. Lab for EEMB 5534. 1 Hour.
Accompanies EEMB 5534. Covers topics from the course through various experiments.

EEMB 5536. Ocean and Coastal Sustainability. 3 Hours.
Explores the physiological responses of marine organisms to variations in environmental factors. Uses complementary techniques, including molecular and physiological approaches, to determine genetic relationships at the species and population level and elucidate the mechanistic basis of organismic responses to environmental conditions at the level of genes and gene products.

EEMB 5559. Diving Research Methods. 2 Hours.
Presents experimental design, sampling methodology, statistical analysis, techniques, and the use of underwater equipment to conduct subtidal research.

EEMB 6465. Ecological and Conservation Genomics. 4 Hours.
Provides an overview of ecological and evolutionary genomics. Covers foundational mathematical concepts in population in quantitative genetics, from individual loci up to whole genomes. Concepts covered include Hardy-Weinberg equilibrium, F statistics, signatures of natural selection in genomes and methods for detecting them, analysis of quantitative genetic evolution, hybridization, and gene expression. Also covers modern statistical methods used to analyze genomic data using the free and open source R programming environment. Builds knowledge through reading of the primary literature and advanced problem sets. The final project requires students to complete a novel data analysis of an open source genomics data set and write a research paper.
EEMB 6470. Coastal Ecology and Sustainability. 4 Hours.
Offers an integrated exposure to issues surrounding the ecology and sustainability of coastal marine systems, with a particular focus on urban harbors. Exposes students to both the diversity and complexity of coastal habitats that exist locally (salt marshes and sea grass beds) and globally (mangroves) and the mechanisms of estuarine and coastal ecosystem functioning (geomorphology, biogeochemistry, microbial ecology, food webs, fisheries). Throughout the course, students focus on translating the basic science of coastal ecology into relevant sustainability practices.

EEMB 6475. Advanced Wildlife Ecology. 4 Hours.
Focuses on wildlife ecology and management, with an emphasis on terrestrial species. Covers habitat use, behavior, wildlife conservation, parasites and pathogens, wildlife sampling, wildlife management, food and nutrition, population viability, and conservation genetics. Engages students in analyzing primary literature and wildlife data, collection, interpretation, and using basic mathematical models.

EEMB 7101. Seminar in Marine and Environmental Sciences. 2 Hours.
Offers students an opportunity to lead critical discussions of recent and classic papers from the literature in marine and environmental sciences. Discusses papers' strengths and weaknesses from the perspective of scientific communication, including the design and presentation of data in figures and tables, the role of synthesis in justifying new concepts, and how terminology and jargon evolve. Students also have an opportunity to write occasional reviews of these papers as if they had just been submitted to a journal for consideration. A goal is to develop peer-review skills so graduate students can see themselves as future potential reviewers for journals, conference proceedings, and grant proposals. Incorporates feedback and discussion of what constitutes a valuable peer review.

EEMB 7102. Seminar in Ecology and Evolutionary Biology. 2 Hours.
Offers an overview of major concepts in the fields of ecology and evolution and how these concepts can be synthesized under a common framework. The first half of the course is organized according to major areas of evolutionary biology, from quantitative genetics to population genetics and phylogenetics and their synthesis. Quantitative genetics, population genetics, and phylogenetics have been historically separate fields and have only recently been synthesized through genomics. Note that quantitative genetics is a field that studies the evolution of phenotypes and requires no genetic information. The second half of the course introduces major concepts in ecology and is designed to introduce students to the major historical underpinnings of community ecology so as to understand the utility (or lack thereof) of these concepts for modern ecology.

EEMB 7103. Seminar in Sustainability Sciences. 2 Hours.
Explores key papers that have shaped modern theory, methodologies, and practices of sustainability science. Sustainability science hinges on integrating social and ecological sciences to assess the sustainability of human-environment interactions. From the social science dimension, many past studies focused on understanding how values, beliefs, and social norms shape human behavior. From an ecological perspective, much work focused on the influence of various institutional arrangements on resource and environmental sustainability. Importantly, a coupled natural-human or social-ecological systems (SES) perspective focuses on the inherently dynamic nature of these systems and interactions.

EEMB 7104. Seminar in Geosciences. 2 Hours.
Explores graduate students pursuing a PhD in marine and environmental sciences to classical and recent high-impact papers in the fields of recent and deep earth history, landform evolution, microbes and their role in global biogeochemical cycling, nutrient stoichiometry, the global carbon cycle, geochemical proxies, evolution of ocean chemistry, oceanic acidification, the role of organisms in sediment and rock production, and geochemical paleoproxies. Examines applications of the above disciplines to mitigating the impacts of anthropogenic impacts on the Earth system. This is a guided readings course.

EEMB 7674. Marine Biology Research Project. 1 Hour.
Offers an opportunity to design and implement a scientifically rigorous independent research project that builds upon current knowledge from the primary literature, under the supervision of a faculty advisor from the program. Students conduct research at any of the program's locations and are then required to analyze data using rigorous statistical methods, write a journal-style research paper, and present their results in a research seminar.

EEMB 8101. Readings in Marine Sciences. 2 Hours.
Designed to prepare PhD students with a concentration in marine sciences for a career in their field by offering an opportunity to learn fundamental aspects of the discipline through readings. Each student works with their Northeastern committee members at their first committee meeting to identify one reading topic per committee member. Committee members provide guidance for the student's readings around their topic. Students meet with each committee member throughout the semester to discuss the readings, ask questions, and clarify any aspects of their topics.

EEMB 8102. Readings in Ecology and Evolutionary Biology. 2 Hours.
Designed to prepare PhD students with a concentration in ecology and evolutionary biology for a career in their field by offering an opportunity to learn fundamental aspects of the discipline through readings. Each student works with their Northeastern committee members at their first committee meeting to identify one reading topic per committee member. Committee members provide guidance for the student's readings around their topic. Students meet with each committee member throughout the semester to discuss the readings, ask questions, and clarify any aspects of their topics.

EEMB 8103. Readings in Sustainability Sciences. 2 Hours.
Designed to prepare PhD students with a concentration in sustainability for a career in their field by offering an opportunity to learn fundamental aspects of the discipline through readings. Each student works with their Northeastern committee members at their first committee meeting to identify one reading topic per committee member. Committee members provide guidance for the student's readings around their topic. Students meet with each committee member throughout the semester to discuss the readings, ask questions, and clarify any aspects of their topics.

EEMB 8104. Readings in Geosciences. 2 Hours.
Designed to prepare PhD students with a concentration in geosciences for a career in their field by offering an opportunity to learn fundamental aspects of the discipline through readings. Each student works with their Northeastern committee members at their first committee meeting to identify one reading topic per committee member. Committee members provide guidance for the student's readings around their topic. Students meet with each committee member throughout the semester to discuss the readings, ask questions, and clarify any aspects of their topics.

EEMB 8982. Readings. 1-4 Hours.
Assigns students independent readings on selected topics in ecology, evolution, and marine biology. May be repeated without limit.
EEMB 8984. Research. 1-4 Hours.
Offers students an opportunity to conduct research. May be repeated without limit.

EEMB 8986. Research. 0 Hours.
Offers students an opportunity to conduct full-time research under faculty supervision. May be repeated without limit.

EEMB 9000. PhD Candidacy Achieved. 0 Hours.
Indicates successful completion of the doctoral comprehensive exam.

EEMB 9990. Dissertation Term 1. 0 Hours.
Offers theoretical and experimental research for the PhD degree.

EEMB 9991. Dissertation Term 2. 0 Hours.
Offers dissertation supervision by members of the department.

EEMB 9996. Dissertation Continuation. 0 Hours.
Offers dissertation supervision by members of the department.